

Radio Guide

Radio's Technology Resource

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December 2003

Volume 11 Issue 12

Come Along On a Radio Guide Roadtrip



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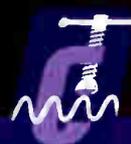
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Volume 11 Issue 12
December 2003

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Radio Guide

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Who Put the Splicing Tape On the Capstan of Life?

Well, folks, what can we say? It has been a busy year – sometimes almost a blur. The past twelve months of 2003 have seen quite a few changes in the face and direction of **Radio Guide**. And, yes, we have more changes and additions planned for 2004.

The response has been rewarding. From all corners of the industry, we have heard from many of you, and we are pleased that you find **Radio Guide** worth reading. Of course, that also pleases the fine folks who support us with their advertising, and we thank those of you who have taken the time to thank our advertisers.

As we move ahead, the one thing we want to be is responsive. Please let us know what you would like to see in **Radio Guide**. In fact, why not consider sharing your experiences with us by writing an article? Share a tech tip. Or, how about telling the story of why you love working in the broadcast industry?

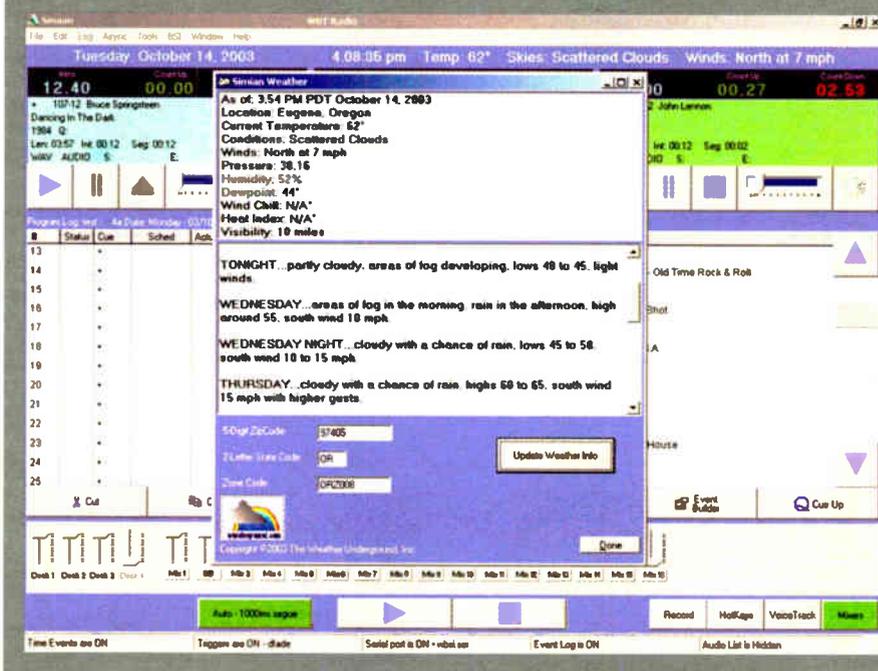
We hope to see you at the Spring NAB show in Las Vegas, and have a chance to chat about what you like and what improvements will make **Radio Guide** more useful to you. After all, that is the reason we are here. Let us make 2004 a great year to grow together!

Simian 1.6 is the result of input from numerous BSI users. Thanks to their input, Simian now includes an on-screen weather display that updates from the internet.

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Radio Guide Visits ERI

by Barry Mishkind

[CHANDLER, IN - December 2003] Normally, when you mention Tom Silliman and ERI, people immediately think of "that guy who hangs off the Empire State Building all the time." And it is true, Silliman has been the "go to" guy to solve antenna problems in the sky for over 30 years now. He could write a book about all the interesting transmission sites on which he has stood at the top.

Silliman and ERI, however, have their collective feet planted firmly on the ground. The company, its products and services are designed from the ground up to be of the highest quality, and any engineer taking over a station with an ERI antenna knows he usually has little to worry about. Even visitors to an ERI work site cannot help but be impressed with Silliman's concern and eagle eye for safety: The "Watch your head!" and other cautions heard repeatedly are just part of the reason ERI has never had a fatality on the job site.

BEGINNINGS

Founded as Electronics Research Inc. in 1943 to manufacture antennas and conduct avionics research for use in World War II airplanes like the P-41, ERI was purchased by Tom's father, Robert Silliman, in the late 1950s, and shifted the company's focus to civilian uses, such as manufacturing broadcast antennas. Over the years, many key developments in antenna design and construction have been pioneered by ERI, from internally fed circularly polarized FM antennas, to temperature compensated RF filters, to the new dual port antennas for IBOC. From small low power single station antennas, to their trademark Rototiller™ design, to complex combiners into wideband panel antennas, ERI has built and tested them.

However, a visit to the ERI facility in Chandler, Indiana quickly shows that ERI is far more than merely an FM antennas company. Housed in the 145,000 square foot facility, are over 200 employees, ranging from Registered Professional Engineers in electronics and structural analysis, to skilled machinists, to experienced riggers. Using state of the art machinery, every necessary component can be fabricated to order. There is even a "training tower" for new employees to learn proper climbing techniques. A few miles away, the 70 acre test range, provides a place where antennas can be field proven.

Presiding over all this activity is Tom Silliman. Whether in his office, designing complex antenna sites or checking in from a site somewhere high above a city, Silliman's touch and insistence on a quality operation is evident. A Cornell University trained RPE, with Bachelor's and Master's degrees in Electrical Engineering, and over 30 years of working with antennas from every conceivable angle, Silliman has developed some strong opinions on how to do things. A true team leader, he surrounds himself with exceptionally capable men and women, yet he maintains a very unassuming and personable character.

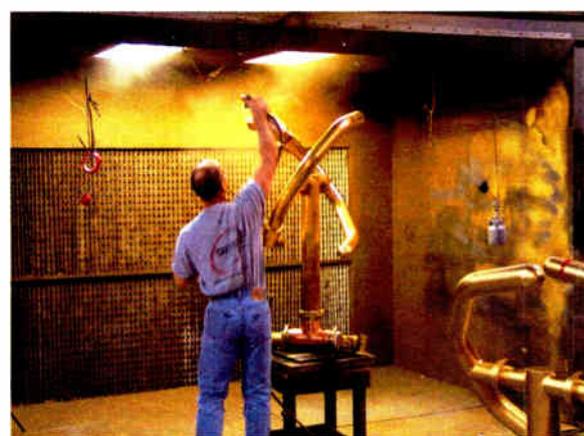
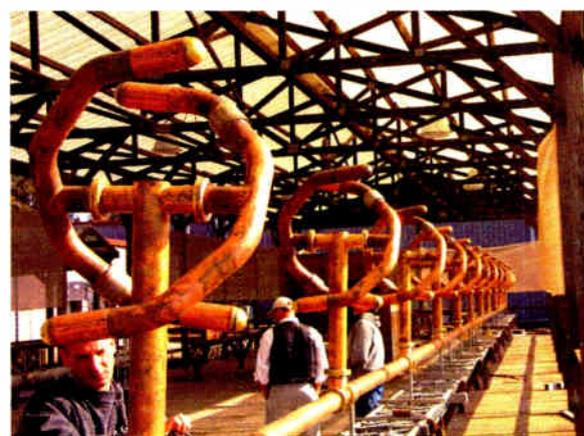
AT THE PLANT

ERI's manufacturing plant is virtually self-contained and capable of working with the raw metal coming in, turning it into a variety of finished products. Perhaps the most famous and recognizable of ERI products is the Rototiller FM bay. Silliman designed the Rototiller in 1975 and first displayed it at the NAB in 1976. The antenna received a lot of attention for its innovative approach in reducing the corona effects (arcing) that had often prevented high power RF antennas from full power operation during harsh weather conditions.

The Rototiller design has since become something of an industry standard, maximizing mechanical stability with consistent RF radiation characteristics under a variety of conditions. At the factory, we can see the elements of a typical ERI Rototiller FM bay take shape.



As the unfinished copper, brass and other raw metal go through one or more of the two dozen computerized machines that mill, bend, form, drill, weld and finish the metal, the various parts of an antenna take recognizable forms. As the antenna comes together, we can see the engineering that is involved. Among the design criteria that require attention for an effective and efficient FM antenna are circularity of pattern, anti-corona resistance, ice handling, mechanical ruggedness, and load impedance. Each part and bend of the element has a purpose.



After testing, the final paint and finishing touches are made.



The antenna is ready for packing & shipping.

The various parts of the antenna all come together, and are carefully inspected at each step of the way. Internal parts, including feed lines are plated, and then the entire antenna is assembled and tested for mechanical and electrical integrity.

(Continued on page 6.)

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ERI Road Trip

Continued from page 6.

In addition to the antenna bays themselves, ERI also manufactures all the brackets, transformers, and other parts necessary to mount the antenna. In the case of installations where combiners are used to run multiple stations into one antenna, ERI's temperature compensated combiners are popular with many engineers for their stability. At the plant, ERI assembles and pre-tunes the combiners prior to delivery, so very little adjustment is needed in the field.



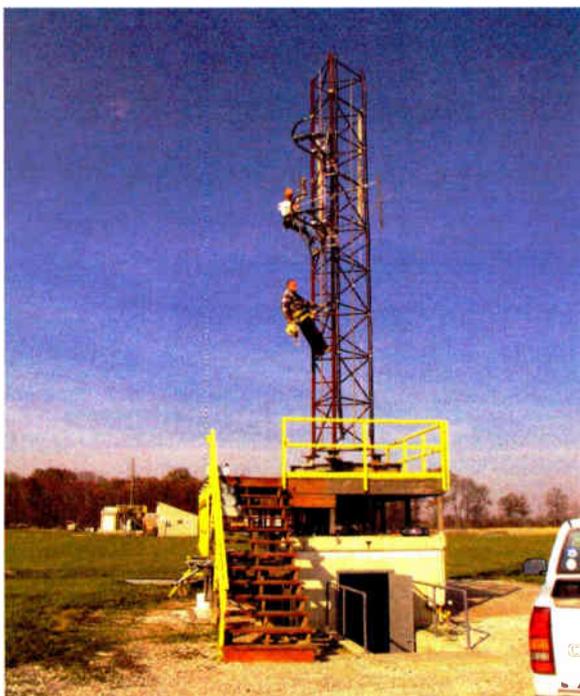
Part of a large combiner being tuned and tested.

Another outgrowth of the technical research that went into the combiner are the IBOC combiners and their new dual port antenna, which reduces the power wastage in the high level combining method by running two pieces of coax up to the antenna.

IN THE FIELD

Considering the variety of places antennas are mounted, from poles to sidemounting on towers of various face widths, it is easy to understand that the resulting pattern may be far from circular. One way to predict the coverage from a given antenna and tower combination, as well as to "optimize" the pattern for a given direction or market, is to mount the antenna on a tower section and measure the resulting pattern.

On the ERI test range are two large turntables, capable of hosting a wide variety of tower sections and antenna mountings.



Following the information from the station, ERI's engineers can quickly provide a very close approximation of how the antenna will perform in the real world.

Optionally, it is possible to use a variety of mounts and/or parasitic elements to ensure the RF will be maximized in the desired direction and any minima directed away from the general market.

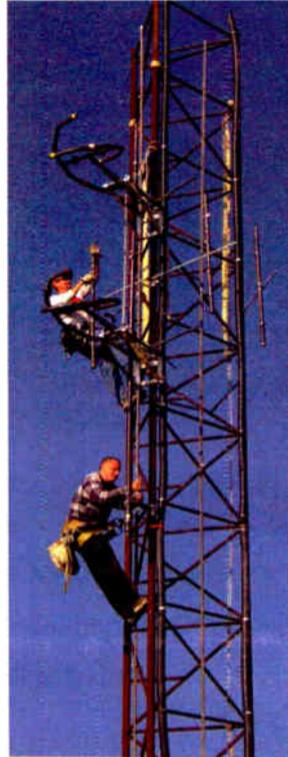


PROJECT OVERSIGHT

One of ERI's great strengths is the ability to take on an entire project, and coordinate everything from engineering, to fabrication, to construction. Their engineers include noted authorities on tower structural analysis and grounding techniques, resulting in various ERI products to enhance tower grounding and lightning protection. The engineering group investigates, considers and solves problems, sometimes before others realize they exist.

Beginning in 1990, ERI has been manufacturing towers in height ranging from short sections to over 1800 feet. Again, the facility can fabricate virtually any component to specification right on site.

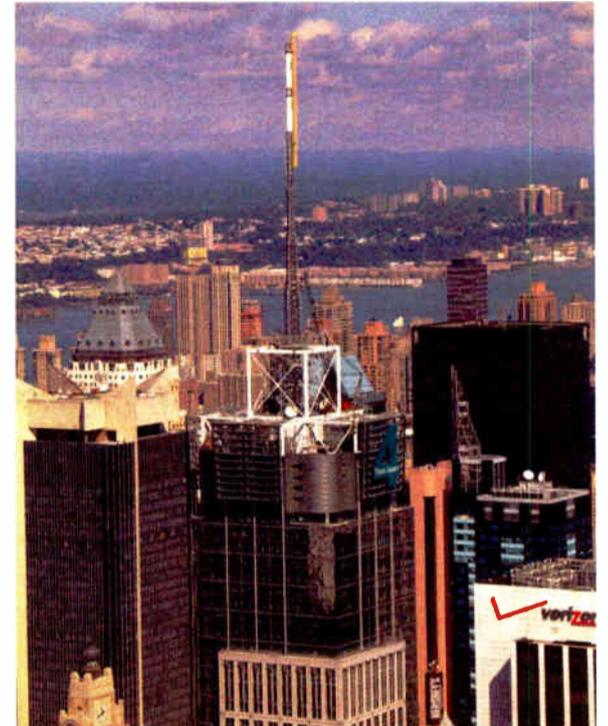
Over the years, as lead contractor on many projects, ERI and Silliman have made a name for themselves in managing and supervising projects. ERI crews are well known around the country for their attention to detail and quality installations. One of the more involved was the project begun in 1992 to redesign the entire transmission complex at the top of the Empire State Building. Over a period of 18 months, Silliman



End Milled towers provide a smooth outer surface for climbers.

replaced antennas, reworked the cables, transmission rooms, and worked on just about the entire system. Some of the pictures taken on top of the Empire State Building have been published in print and on the Internet, giving us groundhuggers a small taste of the thrilling sights from the top. Various TV programs have profiled Silliman and his enjoyment of working high up in the air, yet he shrugs it off as "another day at the office."

