



RADIO WORLD

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Radio Eyes Advantages of Deregulation

The FCC backs off some requirements

BY RANDY J. STINE

WASHINGTON — Recent changes to certain FCC rules present opportunities for the industry to operate more efficiently, supporters believe.

Elimination of the main studio rule, the license posting requirement and the requirement to keep a hard copy of FCC rules at radio stations are three of the changes that have swept through the commission under the leadership of Chairman Ajit Pai.

Further significant regulatory amendments remain in the pipeline, such as the potential relaxation of local ownership rules, including modifying limits on common ownership of AM and FM stations in a market. Those decisions are pending completion of the FCC's latest quadrennial review.

Further, the commission has

launched a proceeding to simplify local public notice requirements for radio station applications, according to a FCC filing.

Radio broadcasters are focused on adapting their operations to better compete in a more relaxed regulatory environment. "The deregulation of the past 18 months is significant," said Scott Flick, partner at Pillsbury Winthrop Shaw Pittman LLP, ahead of a panel discussion of radio and financial experts at the Radio Show in Dallas.

"Early during Chairman Pai's leadership he said he wanted to put one media deregulatory item on each month's FCC agenda. They've hit a lot of the low-hanging fruit, but there is more to go," Flick said. "I think we are on the brink of fundamental regulatory change."

Radio broadcasters are researching

(continued on page 4)

INSIDE THE GLASS-ENCLOSED NERVE CENTER

Here's a visual tour of the new facilities of WTOP, America's top-billing radio station. **Page 6**



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Sentech Shuts Meyerton Shortwave Site

Planned closure comes after years of financial losses

BY HANS JOHNSON

MEYERTON, SOUTH AFRICA — Public broadcast signal distributor Sentech shut down its shortwave station in Meyerton at the end of March. The closure was planned and follows years of financial losses.

The state built Meyerton decades ago in the post-apartheid era and operated it as a brokered station for both international and South African customers.

As a result of the termination, Channel Africa, the country's international service to Africa, is no longer on shortwave. "Our joint efforts with BCC World Service to discourage Sentech from switching off fell on deaf ears," explains Solly Phetoe, the station's general manager. The Sentech-sponsored weekly transmissions of the South African Radio League have also come to end.

Radio Sonder Grense is a domestic service broadcasting in the Afrikaans language. It relied on shortwave to reach the remote areas of the country's Northern Cape province. "From our estimates and from the amount of complaints I've received, it [the audience] was very little," said Johann Pieterse, station producer. But the Mybroadband online South African publication reported that Radio Sonder Grense's closure means "many South Africans living in the Northern Cape" now have to rely upon the "BBC and other international broadcasters for reliable news."

Sentech's shortwave facility had annual revenues of around \$2 million. The amount of annual broadcast hours had slowly dwindled to less than half of what it was a decade ago.

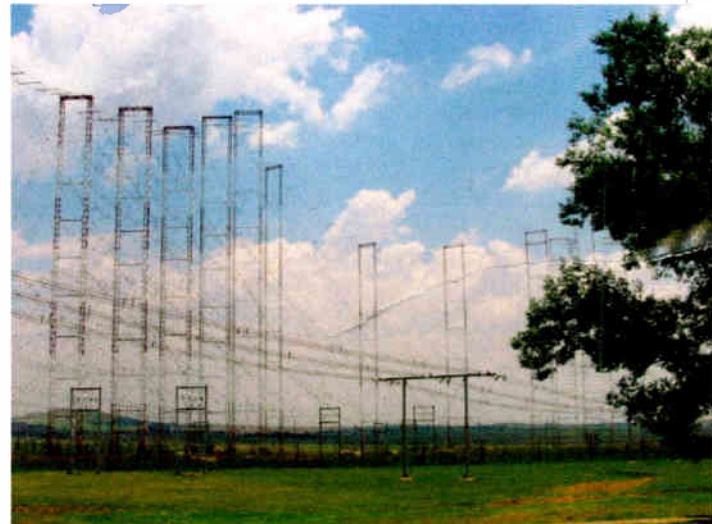
In April 2013, Sentech launched a three-year plan to gain shortwave profitability. The company's goal was to carry profitable services only and restructure staffing to reflect the reduction in total services. The effort failed.

