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Transmitter Efficiency Comes of Age

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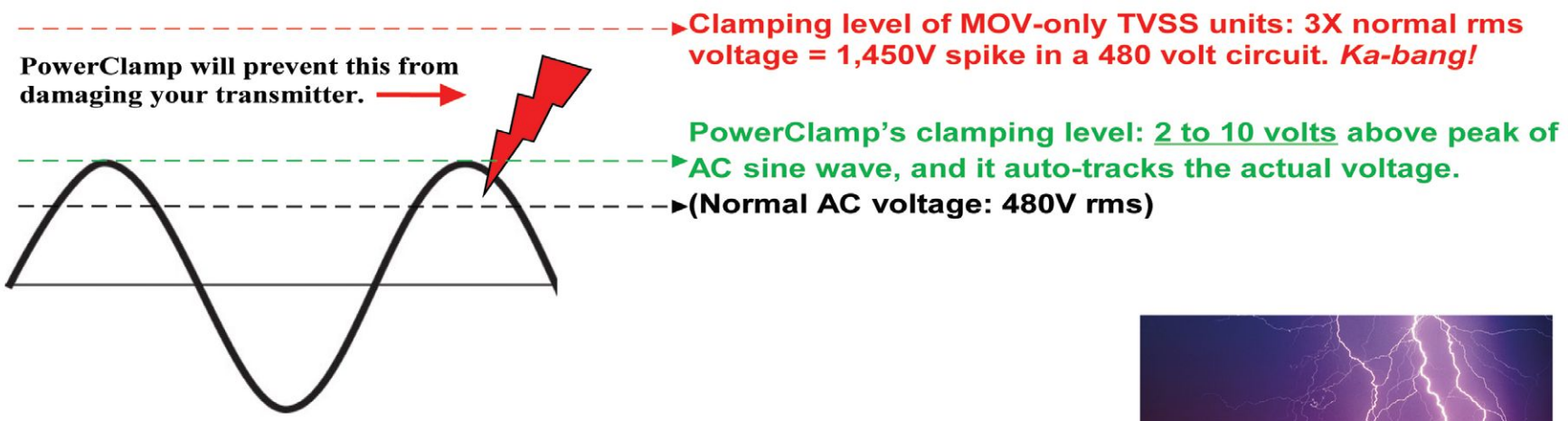

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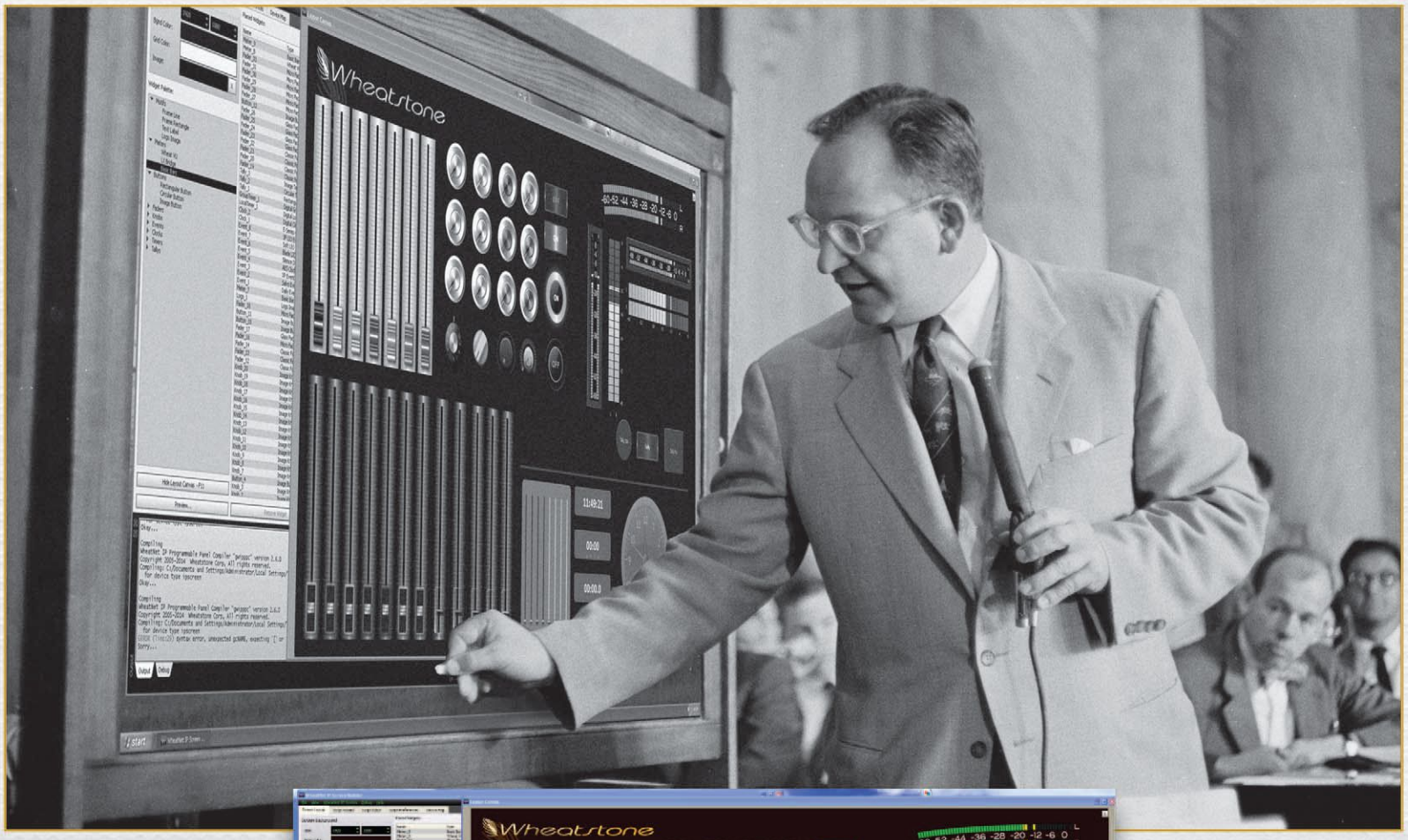

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Cover Photo: GatesAir production line. Rob Munson, Manufacturing Supervisor (left), and Ben Robinson, Manufacturing Manager (right).

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Cover Story

Transmitter Efficiency Comes of Age

by Rich Redmond, Chief Product Officer, GatesAir

It's a new dawn for reducing costs at what's traditionally been the most expensive stage in the air chain.

The broadcast transmitter is shedding its long-standing reputation as an energy-hogging beast with a massive footprint – and for very good reason. Manufacturers have made exceptional strides in transmitter efficiency in recent years, often through proprietary design strategies that enhance power density, amplification and other built-in resources. These developments are lowering long-term operating costs for the broadcaster and network operator.

Several drivers have influenced manufacturers to design more efficient transmitters. Europe has been particularly aggressive with carbon footprint taxes and fees, for example. As a result, many of our customers across Europe have long been focused on building more efficient over-the-air networks. Globally, many broadcasters are following corporate mandates to institute "greener" facilities and operating procedures to minimize environmental impact.

A third factor is the age-old concern of reducing general operating costs. Whereas many broadcasters and network operators initially sought cost reduction at the studio or headend, the focus has gradually shifted to the transmitter room.

These three factors – government regulations, socially conscious corporate mandates, and general operating cost reduction – have all played fundamental roles in transmitter design efficiency. The ultimate goal for vendors is to deliver high-efficiency, over-the-air systems that deliver low total cost of ownership for their customers.

Design Factors

Many design factors play a role in transmitter efficiency, but most revolve around three pillars: footprint, maintenance and energy management – the final of which mainly constitutes power consumption and effective cooling.

Gains in energy efficiency certainly have an impact on the customer's bottom line over time. In a typical FM Analog system, GatesAir calculates a typical total cost of ownership savings of 38% over previous-generation systems – nearly $136,000 over 10 years, based on transmitter system, transmitter cooling and building HVAC costs at an energy rate of 0.14 per kW/hour.

However, for the purpose of this article we'll focus more on the operational value afforded through modern design efficiencies.

On the footprint side, the transmitter continues to shrink from a size and weight perspective. For example, the typical high-power, high-efficiency GatesAir UHF transmitter today is up to 75 percent smaller, and significantly lighter than models one decade ago. These reductions play a significant role in cost savings from initial shipment through its operating lifecycle:

• **Modular designs:** Shipping transmitters modularly reduces cargo size from door to door. Modular shipments also accelerate installation once on site, simplifying the process of connecting and bringing the transmitter to air.

• **Reduced transportation costs:** Significant weight reductions make the transmitter far less expensive to transport. And the days of requiring massive cranes and machinery to move new transmitters into the building are quickly passing, requiring only a simple truck bed for delivery.

• **Personal safety:** Previous-generation designs typically dictated that heavier power modules and supplies inside the transmitter required a two-man lift. This meant dispatching two engineers to a site for maintenance. With these components now much lighter in weight – often under 10 kilos – a one-man lift is satisfactory. This essentially cuts service call costs in half.

• **Building space:** The smaller overall footprint not only opens up more room for maintenance, auxiliary equipment and general comfort – it brings the additional benefit of reducing rental costs. This is especially significant in Europe, where many network operators rent floor space in shared facilities. Similarly, building owners open more rental space to other broadcasters by freeing additional floor space through more compact transmitters – an impactful boost to their bottom lines.

To expand on this last point of facility utilization, one of our European transmitter customers reports that the smaller footprints eliminate the need to expand buildings. In the past, this network operator, which operates its own facilities, in some cases added real estate to existing buildings upon adding a new program multiplex. The costs and labor that went into these initiatives were massive – to the point of easily rising into the hundreds of thousands of Euros.

On the point of reduced transportation costs, a U.S. contract engineer by the name of Victor Vickers recently reported on an installation of a low-power GatesAir transmitter at KLMS-FM. For the first time in his 30 years in the business, Victor drove to the transmitter site with the fully configured unit in the front passenger seat of his pickup truck.

Much of this size and weight reduction has to do with improvements in power density through modern LDMOS device-driven technology, which constitutes the transistors used in transmitter power amplifiers. Specifically, in higher power models, these advancements achieve more power out of a single rack, often eliminating the traditional second rack. On the lower power side, that single rack consolidates three or four transmitters, versus taking up an entire rack each.

In the GatesAir universe, many of these benefits correlate directly to what we call broadband high-efficiency amplification.

Broadband Amplification Demystified

In layman's terms, broadband amplification represents a further simplification of interior design. Additionally, the presence of a software-defined modulator enables simple frequency and modulation changes.

Fewer frequency-determined parts invite higher efficiency from a maintenance standpoint. Instead of labor-intensive component and sub-assembly changes, relocation to a new frequency is software-driven. By punching the new channel frequency into a software-defined modulator, the single amplifier – which is, by definition, broadband – readjusts for the frequency change. That reduction of amplifiers and other interior components also results in the need for fewer spare parts.

Consider how this is useful for large transmitter network operators in Europe, who may be operating several program multiplexes across many different frequencies. In addition to simplifying frequency changes, the same set of broadband spare parts can be shared across the transmitter network.

Software-defined modulators also accelerate in-the-field transitions from one standard to another. Through the same single amplifier, moving from analog to HD Radio is now a software-driven procedure, versus maintenance-heavy, component-driven alterations. This protects the investment for the customer who buys today with plans to evolve moving forward.

Advanced Cooling

The development of liquid-cooled transmission for FM Analog and Digital promises an even greater return on investment. Liquid-cooled systems can provide as much as an additional 8 percent improvement in operating expenses, over even our current air-cooled systems.

Most OTA broadcasters in the U.S. use air-cooled systems that dump heat into the transmit room, and rely on HVAC systems to keep things cool. In that scenario, many broadcasters said they spent more money running their HVAC systems than on the transmitter itself. Today's advanced heat exchange designs help to temper power consumption and bills associated with air-cooled systems, but the fact remains that continuously cycling AC systems to moderate transmitter-produced heat consumes a fair amount of power, and is essentially a redundancy.

The use of liquid-cooled systems will allow broadcasters to further drive down cooling-associated operating costs in RF facilities. Liquid-cooled systems were once only the domain of very high-powered applications, and mostly used for tube transmitters. Air-cooling, meanwhile, was mostly reserved for newer solid-state systems.

Creating a hybrid approach, GatesAir has developed a liquid-cooled system that operates at a much lower power level (about 1 kW), improving efficiency while using a simplified liquid-cooling solution. In the GatesAir design, heat that is generated by the transmitter is evacuated out of the building via the liquid cooling, with the heat exchange located outside.

There are many avenues to explore in transmitter efficiency, and we have only scratched the surface here. For example, an entire article could be devoted to efficiency improvements through intelligent heat exchange and its associated cooling strategies.

However, the takeaway here is that multiple contributing factors have evolved to the point where the broadcaster and network operator can save a great deal of money over the lifecycle of the transmitter – from minimizing spare parts and labor-driven operating costs – while maximizing flexibility across multichannel systems and bringing more services to air. Overall, improvements in transmitter efficiency offer a clear win for today's broadcaster. *– Radio Guide –*

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Studio Site

Your Money or Your Bytes!

by George Zahn

We've been hearing more horrifying stories from broadcasters around the country. Put yourself in the place of a manager, program director, or engineer. The station's locked up and on automation for the night, and you're out for the evening in the car. You tune in and hear nothing. En route to the station, you start to rule out things such as STL, transmitter malfunction, power outage and more.

You arrive at the studios to discover that most everything is running properly. Everything, that is, except for your automation system. You try rebooting. You try multiple trouble shooting measures, but you soon discover that your entire automation system is locked up by an encrypted malware that is keeping your automation from functioning at all. You even try re-running your malware and virus programs to clean things up – nothing.

The ultimate insult, added to the existing injury, is that the culprit who planted the malware is demanding a payment for them to release your computer. Now you have the dilemma. If you pay, there's no guarantee that someone who planted the malware would even follow through on releasing their grip on your livelihood. Even if they do, there's no reason to believe that they wouldn't try the same scheme again.

Truth is Scarier Than Fiction

This is real – it's not just something from a Dan Brown or Michael Crichton novel. Stations are being infected with what is called ransomware, a form of malware that basically disables your automation system and holds it hostage. Stations without the proper safeguards or decent backup systems have been falling prey to these scammers.

Radio Magazine, mlive.com, and WOOD-TV have been reporting on one station in particular. WAKV-AM, licensed to Otsego, Michigan, has been hit twice by such an attack in January, and they are being urged to file FBI complaints. Many stations who have been temporarily disabled may be embarrassed to admit the issue, but in this article, my goal is to help all of us in broadcasting avoid this situation altogether.

I sat down for a conversation with my own Ops/Computer Services Manager at WMKV, Dave Schram. He also is also ACSP (Apple certified) and is a co-host of our weekly Computer Talk program. Realizing that no plan may be one hundred percent foolproof, I asked him, in theory, how something like the hijacking of an automation computer can be done and how to avoid the problem. I urge every manager or engineer to share some of these very simple concepts, with whomever is making your network and computer decisions, as soon as possible.

Gotta Keep 'Em Separated

First, how do we prevent the problem that has paralyzed stations such as WAKV? The first line of defense is simple, according to Schram. "Keep your automation and production systems on a closed network which is not exposed to Internet traffic or access," he warns, "otherwise anything that comes in via e-mail, Internet traffic, or even thumb or flash drives, can potentially introduce a computer virus, worm, or malware."