Recently, I was able to observe a small part of the installation ERI handled on the 4 Times Square building in New York City. On top of the 52 story building, a 380 foot Superior tower was installed, along with a combiner and antenna for many of the NYC FM stations and several TV stations.



The 4 Times Square tower consists of 19 sections ranging from a 12 foot face, four-sided self-supporting structure to a 4 foot diameter, 8-sided pole. Each section was hoisted from Manhattan's 42nd street to the rooftop building. In order to get everything into place, the job required the design and construction of a custom 12 ton gin pole in order to handle the 250 tons of metal tower parts and antennas which were topped off early in October.



MOVING AHEAD

ERI continues to develop more products and services to the broadcast community. In addition to the research activity and testing surrounding the introduction of digital transmission in the US, adding to the ERI legacy now is the Andrew Broadcast Line, purchased in November 2003. After a smooth transition ERI now is the source for TRASAR and ALP Series television antennas, the filter and combiner products produced at the facility located in Gray Maine, and for MACXLine and GUIDELine transmission line products.

Finally, before leaving ERI, we wanted to know what the most unusual key Tom Silliman had on his key ring. Turns out the key ring held some interesting surprises. There are, of course, keys in use at various job sites we cannot talk about. But one little key tells a lot about the man: It is the key to his dad's toolbox, carried as a reminder both of his father and the field they share. —Radio Guide—

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Audio Processing From the Ground Up

Part 12 – How to Get the Sound You Want

by Cornelius Gould

[CLEVELAND, Ohio - December 2003] Should you bother to invest your time in fussing over the sound of your radio station? Apparently, many feel it is a waste of time, maintaining it does not matter what you do with your audio processing. "No one will ever notice." So why be so obsessed about it?

The point of audio processing is not to create an "ooh, aaaah" effect for the listener. If you are adjusting your processing expecting that reaction from the "average Joe," be prepared to be very disappointed. Very few people will listen to a radio station solely because they think it technically "sounds the best" on the dial, or thought "it was really loud, so I stuck around to listen." People are looking to hear some programming they like.

I prefer to view audio processing as another marketing tool for your radio station. Sort of like a decoration on the package that is your radio format. Using your marketing tools effectively will go a long way toward putting your station in the position to be the station to listen to!

DOES ANYONE REALLY CARE?

As an example, if Proctor & Gamble felt no one really cared what the packaging on their top selling toothpaste product looked like, and took the attitude of "no one cares – they just want tooth paste," they would not be one of the top brands they are today. Everything – right down to the size and color of the lettering on the package – is thought out carefully to work in concert with outside advertising to make it one of the products most people will reach for, and use. This type of attention to detail works well in spite of the fact that there is a long shelf full of other (and possibly cheaper) alternatives that do the exact same thing.

I know there are many people reading this who can site example after example of how "all their friends" would never shop that way; "they all" shop for the best value, damn the marketing hype. Yes, there may be a lot of people who would shop that way – but not as many as those who shop due to effective marketing! P&G is a huge company as a result! Proof positive that effective marketing works!



Effective marketing means having the right tools (company assets, outside marketing firms, advertising and employees) and knowing how to properly use them. The "broadcast audio processor" is a marketing tool for radio, and it is just as important as jingle packages, commercial ads, station voice, and the music scheduling software.

Effective marketing in radio-land means using all these tools together effectively to present your programming in a manner that people will favor your product over what is presented by station Y. It does not mean they will not listen to station Y, but you

want them to feel more at home in your format presentation so they will keep coming back to you.

QUALITY DOES MATTER

If audio quality meant absolutely nothing to people, AM radio would still be the king format for music, even with the plethora of after-market radios with a frequency response toppings out at 2 kHz! There is all the evidence you need right there! People do care about quality!

If your station's programming is "dead on," but is hard to listen to due to poor audio quality, then you are really missing out, as people will not stick around to listen for long. You would come off in their mind as "second rate." "They're OK, but I'd prefer to listen to something else," is a typical answer you would get. But if it is inviting, and sounds professional from a technical standpoint, and if the technical sound complements the programming, then you have an inviting situation for the listener. It is easy on the ears, and fun to listen to. No one consciously thinks about the sound, nor would make their exclusive reason to listen based on how it sounds, but subconsciously, how good or bad a station sounds will "taint" listener's perceptions of how good your programming is.

This would be the same as if a major toothpaste manufacturer were to put a picture of "doggie do" on the outside of the toothpaste package, and then wonder why no one would buy it – despite the fact they had put a lot of hard work into making the best tasting and best cleansing toothpaste on the market! Radio has a long history of shooting itself in the foot in this manner, with its on-air sound, in one way or another!

SOURCE QUALITY

Make sure your sources are *clean*! You hear it all the time, but more and more, radio is plagued by bad audio from three sources:

#1 The record companies "hyper compression."
#2 Highly compressed music-on-hard-drive systems which feature coding artifacts made worse by problem #1.

#3 Commercials arriving from all over the place, usually of sub-standard quality.

Stations cannot really do anything about problems #1 and #3 except to try to educate the record companies and production houses how this practice hurts them when their songs and commercials play on the radio.

Record companies are in a loudness war of their own, and while the effect can be dramatic, it really causes problems for radio. Remember pre-emphasis? In the digital world, there is no such thing, so you can pack as much high end on a CD as you want with little penalty. For broadcasting, this high end really builds up in the broadcast pre-emphasis curve, and causes the "hyper-compressed CD" to sound quite shrill and harsh by the time it gets on-air.

We all have heard or read the complaints of radio sounding "more and more shrill" these days. This is due, in part, to the source material from the record companies! To add insult to injury, record labels have turned to either turning up the audio so high that the analog front end of the digital system saturates, resulting in lots of clipping, or have outboard equipment to provide the same effect. The end result is audio smashed so much worse than the output of the majority of the radio stations' audio processing chains!

This really sounds bad on the radio as it aggravates the problems already inherent in broadcasting today.

Combine this with problem #2, and you add to it the strange high end you can get from some bit rate reduction systems, and you start to get the picture on why a lot of radio stations sound the way they do today.

Problem #2 is totally in our hands. The old proverb goes "garbage in = garbage out." With audio processing, the coding artifact garbage is amplified, made bigger than life, and becomes part of your on-air product in a *big* way. Hard drives are cheap these days, and with the short music playlists on most stations today, there is no reason not to go uncompressed to hard drive.

Be careful of coded STL links too! This is especially true if your material on hard drive is already compressed by some system. Sometimes a coded STL link is the only way to get the job done for some reason. If this is the case, it is even more important for the source material to be uncompressed (linear)! (Check out last month's article for a more detailed view of this problem.)

DEVELOPING A PLAN

As we saw in previous articles, the job of "Audio Processing Man" typically falls to the Engineering Department. Yet, more and more we are seeing this role shift to non-technical people. Hence the dual focus of this series. For the person in charge of the audio processor, knowing how that mystery box works (and its limitations) is one thing. Knowing how to "drive it" in a way to add value to the on-air product is another thing! And it is also the hardest thing to teach to most people placed in charge of the mysterious Audio Processing Machine.

STEP 1: KNOW WHERE YOU WANT TO GO!

The best place to begin is to have a quick chat with the programming staff to get a feel for what they are trying to accomplish in terms of programming, and then sit down and listen carefully to what they are doing on-air. Find out how the PDs view their competition, and make sure you are on the same page as them. For the non-technical person in charge, it is a matter of having the sense of the "mood" and "intensity" of the format you want to get across to the listener with the sound of your station. This will pretty much define what kind of audio processing is appropriate for the format.

If you are the PD given the keys to the box, here are some points to consider *before* twisting the controls:

What is the weakness in the programming/marketing philosophy of the competition? What are you as PD trying to accomplish with the image of your station to take advantage of these weaknesses?

If you "don't get it," you will have to do whatever it takes to "get it," or you are in for trouble with regards to processing. Good audio processing engineers have an ear not only for the technical sound, but for programming flow too. They cost good money (not often available in radio these days), so it is up to you to learn! Keep in mind that the processor can either enhance or hinder the "flow" and "image" of your station's programming – depending on how it is adjusted.

Our goal is to try to take many of these concepts and put them into easier to understand terms to help you out in this area. Your homework assignment is to get out your back issues of **Radio Guide**, and review what we have learned. From this point on, we will be tying it all together with some practical information and ideas to help you get closer to the sound you have always wanted!

Cornelius Gould has spent plenty of time playing with audio processors and enjoys sharing his knowledge. Corny is the Chief Engineer for WJCU-88.7 FM, Infinity Broadcasting, in Cleveland, Ohio. You can reach him at: cg@radiocleveland.com

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Building a Digital Studio

Part 4 – Putting it all Together ... Fast

by Mark Lucas

[KNOXVILLE, Tennessee - December 2003] Getting the chance to start over is pretty exciting. And going to a digital system is a great opportunity to make changes and implement things that make a difference in looks, function or cost savings. But the big variable that always rears its head is the time line. How can you get it all done, on budget and within the deadlines that come up?

Probably the most important thing that helps keep control over a project is planning. That does not sound like so much fun; it sounds more like paperwork does it not? While some of it is just paperwork, planning is also a great excuse to get out of the back room and do somewhere new.

Spend sufficient time laying out your plans for the installation and you will minimize the time spent later waiting for something to arrive. Similarly, the more time spent anticipating how things will come together, the more likely you will solve problems before they appear.

FIELD TRIP

A great way to plan your facility is to see others. After checking out all the spec sheets and the manufacturers' sites and photos on the web, the best way to get your arms around a new product is to see it! Find out where there is an installation accessible to you. Or grab the opportunity to get to one of the broadcast conventions or road show exhibits. And remember the monthly SBE chapter meetings, they are a good place to catch up with information on products.

If you have problems finding a place close enough to go see a product, at least pick up a phone and talk to someone with experience with the product. A great teacher can be found at the School of Hard Knocks: take the opportunity to learn from what the other guy has been through; almost everybody has ideas for how to do it better after doing it the first time. Allowing for catching someone at a busy moment, most technical folks in the industry are very willing to share their experience and ideas for a product.



DO THE DANCE

An early part of your rebuild plan will be to figure out how to do the rebuild dance: How can you redo studios and stay on the air? If you are centralizing to equipment racks, then that may well be the place to start, by providing the support necessary to run your new studio. Pre-build all that you can manage to do. Try to have any new power necessary stubbed out to the locations needed. Get the basics ready: power and grounding.

If your design is based on moving lots of the equipment to the equipment racks, it may well be possible to redo studios during weekends or maybe even in overnights. Overnights have advantages and disadvantages: If you can run voice-tracked overnight from a production studio (or another extremely temporary location), then you may be able to buy the time needed to dig in. On the other and, overnight work requires more careful planning since there is no way to replace any parts that go missing.

If you have the luxury of buying new racks, be sure to install the spacers available to go between racks. Keeping your larger cable bundles out of the

way in the back of the rack and over into a four inch spacer is a great help! Planning the location of equipment in the rack itself will also impact cabling and overall neatness. A big help in planning the locations in the rack can be helped by hand drawing or computerized layout sheets.

While drawing them, you have the chance to think about cable access, how many power outlets are needed and front to back space usage. If you have Microsoft's Visio™ product then go to www.racktools.com and download the RackTools software from Middle Atlantic. While it is built around Middle Atlantic's product line, you can also put in the proper spacing for all your equipment to make a really nice layout of your racks in advance.

CABLE DECISIONS

One of the big installation challenges, whether analog pairs, AC power or Category 6 cabling is always how to best deal with the large volume of cables. The equipment racks always involve large quantities of cables. While you are looking at the racks, look into the cable management products available.

Many of the trays, cable tying and routing and labeling products aimed at the computer cabling industry work beautifully for us too! One of my favorite tricks to help neatness is buying shorter power cords. Many equipment locations have no need for those six foot cords. Many people do not know that cords are available in two, three and four foot lengths.

While planning your power, research which products you will be using are powered by wall-wart supplies. Not only do they often consume three positions on a high-density power strip, but I also hate the idea of risking my on-air product on a heavy wall-wart hanging on a vertical strip just waiting to fall out someday. Some power strips have a more boxy shape and have spacing that allows the wall-wart plenty of space.

For example, I decided to locate Cybex extenders for computer remote access on small shelves; I found them plenty of space to fasten on a nice metal power strip providing plenty of space for even the large DC supplies. That is another of those small projects that can be built in advance, drilling and mounting on the equipment and having it ready to go.

By the way, remember to plan your cable management front to back. It seems if much of the computer industry lays out its cabling on the front of the rack, whereas much of our need is really on the back side. If you have cabling on the front side, you have to find a way to get cabling into the rack to go the back of equipment. Unless you are going to leave a gap and just run it through, you probably will accomplish this by including some kind of computer patch panel that will allow cables to approach from the rear and from the front; if using that design, you need to make a count of the cables and have on hand the necessary number of panels.

If you have racks with the rear rails available, you may well be able to solve the problem that way. However, then you will have to be careful what kind of equipment you mount on the front of the rack to have depth necessary and have equipment that you do not need rear access to. One option might be to use that area for interior shelving equipment and use doors on the front side for access and to cover for the best looks.

Another tip: When you plan your computer cabling, it is worth knowing that the computer

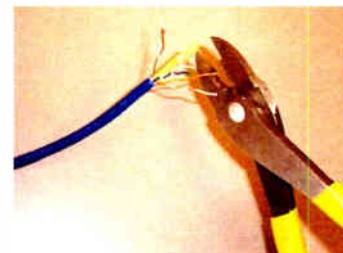
industry uses velcro ties for good reason. Not because they have not discovered our plastic zip ties! Instead, with the higher speeds now being built into data communications, crimping them down tight with a tie is a huge no-no!

When building to achieve the 1 gigabit standard, you cannot just smooth out a kinked up cable. All corners need to be nice and smooth with even, very gradual bends. I think of it as a lot like we have been taught to run grounding to avoid impedance problems for lightning. That actually makes a lot of sense when you think about it: high speed lightning!

THE RIGHT TOOLS

Another big part of getting done with your build out on time and with all due speed is using good tools. If you have been using your favorite cutters for some time now and gotten really good with them – good at cutting 10 gauge AC wire, nipping tin, cutting packing straps – this would be a really good time to pick out a new pair of cutters and be ready for trimming up tiny Cat 6 cabling. Not having those little “nicks” will speed your work.

While you are shopping for tools, check out all the things they have come out with for working with computer cabling. A number of new things are available that you may not have noticed before if you have not been paying attention to that stuff. One neat little inexpensive gadget is a plate that holds a panel mount RJ-45 snapped in place while you punch down the cable with your 110 tool. And make sure you have an extra 110 blade for your punch tool too because all your patch panels and end plates will be using it!



LABELING THE WIRES

Remember documentation? There is a lot of labeling and marking to do! Buy a fresh supply of tape for your brand of label maker, perhaps even several different sizes and colors. Color can be a real big help for identifying different things; white on black makes pretty labels for black faced equipment and panels, the black on clear for the lighter cream colors. If you have a different cabling for the phone and/or computer from your audio computer cabling then either colored labels or colored boots could have keep things separated at a glance.

Label tape usually is available in red, yellow, blue, green and perhaps others. And since digital engines have analog audio in and out, along with the digital in and out, as you make your cabling cut to length (for that space savings we talked about), another approach is to identify them with different colored jackets!

An extra nice touch is color coding your XLR connectors too; a colored boot may really help know which direction something should be going without getting out a flashlight to read a label down there in the dark recesses of the rack. Neutrik now makes a wide variety of colors for the strain relief back side of the connector. Also they have colors for the panel mount XLR side, with space for labeling too.



(Continued on page 12.)

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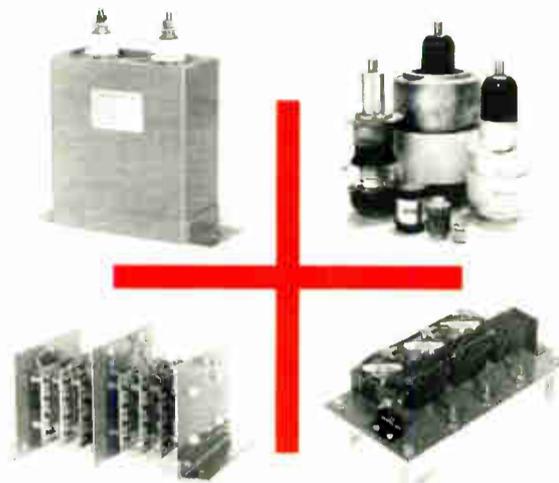
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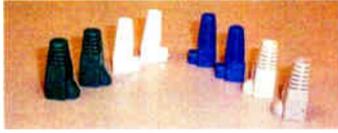
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Digital Studio

Continued from page 10.

While we are discussing labeling, have several different types on hand so you can mark things as you go, without needing to stop and go get something appropriate. There are velcro ties with white labeling areas, wrap out labels, heat shrink labels and lots more. A new build out time is a great time to establish a new scheme. We have done it for a long time with the standard colors of wire pairs and heat shrink boots to mark left and right, but now we can take that even further if we plan ahead.

Even the Cat 6 wiring in some brands can be selected in a variety of colors; it does not have to be grey or black wire anymore! And, when you have pulled three cables over a ceiling and down through a wall, if you have an orange, blue and white, you can confidentially assign their usage without second guessing yourself. When you are into your sixteenth hour straight on a project, these little things can start to be big help in doing things right the first time.



FINISHING UP IN THE STUDIO

For the studio end, it is a good idea to prepare yourself with a few touch up items. While you are picking up other things from the hardware store, get some extra light bulbs for everything from your trouble light, to your flashlights, to the studio lamps. Pick up a spray can of black paint for any black panels you're re-using or the rack racks in case an end shows. You may want to get some stain or other touch up stuff for any woodwork that is either already there or coming in new.

If you are going to be reusing old cabinetry, sometimes a nice touch is to use some thin sheets of nice wood paneling and stain it to match. The single coat polyurethane is available in lots of colors and can look really nice! If you have some XLR plates on the countertop, try painting the metal plate with a gold spray covered by a clear overcoat to prevent scratching.



I have even painted to match them and the metal XLR end with the same gold with good success. When it is up on the counter in a prominent fashion, it might as well look good! Another quick cover up from the paint department is the spray on colored spackling that gives any old object a real new sandstone look!

Overall, strive to give your new studio, no matter how much is still old, a real new appearance! With care, the relatively inexpensive little touches that can be created can help transform the traditional studio to a new and inspiringly different room. And all this can be accomplished within the deadlines that come up, so you can deliver the first new morning show on the exciting new digital audio system!!



Mark Lucas is the Engineering Manager for the Journal Broadcast Group stations in Knoxville, TN. He can be contacted at his email address: mlucas@journalbroadcastgroup.com

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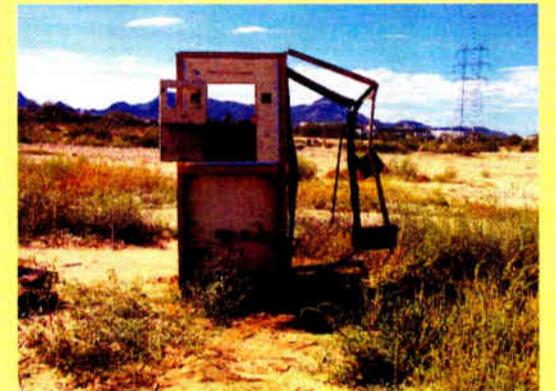
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Is Regular Maintenance
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Has it been too long since
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Full Duplex

Difficult People

Or, How to Dispose of the Bodies

by George Nicholas

[CEDAR RAPIDS, Iowa - December 2003] I thought that title might get your attention! Last time, I touched briefly on some of the types of "difficult personalities" most of us have worked with at one time or another. This time we focus on their behavior; what we might be doing wrong to provoke them, and suggestions on how to deal with them successfully.

While you may have your own names for these people, Sam Deep and Lyle Sussman have identified 44 different types of challenging personalities in their book "What to Say to Get What You Want." Following are just a few types; do any of these people ring a bell?

PUSHY ANIMALS

Rhinos have a powerful need to have their own way. They like to tell you what to do: Rules are meant for you to follow and them to ignore. They can be controlling, aggressive and sometimes hostile. Mistakes we make with Rhinos include backing down (they count on us doing that); going head on (they stampede us); or just becoming flustered. Either way, they win.

We can defeat the Rhino by keeping them in a non-aggressive physical position (e.g. sitting down) and listening until they blow off steam and run out of things to say. That is the perfect opportunity to jump in with assertiveness - do not let them interrupt! Hint: Avoid using the word "you;" it can sound like a counterattack. Refer instead to "it," - the behavior. Counter their argument by agreeing, then startle them with the turnaround. "Everything you said is correct. Let me tell you exactly what I plan to do to get things back on track."

Erupters show spurts of Rhino behavior. They typically pose no problem until they erupt and fly off the handle. Mistakes we make with Erupters: attempting to reason before they have blown off their steam; counter-attacking (they escalate); or accepting their apologies, but failing to use those apologies as a footing to propose the solution.

Handling Erupters requires patience. Listening while they vent completely gains their confidence and positions you to propose a solution. Help them regain their composure before reasoning with them. Say, "I can see why you feel that way." Respond actively and enthusiastically when it is your turn, but address their concerns directly or you may witness another explosion! When all else fails, say "What is it you would like me to do?"

DANGEROUS ANIMALS

Snakes are Rhinos without the guts to fight openly. A competitive coworker may whisper sour nothings in your boss's ear about you, stabbing you in the back with critical or sarcastic remarks, but rarely will they say anything in your presence, except to deny their aggression. Our mistake is we typically do not confront them, as they are counting on us to avoid a scene. Retaliating with the same dirty tricks only brings us down to their level.

What we should do with Snakes: Bring their aggression out into the open by confronting the Snake head-on: "I know what you did." Do not argue when a Snake denies intent to harm you. Ask lots of questions to force the Snake's hand "Why did you not come to me with your concern?" Insist on the new behavior you want. "Next time I expect you to let me know exactly how you feel before you go to anyone else."

TURNING NEGATIVES TO POSITIVES

Grouches are picky people, complaining constantly. They believe their job is to point out faults and problems for you to correct, while blaming others for their mistakes and shortcomings. These people have

nothing nice to say about anything or anybody. It is a mistake to agree with a Grouch's valid complaint - that merely reinforces their invalid ones - or to tune them out and ignore them.

To fix a Grouch, listen to them closely to make them feel important, but make them be specific about their complaints. Acknowledge without agreeing: "I see the problem you're identifying." Get them to recommend a solution. Avoid letting them live in the past; they will bring up everything that went wrong since the Earth cooled.

Do-Nothings promise everything and deliver nothing. An example is a superior unwilling to make a decision on your request because he/she fears the criticism it might bring. They may be perfectionists who want everything to be just so before they will act. Their procrastination may be a fear of failure, or worse yet, a fear of success! Mistakes we make with Do-Nothings include leaving it totally up to them to act, or accepting their unrealistic commitments.

To handle a Do-Nothing person: Raise their level of discomfort by openly rejecting promises you do not believe they will keep. Maintain as much control as you can over the action. Help them remain task oriented by defining the problem and structuring specific goals and realistic deadlines, then ensure they happen. Praise them when they are decisive.

Most of us tech-types are used to working alone, in our own environment, and have had little experience in dealing with difficult people as part of a team. The good news is nobody enjoys difficult people. (If you find yourself enjoying it, it is time to go fishing!) And you should know that more people are on your side than you think, as long as you listen and deal with the problem with the same logic as fixing a transmitter - head on, and open-minded.

Until next time, I am going to attempt to be the person my dog thinks I am ...

George Nicholas operates George Nicholas Communications, specializing in technical and communication consulting throughout the US. You can contact him via his email: georgenicholas@csi.com

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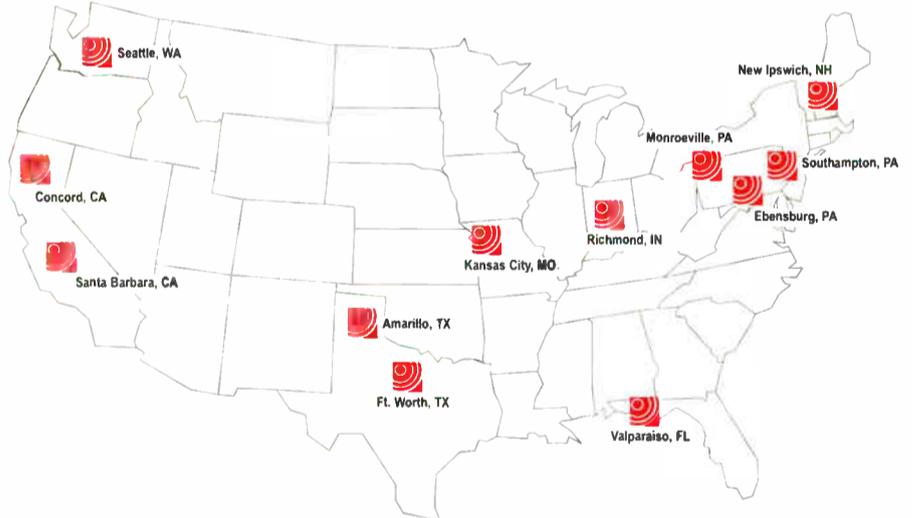
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IT For Radio

The "Other Engineers" on the Team

by Chuck Condron

[PHOENIX, Arizona - December 2003] Greetings from the Dark Side! Being a Broadcast Engineer for over 20 years, I have found the Dark Side (aka IT!) is really not too different than the Engineering world. The same things need to happen. With a radio plant, you have several things that need to occur on a regular basis, in a particular order. You need to stay on the air, stay legal, and maintain the plant. If something fails, you need to repair it, and at times do triage.

The IT world is not any different. The "plant" is still 24 hours, and it is still an on-call situation. Prophet, Scott Studios (or whatever automation system) is now part of your life. These things are "computers and file servers." Computers, the WAN, the LAN, your business servers, are now part of your plant – and your life. These items maintain the air product, and revenue, just as the transmitter and the studio consoles do.

The sales floor is full of computers that aid the sellers in obtaining revenue. The business office and traffic offices have the same "equipment." Whereas some of the equipment is not 24/7, the function is the same. These are all revenue producing items and are just as important as any other component in the building.

If these items are neglected, or not understood, the same problems can occur as if the transmitter is neglected or not understood. Something will not get on the air; something will not work, either of which normally translates into loss of revenue.

IT AND/OR ENGINEERING?

As a Senior Regional IT Manager, I have found the IT world is handled in many different ways. In some markets, there is no distinction between IT and Engineering. If an "engineer" is seen walking down the hall (donut in hand), everyone knows the "engineer" is capable of anything whether it be rebooting the file servers, turning the transmitter back on, installing a printer, making a Automation System user, programming the phone switch, etc. This is very efficient. However, it comes with the understanding there is a triage system involved. The transmitter takes precedence over a printer problem. An automation system lockup takes precedence over a distorted left channel. You get the picture?

Other markets have an engineering staff that does only Broadcast Engineering and Automation, and an "IT Staff" that does the rest of the IT section of the plant. The complete extreme is markets where one person does many different stations, the IT work, budgets ... you name it. I have one market in Yuma where the IT person is the Engineer and also the Business Manager!

No matter what the scenario is, there are some "Basics and IT Bases" that need to be covered. I want to discuss these from your perspective as an engineer or in some cases, that of the Engineer/IT person.

IT TROUBLESHOOTING

The Art of Troubleshooting, and yes – it is an art, as well as a discipline – works the same in IT. You first need to define the problem. Many times I have seen people chasing an "IT problem" when they did not know what the real problem was. Troubleshooting IT involves isolating the problem – ruling out the things that are not causes.