Our station does have Internet access in our air studio for basic information and for checking radio program blogs, but that computer is simply isolated from everything else except the Internet – its only purpose is the internet. All you need is a basic computer, maybe a refurbished model or hand-me-down.

"The costs of basic computers are so low, I'd get a lower end new computer and re-use your monitor," adds Schram, "If the noise of having another computer in the air studio is a problem, place the CPU box outside the studio and use a KVM switch to extend the controls to the air studio. A USB connection will cover 10-15 feet. Longer runs are better with a CAT 5 connection."

Rule of Thumb Drive

So the message is basically clear – keep your automation/production system as isolated as possible. That even goes for inserting music files as data files (mp3s, wav files, etc.) from thumb drives, CD or DVD, or any other source. Data files can be a disguised virus, and the potential for infection can even be greater if the music came from an unknown, or peer-to-peer sharing source. In that case, it may be better to open that file on a separate (less critical) computer and burned as an audio CD, then ripped into the production/automation system.

"If you're lucky, your facility may have strong protection such as SOPHOS or even that accompanied by a hardware firewall," says Dave Schram, "nothing is one hundred percent effective, but I recommend paid products such as ESET NOD32 and Black Ice Defender. The paid versions often update their list of viruses, worms and malware hourly."

Schram also recommends, for any computers using the Internet, that the owner get an antivirus program that includes safe website search capability. This often shows up as tool bar addition on your browser. WMKV is running WideOrbit automation, and by keeping our studio web browsing separate, we all sleep better at night. I'm not trying to make any of us paranoid, but sometimes I think Dave Schram is.

"This will really bake you," he says, "there are viruses out there that go beyond corrupting software and data in your computer. There are some that can attack the firmware on a computer's motherboard." Youch! That means that even if someone has a solid backup plan running regularly for all of my automation system, a stray virus, could actually destroy the core of the computer, not just lock you out.

"Addressing" the Issue

All the better to keep our automation and production machines as clean and quarantined as possible. I had to ask how a station such as WAKV could have been nailed twice in one month by ransomeware. Here's one possible scenario per Schram:

When using broadband connections, it's common for a radio station to be given a static IP (Internet Protocol) address by the ISP (Internet Service Provider). That static, unchanging IP address is your location on the World Wide Web. Dave advises that if your station is still mingling your automation and Internet, and you are a victim of ransomeware, that you immediately contact your ISP (the company through which you secure your internet access) and request a new static IP address.

While this is still not ideal, it makes your station a moving target for those trying to take over your automation. Changing to a new static IP could create a very short term inconvenience, affecting an in-station hosted website or streaming, because it will take the Domain Name Servers on the Internet between an hour and a day to locate the new IP address for your station.

So here are Dave's tips, if you fear your automation system is susceptible to attack by ransomware:

1. Make immediate plans to isolate your automation/production system going forward, and create station policies and security plans to keep your critical system computers isolated. (By the way, reinforcing the firewall and antivirus for your traffic and billing or other critical computers is also a good idea.)

2. Backup up your data on a regular basis, and check to verify the backups are happening and accessible.

3. Make sure you have System Restore set up on your computer.

If you are attacked by ransomeware:

A. Run a good dependable antivirus program (the paid programs may be a bit more robust).

B. If that doesn't work, run the same program with the computer in SAFE mode.

C. Try the free program Malware Bytes, first in regular mode, or if ineffective, in SAFE mode.

D. On Windows computers, you can also try Windows Safety Scanner.

E. Try the Factory Restore for the computer.

Always keep in mind that if you pay someone to release your computer from ransomeware, there's no guarantee that they'll actually ever release it. There's also no guarantee that, as in the case cited in this article, they won't come back again if you keep the same IP address.

George Zahn is a Peabody Award winning radio producer and Station Manager for WMKV-FM at Maple Knoll Communities in Springdale, Ohio. He is a regular contributor to ***Radio Guide*** *and welcomes your feedback. Share your stories with others by sending ideas and comments to: gzahn@mkcommunities.org*

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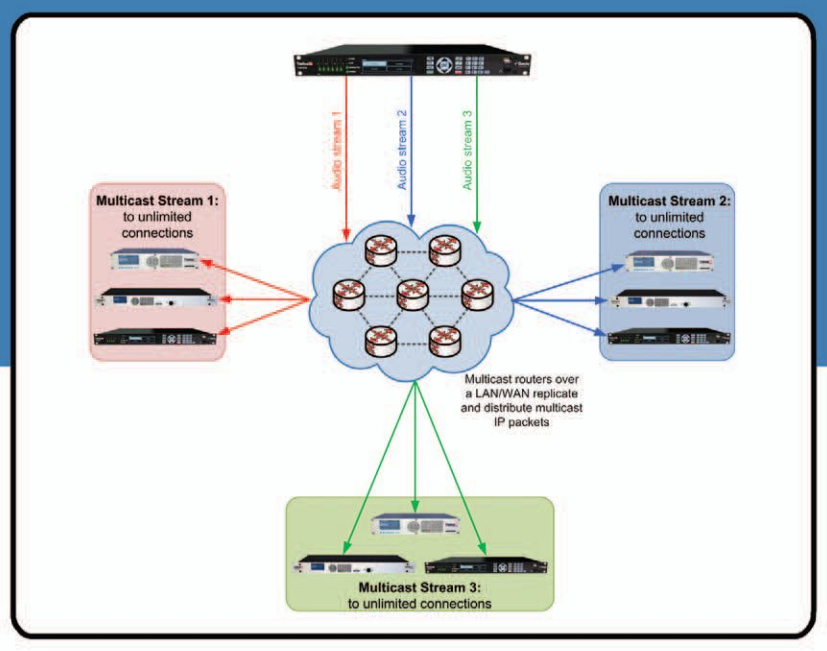

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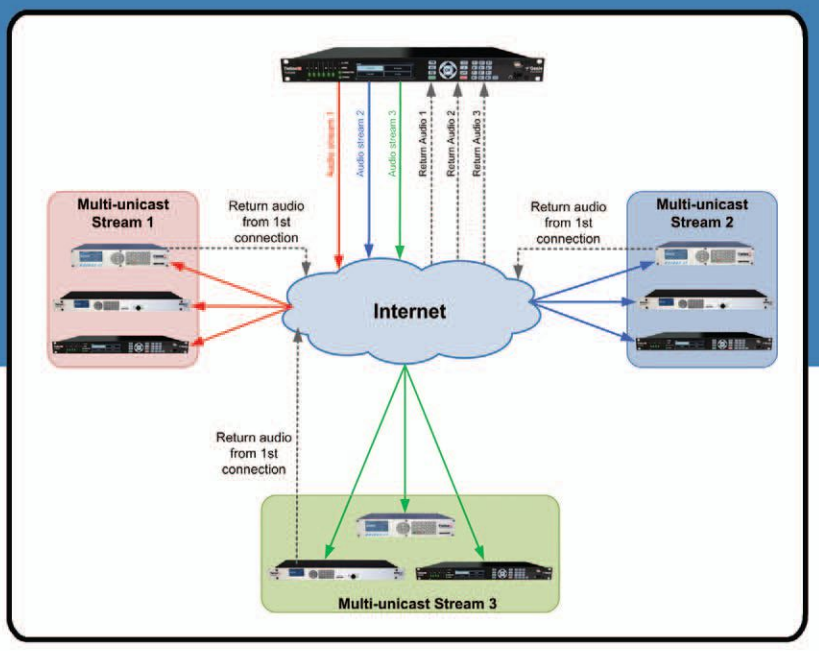

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Tech Management

Much More Than Before

by Chris Tarr

Times have changed for the broadcast Engineer.

It used to be that we could hide in our shop all day, aligning cart decks and creating new gadgets and gizmos. That's not so much the case anymore, and really, that's OK.

Today's Engineering professional is not only a studio and transmitter repair person, they're often a valued department head, helping the General Manager watch the bottom line, and keeping an eye on the future so that, as new challenges come up, they're ready with the right technological answer. There are those who really just want to "fix stuff" and there's nothing wrong with that. However, there has never been a moment where "technology leaders" are needed more than right now.

We need to know the business of broadcasting, and use that knowledge to help the stations we work for succeed. Not just by keeping them on the air, but also by bringing extra value to what we do every single day.

For example, in the past six months, I did a thorough telco audit for my stations, literally saving them over $2,000 month by assessing what we were using and how we could leverage new technology to eliminate those recurring costs. That's a big number for my General Manager, and I know he really appreciated the cost savings I came up with. On that same token, I'm now leading the charge in my two markets to move to SIP trunks for phone service. That alone will account for a combined savings of over $3,000 a month. That's not an inconsequential number.

But that's not all. There are plenty of other places where we've gained reliability and efficiency. Simple things like going through our Audio over IP (AoIP) network and optimizing the network, or finding ways to make the technical facilities easier to use. I spend a lot of time thinking about ways to make things work more intuitively or efficiently. Nothing is every really "finished" in that respect. Things that I put together long ago still get "upgrades," as I think of ways to improve them.

"Leading by Example" Comes Into Play

Last June, I returned to my former job at Entercom's Madison and Milwaukee stations, after having been gone for a year and a half. While it was certainly great to be back, there were many challenges awaiting me. One of the Engineers had left during that time, which put the remaining Engineer in a bad spot. Many things were half-finished or not even started. I set to work right away to bring in some replacement help and right the ship, as it were.

There was a lot of work to do, and I needed my staff (the IT director that was hired while I was gone, and the staff Engineer that I recently hired) to see the big picture, and understand the result I was going after. I dove right in and started the cleanup and repairs. It didn't take long for them to jump in and help, too. Before long, we were making real progress. In fact, the rest of the building staff noticed too, and they started feeling better about their surroundings. Once we started seeing the fruits of our labor, my staff started finding things in their own areas that they could optimize. It was just a matter of time before those little fixes generated big improvements.

Things were cleaner, neater, and running more smoothly than ever before – I even fixed some of the questionable wiring jobs that I had done over the years! It really snowballed into something much bigger. I cared, which my staff could feel. They started to care even more, and that feeling spread throughout the building. People were stopping in while we were removing wires and cleaning up racks just to see the progress we were making. People honestly getting interested in what the Engineers were doing. How often does that happen?

No Longer The Janitor

When you do things like that, the staff, from the GM down to the part-time people, start to look at you as professionals instead of "janitors." You get the reputation for being a valued problem-solver and an important part of the team. I think that's great – not just for us, but for the industry as a whole. It would go a long way in setting the tone for what should be expected of us, and what our value really is to the industry.

One place where I've been able to make a large impact is consulting with small station owners. I'm finding that there are a lot of contract Engineers who simply zip in, fix whatever's broken, and zip right back out. Now, to be fair, there are a lot of small station owners who are OK with this. I'm finding out that more and more, owners are becoming much more tech savvy. I've spent a lot of time with station owners, going over what they have at their transmitter sites and studios, telling them where their weak spots are, and informing them about technology that is coming down the pike that might bring some value to their operation. Those conversations are very, very important, but often overlooked by the "fix and bill" types.

Make Them Part of The Process

I had a small-market GM say to me once: "I spend my days in the trenches trying to bring in money. I don't want to be ignorant about what's going on at my transmitter sites, but if I don't see them every day, they're not on my mind. I need to rely on trusted experts to give me the situational awareness I need to make smart decisions with my money. It's not as simple as 'don't spend any' – I need to understand the value of the investment." I think that speaks volumes. I'll often hear GM's complain about spending money, but that's after we do nothing more than, "I need to spend this money, sign here." By making them part of the process, and helping them understand the things that might become an expense, they feel that they have more control and understanding of the process, and in turn, place a lot more trust in our decisions.

There's a quote I like to use with GM's, when I'm talking about spending money. "There are two types of doctors: One will tell you that you should just take some aspirin for that headache. The other takes the time to ask some questions and do some poking around, and then advises you to have the tumor that's causing the headaches removed – I'm the second doctor."

We often take for granted that we hold a lot of expertise and knowledge. We also believe that we should dole it out on an as-needed basis a lot of times, instead of being proactive. That's a mistake in my opinion. I think that by doing that, we earn the reputation of being the cranky person who hides back in the shop. That's not only a disservice to us, but to our trade as a whole.

Embrace the "Non-Traditional"

I think that it's important for anyone in our line of work to at least understand the basics of running a business, either by learning through a mentor, or perhaps by taking some classes. Learn about how your programming and sales staff operate. Spend some time with them, and ask some questions. Go to SBE meetings and attend conventions that have technical discussions. Always be learning. Any money spent on furthering your knowledge is an investment in yourself and is money well spent.

As Engineers, we tend to think that our job is to keep the studios, transmitters, and buildings running. In reality it is much more. We're "enablers." We remove the hurdles that exist for creative people creating content. We remove the obstacles that get in the way of an Account Executive helping their client. We help the General Managers achieve their financial goals. We're important leaders that make a difference in our operations every single day.

Christopher Tarr CSRE, CBNE, DRB is the Director of Radio Operations/Engineering for 88Nine, Radio Milwaukee. He can be reached at chris@radiomilwaukee.org

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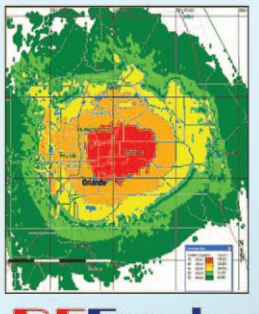

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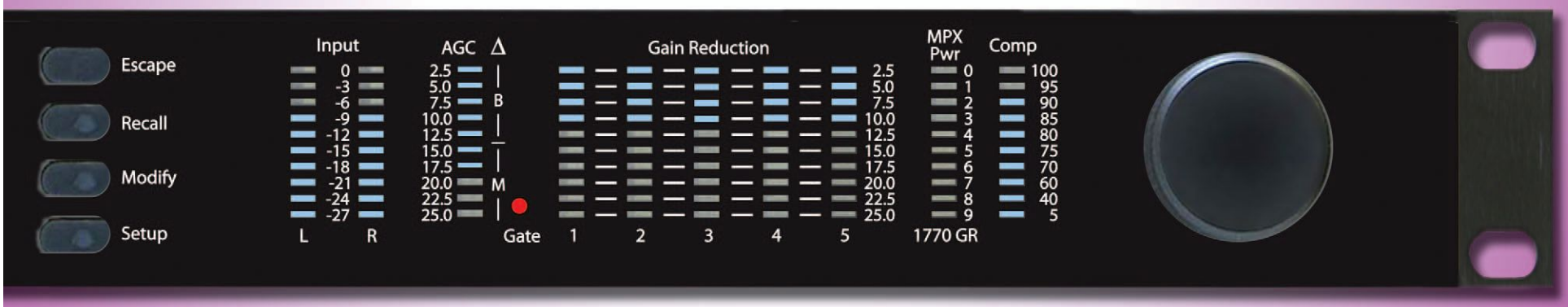

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Radio Redux

Who Was Your Mentor?

by Steve Callahan

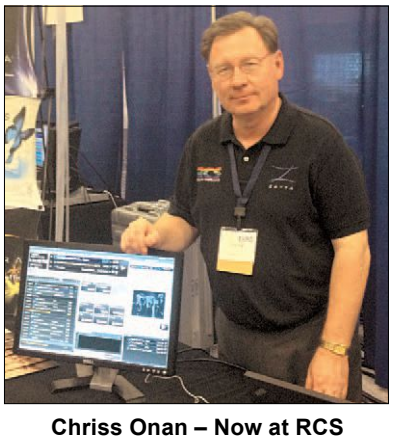
You hear it all the time. There are no new broadcast engineers coming up to take the place of us "old timers." Once upon a time, in the previous century, and in a past millennium, someone took the time to show you the ropes and let you look over their shoulder. Do you remember who did that?

For me, forty-three years ago, a very patient contract engineer by the name of Jerry Erickson would come after sign-off, and take a young DJ at his first radio job under his wing, and showed me what to do (and what not to do) in the station's 250 Watt AM transmitter room. I remember quite clearly learning the nuances of the stations patch panel, and him helping to demystify all the daunting pieces of equipment in the rack.

I can still fondly recall all of the names and faces of other "old timers" who guided this rookie. Ted Kalin, among many other things, clearly explained to me exactly how important it was to manage filament voltage on a tube FM transmitter. I would watch Lindsay Collins take a transmitter totally apart overnight, solve its problem, and then magically get it back together, and get it working just in time for the 6:99 a.m. sign on.

Bob Nystrom tolerated my incessant questions about the amplifiers he was building, because his design was better than any commercially amplifier on the market at the time. Dana Puopolo was the first person to clearly and succinctly explain to me how and why a multi-tower AM array works.

In today's broadcast facility, most likely you'll find technical folks more comfortable with a hard drive than an exciter's drive. Show them a trick or two at the transmitter sites that has worked for you. Invite them to an SBE meeting and introduce them to the other old timers. Be available to them, if they get in too deep and need a helping hand or just another pair of eyes. Your knowledge has come from traveling down the long road of experience, so be sure to share it when you have the chance.



Chriss Onan – Now at RCS

I've met a lot of interesting people in my time in broadcasting. Many years ago, I met Criss Onan when he was working for Bill Bingham at Northeast Broadcast Labs. I've had the pleasure of working with him many times over the decades. Recently, I had the chance to ask Criss some questions about his own trek through the world of radio.

SC: *When were you born and raised?*

CO: In the Finger Lakes region of upstate New York, I spent a lot of time in the vineyards there learning that a farmer's life was not for me!

SC: *What was your first exposure to radio?*

CO: I was bitten by the radio bug around age 8 by listening to my favorite announcer on my local station. I later had the good fortune of working with him later in my career. I passed my FCC Third Class Permit with Broadcast Endorsement when I was 13. I was then hired at my local radio stations, WFLR and WFLR-FM in Dundee, NY when I was 17.

SC: *What did you learn at WFLR?*

CO: In addition to my other duties, I was the board op for sports play-by-play and for the U.S. Grand Prix (because the station owner was part owner of the race track). One night in 1973, I found myself alone at the stations babysitting the automation on one station, doing board-op for a Mets Baseball game on another, all while feeding rock concert reports of the Watkins Glen "Summer Jam" to other stations around the country who were calling in.

Chriss Onan at WFLR, 1974

SC: *Where was your next stop?*

CO: After graduating from SUNY, I worked at a variety of stations in the region. At one point I had the pleasant experience of starting a stand-alone AM station in Cobleskill, NY, which is still on the air. The electro-mechanical automation systems of the day fascinated me, especially after I learned that the IGM 500 system I had worked with at WFLR started life at KFRC in San Francisco. I later met the Chief Engineer of KFRC who, years before, had used a hand truck to wheel out each of the big blue IGM racks.

The IGM 500 at WFLR

SC: *When did you meet Bill Bingham at Northeast Broadcast Labs?*

CO: After being a radio "journeyman" for eight years, I sent a letter to Bill in Glens Falls, NY, asking him for job referrals. Bill had developed a thriving business doing project installs for large groups like RKO and for small stations like the ones that I worked for. He said he was looking for his first full-time sales employee, because he was transitioning from installations to sales. He didn't know exactly what I would be doing, but his business had doubled every year after printing a catalog and installing an 800 number, so he needed my help.

SC: *Why did you move on from NBL?*

CO: After eight years, it was time for me to work directly for a manufacturer, because I wanted to learn one product well rather than a little about each product from a hundred manufacturers. In 1994 Broadcast Electronics was looking for its first direct automation sales person for their new AudioVAULT, and learning that I could stay and sell in the Northeast sealed the deal for me.

SC: *How did you find your way to RCS?*

CO: In 2012, I was fortunate to join RCS as its Northeast regional sales manager. I had found RCS to be a good competitor with great products in my previous job.

RCS had been founded in 1979 by Dr. Andrew Economos. He had been part of one of the first in-house traffic scheduling systems, by one of the networks, and thought he could leverage the knowledge he had gained to create a music scheduling software which he named Selector.

SC: *I remember Selector quite well. What else did RCS offer?*

CO: RCS was an early provider of hard drive playback systems with its Master Control product – Master Control pioneered the ability to do voice tracking. In the mid 2000's, RCS acquired the full featured NexGen system which offers extremely high redundancy. Then in 2007, RCS developed a state-of-the-art system called Zetta.

It allows each operator to have the tools needed in any studio that may be available. Talent can interact with each other, and a cut can be simply dragged-and-dropped from one application to another – even from a flash drive. It includes a native multi-track editor and may interface with ProTools or Adobe Audition. Just like with Master Control, RCS's concept of a "Living Log" is supported so that a change in the music schedule is instantly reflected in the playout system and vice-versa.

SC: *What's new from RCS?*

CO: Debuted at last year's NAB show, the RCS 2Go concept provides key functions of Zetta, GSelector music scheduling and Aquira traffic scheduling to users on the device and Web browser of their choice through the use of HTML5. This eliminates the need for "apps" proprietary to a particular operating system.

The RCS Zetta Screen

SC: So what do you do for fun?

CO: Obviously, I have a great interest in radio broadcasting history, especially the history of radio automation. I help administer the Radio Broadcasting History Facebook page and I can be reached at conan@rcsworks.com

Steve Callahan, CBRE, AMD, is the owner of WVBF, Middleboro, Mass. Email at: wvbf1530@yahoo.com

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FCC Focus

Don't Get SLAPPed

by Peter Gutmann

Cost aside, many broadcasters have become hesitant to tackle controversial issues for fear of lawsuits by those claiming to be offended. "Anti-SLAPP" laws are attempting to redress such concerns.

"SLAPP" means "**S**trategic **L**awsuits **A**gainst **P**ublic **P**articipation." These laws are intended to penalize would-be plaintiffs who might be tempted to sue media and others in order to silence criticism.

There is no federal Anti-SLAPP law. Rather enactment is up to each state. According to the Public Participation Project, 27 states have enacted such laws so far.

State versions vary considerably in their scope. Some currently are limited to statements that involve pending legislation or hearings. But others go considerably further. For example, Maryland's law extends to most matters that merely are within the authority of a government body. Indiana's covers any conduct in furtherance of free speech in connection with a public issue or an issue of public interest.

Several laws also contain "SLAPP-back" provisions allowing the recovery of compensatory and punitive damages, in addition to fees and costs, if a lawsuit was commenced or continued for the purpose of harassing, intimidating, punishing, or otherwise maliciously inhibiting the free exercise of speech.

Here's an example of one such law in action. In February 2011 Dan Snyder, owner of the Washington, DC NFL team, was irked over a scathing article in the alternative *City Paper* and sued both the newspaper and the author for defamation. The defendants counterclaimed under DC's permissive Anti-SLAPP law, which covers any act in furtherance of the right of advocacy in a place open to the public in connection with an issue of public interest or communicating views to members of the public in connection with an issue of public interest. The DC law defines an issue of public interest quite broadly as extending to community well-being, public figures, and goods, products or services in the market place. Snyder dismissed his lawsuit in exchange for the defendants not pursuing their Anti-SLAPP damages.

Thus, had it not been for the Anti-SLAPP law, Synder could have muffled criticism of his public conduct in running his NFL team which, in fact, has attracted much harsh censure. (Admittedly, part of his motivation for dismissal may have been to avoid risking revelations in a full-fledged defamation trial to determine whether the article was substantially correct with respect to its facts, since mere opinions are not actionable.)

The most visible use of Anti-SLAPP laws has been by traditional news organizations. But its use extends deeper and has included bloggers, attorneys, consultants, YELP reviewers, a medical journal that denounced a doctor's study as fraudulent, neighbors protesting a nightclub and residents protesting fracking activity.

So Anti-SLAPP laws may prove to be a potent weapon to shield investigative reports from intimidation. Check to see the protection afforded by your state's laws and push for adoption if they don't yet exist or are too limited to dissuade retaliation for news activity or criticism. Hopefully, these laws will help to encourage radio to revive the type of investigative reporting for which it once was admired but that nowadays seems to have become the sole province of major newspapers and websites.

Major Overhaul of Copyright Law

In February the Copyright Office issued a Report on "Copyright and the Music Marketplace" that may hold major future significance for the radio industry. It should be noted at the outset that the Report only represents recommendations and requires legislation to implement. And we all know how long and uncertain the legislative process can be. Even so, the views of an expert body, especially when backed up with citations to authority and extensive industry comment, are likely to be quite influential.

The Report urges a major overhaul of copyright law and attempts to balance the interests of artists, publishers, distributors, administrators and consumers (including broadcasters) in arriving at fair and efficient rates and procedures. Its 202 pages of text and 975 footnotes provide much detail and opportunities for discussion, but the portions of greatest interest to radio would seem to be the following:

• **Parity of recordings and compositions** – The Report notes that the current law is a patchwork grounded in long-outdated technology (beginning when most music was distributed as sheet music) and poses a fundamental but unsolvable question: "Which is more important, the song or the recording?" While not attempting an answer, the Report recommends empowering the Copyright Royalty Board ("CRB") with all rate-setting under common standards, whatever that may turn out to be. The Report also would allow copyright owners to opt out of the governmentally-determined rate structure to negotiate directly with users. At this point it is far from clear whether this will simplify licensing and the extent of its impact upon radio and streaming royalty payments.

• **Extending performance rights to terrestrial radio** – Here, the Report is unequivocal, strongly urging that radio be made to pay rates for performance comparable to other providers. It contends that the current exemption deprives owners of reciprocal payments for overseas use and is unfair to competing satellite and Internet providers who must pay for performance rights. The Report contends that the lack of such fees has hurt the health of the recording industry. It asserts that radio's promotion of new releases is becoming less relevant as consumers shift away from music ownership and must be weighed against the overall earnings of radio ($17 billion in 2013). Even so, the Report suggests that promotional value be factored into royalty rate calculations. Needless to say, if this aspect of the Report is implemented, it could be costly for radio.

• **Federalizing pre-1972 recordings** – Here, too, the Report notes the current disparity on radio between publishing (for which royalties are required) and recordings (which have no federal copyright protection). The Report considers the difference to be a fluke of the 1972 legislation that extended federal protection to recordings but was not retroactive, even though older recordings have significant value. It also recognizes the confusion that is likely to increase as the result of lawsuits that seek to apply disparate state copyright laws to this issue in the absence of federal preemption. Stations playing or streaming pre-1972 music undoubtedly would face higher rates, although at least this pain will be shared by satellite and Internet platforms.

• **Establishing consistent standards for all royalty rates** – The Report notes that certain statutory licenses (the so-called section 112 and 114 licenses, which apply to ephemeral copies and most webcasting) are set with regard to factors that consider social and industry impact, and thus tend to be lower than rates that apply to Internet services, which are set strictly on the basis of a free-market approach (that is, estimating what a willing buyer and a willing seller would be expected to pay). The Report notes that a similar disparity applies to publication rights – ASCAP and BMI are subject to consent decrees that require their rates to approximate a free-market value but often take other factors into account and are artificially lower, while SESAC and smaller Performance Rights Organizations ("PROs") may negotiate freely. A unified standard is apt to increase radio royalty rates.

Aside from its major policy recommendations, the Report contains a number of more targeted suggestions that also promise, in varying ways, to impact radio (if, as is far from certain, they are implemented).

• Perhaps most important, the Report suggests that publishers be able to withdraw at least digital performance rights from the PROs, to be freely negotiated outside of the statutory licenses.

• The Report suggests that certain of the fine details in webcasting be left to the judgment of regulatory authorities. Specifically cited is the restriction that limits the frequency with which songs from the same album or by the same artist may be played by a streaming service, as well as a prohibition against announcing upcoming selections.

• The Report recommends that licensing for public broadcasters' over-the-air and on-line activities be efficiently consolidated within a unified licensing structure under the auspices of the CRB rather than requiring multiple negotiations and rate-setting.

• The Report looks to the establishment by the industry, rather than the government, of an authoritative public database to facilitate research into copyright matters – an important first step toward solving the "orphan" copyright owner problem.

• Unlike the statutory license for mechanical reproduction (manufacturing CDs, for example), the licenses for webcasting currently do not contain provisions allowing termination for non-payment. The Report sees no justification for continued licensing of a user that is not meeting its financial obligations to pay royalties.

• Under the ASCAP and BMI consent decrees, new licenses must be granted upon request but payment is not due until the conclusion of industry-wide negotiation or a court finally sets retroactive rates. The Report recommends that payment of an interim rate begin immediately upon licensing.

• It proposes that rights be bundled to allow PROs and other entities to become music rights organizations that could license reproduction, distribution and performance rights rather than requiring users to obtain separate licenses for each aspect of their operation.

• The Report recommends that in lieu of the present five-year cycle, the CRB step in to convene proceedings only as necessary when a PRO or SoundExchange cannot agree with licensees on negotiated rates. It also suggests means by which the Board's procedures might be streamlined.

As expected, artist organizations largely praised the Report, contending that its recommendations will implement needed reform to provide them with a just share of revenue, while the NAB condemned it as unduly influenced by copyright owners and upsetting the current licensing structure, especially ignoring the promotional value of free airplay. If nothing else, the Report suggests topics ripe for debate that are bound to affect the entire industry.

Peter Gutmann is a partner in the Washington, DC office of the law firm of Womble Carlyle Sandridge & Rice, LLP. He specializes in broadcast regulation and transactions. His email is: pgutmann@wcsr.com

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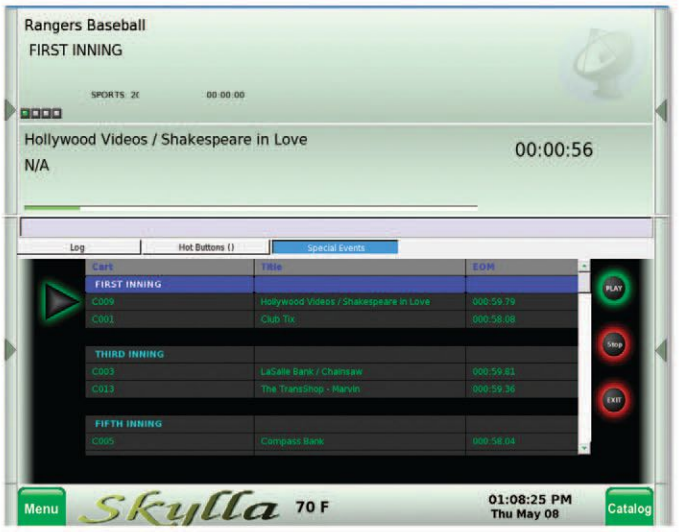

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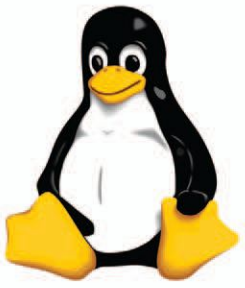

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Audio Guide

Repurposing Spoken Word Audio for Podcasts

by Paul Figgiani

From late 2004 through 2012, I managed the Audio Post Production staff at The Conversations Network. Our flagship channel was the popular IT Conversations. Throughout the entire lifespan of the network we distributed technology-based conference recordings and interviews as Podcasts. Operations ceased in 2012.