The best way to do this is have a firm understanding of what you are troubleshooting. For example, you might be working on a problem where a person cannot login to the Novell environment. This issue can involve several different aspects: There is a computer, a user, a network card, a chunk of cable, a hub or a switch, and finally the server. One ap-

proach to the problem is from the server side: checking connections, user rights, etc. Or, you might approach the problem from the computer end: is the nic card working, is it a cable problem, a problem with a driver?

You could look at the switch, the hub, and even the user. Perhaps two hours have elapsed and you still have not solved it; what could it be? How about protocol? Yes, there is still one more element to check. Most NetWare servers use IPX/SPX and not TCP/IP, and – if you install the protocol – boom! they can log right in. Did you even know it was a Novell Server as opposed to a Microsoft Server or visa versa? So, isolate the problem – understand the problem – fix the problem.

Remember – fix the problem. Do not work around the problem. Many times, I have found situations where something works ... but it is still broken. For example, one time, not long ago, some old DNS/WINS servers were turned off. Stations found that if they created a HOSTS or LMHOSTS files or hard coded some IP addresses into their Microsoft Exchange clients, that this "fixed the problem." When in reality, they worked around the problem.

They moved on to the transmitter site after that, the budget meeting, etc. Several months later, the HOSTS file gets deleted, or the hard coded Exchange entry gets deleted and you are right back to the problem again ... it never got fixed. Again, define the problem, and then fix the problem. In this case, find out the correct DNS/WINS entries, enter them, and move on.

WHERE IS IT? WHAT IS IT?

Know Your Plant/Document/File/Organize/Prepare: This does not have to be hard. How many times have you been off the air, run to fix something and could not find the schematic, or find you never logged readings for the past year so you have no idea when the screen grid current dropped? You do not know where that box of parts is. You cannot find that "Factory Bulletin" on the problem. You cannot, well, find something critical. Again, it is no different in the IT world. When your Automation System has locked up, or the Business Manager is two hours away from flying to the corporate budget meetings and the business server locks up, etc., you must come to the rescue.

Do not be caught spending more time finding the tools and paper work to fix the problem, than it would take to fix the problem. If you change something on your server, make sure you at least write it down somewhere, so you can back track. This is actually easy. If you get in the habit of doing the things needed all the time, it just gets done. Log when you did the last corporate directed patch. Log what patch level you are on. Log your IP addresses, your circuit ids, WAN vendor, etc. Keep a file of this. And, remember where you keep your file!

As you go, update the file just like you would transmitter logs. Have a game plan. Have a backup plan, etc. Speaking of licenses, have you checked to see if you can present the licenses for all installed software?

CHECK POINTS

Develop a backup plan! When I look over the IT Budgets submitted to me, I am usually amazed at how many people have no backup plan in place. Some did not know if they even had a backup tape system let alone could tell me if they have ever backed up. Some places not only did not have a backup tape system, they did not have a back up IT system. Some of this is not the fault of the engineer; it may be a budget thing. Either way, you need to have a plan in place.

You can never have too many backups. You should also have a plan in place to have a back up for equipment. It may not be possible to have back up servers, but if you do, keep them running. Have parts around. For example: hard drives, SCSI cables, gender changers, keyboards, etc. It is just like at the transmitter where "hopefully" you have a spare tube, fuses, antennas, etc. The more you can prepare and have a game plan for when a huge failure hits, the better things will fare for you. Also, test your backup tapes, and do restore regularly to make sure you are really backing up. A bad tape burned me big time recently!

Enlist help: Often, many of you do not have anyone around to assist. However, maybe you do! Sales Assistants, Office Managers, the Web folks, even the News Director, have been known to be great IT assets. Many locations have been blessed with some fairly computer savvy Sales Assistants. They can help with training, knowing how the network works, what a "Drive Mapping" is, etc. They can help back things up by burning things to CDs.

I am not talking about full time duties, but more of a cooperative effort. The more people who are in tune with the IT world in your plant, the better chance you will have to maintain a working environment. The more people who at least know where the server is, the phone room, the de-mark, etc., the better. If you are at the transmitter and there is an IT emergency, maybe the Office Manager can reboot the server, so the Business Manager can print after the web guy finds out why the Business Manager can not hit the Corporate Budget Report web page. See what I mean? It does not have to be all you!

Are you legal? When was the last time you checked the sales peoples' desktops? Are you sure they are using software for which your organization has a license? Are you under the impression that you can have one copy of PC Anywhere™ around and you can install it on every computer you think needs it? These things are legal issues and can affect revenue. Your office/ownership might be a prime target for the famed Software Police. Just as you can get inspected by the FCC, you and or your station lawyers could get hit with an audit of software. To be safe, check with your corporate or business office of what has been paid for and licensed.

TO SUMMARIZE:

- Learn the Art of IT Troubleshooting.
- Define the problem.
- Isolate the problem.
- Fix the problem, do not work around the problem (for long).
- Know Your Plant/Document!/File/Organize/Prepare.
- Training. Learn the systems you are expected to fix; buy books, study, take classes, do not be afraid to ask for help!
- Have a Backup Plan. Then once the plan is in place, make sure you indeed do back up and then test your backups regularly.
- Budget for problems.
- Enlist Help.
- Make sure you are legal?

Finally, here is the most important part of a successful operation: follow through. Leave nothing undone; make sure you are done with the "task" before "closing it" in your mind.

I hope this article has been helpful and I hope I can continue to help you folks out. Feel free to send me questions and problems you would like to see covered!

Chuck Condron is the Senior Regional IT Manager for Clear Channel Worldwide, based in Phoenix. He can be reached at chuckcondron@clearchannel.com



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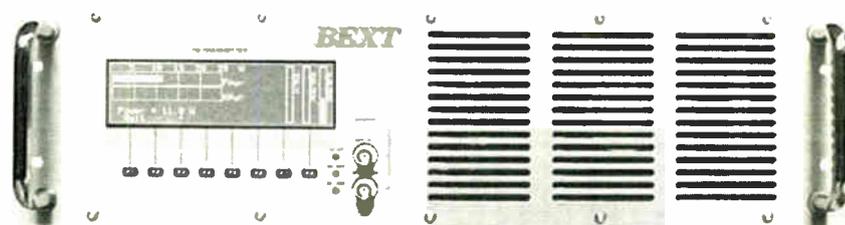
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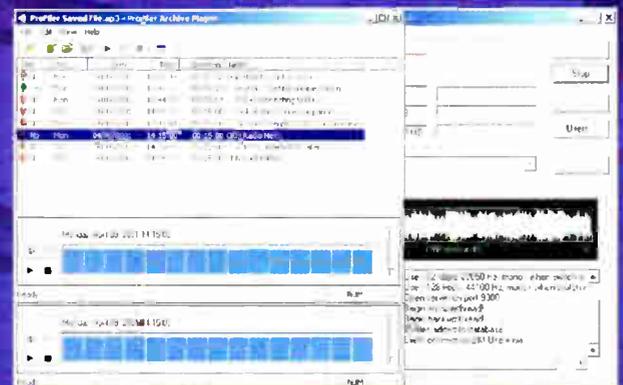
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Low Power Ain't No Power Leaky Cable AM and FM

by John Devecka

Continuing his discussion of how to get a signal "out there," John tackles some of the other options for low power stations.

[BALTIMORE, Maryland - December 2003] Among the options for low power operation are radiating (or "leaky") cables. These systems are designed to spread signal in a fairly even pattern along their full length, unlike a typical vertical antenna system. They can be likened to a garden sprinkler hose, with holes punched evenly along their length; the signal from these cables then will leak in a roughly cylindrical pattern from end to end, giving you some unique benefits.

For example, unlike the fixed vertical antenna, radiating cables are a coaxial (or tri-axial in some cases) cable that is flexible enough to be shaped to meet the needs of the receiving audience. Whether it is alongside a road, around a balcony or inside a building ceiling, radiating cable offers the kind of flexibility needed for many applications. Areas of interest get coverage; power is not wasted where it is not needed.

Radiating Cable systems fall under three sections of the FCC rules: §15.211 (Tunnel Systems); §15.221 (AM); §15.239 (FM) and §90.242 (Traffic Information Systems - Licensed Only). We will talk about the first three here to give you a good basic primer on them. I will cover TIS systems in another column since it has its own complications.

OUTDOOR AM SYSTEMS

Some of the most common applications for Radiating Cables are outdoor and tunnel systems. This is true on a lot of different frequencies, but the first documented and successful application of Radiating Cable outside was for the 1939 World's Fair when Bill Halstead ran his cable across the George Washington Bridge to communicate with attendees.

Tunnel systems have their own set of rules within Part 15 (§15.211) which allows them to essentially run at any power level provided that outside the tunnel they still comply with §15.209 emissions limits and §15.207 limits on the power lines. A typical tunnel system consists of radiating cable running the length of the tunnel (usually on the ceiling) and fed with a linear amplifier or transmitter. In those cases where the system is rebroadcasting a licensed station (for example: WJR in the Detroit-Windsor Tunnel) the transmitter is usually a Type-Accepted unit that ensures synchronous operation via lines from the station.

A more common outdoor installation is Radiating Cable on a roadside. These are the systems that greet visitors to Walt Disney World and EPCOT Center, and tell you about the animals as you drive the safari at Six Flags Great Adventure. They are installed in the ground alongside a roadway, ideally in a protective conduit, and buried to prevent



Radiating cable being installed roadside at Six Flags.

their easy access by critters (squirrels seem to find the jacketing very tasty). The nice part about radiating cable on a roadside is the ease of configuration to the bends in the road, so following routes for a consistent distance is easy, giving a better coverage result.

INDOOR COVERAGE

The most common indoor installation of Radiating Cable is along balcony facings and stadium overhangs to provide coverage into the seating areas of arenas. These would fall under the §15.221(a) limitations for radiated field, or under the campus antenna limitations if you wish - if you are doing this in your own school stadium.

Probably the greatest success for Radiating Cable systems was the Amsterdam 2000 Conference hosted by Billy Graham. A total of 28 languages were run simultaneously on individual Radiating Cable systems, each driven by transmitters running approximately eight watts in the RAI Center in Amsterdam. Despite many naysayers, who felt it was not possible to provide good audio to such a large area in this manner, the systems performed with great success for nearly 11,000 people from 209 nations over 10 days.

For temporary events, such as Christmas Light Shows, Radiating Cables can be laid on the ground alongside a road, connected to transmitters and run for the duration of the event. At the end, roll up the cable, and stash it away until next year! All in all, it provides simple, legal and effective coverage.

Radiating Cable AM systems, typically, run in the neighborhood of \$12,000 for a mile of cable and related equipment. This can vary depending on installation requirements, but it gets you in the right general area for budgeting. Installation is pretty easy and the cables are typically very flexible.



Roadside radiating cable transmitter cabinet at Six Flags.

OK, ENOUGH AM ALREADY!

There is one option out there for FM, and a couple of ways to do it. §15.239 allows you to run an FM system with a field strength of 250uV/m at a distance of three meters. That is about all it says. There are specific references in other areas of Part 15 to kits, antenna mountings, etc., but the important thing about §15.239 is that it lets you choose your antenna and transmitter. No, I do not mean home brewing it, I mean you can use a certified system with radiating cable or a fixed antenna depending on your plans.

We need to start by clearing up the #1 misunderstanding for FM and low power. *There is no 100 milliwatt rule for FM.* None. Really! So pay attention when you see devices that "meet the FCC rules" and have 100mW of power. Typical fixed antenna systems for unlicensed FM systems do not exceed 18 milliwatts to meet the field limits!

A fixed antenna system is typically about the size of an NAB engineering handbook, but much lighter (OK, it is on the shelf next to me, and I figured most of you know how stupidly heavy it is). You likely have seen these devices for sale in many places - an FM transmitter for your iPod, or to connect your CD player to the car radio without wires, or to jump from your computer

to the home stereo, etc., and you understand their range limitations. Typically, these devices are designed for some portion of the FM band, occasionally all of it, and they reach 50 to 100 feet at best. They are subject to the kind of interference you would expect when you see their power level.

FM FOR THE WHOLE BUILDING

There is another option, however, one that actually works to cover a whole building, or more. Yes, we are talking about Mr. Radiating "Leaky" Cable. He has never been fond of being called "Leaky" since it sounds like an accident, so stop it.



Amsterdam 2000 Transmission Room

Radiating Cable systems are subject to the same field limits as the fixed antenna, but they can have a virtually unlimited length of antenna. That changes the installation considerably, but it also means you can make the rule work for you. Instead of a small sphere of coverage, you have a cylindrical option, which can be as long as a building! By installing a radiating cable system inside a building, and running the full length, you can ensure coverage inside it and low signal outside.

Discussions long ago with the FCC yielded the acceptance that field measurements with a FIM-71 inside a dorm hallway was next to impossible (try it some time), so they have accepted measurements for §15.239 to be made three meters outside the building. The logic is that the target audience is inside the building and the structure will attenuate signal enough to meet the rules where they can be practically measured.

The plus side? You can take a typical dorm building that is 200 feet long and 3 stories, run a single radiating cable down the ceiling of the middle floor and you will generally get FM Stereo coverage of the whole building within §15.239 limits. Pretty easy, but unfortunately not real cheap. It is FM after all, and do not all of your rate cards say FM costs more? That is the down side. The cost can be about two to three times that of AM systems, and getting the right design is critical to success. But hey, you do get two channels!

A typical FM radiating cable system runs about \$2000-3000 per building, depending on more factors than we have column inches here. There are options for distributing the signal, installing the cable, and more, all of which can influence the design and costs. It is not a system design for the meek, but the resulting FM Stereo signal is worth the effort and costs.

USE YOUR VISION

Low power systems are amazingly flexible, and effective, but they do require experience to design and patience to fine tune to your needs. When you are done, however, you do not have to deal with Public Files, license fees, speech controls, commercial issues, etc., and you can run whatever programming you want.

I have designed systems for applications from drive-thru lines to evangelical churches, to sports to health clubs. If you find a place you wish you had a signal (original or rebroadcast) just crack open Part 15 because the solution is already there.

John Devecka is Operations Manager for WLOY in Baltimore and spent a past life designing, supplying and installing Low Power Broadcasting systems on a global scale. He is believed to sleep with a copy of Part 15 under his pillow. He can be reached by email wloy@loyola.edu or phone at 410-617-5349.