In 2006 the network's Founder and Executive Director Doug Kaye implemented a proprietary Content Management and "Show Assembly System." This was a server-side engine designed to automatically assemble various audio components including Intros, Ad Spots, and Show Bodies, in preparation for publication. Prior to assembly, all components were processed to a standardized Average Loudness target with a suitable Peak Ceiling to prevent overload (clipping). The selection of the Loudness Target was based on feedback and recommendations by leading experts in the Public Radio space.

The intent of this implementation was to address two issues: (1) Inconsistent production loudness of components submitted by a vast array of independent producers, (2) The establishment of consistent Average (Perceived) Loudness for all distributed programs on the network. The standardization established consistency and freed subscribers from making constant playback volume adjustments when listening to multiple sequential programs.

In my view, many Radio Stations and Public Radio Networks fail to employ similar best practices when distributing audio as Podcasts. This is partially due to the absence of universally recognized optimized guidelines.

Peak Amplitude, Metering, and Gain

Producers planning to prepare audio for Internet/mobile Podcast publication need to be aware of the following:

• There is a difference between gain level inconsistencies for multiple participants within a single program vs. Program (Integrated/Average) Loudness inconsistencies from program to program.

• Peak Normalization will *not* establish average loudness consistency across multiple audio files. In fact Peak Normalized audio files with a common ceiling will more than likely exhibit inconsistent perceived loudness. Loudness Normalization is the recommended alternative.

• Peak Program Meters found in most DAWS represent the proportional voltage of an audio signal. The meter's purpose is to monitor signal level and potential overload (clipping). PPM meters do not display accurate representation of perception. Modern Loudness meters are recommended.

What Exactly is Loudness Normalization?

Loudness Normalization is simple in concept. First, the existing Program Loudness of an audio segment must be realized by measuring the segment in it's entirety. The measurement process can be performed on-line (in real time) with a Loudness Meter, and off-line with a supported Meter or dedicated utility. Once the Program Loudness is realized, a global gain offset is applied, shifting the Program Loudness to the desired target.

For example, if the Program Loudness target is -24.0 LUFS and the measured Program Loudness of the source clip is -20.0 LUFS, subtracting 4 dB of gain normalizes the clip. ("LUFS" refers to Loudness Units relative to Full Scale.) Program Loudness, also referred to as Integrated Loudness describes average loudness over time.

Things get slightly more complicated when the gain offset is on the positive side. Here the operator must apply limiting to prevent overshoots.

It's important to note that Loudness Normalization will not alter/correct relative level variations between segment participants.

Broadcast Standards

Broadcast Media Program Loudness targets are now, for the most part, ubiquitous. The EBU R128 Program Loudness target is -23.0 LUFS. ATSC A/85 checks in at -24.0 LUFS.

Most recently PRSS(c) (Public Radio Satellite Systems) published the "PRSS Loudness Standard." This documentation specifies submission guidelines for contributing producers with the intent to establish standardization. The PRSS Program Loudness target is also -24.0 LUFS.

In addition, Broadcast Loudness specifications include True Peak compliance targets, focusing on Intersample Peaks that may occur due to the Interpolation of samples at or near the specified ceiling. The use of a True Peak Limiter will prevent any potential occurrences of Intersample Peaks. EBU R128 requires -1.0 dBTP (True Peak). ATSC A/85 requires -2.0 dBTP. PRSS suggests -3.0 dBFS for Sample Peaks, with True Peaks limited to -2.0 dBTP.

Necessity for Revised Guidelines

And so the question is – when preparing audio Podcasts for Internet/mobile distribution, wouldn't it make sense to simply honor one of the Broadcast Media Program Loudness targets? Not exactly. Quite simply, audio Loudness Normalized to these (-23.0/-24.0 LUFS) targets will not be loud enough for Podcast distribution. This is due to: (1) a wide range of common listening environments that may contain problematic ambience, (2) consumption device gain deficiencies.

For example, it would be difficult to comfortably listen to an audio Podcast Loudness Normalized to -23.0 LUFS in a noisy airplane or subway. The playback device may not have the capability to add a sufficient amount of gain to compensate. If by chance the audio was highly dynamic, the listening experience difficulties would intensify.

A quick note on spoken word/Podcast audio processing - I'm inclined to suggest a slightly more aggressive approach when applying dynamic range compression. Taming human voice dynamics will often improve intelligibility – especially when the media is to be consumed in a noisy environment. Furthermore, since audio intended for Podcast distribution may often require added gain, compressed dynamics will often curtail the need to apply heavy limiting.

Apple and -16.0 LUFS

TC Electronic under the leadership of Thomas Lund (CTO Broadcast/Production) is on the leading edge in the world of Broadcast Loudness processing and compliance. In their published paper entitled *Audio for Mobile, iPad, and iPod,* Mr. Lund reveals (as a result of extensive studies) that -16.0 LUFS is Apple's Program Loudness target when the "Sound Check" option is enabled in iTunes. Sound Check is Apple's version of Loudness Normalization.

It has also been suggested that Apple adheres to the same Program Loudness target for iTunes Radio audio playback. This target has carried over into the Podcasting space. It is now referenced in processing and metering tools offered by TC Electronic and other third party developers. I am a strong supporter of this and advise all clients to honor it.

Note that -16.0 LUFS is upwards of +8 LU "louder" than what is required for EBU R128, ATSC/ A 85, and PRSS compliance. The added gain addresses potential device deficiencies and problematic ambience that may hinder the Internet/mobile listening experience.

Program Loudness standardization also solves playback volume inconstancies between sequential programs distributed by aggregation networks as well as independent producers.

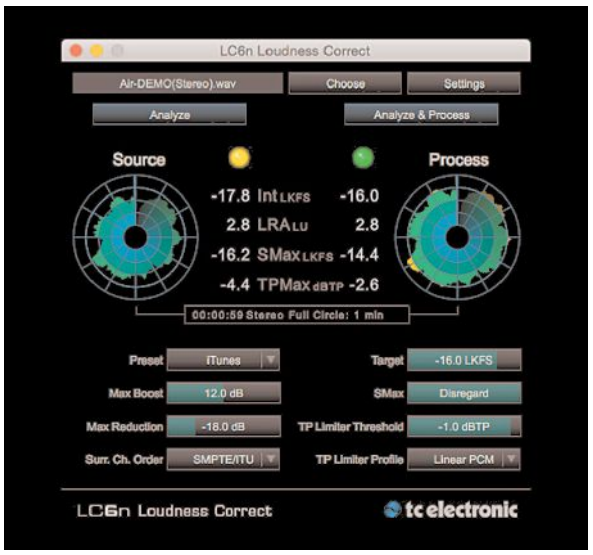
The Recommended Standard for Podcasts

Suggested standards for Internet/mobile audio distribution require compliance targets for both Program Loudness and True Peak descriptors. The recommended targets for Internet/mobile stereo audio files are: **-16.0 LUFS Program Loudness** with allowance for a reasonable deviation, and a **True Peak ceiling of -1.5 dBTP** in the lossy distribution file. Note that the True Peak ceiling is somewhat subjective. Some institutions recommend a -3 dBTP True Peak due to various aspects of lossy encoding that may cause overshoots if ample headroom is not present.

Getting It Done

There are a number of useful tools available that support Loudness Normalization for Internet/mobile compliance.

TC Electronic recently released the LC6n (six channel) and LC2n (two channel) Loudness Correct processors. These tools offer advanced customization options and analytics. Both versions function as stand-alone applications as well as Pro Tools supported Audio Suite AAX plugins for off-line processing.



The web service Auphonic distributes a stand alone desktop application with user-defined Target Loudness and True Peak descriptors.

From a manual processing perspective, TC Electronics' Mr. Lund recommends a workflow that I have adopted and customized:

1. Loudness Normalize source audio files to -24.0 LUFS. Do this by first measuring the audio to determine the existing Program Loudness. Then apply the necessary gain offset to compensate.

2. Pass normalized audio through a True Peak Limiter with it's ceiling set to -9.5dBTP.

3. Apply +8 dB of gain.

The processed audio's Program Loudness will be -16.xx LUFS with True Peaks never exceeding -1.5 dBTP

Off-line measurements can be performed using supported Loudness Meters or freely distributed utilities like FFmpeg, r128x, and R128GAIN.

Paul Figgiani is an independent audio producer/engineer with extensive experience producing Podcast Audio since 2004. He is the founder of www.producenewmedia.com Paul currently provides media post-production services and consulting for a select group of clients. Email: ptfigg@producenewmedia.com Twitter: @produceNewMedia

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Transmitter Site

Adding Phase Protection to the Plant

by Clay Freinwald

Using three-phase power solves many problems, but all three phases need to be working. For that reason, most modern equipment incorporates phase-loss protection – but not all. As Clay Freinwald shows, protecting the plant is very important, but not that difficult.

A number of years ago an AM station I was maintaining lost one phase of the power feed from the Public Utility District. Remarkably the station stayed on the air, although at reduced power and with some hum in the audio, probably due to its Nautel Ampfet 10 – a transmitter that seems to be immune to such things.

Smoking in the Transmitter Room

The problem is that very few things which operate with three-phase power are as forgiving. In fact, it is well known that a great deal of smoke can be released from heavy and/or expensive inductive devices when your three-phase goes bad.

A few years back we were building an addition to a transmitter plant. My design called for a variable-speed fan, one whose output would change with the temperature, thereby providing a more constant temperature in the building. In the HVAC trades the device that performs the variable speed, or proportional speed control is referred to as a "Frequency Drive."

One might have thought, considering my experience over the years, that phase-loss protection would have been in my design specifications for the new supply fan controller. But not in this case – at least at first. It was my reward for assuming.

An XFC Frequency Drive Unit

Fortunately, a little bird told me up there on the mountain top, where losing a phase was a common occurrence, that I had better look in the paperwork that came with this device to make sure that the big blower motor would be protected. The instructions were not much help, so I called the manufacturer and was informed that, *no*, phase-loss protection was *not* included. Now what do I do?

Full Protection

Most station facilities are not going to be able to withstand the loss of a phase, usually due to what it does to electric motors, power transformers etc. This is the reason why most equipment comes with three-phase loss – and rotation protection – built in. Still, once in a while you will run across a situation where such protection is not included in the design of the product.

As mentioned, the XFC Frequency Drive was not phase-loss protected. You can well imagine that, running with a 7.5 horsepower motor, loss of a phase could get pretty "exciting." Furthermore, as this system resides on a mountain top, one of Murphy's Laws comes into play: Murphy dictates that any failure shall occur at a time when you cannot get there from here!

The good news is: it is easy to roll your own protection.

Plug-In Brains

For the heart of the system, I turned to my trusty Diversified Electronics Catalog to find the needed phase-loss module. (It sure beats rolling your own on a breadboard.) The item needed was indeed there.

The Diversified Phase Loss Relay

The module is a model SLA-230-ASA, running a nominal 240V AC. Those of you with Continental Electronics transmitters will recognize this item, as it is used inside the 831G and 816R series for the same purpose – to sense a lost AC power phase.

The top of the Phase Loss module. Note the adjustable trip point.

It is worth noting that these modules come in a range of currents, voltages, features and form factors from various manufacturers. The reason I uses the Diversified unit is my long and satisfactory experience with their products.

Measure the current of the motor you wish to protect and select a contactor that will handle the current. For my project, a GE CR305D0 proved to be the right size. Do not forget to make sure that the controller module is able to handle the coil current of the contactor.

The contactor and Phase Loss module mount inside a 12x12x6 Hoffman enclosure.

Making it Look Pretty

You may be tempted to mount these components in or on something from under the bench. Resist that temptation and do what most electricians do: mount the parts in a Hoffman enclosure (my favorite) and connect the protection system between the supply and the unit you wish to protect. (One of the goals on a project like this is to build and install it in a manner that will make your electrician say "Wow! Where did you buy that?")

Phase protection on Top, Frequency Drive unit in the middle, and power disconnect on the bottom.

The Phase Loss Module monitors the supply and holds the contactor closed. If it senses a loss of one or more of the electrical phases, the module drops the contactor and protects the motor.

Document It!

And one more thing: Put a schematic of the system inside the enclosure door so that others (or possibly even yourself, some years hence) will know exactly what you have done. They (and you, yourself) will think better of you for it.

This same method can be used to protect a variety of otherwise un-protected equipment. It is just a matter of choosing the correct module and contactor for the job.

Problem Solvers That Will Work for You

Do yourself a favor: from time to time sit down with a catalog of electronic control modules, or ECM's. You will find a whole slew of problem savers – timers, sequencers, monitors etc. And in the process, you will soon be looking for ways you can put these devices to work.

If you are looking for some on-line resources, here are some good places to start:

- www.marshbellofram.com/diversified-electronics/
- www.ssac.com

Clay Freinwald has been an RF Systems Engineer in the Seattle area for over 50 years. A member of the SBE Board of Directors, you can contact Clay at: k7cr@blarg.net

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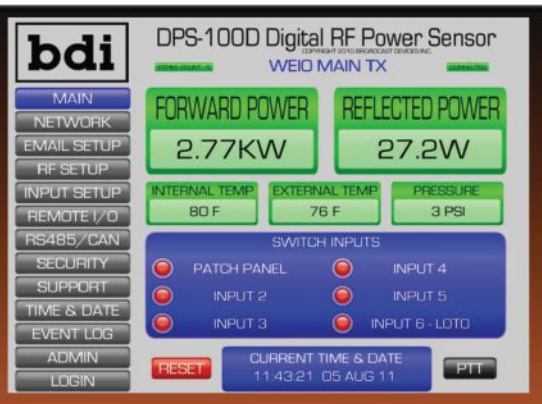

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Chief Engineer

Trouble Came in Threes

by Scott Schmeling

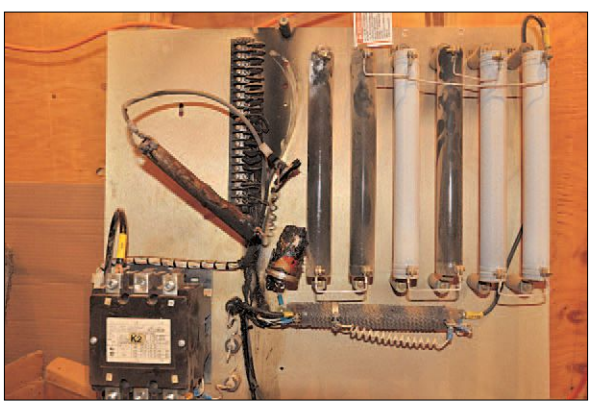
We often hear it said that things happen in threes. For example, when a famous actor dies, it seems that not too long after, two more die. We recently had a CCA, FM 10,000 GX transmitter that demonstrated this property.

It started in December – first we had a 3-day power outage. About a week after the power was restored, the transmitter shut down and could not be brought back up by remote. Keith Wright, Operations Manager and my Engineering Assistant, traveled to the site and found the HV Overload indicator glowing red.

While replacing the tube, we noticed the PA Filament control had no effect on the filament voltage. A quick inspection of the rheostat showed that the wiper contact was not in its proper holder and therefore not making contact. This is not an uncommon occurrence. After getting the contact back into position we discovered filament voltage seemed to jump around somewhat erratically as we turned to knob left and right. We set the knob to a position that gave something close to the proper voltage and closed everything up. A replacement rheostat would be ordered.