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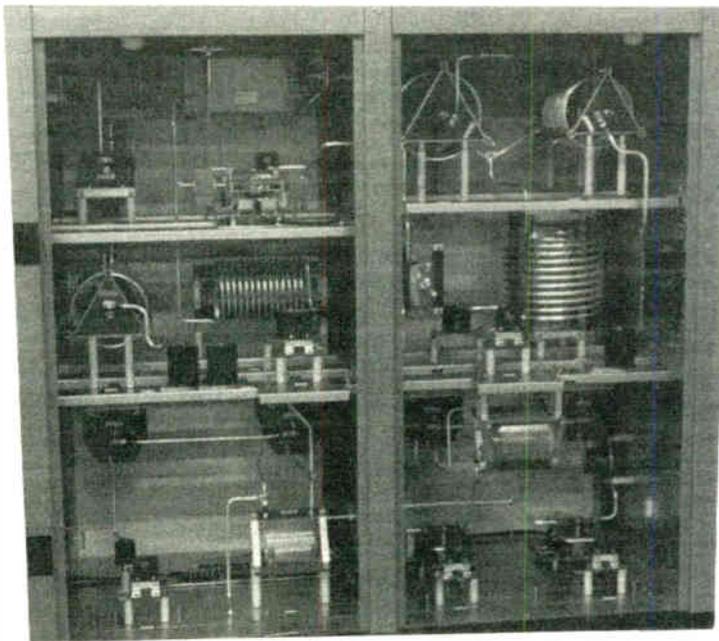
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Maintaining Reliable Power Systems

Backup Power for Your Station

by Dana Puopolo

Are you wondering what it takes to add backup power to your facility? In this fourth installment, Dana focuses on the questions and considerations necessary to spec out such a system.

[SANTAMONICA, California-November 2003] In the past several months, we have been reviewing the various elements that make up a modern facility's back up power system. This time, our goal is to pull all of these together and design an actual system.

But before we do, let me address some comments and experiences readers have shared (which is both welcomed and encouraged, by the way). For example, several writers advised me of their unsatisfactory experiences using portable generators. It seems some of these "one lungers" have poor voltage and frequency regulation, not to mention sine waves that are sometimes not very pure. As we noted, these issues can wreck havoc with broadcast equipment. It might be prudent to "try before you buy" one of these smaller units (or make sure you can return it) and then test it with a voltmeter, frequency counter and oscilloscope using a portable heater or two for the load.

Another writer reminds me that most small generators (and many commercial ones too!) have two ratings, one for intermittent duty and a lower continuous duty rating. Since broadcast equipment is a continuous draw of power, make sure you figure this into your calculations. Otherwise, when you go to Home Depot to buy that "5000 watt" generator to power your transmitter for a day, you just might find it overheating within a few hours.

I was also reminded that it is essential for the power draw on each phase of three phase generators to be balanced within 10-15%, or they will overheat and can burn out. This becomes important if you have a large FM transmitter drawing from all 3 phases and a smaller single phase AM transmitter located at the same site. It is also the reason many transmitter sites do not put their tower lights on back up power as they usually are high draw single phase circuits (and when the lights turn on at sunset, they can unbalance a power system).

Finally, Henry Engineering is now marketing a new type of surge suppressor that actually tracks the power line sine wave and sets its transient clamp point a mere 2 Volts above the RMS voltage. Originally designed for the military, the *Powerclamp Series 8* has received rave reviews from the engineers who have been using it for a while. Contact Henry Engineering at (626) 355-3656 for more information.



SPECING A SYSTEM

Our first design is an actual UHF TV studio that I built. Though this installation is for a TV studio, there is no reason why it could not also be applied to a medium size radio station.

The station is located in a major market and is an affiliate of a "non big 4" TV network. Their main broadcast location is their Master Control room,

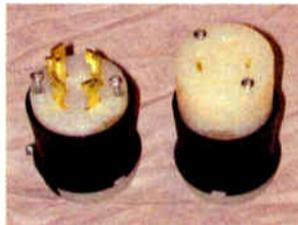
which has a switcher, 48 x 48 crosspoint router, various video and audio processing equipment, video and audio DAs, EAS, several computers and seven VCRs for playback. In another room is the station's STL, production equipment, Profile video file server and medium size telephone system.

Since this company uses thin client computing company-wide (i.e., all applications run on central servers corporately located in Florida and connected by a WAN, with local workstations using Winterm), there is no station-located file server. Local Internet access is done using several computers connected to a small router and DSL line.

Staying on the air during a power failure is essential, so this station elected to run all broadcast equipment off a 15 kW online UPS, backed up by the station's 60 kW diesel generator. The online UPS has an efficiency of about 75%, meaning that its power draw is 20 kW. However, the actual amount of power needed to use the UPS is about 30 kW because the unit puts out 5 kW of heat, which must be removed by the station's air conditioning unit.

This station decided to cut costs by putting in a single phase UPS and generator, as well as a separate single phase air conditioning unit for the Master Control and equipment areas. This makes sense because they can then also shut off the main building A/C unit nights and weekends, saving electricity.

Since the station's Master Control and equipment rooms are next to each other, it was easy to wire the UPS through a sub panel to serve this area. Outside the technical areas, each group of desks has a receptacle hooked to the generator for Winterms to be plugged into. These use Hubble Twist-Lok™ type connectors. Why? Because my experience has been that using normal receptacles here encourages the use of small heaters by the office staff, which can cause havoc with your UPS and/or generator.



Instead, I used the Twist-Lok connectors, which pigtail to a 4 inch square electrical box with four IEC computer power cords for Winterms coming out of it. This way there is almost no possibility a wayward heater can be plugged somewhere it should not be (except for the receptionist who had an IEC to 3 prong adapter for her heater!). If you must use normal receptacles, at least use red cover plates on them. The Internet computers are all plugged into a 1500 Watt UPS located in the Internet room. Only the actual CPUs and router are on UPS, though monitors, printers, etc. do run on the generator. Both UPSs can run their loads for about ten minutes, which is plenty of time for the generator to come on.

Summarizing the costs of this system, we have:

- ❑ 15 kW Online UPS: \$12,500
- ❑ 60 kW generator and transfer switch: \$30,500
- ❑ Additional electrical wiring: \$7,500
- ❑ Additional costs for A/C unit (three phase units are cheaper): \$1000.00 (approx)
- ❑ 1.5 kW UPS: \$500.00
- ❑ **Total: \$52,000**

An interesting footnote is that this station has a 10 meter steerable satellite dish located next to the generator. Both are about 500 feet from the transfer switch, so the decision was made to run the dish's steering motor directly off the generator. This saved the cost of running an additional set of wires back to the dish from the transfer panel at the studio. Since the dish is only moved occasionally, starting the generator (remotely) before moving it is no big deal.

SOMETHING SMALLER?

At the lower end, let us look at a typical small AM/FM transmitter site. This location has a Class D (an old class IV) AM station operating 1 kW full time and a 6 kW class A FM station.

The AM transmitter is solid state, with a back up tube rig; the FM is a 5 kW tube transmitter with a 2.5 kW tube backup. Power to the building is 240 VAC single phase. The decision was made to have enough emergency power to run either two transmitters with air conditioning, or all four without (for testing and repair). The building temperature is normally set at 85 degrees, with a thermostatically controlled set of filtered intake louvers and exhaust fan set to 95 degrees for back up cooling. The total draw of the main transmitters is approximately 13 kW (3 kW for AM, 10 kW for FM). Remember, in the case of AM, you have to factor in the additional power consumption required for 125% modulation.

The auxiliary transmitters draw another 10 kW, slightly more than the air conditioning unit. This site also has a lighted tower using one beacon and two side lights. The calculated draw from the tower lights is 2 kW with beacons on (Hint: when calculating the lighting power consumption on an AM tower, always factor in the power loss in the isolation transformer, if used). There are the usual audio processors, RPU systems, remote controls, STL's, etc. Together they draw about 2.5 kW.

This makes the total power consumption of this plant approximately 27.5 kW. Generators are usually sized at 25 kW and 30 kW. The decision had to be made whether to power the tower lights (and buy a lower powered unit) or to buy the bigger generator. In the end, the cost difference between the two was negligible when you factored in the additional electrical work needed to break out the tower lights into their own sub panel. By including the lights, all the electrician had to do was insert the transfer switch between the building cut off breaker and the electrical panel. In effect, getting a bigger generator actually cost less! The station also elected to put their remote control, STLs, TSL link and exciter on a 1.5 kW UPS.

This second case shows the need to consider both the individual pieces of a project and also the project as a whole. Individually, the smaller generator would have cost less, but when the additional wiring needed for the tower lights was factored in, the actual project cost would have been more. It turns out that a year after this project was completed, the National Weather Service became a tenant on this tower. Thanks to the larger generator, their project was much easier too.

Costs were as follows:

- ❑ 30 kW generator and transfer panel: \$20,000
- ❑ Electrical wiring: \$2500.00
- ❑ Stand alone UPS unit: \$400.00
- ❑ **Total: \$22,900.00**

Next time, we will consider a more complex (and common situation) under consolidations: the power needs and solutions for a large market multi station studio and a multi-station class B/C FM transmitter installation.

Dana Puopolo has been a broadcast engineer for over 30 years, building, operating and maintaining radio and television plants of all sizes. He can be reached at dpuopolo@usa.net



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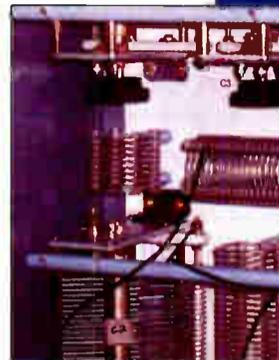
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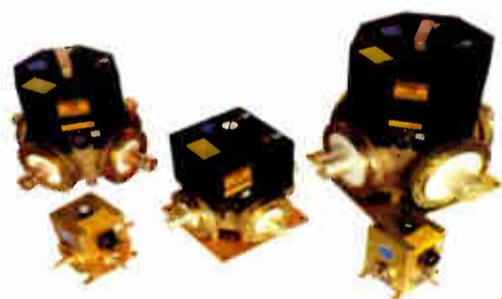
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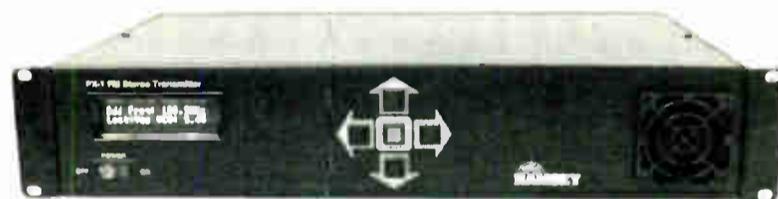
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Among the efforts to improve the effectiveness of the EAS, the formation of the PPW is noteworthy, along with its recent report and recommendations. Clay and Barry discuss some of the interesting points.

[SEATTLE, Washington - December 2003]

Barry - Recently the Partnership for Public Warning, PPW, issued a series of recommendations for changes to the EAS. What are they and how are they likely to impact broadcasting?

Clay - This question demands a rather complex response. First of all, I highly recommend all interested parties go to the PPW Web Site and take a look at this material for themselves. Their site is at www.partnershipforpublicwarning.org - yes, that is all one word.

PPW has worked with a number of individuals and organizations - including the SBE - in developing a rather comprehensive assessment of the EAS. This document, report #2003-3, gives the reader a historical perspective of EAS and goes into significant detail as to the state of EAS and what can be done to improve it. This document is available from PPW. With that being said, let us take a moment and look at each of the nine recommendations in light of your question:

PARTNERSHIP FOR PUBLIC WARNING

www.PartnershipForPublicWarning.org

1. PPW is apparently concerned that broadcasters (and cable operators) are only required to broadcast national level EAS messages. The FCC encourages carrying state, local and weather messages, but in the final analysis, this is 100% voluntary. PPW stopped short of recommending that broadcasting such messages be required and simply recommended that there should be some incentives to get Broadcasters to carry them. This is not to say the FCC could not change this in the future.

OPERATIONAL COMMUNICATIONS

2. PPW judged the existing communications links used with EAS are inadequate to perform the task. On the national level, they pointed out the weakness of the comm-links to the PEP (Primary Entry Point) stations means the PEP system can not adequately distribute national EAS messages to the entire country. They recommend adding more PEP facilities, as well as greater participation by National Public Radio (NPR). Additionally, they recommend that the national system be tested periodically (something that has never been done).

At the state and local levels, originators of EAS messages often do not have communications links to enable them to communicate instantly via broadcast stations as well as NOAA Weather Radio (NWR). PPW suggested designated government radio channels be used as "Local Relay Networks" (a term started in Washington state with their EAS planning back in 1997 and long promoted by yours truly).

3. PPW noted that few of the some 3,000 counties in the country have EAS equipment. This forces emergency managers to contact Broadcast stations to get an EAS message out. However, with many of the nation's broadcasters operating unattended, the timely use of the EAS is difficult to impossible in those areas. They also felt that broadcasters are much more suited for broadcasting emergency messages than originating them.

Taking a few pages from the Washington State EAS Plan, PPW is recommending emergency managers be equipped with EAS equipment that can be used with the communications links (recommendation #2) to reach broadcast stations and cable operators even if they are operating unattended. (Those of you who have been reading the EAS Q&A for some time will recognize this line of thinking.)

PUT EAS PLANS IN ORDER

4. The PPW Report indicates EAS planning has fallen behind with many state and local plans having never been completed. They acknowledge the efforts of SBE and other volunteer organizations to try and bridge this gap have fallen short. Furthermore, PPW recommends some standardization for the various EAS plans.

The lack of leadership has been voiced very clearly by many. Therefore, the PPW recommendation is for some federal agency to "take charge" of EAS. Beyond having a federal agency lead EAS, PPW sees the need for the development of study courses, workshops and training sessions. And of course, there must be funding for these activities.

5. Recognizing that EAS and NWR need to be integrated, PPW points out that EAS and NWR have a standard protocol but in most cases lack full integration. By better integration of EAS and NWR, a great deal of progress could be made with receiving devices that could automatically alert citizens without relying upon them having a radio or TV turned on.

PPW most certainly has been watching the situation in Seattle where the Washington State SECC has been working with the NWS to fully integrate EAS. This "marriage" effectively enables NWR to be a true "All Hazards" service. Already, a few other locations in the country have followed Seattle's lead. PPW is recommending this move beyond the "experimental" stage. I have also been advocating this integration, not only in **Radio Guide**, but in my EAS Workshops around the country.

EBS or EAS?

6. PPW is concerned that many citizens feel that EBS is still in place. They recommend EAS get more exposure, encouraging a nationwide effort to make the public aware of the capabilities of EAS.

7. PPW is concerned that the February 2002 R&O amending EAS rules and enhancing EAS, while adding needed new event codes etc., made such upgrades voluntary. This limits the effectiveness of the EAS because those who originate EAS messages cannot be sure everyone is receiving them, much less with any clarity of action. They recommend the FCC make the upgrading of this equipment a requirement by Feb 29, 2004.

8. PPW feels more EAS training is needed for both broadcast industry and government personnel. They go on to recommend "government personnel" be used to provide more support and on-site assistance to industry. PPW suggests broadcast and cable events and conventions would be great places to provide assistance. They also recommend that EAS principles be covered in training materials for emergency management personnel.

WIDENING THE CALL

9. Finally, efforts should be made to induce other communications industries to join in transmitting EAS/NWR warning messages. Experts looking deeply into this issue all agree the most effective public warning system is one that utilizes many, redundant, delivery methods.

They suggest EAS should be expanded to include other communications systems such as telephone, satellite, internet etc. and that the government should reach out and encourage and provide incentives for those industries to participate.

Barry - That sure does cover a lot of material, from the looks of things. However, would you agree that broadcasters should not find this bad news and worry about the recommendations?

Clay - You are right. Other than the recommendation that everyone upgrade their EAS equipment by early next year, there does not appear to be any reason for alarm in the broadcast community.

Barry - Do you feel that EAS will be better off if all these recommendations are adopted?

Clay - Yes, very much so. Actually, many of those ideas and recommendations put forth are already in use in some areas of the country. Nevertheless, we still have a "patch-work" of good and not-so-good EAS systems out there. These recommendations, if acted upon, will go a long way toward creating an effective EAS, nationwide.

Barry - Now, the question has to be asked, what do you think are the chances these changes and recommendations will become policy?

Clay - That is the \$64,000 question! Predicting government is always quite difficult, however with the concern and focus on Homeland Security I would venture to say a good portion of this has a chance of becoming policy.

We need to face it, an effective public warning system should be an integral part of any homeland security effort, and EAS needs help! PPW is indeed a partnership with many industry and government entities participating. All the right players are at the table. This has a chance - but as with all committees involving different governmental agencies, my fingers are still crossed.

Personally, I feel PPW's work has been excellent. Granted, I could have recommended some additional items from my own list, such as adding text distribution to the EAS protocol, for example. But, all in all, this is a great report. I am looking forward to the comments that will be received from interested parties.

Barry - It does sound like there is at least the gathering of the right people, as you say. Let us all hope they continue to work together in a positive, progressive way. Otherwise the EAS system could develop more problems.

Clay - That is true. Balancing the voluntary aspects with the legally mandated parts of EAS has always brought some confusion to some parts of the system. We just need to work harder to make it function better.

MESSAGE CONTENT

Barry - OK, that brings up a good point: trying to function better. Sometimes an alert will come in and the audio is horrendous. So, stations will re-voice the message, and re-transmit. This is fine, right?

Clay - (cautiously) ... yes ...

Barry - So, what about the tests? I have a question here from a reader: "In our market some of the stations use their audio in the test, is this wrong?"

Clay - You did not specify which test you meant. If the test is an RWT, there is no audio required, just the transmission of the EAS Tones. However if the test is an RMT, then the audio should be coming from the source of the test, which should be a government entity. In that case, the entire test should be relayed as received. I have to admit it is tempting to "replace" the audio with something that sounds better, but I do not recommend it. The best thing to do is to work with your local or state EAS committee to see what can be done to improve the audio quality.

Barry - Another reader says the reason they do this is that the LP-1 often forgets to send the EOM (End of Message) until after they have announced their call letters and gone into a commercial or station promo.

Clay - This is still no reason to change the way we test the system. The LECC and SECC need to impress upon the LP-1 station the need to ensure the EOM is pressed at the conclusion of the test. Of course, there is another answer that could cause this situation; the LP-1 is running their EAS encoder *through* their console, not using the relays to interrupt audio as required. Running the audio through the console could allow an announcer to forget to have the pot up, and not even realize he did not send the EOM outside his building.

Barry - Can the other local broadcasters do anything about this?

Clay - Although physical violence is not the answer, I can understand how strongly the other PDs and GMS in the market might feel about this "invasion," especially if it happens repeatedly. Again, the first place to go is the LECC and SECC; often such substantial peer pressure can persuade an LP-1 station to make the needed changes on a pleasant basis.

Clay Freinwald, Senior Facilities Engineer for Entercom in Seattle, is Chairman of the SBE's EAS Committee as well as chair of the Washington State SECC. He welcomes your questions about EAS at k7cr@wolfenet.com

FCC Focus

Avoiding the FCC Fine Machine

by Ken Benner, NCE

[TUCSON, Arizona - December 2003] Shock-waves continue across the broadcast spectrum following the 28 East Coast stations fined \$3,000 each for Public File problems. Four Mount Wilson stations were charged \$10,000 each for radiation non-compliance, an Alabama station was clipped of \$11,000 for lack of EAS operation and tower registration, and the fines just keep coming.

The Public File violation fines are in part the result of the recent three-year license renewal process and apparently involved the stations' response to question number four on License Renewal Form 303-S, which asks if the station is aware of any violations during the present license period. This item raised a substantial hue and cry at the last Las Vegas NAB convention because the question implied license renewal time was also confession time and indeed more than one station in the past has paid fines after voluntarily informing the Commission of some inadvertent violation.

Chief of the FCC Media Bureau Ken Ferree explained: "Our decision to fine these stations reflects the seriousness of the violations and is consistent with FCC Chairman Michael K. Powell's initiative to promote and protect localism in broadcasters' service to their communities. Make no mistake about it, the FCC will not tolerate less than diligent efforts to ensure the accuracy and timeliness of that information."

Yours truly promptly emailed all top level FCC personnel suggesting that if license renewal was also "Admission of Guilt Time," the Alternative Inspection Program (AIP) was essentially a self incrimination study

in futility, since non-compliant items found during such inspections, even though corrected, still set the stations up for FCC fines under this scenario.

Possibly as a result of emails from myself and other interested parties, the Commission quickly issued a press release (DA 03-1437 of April 30, 2003) advising revised instructions relative to 303-S Q-4 so as "...to clarify the limited scope of the "violations" disclosure requirement for purposes of this license renewal form item only." This key portion from the press release explains:

"For purposes of this license renewal form (303s) only, an applicant is required to disclose only violations of the Communications Act of 1934, as amended, or the Rules of the Commission that occurred at the subject station during the license term, as preliminarily or finally determined by the Commission, staff, or a court of competent jurisdiction. This includes Notices of Violation, Notices of Apparent Liability, Forfeiture Orders, and other specific findings or Act or Rule violations. *It does not include "violations" identified by the station itself or in conjunction with the station's participation in an Alternative Broadcast Inspection Program.*" (italics indicate my emphasis).

In other words, stations that have corrected violations of the Rules discovered during an AIP need not report these to the FCC at any time, including the renewal process. The only time a station would be required to report a violation discovered during an AIP inspection would be if the station declined to make the needed corrections, and by that action, in fact, would not have qualified for certification under the AIP.

The majority of fine producing violations I have observed over my past 40-plus broadcast years has almost always included Public File issues. These over-complexified little suckers have been required since May 13, 1965, and have been recomplexified many, many times since by special interest lobbying of the FCC and Congress. This has proven to be very profitable for many communications law firms as they spend many hours explaining and re-explaining all the confusing Public File modifications that continue to develop.

Aside from during inspections, Public Files are rarely seen by members of the public. Nearly all access requests I have noted came from politicians seeking information on how much their opponents pay for political ads; and I have inspected several major market television stations that have never had a request for Public File access in their memory. This leads to an incredible degree of frustration as stations desperately try to do what is right but remain in constant fear of being cited for some technicality.

Nevertheless, the Public File folders provide a station with a primary means of defense when challenged by outsiders during the renewal process. Any allegation of failure of a station to perform adequately in the Public Interest, Convenience or Necessity (PICON), can be easily addressed by a properly maintained Public File. This should be an important incentive for station management and ownership to be actively involved in improving their Public File.

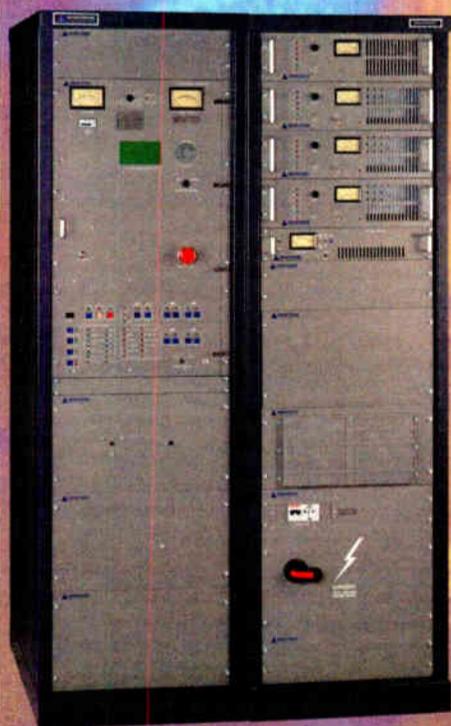
While the FCC's Ferree and his inspectors continue to focus on enforcing the Public File and other Rules, there is a growing understanding of the complex burden involved in the field. Small stations, especially Mom & Pop operations, are often busy struggling just to stay on the air, much less deal with the myriad public notices, press releases, and legal gobbledegook to keep abreast of regulatory changes.

While fines are properly assessed for these violations, the Commission frequently takes into consideration "extenuating circumstances" as long as the station is trying to comply with the Rules and does not try to bluff or challenge the Commission.

Although this has saved many small stations from being crippled by fines, again we need to stress the important of regulatory compliance. Still, Ol' Dad here once wrote a long, long time ago, "When something appears grossly over-complexified - it's time to ask: 'Who the hell is profiting from all this garbage?'" Could it be Confusem, Conem, Bilkem & Milkem, LLP?

Ken Benner really does like broadcast attorneys! An active inspector in the AIP, Ken resides in Tucson, Arizona. Ken can be reached at his email address: bennerassociates@aol.com.

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PCN for 950 MHz Aural BAS

by Dane E. Ericksen, P.E., CS RTE

In ET Docket 01-75, the FCC decided to extend Section 101.102 Prior Coordination Notice (PCN) frequency coordination protocols to 950 MHz Aural Broadcast Auxiliary Service (BAS) fixed links, and also to 2.5, 7 and 13 GHz TV BAS fixed links, for the first time. The PCN requirement was originally scheduled to go into effect on April 16, 2003, but, in response to an April 4 SBE request for a one-year stay, a six-month delay, until October 16, 2003, was granted.

SBE had requested a temporary stay of the PCN requirement because of significant errors for fixed link BAS stations in the Universal Licensing System (ULS), where about a third of all such records were missing receive end coordinates, antenna height, and/or antenna type. These are, of course, critical data for anyone needing to conduct a frequency coordination study. SBE also pointed out the lack of an industry consensus for what interference criteria should be used for 950 MHz Aural BAS frequency coordination studies.

Although SBE fought hard for a second six-month stay, citing continued problems with BAS records in the ULS, SBE lost that battle when, on October 16, the FCC issued an order denying the SBE request for a second six-month postponement of the new PCN protocols. Therefore, as of October 17, 2003, all fixed link 950 MHz Aural BAS applications became subject to PCN, and required to include a PCN exhibit. However, there may be grounds for an appeal of the denial of a further stay: First, the need for a second (and final) PCN stay was in no small part the Commission's own fault, as a result of the FCC taking over three months to decide on the SBE's June 2, 2003, request for a blanket waiver of the \$120 Form 601 filing fee, if the purpose of the filing was to supply missing data due to legacy problems (for example, at one time the predecessor Form 313 did not ask for the geographic coordinates, or receiving antenna type, for a fixed, point-to-point BAS link).

Unfortunately, the FCC denied the SBE blanket fee waiver request, on September 3, 2003. Thus, broadcasters reasonably waiting to find out if a blanket fee waiver would be granted were left with only about a month to fix all of their missing or erroneous BAS records in the ULS. As was documented in the October 1, 2003, SBE request for a second (and final) stay, this proved to be too short of a time period to accomplish this daunting task. Second, in the October 16, 2003, Order denying a further stay, the FCC incorrectly stated that "BAS licensees have had almost a full year's notice, since November 2, 2002, in which to file applications to complete and correct the BAS license records in the ULS." But, the ET Docket 01-75 Report & Order (R&O) was not published in the Federal Register until March 17, 2003 (hence the April 16, 2003, effective date).

FCC staff especially should know that notice of a governmental action is not deemed given until publication in the Federal Register. Therefore, it would appear that the FCC has administratively erred, and that broadcasters are entitled to a four and a half month further stay of the PCN requirement; stay tuned to the SBE web site (www.sbe.org) to see how this plays out. But, just in case no appeal gets filed (it is a work in progress as of the date of this article), or, if filed, also gets denied, here is some of what you need to know about PCN.

PCN PROTOCOLS

PCN protocols are spelled out in Section 101.103(d) of the FCC Rules. Any application for a new station, or a major modification to an existing station, triggers the requirement. Section 1.929(d) of the FCC Rules defines what constitutes a "major" change for fixed, point-to-point BAS stations:

1. Transmitter site change in excess of 5 seconds in latitude or longitude.
2. Any increase (relaxation) in frequency tolerance.