I would like to add a quick note about that rheostat. The schematic calls for a 10 Ohm, 100 Watt rheostat. It has been found that 7.5 Ohm 150 Watt is a better choice. It won't give you quite as much range, but should run cooler (and longer?).

That was the first "issue." The second "issue" happened about three weeks later. Again, the transmitter shut down. This time, when Keith arrived, the transmitter was completely dark. On the front panel, all the breakers were tripped and all the fuses were blown. When he flipped the blower breaker handle back up he got lots of sparks! Again, I packed up my tools and hit the road.



A Badly Burned Panel

We don't have a backup transmitter, but we are using a 100 Watt exciter. At times like this, we un-bolt the line from the filter, install an EIA Flange to N-Type Connector adaptor on the end of the line, connect the exciter and run the power up. To be honest, it's really impressive how far 100 Watts will go when it's on the main antenna.

Another side-note: having an EIA Flange to N-type adaptor and cable (RG-8 or RG-214) on site can allow you to at least have *something* on the air. And *something* is always better than *nothing!*

When I arrived on site, I opened the back of the cabinet and the first thing I saw was broken glass on the floor and some oily substance. C3 was a 0.1uF 10 kV capacitor – it blew up! C3, along with R1, form a surge suppressor circuit. It would appear it took one heck of a surge, because in addition to C3 blowing up, R1 was melted!

But that wasn't the worst part. Mounted near R1 was TB-11, a 20-conductor barrier terminal strip. Attached to TB-11 was the wiring harness for the Rectifier Panel and it was badly burned. Much of the insulation was gone and you could see soot-covered bare wire. I didn't even want to *think* about tracing all the wires and building a new wiring harness.

As mentioned, this transmitter is a CCA, FM 10,000 GX. Some of you may not be aware that CCA filed for bankruptcy in late 2002. Fortunately for owners of CCA transmitters, Jerry Meier and Van Njuyen formed V&J Electronics and still have many parts available. My big question was, did they have a rectifier panel wiring harness for a 10,000 GX? We started a list of parts and I took pictures with my phone. Then I called Van, and asked him if he had the wiring harness. In my mind, it was a long shot, but believe it or not, he *did* have it in stock! After looking at the pictures he also recommended a couple of other small parts.

He also recommended that I remove the Rectifier Panel and told me how to do it. (That piece of advice, *alone*, was worth the phone call!) By taking the panel out we could get the job done much, much faster and with considerably *less* back pain. Thank you Van!

(Continued on Page 22)

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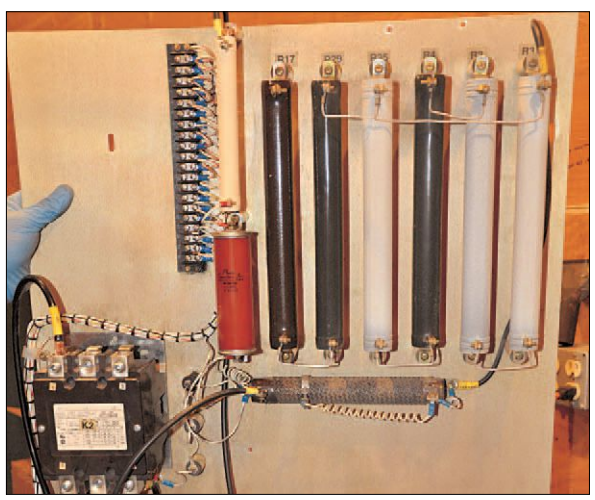
Chief Engineer

– Continued from Page 20 –

And if that weren't enough, Van also sent wiring charts, showing exactly which wire went where. His remaining question was, "did I want him to put the lugs in?" I said, "Yes," expecting to have the lugs in a bag. But no, he crimped the lugs onto the wires for us.

Monday morning came, and we arrived on site armed with cleaning supplies, including Methyl Ethyl Keytone to remove as much of the soot, char and crud as possible. Keytone (for short) is a wonderful cleaner/solvent. It dries extremely fast and leaves no residue.



A Cleaned and Restored Panel

First we followed Van's instructions and removed the panel to start working on it. The Keytone did a wonderful job. Nearly all the "crud" was removed by the time the parts arrived. Installation of the wiring harness was just about as easy as it could be, and with the help of the wiring chart we were confident everything was properly connected.

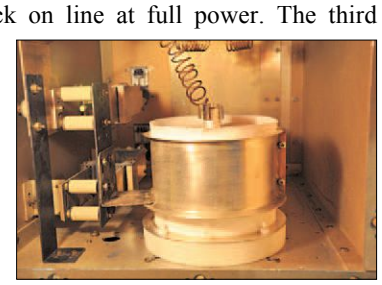
The third "incident" happened two months later. Once again, the transmitter went down and Keith couldn't bring it back on by remote. When he arrived, he again had an HV Overload. Considering the recent events, we decided I should come out and check things before we changed the tube. Plus, it was a very busy day back at the studio and Keith needed to be there.

I checked all the other things we had worked on and everything appeared to be OK so it must be the tube. (This tube, by the way, had been installed after the previous repair job – just in case there had been tube damage.) Let me also note that the Plate Blocker on this transmitter fits extremely tight. Sometimes it's necessary to remove four Teflon bolts and some other hardware so the blocker comes up with the tube. I did that, and as I was cranking on the wrench for the tube extractor I noticed the tube didn't seem to be lifting out of the socket. A quick peak between the blocker and the Teflon ring below it showed that, indeed, the bottom part of the tube was still fully seated in the socket. The ceramic was cracked and the tube was coming apart! When I got the bottom half of the tube out I also noticed the fingerstock on the grid ring was coming loose.

Again, I sent some pictures to Van. I needed a new grid ring, and I also ordered a new blocker. Van had told me some time ago that when they were built, the wrong specs were used and they were just a little too tight. He is able to modify (stretch?) them to make them just slightly bigger, but still with good contact to the tube. But Van also mentioned something else. In one of the pictures of the grid ring you can see some debris on the underside of the screen. It hadn't looked that serious to me and I planned to thoroughly clean it and the blower fins when I did the rest of the repair. But he was pretty certain it was enough to block air flow and damage the tube (crack the ceramic).

Tube Air Flow Reduced by Debris

The parts arrived, repairs were completed, and the transmitter was back on line at full power. The third problem has been taken care of and everything is running great (but it's only been a week ... so far!)



New Plate Blocker Installed

If you would like to contact Van at V&J Electronics, his email address is van@ccatransmitter.com

That's it for now. Until next time, keep it between 90 and 105!

Scott Schmeling is the Chief Engineer for Minnesota Valley Broadcasting. You may email him at: scottschmeling@radiomankato.com

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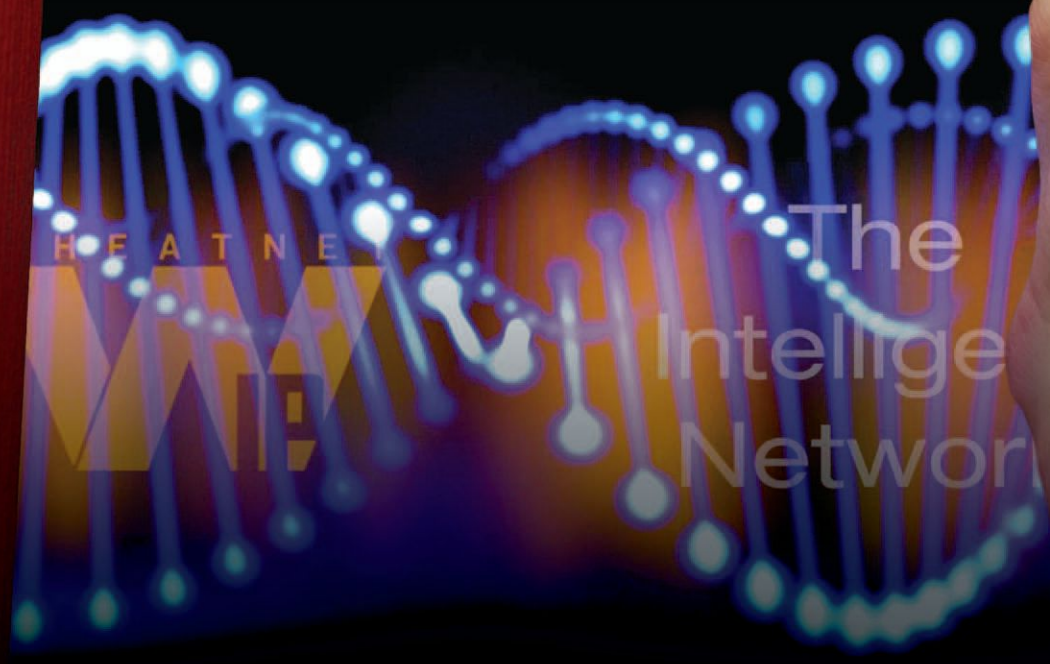

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Survival Guide

When Good Is Better Than Best

by Rolin Lintag

Did I say good enough is better than best? No, but I did say that good may sometimes be better than best. You'll be surprised how we take this observation for granted until we notice that it is more common than we thought.

Tweak It Good

After spending many nights tuning transmitters and other fun gear, there is one observation that seems to be a recurring theme among electronic systems. Do not go for the best, if you want to go home in the morning after an overnight maintenance.

Let me illustrate.

Figure 1 shows what I call the Tweaking Chart. The Y-axis (ordinate) is the parameter you are trying to tune like %THD, SNR, Amplitude, etc. It starts from zero which is the least desired value going up to the more desired value. The X-axis (abscissa) is the amount of effort or tweaking that you do – either turning an adjustment control clockwise (CW) or counter-clockwise (CCW). The characteristic curve defines the behavior of the circuit when being tuned. There may be other curves that define a system, but this one I am using for illustration is the behavior I observed on many systems. I have seen this behavior on exciters, audio and video processors , and feedback or neutralization of amplifiers.

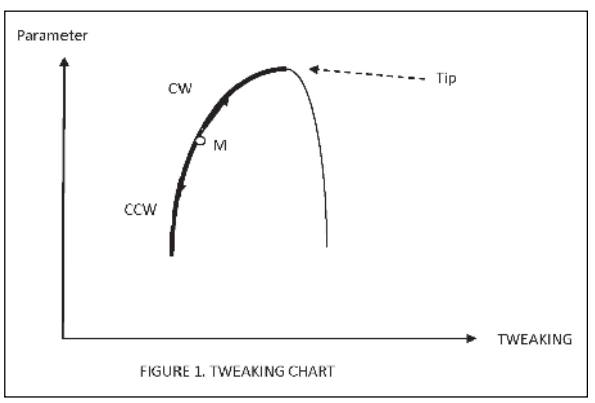

FIGURE 1. TWEAKING CHART

The curve defines a behavior where there is improvement as you go tweaking, until it reaches an apex point that I call the TIP, and then the parameter crashes down (like falling on a cliff) after just a little bit more of tweaking. This may be the end of the potentiometer turn point, where oscillations occur (instability) or simply outside the window of the circuit design. The midpoint, M is where I usually start as reference in tweaking. I assume that if the circuit designer did his job right, he will put the adjustment window of the parameter at the middle of the pot. This is true more often than not, so it is reasonable to start tuning from the mid-point of the potentiometer.

Now do I tweak it at the TIP, which seems like the best condition maximizing the parameter I wanted to improve?

Go ahead, make your day and fall off the cliff.

I'd be a bit conservative if I were you, so I'd graze the cliff, back off a bit, and leave it there at point O (Optimum) of **Figure 2**.

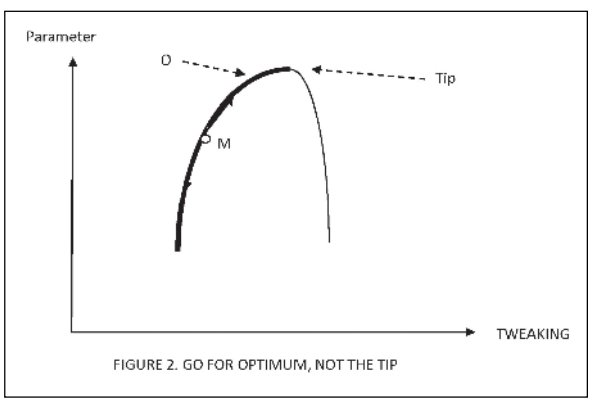

FIGURE 2. GO FOR OPTIMUM, NOT THE TIP

Why? Because there is no such thing as a perfect component or system in this planet we live in. Please tell me if you have found one. There may be one in the metaphysical world, but after living on this planet for some time, I have to live with compromises and the lesser evil. An electronic system, whether analog or digital, drifts in its behavior over time, in the environment it is exposed to. You don't find them to remain in

(Continued on Page 28)

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Good Is Better Than Best

– Continued from Page 26 –

the exact condition, if left alone over time. I remember working on four, same-model transmitters and each one has its own idiosyncracies, even though they were all in the same building. No two equipment are exactly alike. They may tune similarly but not *exactly* the same. There is this fuzzy factor that always creeps into systems, messing up the best, to become less than good. So why would I want the best, if good does a good job already, and is more stable over time? Best can be very elusive, so it may be wise to leave things at good and live better.

Looking For Superman (or Super Engineer)?

Reading through job descriptions, and after writing some myself when hiring engineers, I think the candidate we are looking for is Superman.

1. Should be very good in both IT and RF – and everything in between. (Omniscience?)

2. Can understand schematics (maybe some German), see color, and more (perhaps see through lead?).

3. Can lift 50 pounds unaided (just why you want to break your back, I don't know), climb ladders (only if your insurance policy covers it), work in tight spaces (meaning you work regularly in a gym or drink slimming tea everyday), and my favorite – have the guts to work in high voltages (hair-raising corona!) Ooo-Rah!

4. Well versed in verbal and written communications (Are you sure you are looking for an engineer? Really?)

5. Willing to work overnights, holidays, at a moment's notice, and be called upon 24/7, 365-days whatever. (In other words, have no life, works like a robot, sleeps on his feet like the Terminator, and an over-all good Minion).

6. Drives a reliable vehicle with good insurance (You might make more money driving for Uber, btw. Just saying.)

7. Does not require supervision, works independently but is a team worker. (I did not know that the Mona Lisa was a team effort! Hmm, help me out here Da Vinci!)

Nuff said.

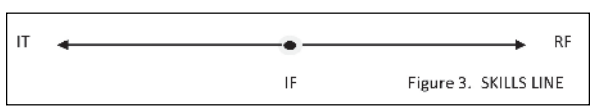

Figure 3. SKILLS LINE

My observation, after being in this industry for many years, is shown on **Figure 3**, which I call the SKILLS LINE. The Skills Line shows that one can be very good at IT, but moves away from the RF expertise. Or one can be very good in RF but moves away from the IT skills. This is simple to understand since we all have only 24 hours a day, and you can either be in front of the computer so many hours a day *or* working on the transmitters so many hours a day. The Law of Non-contradiction works against you, since you cannot be in front of the computer and the transmitter at the same time. You only have to pick one and spend time being very good at one.

Almost everyone I know in this industry is either a very good IT guy or a very good RF guy – but not both at the same time. If you know someone who is really good at both – *at the same time* – he is either retired or is self-employed as a consultant, and will not work for you, anyway. Even if he *will* work for you, can you pay him?