3. Any increase in bandwidth.
4. Any change in emission type.
5. Any increase in EIRP exceeding 3 dB.
6. In general, any increase in transmitting antenna height exceeding 3 meters.
7. In general, any increase in the transmitting antenna beamwidth.
8. Any change in polarization.

For most cases, this will mean that any Form 601 application involving a 950 MHz Aural BAS station will now be required to include a frequency coordination exhibit.

In general, PCN is a two-step process: The first step is selecting a frequency, path and operational parameters that will not cause interference to any existing link (presumably this also includes checking that the new link will not receive interference from any existing link, as well, although this is not an explicit requirement). Then, notices must be sent to all studied stations, informing them of the selected frequency, path, and parameters; licensees receiving such PCNs then have 30 days to respond. "No response" is presumed to mean that the notified station does not object to the proposal, although unfortunately it can also mean that, for a variety of reasons, the notification was never received.

If, after the 30-day period, there are no "unresolved" coordination issues, a PCN exhibit can then be prepared, certifying compliance with all of the PCN protocols. This certification must not be done lightly, as the exhibit becomes part of the application and is accordingly subject to Section 1001 of Title 18 of the United States Code prohibiting willful false statements made on any form or attachment submitted to the federal government. The PCN exhibit must provide the names of all notified parties. In the event of an unresolved frequency coordination issue, an application and its PCN exhibit may still be filed, but must disclose and explain the basis of the dispute

INTERFERENCE CRITERIA

Section 101.105(c) of the FCC Rules provides "guidelines" for applying the interference protection criteria for fixed stations. This rule references Telecommunications Industry Association Telecommunications Systems Bulletin TSB-10, "Interference Criteria for Microwave Systems." In effect, this rule says that if you follow TSB-10F protocols (version F being the most recent edition), the FCC will not "second guess" your methodology; that is, following TSB-10F can be considered as a "safe harbor."

Unfortunately, TSB-10F is dated June 1994, and is definitely now long in tooth. It was written primarily to address the frequency coordination of Common Carrier and Private Operational Fixed Service (POFS) links carrying hundreds of voice channels. It is silent on Aural BAS applications, which involve various combinations of analog mono links, analog stereo links, and digital links, and it is silent on modern-day TV BAS applications involving hybrid analog-digital links (e.g., the MRC TwinStream or the Nucomm DualStream). Section 101.105(c)(2) states that if there are no "generally accepted" criteria for carrier-to-interference (C/I) ratios, then a co-channel C/I ratio of 90 dB or better, and an adjacent channel C/I ratio of 56 dB or better, shall apply (C/I is also known as the desired-to-undesired (D/U) signal ratio).

At Hammett & Edison, and prior to the instant PCN requirement, we have used a co-channel D/U criteria of 60 dB or better, and an adjacent-channel D/U criteria of 0 dB or better if the newcomer link is analog, and 10 dB or better if the newcomer link is digital (because digitally modulated links tend to have more energy near their band edges than do analog links). Alternatively, a noise degradation criteria can be used, where the newcomer station may not degrade the noise threshold of the

protected link by more than 1 dB (this criteria is often used when the protected station is using digital modulation).

So, this raises an interesting point: If TSB-10F does not recognize certain modern-day BAS applications, does that mean that the default and exceedingly stringent protection criteria of 90 dB or better co-channel and 56 dB or better adjacent-channel must be used? If so, this writer believes it unlikely that it will be possible to frequency coordinate any new or modified BAS links in the largest TV markets, where frequency congestion is heaviest.

Yet another issue is what steps must be taken when a BAS record in the ULS is missing critical information such as receive end coordinates, receiving antenna height, and/or receiving antenna type. At H&E, such missing information means calling the station in question and obtaining the information, sometimes with considerable difficulty and expense. Others apparently take certain short-cuts. For example, in its October 7 filing opposing the SBE's request for a further stay of the PCN requirement, the National Spectrum Managers Association (NSMA) suggested that a commercial microwave frequency coordinator (CMFC, this writer's term) could simply send PCNs to all broadcasters in the area, and let those stations figure out whether the proposed new link would be a problem. Talk about getting it backwards! In effect, NSMA would have all other stations do their engineering design homework for them. SBE pointed out this problem in its October 8 Reply, stating:

"Supposing that the coordinators might just send PCN notices to every broadcaster in a market, this places a massive and completely unfair burden on broadcasters to review and analyze each and every PCN mailing to see for itself whether the application will have an effect on their facility. That process is exactly backwards, and does not exist now under the procedures used by the Part 74 volunteer coordinators operating under the auspices of the SBE.

"The commercial coordinators must, under the PCN process, bear the burden of doing its homework first, and not to rely on protests to support its supposed coordination, based on a seriously flawed database, in order to set things right. If that is the case, the coordinator is providing no service at all, and is simply fishing in a murky pond. The present, local coordination procedures are far preferable and have worked fine due to the volunteer Part 74 coordinators' familiarity with the market and the lack of reliance on the flawed ULS database." ... but, to no avail.

Another CMFC reportedly simply assumes a receive location at a distance of 25 miles on the indicated transmit azimuth when missing or bogus receive end coordinates are found. This raises fascinating corollary questions such as what do they do when the transmit azimuth is also missing, and even when the transmit azimuth is available, and a completely arbitrary and capricious set of receive end coordinates are derived, what height and antenna type are assumed? The directivity of the receiving antenna can have a huge impact on the frequency coordination study.

DIFFICULT TIMES AHEAD

PCN will now substitute frequency coordination studies done by CMFCs most likely using just the ULS records for its frequency selection, and will likely forgo the wisdom and experience of a local BAS frequency coordinator. Although it is not the job of a volunteer coordinator to conduct detailed engineering studies (that is the obligation of the newcomer, or the newcomer's engineering consultant), what a local BAS coordinator does provide is information on who needs to be contacted to ensure that the latest information on actual facilities is used, and this information can be invaluable.

In contrast, a CMFC relying on only the ULS is less likely to generate an accurate frequency selection, at least until the errors and omissions for BAS records in the ULS get fixed. Given that PCN for BAS links is now here, it becomes all the more important for existing BAS licensees to ensure that their BAS records are accurate and complete in the ULS, even if this means filing multiple Form 601 applications, each with its own \$120.00 filing fee. Otherwise, you may find a CMFC on the other side of the country issuing a PCN that will result in interference.

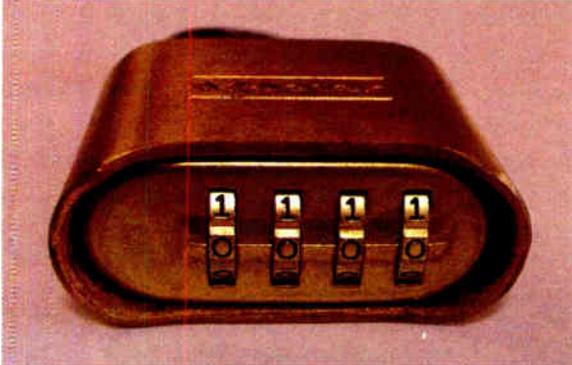
Dane Ericksen is the Chairman of the SBE FCC Liaison Committee, as well as Senior Engineer, Hammett & Edison, Inc., Consulting Engineers, San Francisco, California. He can be reached at dericksen@h-e.com

Tips From the Field

Padlock Security Tip

Contributed by John Stortz - WKES, Lakeland, FL

[TAMPA, Florida - December 2003] Several of our tower sites use user-determined combination padlocks on the fence gates. These padlocks have four number wheels to set the combination. Here is what I have noticed: Usually persons entering will likely leave the padlock set to the combination until they depart. This makes the combination accessible to anyone who drives up and looks at the padlock.



Those opening the gate should immediately change the thumbwheels, so others cannot read the combination from the open padlock. Furthermore, those numbers left exposed to the weather will show signs of "weathering" more than those numbers that remain inside the lock; the numbers for the lock's access eventually could become brighter than the other numbers. A way around this is to always reset the lock to "0000." This makes it much more difficult for an outsider to figure out the combination.

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Things You Need to Know

FCC Opens AM Filing Window

[WASHINGTON, D.C. - December 2003] It has been a while since the FCC has accepted applications for new AM stations and for Major Changes to existing facilities in the Non-Expanded Band (under 1600 kHz and below). If your AM station has been waiting for an opportunity to make a major change (Community of License or frequency), there will be a five day window at the end of January when applications will be accepted.

There are a couple of things worth noting about this window. Clearly the FCC is expecting more than a few applications, as they will freeze all Minor Change applications prior to opening this window. By the way, the definition of "minor" may have changed from the last time your station sought a CP. For example, the Commission has reclassified many technical changes in AM operations, such as modifications of power, antenna height or antenna location, hours of authorized operation, or the addition of nighttime service, as minor changes.

It would be a prudent move to check with your consulting engineer immediately to whether you can benefit from this process, which may include an auction to resolve some mutually exclusive applications. And, since Minor Change applications filed before the window will be protected, if you are planning any changes, it might be good to get them filed immediately.

Checking the calendar, the process stacks up as:

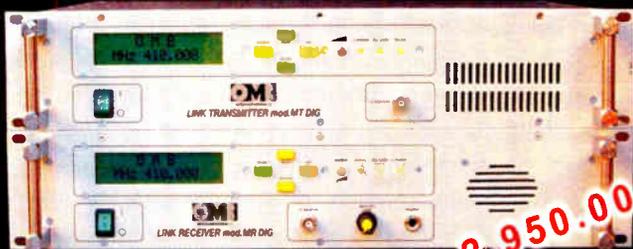
1. Minor Changes need to be filed before January 12, 2004 in order to be protected during the Major Change window. In fact, any Minor Change filed between January 12 and 30 will be dismissed.

2. New Applications and Major Changes for Existing AM stations will be accepted ONLY from January 26th to January 30th, 2004.

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The new "Rack-Able" SS 4.1 III switcher replaces the popular SS 3.1 while adding a fourth stereo input channel and front panel control. We've kept the best of the SS 3.1 features and added a few more.

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From the Transmitter Shack

The Transmitter I Loved From Afar

by Don Kimberlin

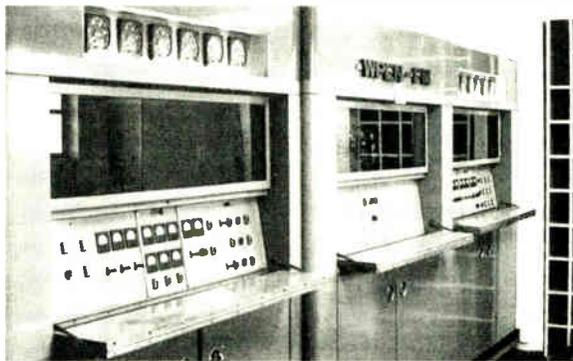
[LANDIS, NC - December 2003] I only saw her once, but I fell in love with her immediately. She was then a young beauty of a Westinghouse FM transmitter located at WFLA in Tampa. She had first been installed at WFLA's separate FM site on the 22nd Street Causeway just outside downtown, and when WFLA put channel 8 on the air, they moved her to the new TV transmitter site at Riverview and gave her a side-mounted antenna 900-odd feet up.

From there, she produced the most commanding sort of FM signal from her 10 kW RF output that one could imagine. Her 93.3 FM signal boomed like a local all the way across Florida, from its Gulf Coast to the Atlantic. That was proved in a curious way, when during FM's darkest days, WFLA applied to the FCC to reduce her power level in order to save some pennies in power bills and tubes. The FCC refused to permit a reduction in her power because farmers over on the Atlantic coast objected, saying they listened to her for their farm reports early each day.

A PINUP FOR THE MIND

I carried a picture of her in my mind for years. Then, one day, I found the photo you see here in the broadcast archive at www.olderadio.com. Although this is one of her 3 kW smaller sisters, the photo shows the same family characteristics that so enamored me in that one brief visit almost a half century ago. Look at all that instrumentation! It looks like every tube in every stage was metered individually!

And, check out all those telephone lever switches! As I recall, it appeared everything back inside was motor-driven and controllable from the front panel! You could tune that baby from zero to max while admiring her full frontal view!



OPEN VIEW

Better yet, look at those panoramic windows! Looking inside her was like looking over a veritable telecommunications landscape, where you could even see the position of every remote switch and rotary inductor throughout her inner electronic being!

Yes, I have to openly admit, I loved her from afar all those years ago, and I have yearned to love her in person ever since. But, like a movie star, she was the property of someone else, and alas, she is my one and only unrequited transmitter love to this very day!

Get Each Issue of Radio Guide Now on CD!

The BDR is Now Adding an Archive Edition of Each Issue of Radio Guide. With Version 1.7 the entire year 2003 is now available.

The BDR (Broadcaster's Desktop Reference) is an ongoing effort to provide useful tools, information, and history of interest to broadcasters.

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.olderadio.com/latest.htm

The proceeds from this CD are going to be put into improving the next edition of the CD, and supporting Olderadio.com and its efforts to document and display the history of our industry.

We are suggesting something in the range of \$15-\$20 (or more, if you really want to support the Olderadio Project).

We'll send you a copy of the CD (via postal service), and personally notify you when Version 2.0 is made available. (The plan is to provide a free upgrade to registered users, or an updated CD for just the cost of shipping and handling.)

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Radio Guide Book Shelf

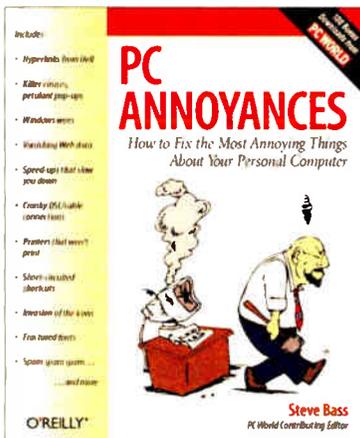
Good Hacking

Among the books that I find most useful are those that anticipate my needs and make it easy to accomplish my goals. O'Reilly has several series of books that do this, depending upon my needs of the moment.

DEALING WITH ANNOYANCES

For example, the "Annoyances" series, including *PC Annoyances: How to Fix the Most Annoying Things About Your Personal Computer* by Steve Bass, are books that cover many of the issues that arise when someone asks "What is it about PC that bothers you the most?" This easy to read book helps get you past the roadblocks that seem determined to prevent your PC and your software from talking to each other properly.

As you can imagine, the Annoyance series has books to discuss various OSs and programs, including XP. *Windows XP Annoyances* by David Karp focuses on the



various things XP does differently from other OSs and offers solutions, tips, workarounds and warnings to help you customize and troubleshoot your XP settings. You can see a sample from the book at <http://www.oreilly.com/catalog/pcannoy/> as well as links for literally dozens of utilities (many free) to help manage your computer.

IF YOU REALLY WANT TO DIG IN ...

Another O'Reilly series takes a different approach. Once a power user gets their computer set right, and everything running smoothly, the "hacker" mentality often sets in: "What can I do to make this better?" And, this is where the "Hacks" series comes in to play. Each *Hacks* book contains 100 tips, tools, and tricks to change the unchangeable, control the controls, etc. In other words, here are ideas from folks who seek to squeeze out the best from everything.

For example, if you have your Windows XP machine set up and running, perhaps you would like to know how to "press the pedal to the metal" so to speak. Preston Gralla's *Windows XP Hacks* include information on speeding up file downloads, fixing network problems, surfing anonymously, and more.

The entire series of Hacks books can be found at <http://hacks.oreilly.com> and, in addition to XP, has

books devoted to hacking your way to the best Linux Server and Mac OS. Additional tips and tricks enhance wireless computing, Google, eBay – there is even a book listing 100 TiVo Hacks. There are samples of the hacks from each book on line, along with additional readers contributions.

O'Reilly, a well regarded source of information for programmers and users, also publishes a wide variety of books on different applications and programming languages, with information for beginners as well as experienced programmers. Links to information on Java to C/C++ to .NET, and many more languages, as well as a comprehensive catalog, can be found right on the home page: www.oreilly.com, or call them at 800-998-9938

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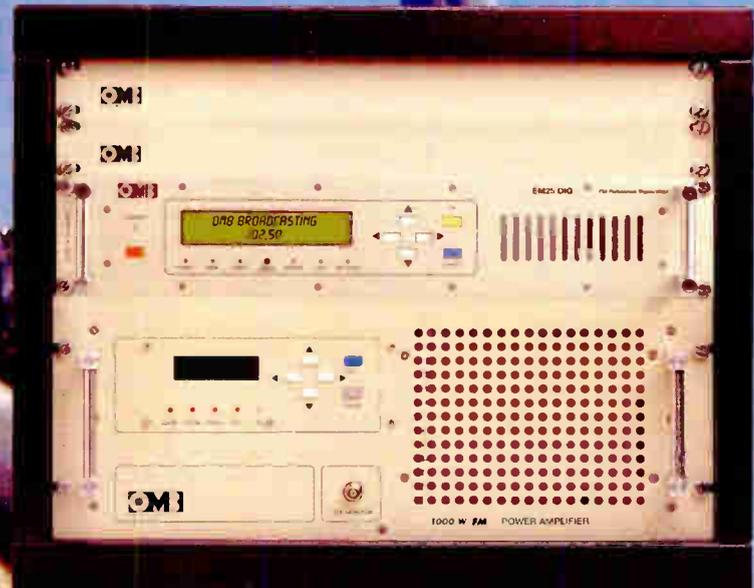
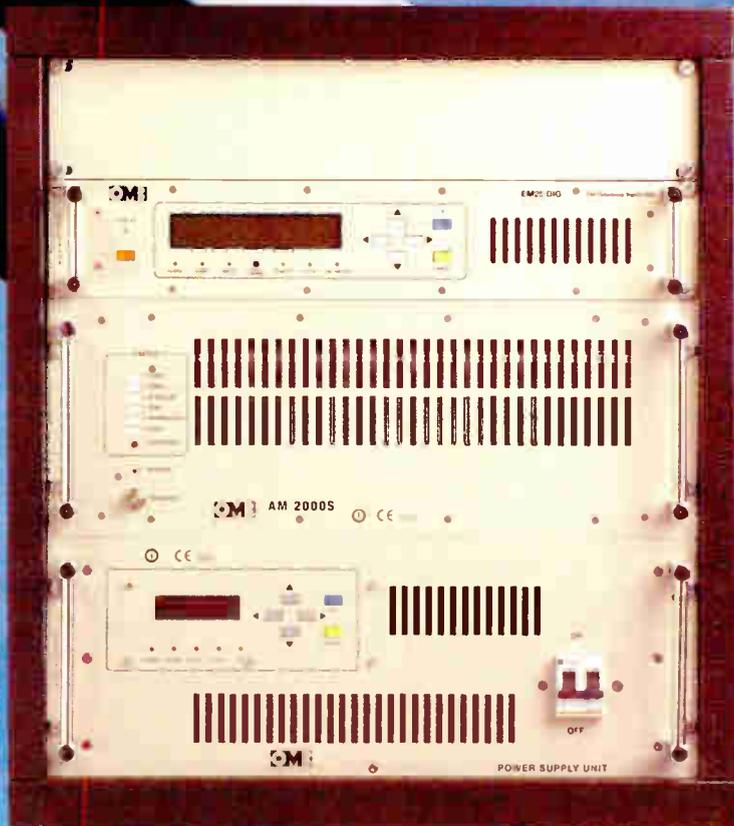
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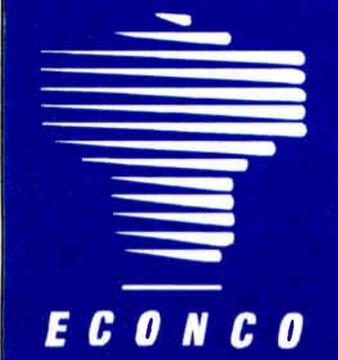
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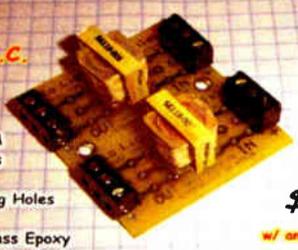
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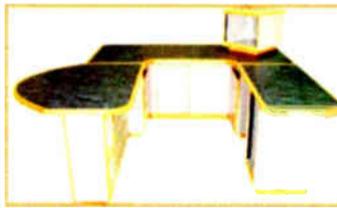
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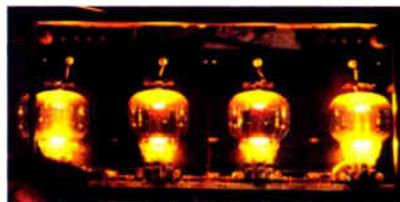
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Frequency Response: Main: 20HZ to 15kHz (-3dB); SCA: 4 kHz min, (6KHz w/o De-emphasis).

De-emphasis: Main: None/50/75 uS; SCA: None/150/220 uS.

Distortion: Main: Less than 1% THD at 100% Mod; SCA: Less than 1.5% THD.

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Industry Updates

ERI Buys Andrew Assets

Chandler, Indiana - November 24, 2003 - Electronics Research announced today that it has closed on its agreement to purchase from Andrew Corporation, selected assets from its Orland Park, Illinois location, and all of the assets at its Gray, Maine facility. The selected assets sold include filters, combiners and RF components for television and FM radio, antenna systems for television broadcast applications, and rigid transmission line products including the MACXLine(r) and GUIDELine(r) brands. Financial details of the transaction are not being disclosed.

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Radio Guide Ads: Dec-03

Advertiser - Page	Website
Armstrong Transmitters - 23	www.armstrongtx.com
Audemat-Aztec - 9	www.audemat-aztec.com
Avcom-Ramsey - 21	www.ramseyelectronics.com
Balsys - 9	www.balsys.com
BEXT - 15	www.bext.com
Broadcast Connection - 15	www.broadcastconnection.com
Broadcast Devices - 19	www.broadcast-devices.com
Broadcast Software Intl. - 3	www.bsiusa.com
Broadcast Tools - 24	www.broadcasttools.com
Broadcast Warehouse - 15	www.broadcastwarehouse.com
Conex Electro Systems - 13	www.conex-electro.com
D&H Antennas - 11	www.dhsatellite.com
Decade Transmitters - 9	www.decade.ca
Econco Tubes - 9 & 28	www.econco.com
Electronic Mfg. - 19	www.rectifiers.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 - 7	www.jkaudio.com
Kahn Communications - 23	none
Larcan FM Translators - 7	www.larcan.com
Lightner Electronics - 7	www.lightnerelectronics.com
Micro Communications - 21	www.mcibroadcast.com
Not Ltd. - 21	www.nottltd.com
OMB America - 24 & 27	www.omb.com
Omnia Audio - 16	www.omniaaudio.com
Orban - 32	www.orban.com
Peter Dahl - 11	www.pwdahl.com
Phasetek - 19	www.phasetekinc.com
Prophet Systems - 31	www.prophetsys.com
RF Specialties - 13	www.rfspec.com
SCMS Inc. - 11	www.scmsinc.com
Sine Systems - 21	www.sinesystems.com
Telos - 17	www.telos-systems.com
TFT - 11	www.tftinc.com
Tieline - 5	www.tieline.com
Transcom - 13	www.fmamtv.com

://Radio Browser

Broadcast Archives

Radio History on the Web

www.olderadio.com

Radio Broadcast Links

Industry-wide database of radio web-links.

www.radiolinks.net

Orban Product Manuals On-Line

Free, downloadable copies of Orban tech manuals at: <ftp://ftp.orban.com/>

Part 11 - EAS

www.access.gpo.gov/nara/cfr/waisidx_02/47cfr11_02.html

Part 15 - Unlicensed Operation

www.access.gpo.gov/nara/cfr/waisidx_02/47cfr15_02.html

Part 73 - Licensed Operation

www.access.gpo.gov/nara/cfr/waisidx_02/47cfr73_02.html

Part 90 - Licensed TIS/HAR

www.access.gpo.gov/nara/cfr/waisidx_02/47cfr90_02.html

Date Book

Radio Conference Guide

List your Convention or Gathering Here

Email: radio@broadcast.net

Great Lakes Broadcast Conf. - March 7-9

Lansing, Michigan

www.michmab.com/conferences/glbcmmain.html

IBS College Radio Conf. - Mar 12-14 - New York

www.ibsradio.org

Black College Radio - April 16-17 - Atlanta, GA

www.blackcollegeradio.com

NAB Spring 2004 - April 17-22 - Las Vegas, NV

www.nab.org

Hamvention® 2004 - May 14-16 - Dayton, Ohio

www.hamvention.org

NAB Radio Show - October 6-8 - San Deigo, CA

www.nab.org

"Field Notes"

Letters From Our Readers

Dear Editor:

I liked very much your article in the November 2003 issue of **Radio Guide** entitled: "Broadcast Maintenance in the 21st Century." It sure tells it like it is, and how it was. I remember one GM saying that engineers were a necessary evil. I let him know that, without us, he wouldn't have a job.

Shortly after that ... I didn't, but I didn't like working there anyhow. Good work and thanks.

From: Larry Bloomfield, Bloomfield Enterprises, LLC

Dear Cornelius:

I found your part 10 a really fine explanatory writing ... I am an owner, not a full time engineer. Keep up the good work.

From: Guil Dye

Cornelius Gould Replies:

Thanks for the good words!!!

I have parts 1-7 [Audio Processing From the Ground Up] located on my website: <http://gould.com/processing/> More will be posted as the .pdf's roll in! We're glad to have you on board with Radio Guide, and hope you enjoy all the nifty things to come!

Dear Editor:

The magazine looks way better with the higher-quality paper, in my humble opinion. Thoroughly enjoyed your article on maintenance and read with interest the article on LTLPAM (lower than low-power AM).

From: Rich Robbin

Radio Guide Replies:

2003 was a year of change for us, and we're doing our best to provide you with the the articles and readability that you need.

"We've identified our needs and we're absolutely convinced the solution is NexGen."

Gordon Carter
WFMT-Chicago

"A beginner to the industry, I found NexGen easy to learn. The flexibility really makes the system work for you."

Amy Flaherty
KNOM-Nome Alaska

"NexGen is doing exactly what we expected. We're extremely pleased."

Clint Barrick
KOHM
Texas Tech University

NexGen "increases operation efficiency" and "allows our staff to be more productive."

Jim Clark
KBYI
Brigham Young
University-Idaho

NexGen 2 Studio Suite, the revolutionary "all in one" radio system designed with you in mind.

Prophet Systems has integrated all our software packages into one ultra powerful software suite, NexGen 2 Studio Suite. NexGen 2 is the product of our many years of experience, and our well deserved reputation for thinking outside of the box. NexGen 2 utilizes the same classic Prophet feature-rich software, but it's packaged into hardware that maximizes your investment of money and time like never before!

MusicGen

*Finally a professional music scheduler at a great price-FREE!
Download MusicGen from our website, and keep it as our contribution to great radio!*

Choose from four affordable Studio solutions, each designed to handle your specific needs.

Studio 11 ~ \$4,500

Cost-effective solutions for the standalone AM, FM or LPFM. Ideal for remote or home-based voice tracking and music scheduling.

Studio 22 ~ \$7,000

Designed for mostly automated, satellite or voice tracked stations.

Studio 41 ~ \$7,500

Perfect for active control rooms and production studios.

Studio 44 ~ \$9,700

The best of both worlds! This powerful workstation can handle live or automated operations.

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Are you ready for a breakout performance?

The notion of "perfect sound" is always going to be fodder for debate among radio pros far and wide. But regardless of what you hear as "perfect" most PD's and engineers agree that major market radio sound demands consistent loudness, punch, and clarity. In fact, more than ever, it demands the Orban Optimod-FM 8400. With five times the raw processing power of its predecessor, the Orban Optimod-FM 8400 delivers a consistently louder signal with lower distortion than any other product on the market, analog or digital...and at lower cost. The "look ahead" intelligent design means you'll pump out polished, balanced sound regardless of the input – be it speech or music – and you have the flexibility of customizing that sound with over 20 expertly designed preset audio textures. The Orban Optimod-FM 8400 also features three levels of password-protected access control and full TCP/IP network and PC dial-up remote control. What a package. But then...you wanted perfect, didn't you?

For more information on the Orban Optimod-FM 8400 call us today at 1-800-622-0022.



www.broadcast.harris.com

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