What does this Skills Line do to your hiring process, then? Do not look for what I call the "IF" in the middle of the line. That IF is an expert in IT and RF, and rightly owns the title of an Interesting Fella (IF). Looking for an IF is like looking for a needle in a haystack, to use a boring cliche. The smarter approach to hiring is defining a certain deviation from the IF that you are comfortable starting with for a new hire. Then let him grow within your organization to the kind of engineer you need. My hiring principle is to look for the right attitude and aptitude, rather than to zoom in on skills. Skills can be learned over time with the right mentor. But it may take God to develop the right attitude and aptitude from any candidate.

So if you are always looking for the Best Man, you will never find the Groom! (Don't mind me. I'm just a dude ranting ;) *– Radio Guide –*

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State of the Art

Keep Your Skills Current

by Tommy Gray CBRTE CBNE K3ZF

There is an old sage saying I used to hear that goes something like this: *"If you are not growing you are dying."* The other one, along those lines that is relevant here, is one that says: *"If you don't use it, you lose it."* Friends, when you are a young person, and your mind is very fresh and alert, retaining your technical knowledge is a lot easier than it is when you get a significant number of laps around the planet behind you. There are things I used to have right on the tip of my tongue when needed, that I have had to commit to my smart phone, or computer to be able to continue that "Instant Recall."

One other thing these days that demands a regimen of "Life Long Learning" is the fast pace at which technology changes. It is almost so fast that if you take a two week vacation (I know that is something many of you are unfamiliar with!), it seems that you have fallen behind and have to spend a lot of time just catching up to where things were while you were away. That may seem a little extreme, but I can tell you the pace is almost that fast.

Every month I read white papers, and tech journal articles about some new way of doing things or some new technology. A lot of things we schemed about years ago, and thought they were out of some science fiction novel, are reality – many have even become commonplace. For example would you have thought 20 years ago that you would be carrying your office in your pocket – computer, telephone and all? For most of us, especially those who have large plants separated by many miles, it is an absolute necessity! We get phone calls from our remote equipment or in many cases even email. There is just something neat to me about my transmitter sending me an email! It is a real novelty in many cases.

Just yesterday, some of us here were talking, and a couple of the guys were complaining about having to get phone calls while they were out enjoying their personal time. I mentioned that it has not been that long ago when we had pagers, and when the thing beeped, we had to drive around some strange city trying to find a pay phone to call the station – only to hear that the transmitter was down, and that you were getting called out. These days, the phone rings, interrupts our personal time, and in a few minutes we have made an adjustment, or put backup equipment into service – and gone right back to our movie or family outing! Frankly friends, I *love* being able to simply do things by phone or computer that once caused me to have to drive many miles, using up my personal time. More than likely, I never got that time back, as there was just too much to do to find time to take off to make it up!

Knowing What To Do When the Phone Rings or the Email Comes In

Staying "Technology Savvy" requires some kind of a learning curve in most cases. Keeping up with the industry requires training. In times past, some of us were extended the luxury of being allowed to attend an occasional seminar, or factory training school. These days you must continually train yourself through on-line courses, factory schools, university courses, and other industry training to stay current. The great thing about it all is that knowledge is available if you want it. Wisdom is obtained by experience many times, but knowledge, you have to work for!

Knowing what to do when the PD comes in and says the new digital console is making strange sounds, and is acting weird, requires knowledge to be able to understand what is going on, logically troubleshoot it, and correct the problem. With each new piece of equipment comes an entirely new set of challenges to be able to understand and maintain it. Admittedly, much is better left to the factory, but you can handle most challenges in-house (to a degree) if you know what you are doing.

There is no substitute for comprehensive technical documentation and manuals. Unfortunately, the days of printed manuals is almost a thing of the past. However, the good side of that is that you can carry a lot of them in your phone, tablet, laptop, etc., and easily access them wherever you happen to be, in the form of digital documentation. I would venture to say that a competent

(Continued on Page 32)

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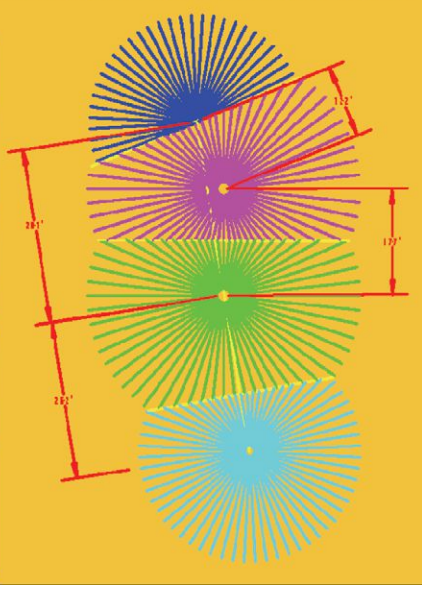

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State of the Art

– Continued from Page 30 –

technician these days (I use that word instead of engineer, since today's tech guys and gals must be adept in several fields) has to not only be a good engineer, but an IT tech as well. When is the last time you pulled out the soldering iron and changed a component in a console? Unless you have a very dated plant I can be assured that it has been a long time.

Continuing Education

Continuing education is not a luxury these days – it is an absolute necessity, unless you want the business to leave you in the dust. There are a lot of resources out there for a person to access that are totally free, or for a nominal fee. Factory webinars are, for the most part, free. You may have to setup an on-line account with them that will require giving them an email address. Smart techs know to have an email account for such things, that prevents you from having to give them your main email address and prevents you from getting unwanted email by the ton.

One such example of factory webinars you can easily access, are those found at Nautel Corporation's website. You can access them at: http://www.nautel.com/resources/webinars/. One added benefit to these webinars is that the completion of a Nautel webinar qualifies for 1/2 SBE re-certification credit, identified under Category I of the Re-certification Schedule for SBE Certifications. There are several recent ones there, plus an archive of many more. They are all free and easily accessed. Many other companies have similar webinars or white papers, etc., available in some form.

Speaking of Recertification ...

If you are an SBE Certified tech with a certification in one of the fields related to broadcasting, whether it be an engineering related field, or an IT related discipline, you will need to recertify at some point. You can do this either by retesting or by accumulating the required number of points for your individual certification. Points can be accumulated by taking SBE courses, approved courses from other entities, school or university classes, SBE Meeting attendance (which garners you 1/2 point for each meeting attended), or points from many other sources.

Stirring Up The Brain Cells

I recently obtained an additional certification, and as a result I had to spend a fair amount of time studying for the test. It was of great benefit to me as it was more of a refresher than anything, bringing me back up to speed in a lot of areas where the gray matter (no pun intended) needed a little prodding to reach back and pull out long forgotten things. The benefit to me was a lot more than just the certificate. It got my mind moving again. Having to attend so many meetings, managing so many projects, etc., left little time to keep current, so forcing myself to study was of good benefit.

After being in "study mode" for several weeks, waiting on test day to arrive, I was at a loss for something to do when it was all over. Well, several of the guys here are Hams. I had let my license expire in the late 70's because of a lack of time, and geographical relocation that prevented taking everything with me. I decided that I would study to get a license again. This became a challenge to the guys here who were not Hams, to study and compete with me. In the period of 5 weeks, I had taken all three Ham tests and passed them with flying colors (100% on all three). The material, especially in the Extra Class exam was good enough to get me thinking about AM antennas again. After those tests I needed something else to do in order to keep the learning mode going, so I took the SBE AM Antenna Systems course.

I can tell you this. The time I spent studying the material and refreshing my memory on things that had fallen into the "Back Memory Bucket" was worth every minute. I was recently called on to help a small AM station who was replacing a tower, and the material I needed was fresh and readily available.

Whether you take a few webinars, some SBE courses, a Ham test or two, or simply review the material, you need to study to stay current and useful in our field. Doing so will make you more valuable to your company and may increase your paycheck at some point! If nothing else, you will know what to do when that Jr. Engineer asks those endless questions and leaves in awe at how much you know. I can tell you that I was glad to have a guy who mentored me early in my career. Looking back I realize that he did not know more than any other competent engineer, but to me he was a guru and an inspiration.

Exercise those Brain Cells!

Tommy Gray, CBRTE, CBNE, KG5FAN/AE, is the Director of Broadcast Engineering/Technology/Facilities at KSBJ/NGEN Radio Networks. He may be reached at: tgray@ksbj.org

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Facility Focus

It's a Numbers Game

The Story of a Curiosity

by Jim Turvaville

We all know our station's frequency, call sign, actual city of license, and other typical details. After all, that's how our listeners and clients know who we are, as well as the ratings agencies and licensing authorities. You may be tempted to think that is also how the FCC keeps track of your station – but that's not at all true. I recently had a client who swapped call letters on one of his stations, and looking up the history of those calls found he was the 7th user of that set of letters – from Colorado to Wyoming to California, on both FM and AM stations. Trying to keep track of a station by Call Letter would be a disaster at the very least.

While it is true that Call Letters were the base of recordkeeping, from the beginning of the Federal Communications Commission in 1934 (and with its predecessor the Federal Radio Commission), starting sometime in the early 90's the FCC has reverted to a Facility Identification numbering system – known to them as "FACID" for short. All of the Radio and TV facilities which are authorized have a unique FACID which remains with the facility for its entire existence, which the FCC then uses to attempt to keep accurate records about each one. When a TV station moves channels or transitioned from Analog to Digital, that FACID stayed with it along the way. I grew up in the 60's watching KAUZ-TV ("Cause-Television") which was on analog Channel 6; when the transition to digital occurred in 2009 and they moved to DTV Channel 22, the same FACID of 6864 went right along with it. When KKHI 104.5 Class-C2 was licensed in Laramie WY in 2002, it had FACID 9761; when it moved and become KCWA 93.9 Class-A in Loveland CO in 2010, that same FACID followed it along. In the opposite way, I listened to 96.9 KLSF ("Class-FM") when I was in college; but that station was FACID 3608 and the license was deleted after bankruptcy in the 80's. The station on the air now as 96.9 KXSS-FM in Amarillo TX has FACID 9306, having filled the left-vacant allocation in 1992 – with no relation to the previous facility, owner, location, etc.

Anyone who makes FCC filings with the Electronic CDBS system is keenly aware of the FACID system, because any references in an application to a facility must have that number included. From an application to transfer ownership of a station, to the notation of the primary station for an FM or TV translator, the FACID is the identifying entry on the associated electronic form. I became intrigued with the FACID number system when, a few years back filling out a translator application, I listed the primary station FACID as "666" and wondered if anyone ever got bothered by their particular FACID number. I know Mr. Sisk that owns WFTA(FM) in Fulton MS, and I dare say he's not the type to be bothered by that kind of a thing – after all, it's an assigned number and not one we pick. But that did make me look more closely at the FACID of the stations I came across. I noted that several of the AM/FM combo stations had sequential FACID numbers assigned: 24249 and 24250 was originally KIXC FM/AM in Quanah TX, 26169 and 26170 were KLSR FM/AM in Memphis TX, 67311 and 67312 were KYBE(FM) and KTAT(AM) in Frederick OK – all locations where I have formerly worked.

That led me to wonder if there was rhyme or reason behind how the numbers were assigned back in the day; after all, if the Commission was going to set up a number system which would carry this much importance, they have to start "somewhere," right? So just for fun I put in FACID #1 to see which station had the honor of having the smallest FACID in the database. That award goes to Carnegie-Mellon University in Pittsburgh, for their heritage WRCT(FM) educational facility on 88.3 – originally authorized in the late 70's and still operational today. That led me to think that #2 was probably close by in the geographic region, and had a close set of call letters – or at least *something* that would be a pattern our fine government agency would follow in assigning these valuable numbers.

Right? Well, not really.

FACID #2 is WFMZ(AM) 1470 in Brooksfield MO, FACID #3 is WCLG(AM) 1300 in Morgantown WV, and FACID #4 is KIXW(AM) 960 Apple Valley CA.

(Continued on Page 36)

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It's a Numbers Game

The Story of a Curiosity

– Continued from Page 34 –

Wow, that's like all over the map in both geography and in call sign usage. Looking at the entire double-digit set of FACID numbers (up to #99), only 13 of those numbers represent current facilities – a mixed bag of AM, FM and TV stations and lots of deleted CP's for FM's in the 90's, TV translators and FM translator facilities, from New York to Arkansas, from Texas to Alaska – with no obvious rhyme or reason to be seen in how the sequence was assigned.

That's not a terribly impressive beginning to a number system that now stretches into the dozens of thousands. You can see some form of collectivism in the numbers, however. For example many early FM translators were 5 digit numbers, generally following the sequence of numbers whereby all of the then-existing FM and AM stations were given numbers, and often in close sequence to the primary stations they repeated. Then when Auction 83 came along in 2003, FM translator applications were given FACID numbers in the 14,000 range and counting.

When the AM Filing window of 2008 came along, applications were given FACID numbers mostly in the 13,000 and 16,000 ranges. Stations in the NCE filing Window in 2007 were mostly given numbers in the 17,000 range. In fact, each spectrum Auction seems to now have some specific range of FACID numbers which the CDBS system will assign to all of the applicants at the time of filing, which distinguishes that particular Auction's results. Now, FACID numbers are assigned at the time an original application is made for a new station, and they seem to be assigned in numerical order as they are filed, much like the application file number system follows a similar pattern. While the initial assignment of FACID numbers seemed quite random, there is sequence and system to it now, and in the future it seems.

So what began as just a curiosity for me is really somewhat important to us all. Simply put, your station's FACID is like the Social Security Number for your radio station. I've had a SSN from the time I started my first job (at a radio station in case you were wondering) but never took second thought to it until I went to College; there, absolutely everything revolved around it. I used to joke I did not think I could get into the Men's room without my SSN, because everything the College did with me used that number to know who I was and what courses I was studying.

In a similar way, with any FCC correspondence, be it on paper, by email, over the phone or in person when a member of the Enforcement Bureau pays you a call, knowing the FACID number for your station is the language they speak. Every AM, FM, TV, LPTV, LPFM, TV translator and FM translator has a unique FACID; it is printed on your station authorization (beginning with a CP and then when it becomes a license) and you should know where to find it and use it when needed for reference. All of your current auxiliary licenses – STL, Remote Pickup units, etc – have an association with a "Parent Station" and the FACID of that Parent Station is listed on the authorization for those facilities. Again, you should know where to find those and how to use them when needed.

There is a reasonably user-friendly portal for the FCC CDBS system which is accessible on-line, where you can look up station information for AM, FM and TV; and application information including EEO and Ownership reports. That is located at: http://licensing.fcc.gov/prod/cdbs/pubacc/prod/cdbs_pa.htm

An easier commercial portal is provided by Cavell Mertz & Associates at: http://www.fccinfo.com/

And the easy way to look up any facility? Yep, that FACID.

Because after all, we are all really just a number!

Jim "Turbo" Turvaville is semi-retired from 36 years in full-time Radio Engineering and maintains a small clientele of stations under his Turbo Technical Services (www.jimturbo.net) operation providing FCC application preparation and field work.

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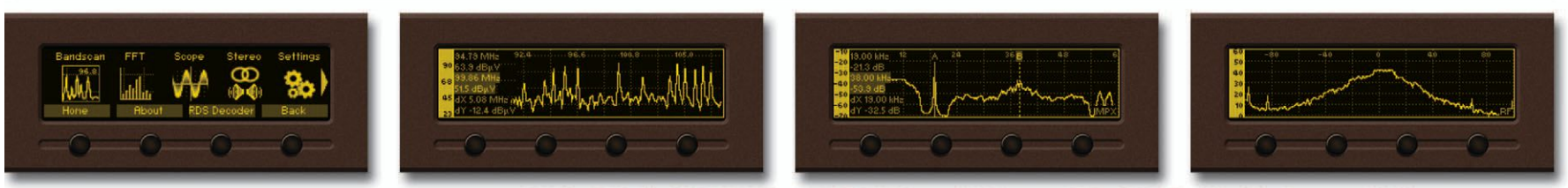

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Streaming Guide

Netcasting – It's Worth Paying Attention To

by Mike Callaghan - KIIS, Los Angeles (retired)

Internet streaming has arrived in radio broadcasting. I know, there's a tendency to treat it as an "also-ran." If it goes down, getting it back on-line doesn't have the importance you'd attach to a transmitter failure. Even our program directors don't seem to have the attachment to it they have for the terrestrial signal.

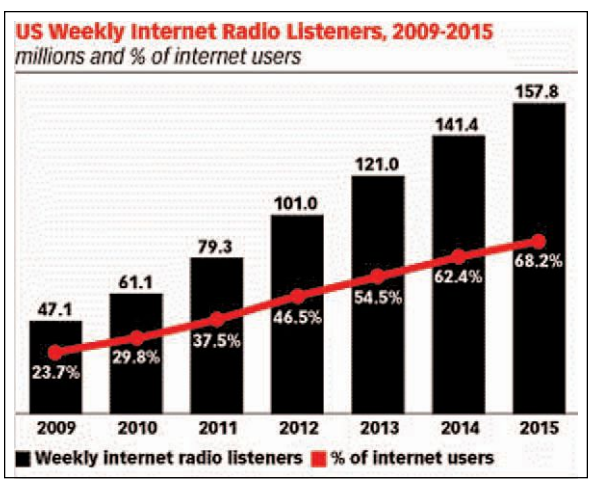
But our streaming audience is growing rapidly, and we need to pay attention. More people listen to on-line radio than to satellite radio, and HD1 and HD2 programming combined. As far back as 2008, Arbitron reported that one in seven listeners heard Internet radio weekly. At the end of 2012, Internet listening accounted for almost one-quarter (23%) of the average weekly music listener time of consumers between 13 and 35. This was an increase of 17 percent over the previous year. By far, the rapidly increasing number of Internet listeners are made up of younger demographics, mostly Gen-Xers and Millennials. These are the demographics advertisers really want to reach. Increased access to the Internet with smartphones and mobile devices will only make these numbers grow more significantly.

The FCC recently decided that 'Broadband' is now defined as 25 Mbits/sec. or faster. That leaves DSL users out. You can bet there will be a scramble for faster download speeds, which can only increase the number of streamers.

Unlike the PPM and/or diaries used to validate terrestrial radio, it's very easy to quantify the number of people that are using the stream. This number is easily obtained from the service doing the streaming. These numbers are worth paying attention to, and they're frequently shocking.

As an example, KFI, in Los Angeles, has a very active stream. It's tag line is "More Stimulating Talk Radio." That must be true, because in the month of January, 2015, the Internet delivered over 3,330,000 hours of KFI's material to downloaders and streaming listeners.

That's over 100,000 hours each and every day of the month!



Numbers like that have to draw attention. You'd better believe that keeping the stream up and running has a huge importance to the people at KFI.

And supporting those listeners is a vastly different project than just taking a program feed off the console and dumping it into the Internet. Like a lot of stations, KFI runs different reports and commercials on the stream than it does on the terrestrial transmitter. This makes sense – why run weather, a traffic report or a local spot on the stream when it will be heard all across the country? The station is much better off streaming national spots that benefit the advertiser no matter where the listener's located. (Many stations in the U.S. limit their stream just to the U.S. This avoids problems with music licensing and copyright issues.)

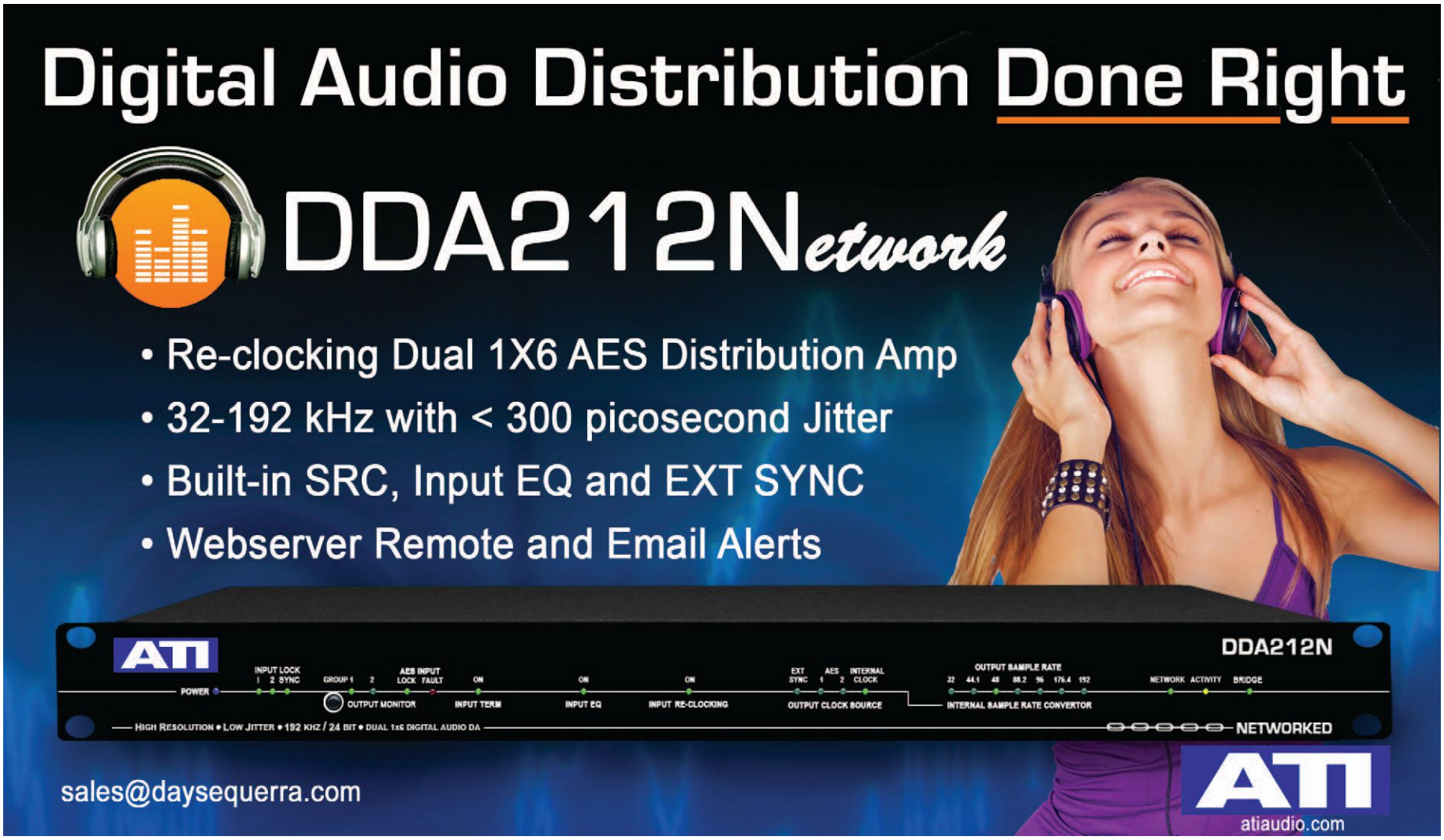
Because the commercials are different feeding into the transmitter than to the stream, they have to be timed precisely. In times past, a disc jockey could be given a page of copy and told to read it live on the air, between a couple of records. So if a sixty second spot ran a second or two long, it was no big deal.

But when you're switching to a pair of different commercial sources and then trying to rejoin them together gracefully, an extra second or two in one of them means there's going to be a train wreck somewhere. As a result, "live reads" are ancient history for most radio stations. There's just no talent that can be that precise.

Even recently, it's been the Internet that gets the short end of the stick. A long or short spot goes over the air just fine. It's the streaming audience that gets cut short or has an abrupt moment coming out of the stop set. Things are getting better; many sixty second spots are really running exactly sixty seconds, and this makes it a lot easier for both the radio listener and the Internet streamer to avoid calamities.

In the larger radio groups, streaming tasks are often handled externally to the radio station itself. The program content is sent to a different location, where dedicated servers hold the separate commercials, and specialized software is used to handle the actual insertion of the different spots into the stream. I can easily recall the scathing phone calls we'd get from the stream coordinator if a locally produced stop set ran short or long. The engineers would

(Continued on Page 40)



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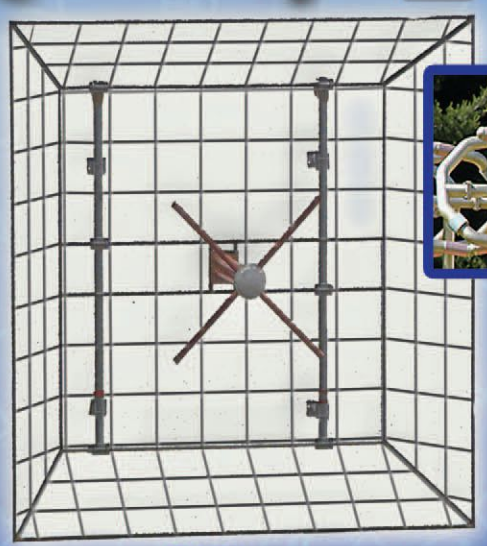

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– Continued from Page 38 –

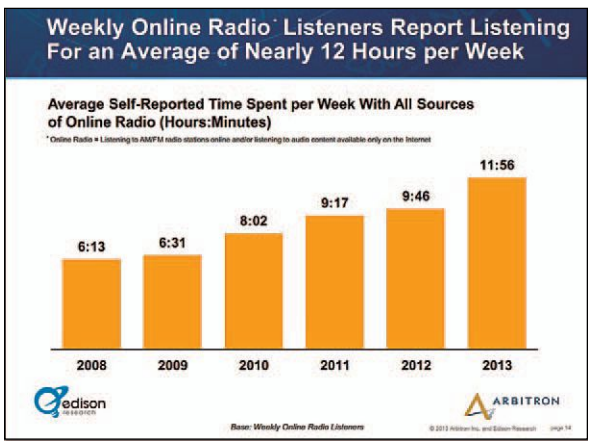
hear about the train wrecks, even though we had our hands tied and were unable to control the air talent who wanted to wait an extra beat between spots. All we could do was mention it to the talent and hope they'd pay more attention to getting the spots timed out right.

Stations seem to be trending towards more and more automated stop sets. This makes it much easier to precisely control the content and timing. Morning shows, which historically are live and topical, benefit when this happens – the hosts have less to do while spots run. They can assemble the next segment, review the news, and get ready to go back on the air without worrying about firing off a bunch of commercials.

Carrying automation to the extreme, a lot of programming consists of "voice tracks" laid down by a talent. These intros and outros are later assembled by a computer in real time and fed to the stream as a complete program, as well as to the station's transmitter. This allows a single air talent to do programs in multiple markets as well as be on numerous streams. This can get carried too far; you have to wonder how much listeners in the Pacific Northwest appreciate it when their "local" announcer comes across with a "Texas Twang!"

Podcasting also makes use of automation; doing for radio broadcasting what Tivo did for TV. Fans can download programs and listen to them whenever they want – in the car, on the beach, or anywhere they have a smartphone or a computer. This allows users to obtain lengthy programs in just a few seconds, dramatically increasing the convenience to the listener. Some stations gather additional revenue by selling subscriptions to the podcasts. In many cases, the podcasts are edited to remove the stop sets and fill material, so an hour's worth of program can be heard in 35-40 minutes or so.

All this means is that we can be certain that the single transmitter feeding a single antenna system is becoming a lot less dominant than it was in the past. We, as engineers, have a much wider variety of responsibilities than we used to. Streaming technology is changing rapidly, and we need to stay ahead of the curve if we're going to be able to maintain and understand the equipment, the software, and the challenges involved.



When I was finishing up my engineering education, I had to make a choice. I could specialize either in analog technology, or I could move into the world of computers and software. These days it doesn't matter which you choose; you're going to end up working, knowing and being challenged by both.

So, how long will we have transmitters and towers requiring prompt attention in the middle of the night? Chances are it will be a very long time before we stop using RF carriers. But the emphasis, just on the RF, is starting to fade. Fortunately for us, the new solid state transmitters have a lot fewer problems than we got used to with tube equipment. Lower operating voltages and longer lasting output devices hopefully mean we don't need to rush to the transmitter as often.

With stations like KFI streaming upwards of 100,000 hours of programming a day, and more and more of our audience listening to AM and FM programming over the Internet, you have to wonder if there's any point to pushing the station processing to be the loudest spot on the dial anymore. Will program directors start pushing to be the loudest URL on the 'Net? It's pretty unlikely; digital audio has a great signal-to-noise ratio, so we don't have to worry about standing out above the noise. A variety of signal processors are available just for handling streaming. These can fatten up what listeners hear and improve the sound, no question. But loudness isn't the be-all to end-all, like it's traditionally been when feeding a transmitter.

One other facet of streaming is that it doesn't matter how big or powerful a station is anymore. Even a 250 Watt Class "A" FM station can have just as large an Internet presence as a 100,000 Watt flamethrower. Indeed, many popular Internet stations originated in spare bedrooms and have no RF presence whatsoever. All it takes is a fairly fast Internet connection, a dedicated computer, a hard drive full of music, and automation software to get started.

The music licensing issue, about what streaming stations have to pay to publishers and artists, is still not totally resolved, but there are many small operations running really good music and interesting programming 24/7. Some providers, such as "Live365," gather a large number of Netcasters together and get them all on the net and cover the licensing issues for them. They run commercials and PSA's exactly like legendary radio outlets.

Netcasting is definitely a force to be reckoned with. As more and more listeners move to this static-free and increasingly convenient way to hear our programming, we need to take all measures possible to keep the stream up, running, and as free of train wrecks as possible.

Mike Callaghan was formerly the Chief Engineer at KIIS-FM in Los Angeles, CA. His email is: rg@mike.fm

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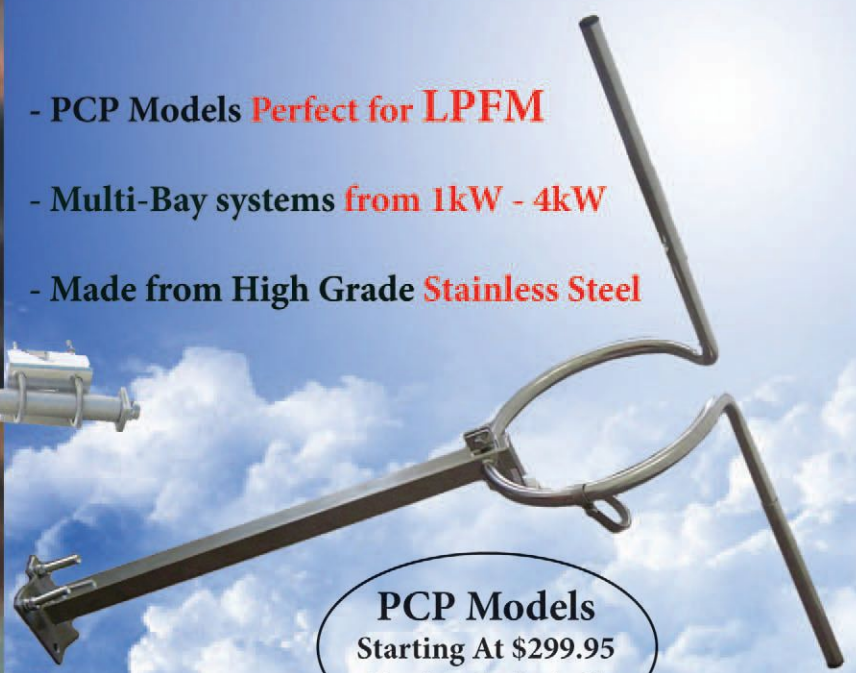

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Small Market Guide

Take Advantage of the Small Market

Turn the Annual January Slump Into $$$

by Roger Paskvan

Almost every radio station experiences a slump in sales during the first two months of each year. Whether you're a top 100 or just a lonely station in small marketville, let's face it, sales suck in January and February. Year after year this graphable pattern continued for us until one day we had a meeting that changed it all.

It was a cold December day and we decided to sit down and analyze why sales were down and what we could really do about it. I know, sell more ... well our sales team keeps saying – they all say no, go away! It is like all our small market merchants just crawl into a hole and don't want to be found until March. They all seem to preach the same song, "go away come back some other day."

In our strategy meeting it became abundantly clear that we were not going to change the merchant buying pattern utilizing the traditional approach to small market radio sales – buy more ads just isn't working every year.

Seeing more clients wasn't the answer either since they all play the same tune, "go away come back another day." It became apparent that in order to raise the billing in January, a non-traditional approach to radio sales would have to be embraced. Our staff pondered ideas for several days. Fishing contests, winter fest, parades, give-aways, but the bottom line is people don't want to stand outside for hours with temperatures in the teens. Considering the northern temperatures at that time of year, the approach would have to be an inside event to break tradition. Something that would force the merchants out of their igloos and into the limelight in late January.

Well the ideas flowed and our GM coined the idea of a big boys and girls toys show, to be held in the local events center, an area utilized for hockey and other sporting events, year round. It was heated, a perfect place to host a big show of large winter and summer toys on display. Well, we organized a trade show with several big local boat dealers, four wheeler and snowmobile dealers as the key sponsors. The sales pitch went out and we sold booth space to as many merchants as would listen. The idea of having a big show in a small market town during the slowest time of year was differently, great. This was to be a free event to the general public. Within three weeks we were sold out for the entire arena.

This was a way for our small market clients to get out of their slow time of year, too! The miracle of radio was bringing the people to see their product displays. It was a new local event in a small town, where many have nothing to do or places to go during the long cold winter months. The event was held for two days over a weekend. It was a safe, free place to bring the whole family – Mom, Dad and the kids for a day to walk around and see all the big boats, trucks, sporting goods, with lots of places to eat something while wondering.

Well, small market radio really worked and the two day event brought in over 3,500 people to the show. Many positive comments, especially "it's free." The merchants couldn't believe it; one boat dealer sold three big cruisers the very first day, right on the show floor. That is more than he ever sold in any previous January. He is definitely coming back next year. We became the local merchant heroes and this event sure didn't hurt our community image. We're planning an even bigger show next January.

After expenses and paying all the bills our stations actually finished with a positive cash flow in January. That was a first in ten years. The moral of the story, initiate an NTR (non-traditional revenue) community event to get yourself out of the winter slump and turn your first quarter into a positive cash flow.

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

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State of the Station

Improving Your Physical Plant

by Steve Tuzeneu

With each new year come budget planning and plans for where you want to take your station. One of those plans should include evaluating your physical plant. By that, I mean your transmitter plant.

While it is good stewardship to keep your transmitter for as long as you can, there are financial rewards for periodically upgrading. Here are some thoughts to keep in mind when evaluating your plant.

1. Efficiency – Probably the best reason for upgrading to a new transmitter is the money you will save in monthly energy costs. Some older transmitters are only about forty, or forty-five percent energy efficient. That means you are spending more money than you should each month on energy. A new, energy efficient transmitter can pay for itself in energy savings in just a few years. Part of that savings is made up in the money you will save by lower costs in air conditioning the room or building where you transmitter is located. By energy efficient I am referring to a solid state transmitter.

2. Reliability – Solid state transmitters are typically more reliable than tube transmitters because of the ruggedness of the newer designs and the redundancy of the circuits. Some solid state transmitters are not as tolerant, however, of high VSWR conditions as the older tube models. This is usually only a concern when the transmitter and antenna are located in a part of the world where snow and ice are frequently part of the normal winter weather. In which case you should seriously consider radomes or an antenna equipped with heaters.

3. Support – Some transmitter manufacturers do not support a transmitter after the twenty year mark. At least one manufacturer that I know of supports every model they ever made, but most do not. In the planning process you want to choose a manufacturer that you and your engineer are comfortable with. While you can get a cheaper transmitter from a foreign manufacturer, you may pay later by not having an English-speaking, U.S.-based tech support staff available 24 hours a day, seven days a week.

Some transmitters still in use are orphans, meaning the company has long gone out of business, so getting support is impossible, unless you know someone who has launched a business that supports your transmitter, or you know an engineer who has experience with it. You want to make a point of asking engineers who maintain the brand of transmitter you are considering, what they think of the support the manufacturer gives its clients.

4. Documentation – While this section could be a part of the "support" section above, I felt it necessary to make it separate because it deserves more than just a passing comment. Of all the technical documents I have read for equipment used with a radio station, very few companies have produced support and service documentation that answered enough of my questions to qualify as a complete work. With the Internet and compact media like CDs or flash drives, the cost for producing good documentation should be considerably less.

During the research process of purchasing your new transmitter, ask the company, and other engineers, "how good is the documentation that comes with the transmitter?" Naturally the manufacturer won't be able to address every concern an engineer may have in the documentation, but there should be enough to help the engineer maintain the transmitter under normal circumstances.

5. Parts – When a manufacturer goes out of business, or no longer supports your old transmitter, you come to the point where finding parts is a challenge. Some companies assembled their products with proprietary part numbers – if you call up a parts supplier, you are not going to be able to find replacements. Other manufacturers use off the shelf parts that you can order from your favorite source simply by giving the sales representative the part number and name of the company that produced it.

These areas of consideration are by no means exhaustive, but they will help you in deciding whether or not it makes sense to replace that old box you call your transmitter. If the transmitter shack electric bill doesn't make you cringe every time you read it, and the transmitter is reasonably reliable, and you can get parts and manufacturer support for it, you may be able to keep it a few more years. Be sure to weigh the costs of running the current transmitter with the potential savings you will enjoy with something new.

Steve Tuzeneu is the director of engineering for KBKL, KEKB, KEXO, KMXY, and KKNN. Townsquare Media, Grand Junction, Colorado.

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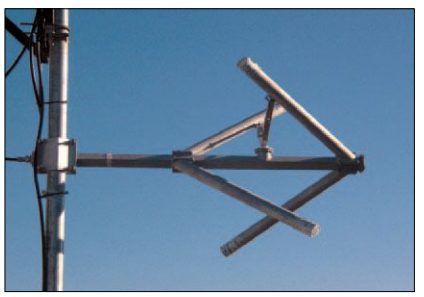

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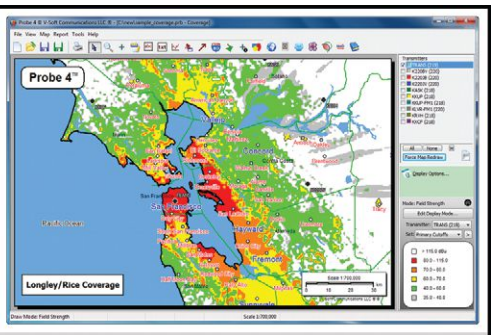

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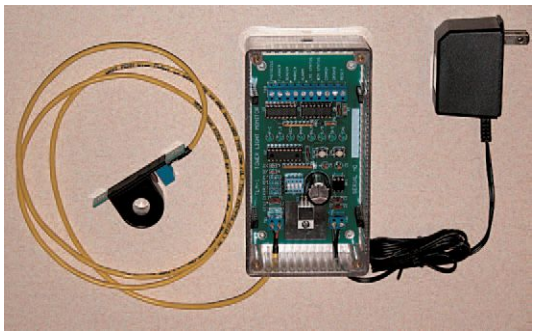

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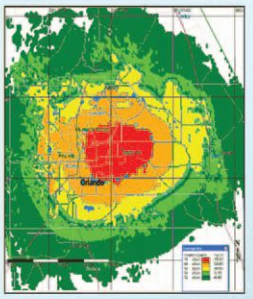

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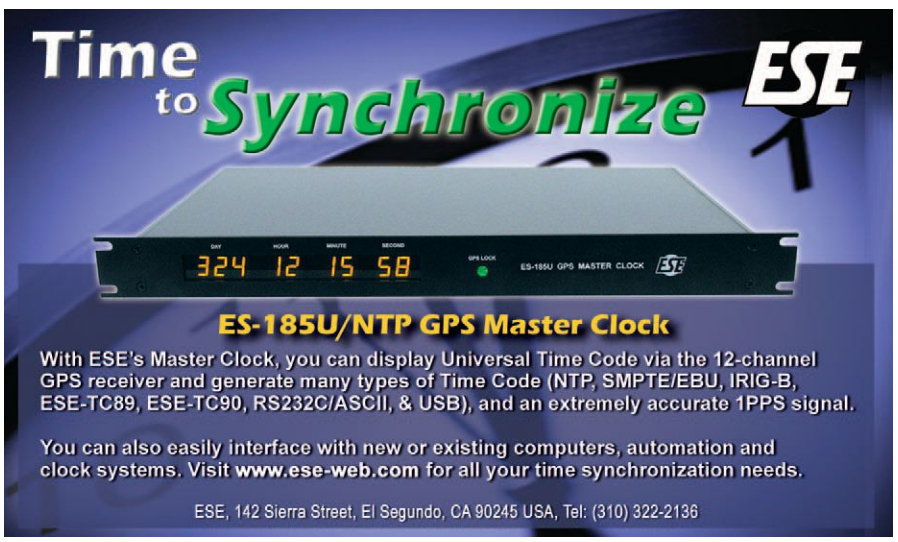

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Studio Control? It's as simple as 1, 2, 3

1- The Studio Slave Auxiliary Relay Pack

The Studio Slave is the perfect solution for studio control functions at an economical price, featuring 8 form C contacts for switching functions ranging from low level audio, and up to 2 amps of AC or DC. Featuring momentary, latch on, latch off, positive DC, logic low or dry contact input control, steady state and flashing Solid State Relay driver voltages, variable delay and more.

2- The Original Mic Pro & the Mic Pro 2 Microphone ON-OFF Controllers

The Original Mic Pro is a lighted Mic switching controller for the Studio SLAVE and similar competitive products.

The Mic Pro 2 is a stand alone lighted microphone ON-OFF controller designed for microphone control of low cost mixing boards with "insert" jacks, and will also directly drive the Studio Solid State Relay Pack.

3- The Studio Solid State Relay Pack

A solid state switching interface that can switch up to 5 amps at 120 VAC for powering "ON AIR" or "RECORDING" signs, flood lamps or other alerting indicators. May be controlled directly by the DME Studio SLAVE, Mic Pro 2, DME Phone Flashers, and any 5-30 VDC source, normally open contact closure or logic low.

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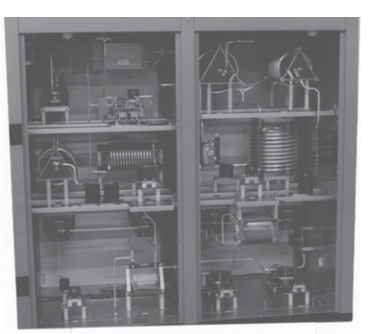

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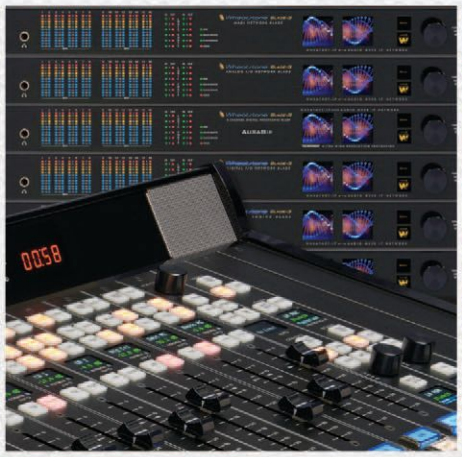

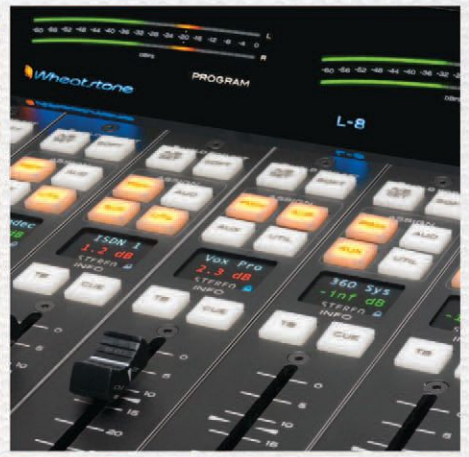

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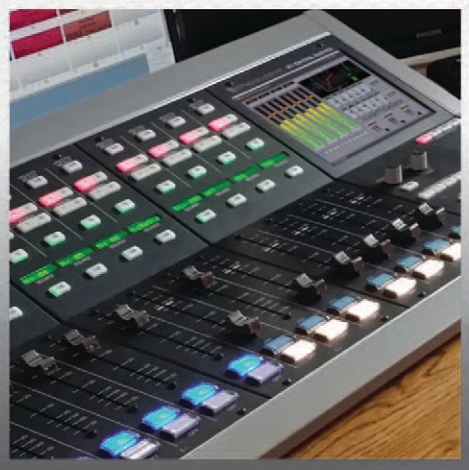

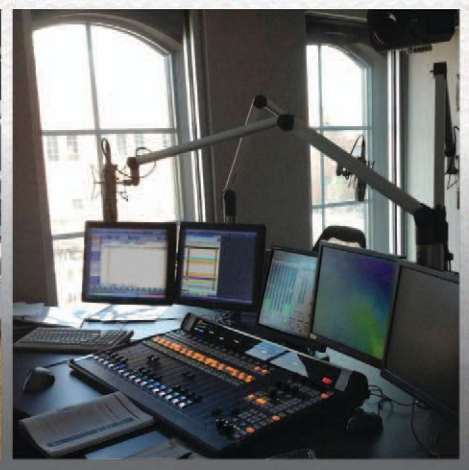

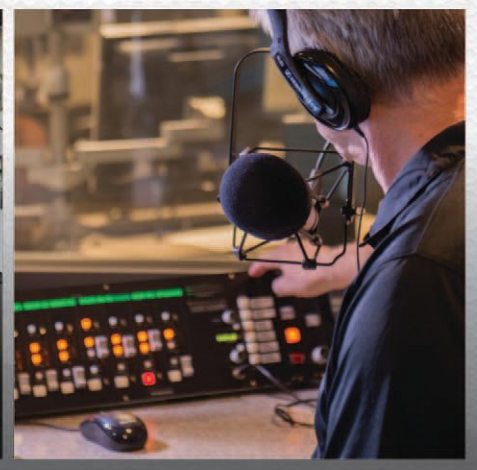

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