Sentech attributed the decline in its shortwave business to the internet and satellite broadcasting. Facing what it described as high maintenance costs and viewing analog shortwave as an obsolete technology, Sentech changed course in 2017. It approved a plan to shut down the site as well as a transition to Digital Radio Mondiale. A conference was held in May 2018 to examine its impact and to discuss alternative funding methods.

Phetoe suggested radio advertising at the event, but traditionally large shortwave stations have not succeeded in advertising products and services.

Any DRM conversion will require substantial capital investment given Sentech's aging transmitters and have to take into account the lack of DRM receivers.

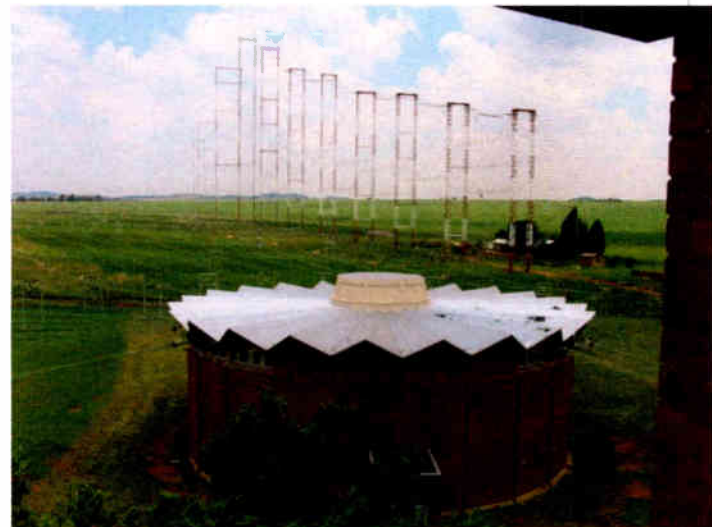
Will Channel Africa find a new site? "We are nego-



Curtain antennas at the Meyerton relay station.



The entrance of the Meyerton relay station.



The switch house rooftop.

tiating with Sentech to provide an alternative shortwave platform," said Phetoe.

Hans Johnson has worked as a shortwave broadcast consultant and frequency manager for over 20 years.

DEREGULATION

(continued from page 1)

alternate business practices to improve efficiencies, Flick said, but first they must consider structural changes in how they run their businesses.

"Radio broadcasters are so used to being micro-managed by the FCC that it takes a while for these changes to sink in. For instance, the elimination of the main studio rule. Of course broadcasters want to maintain a presence in their local communities, but there are circumstances where having a main studio, or at least what qualifies as a main studio now by the FCC, may not make sense anymore," Flick said.

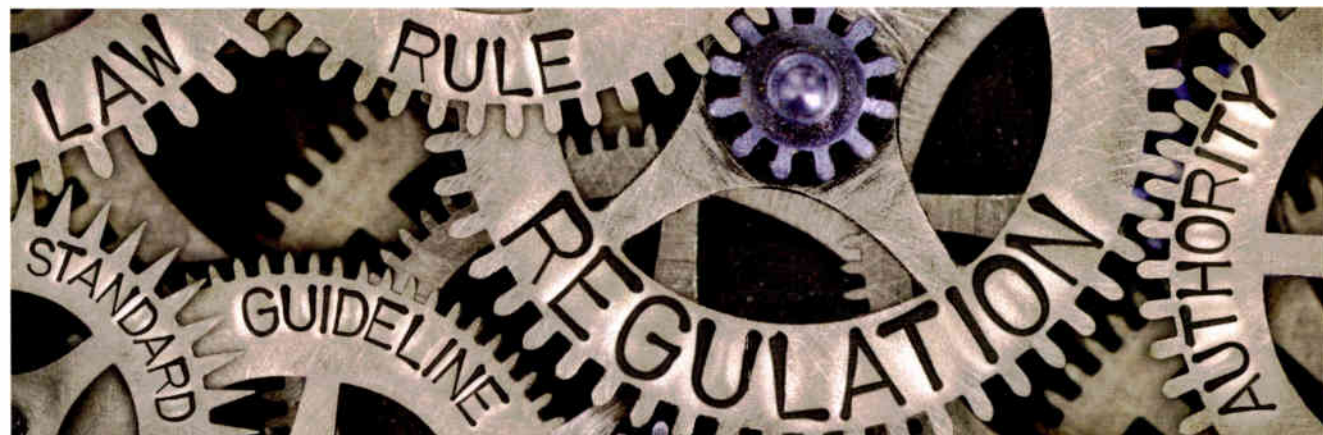
"Broadcasters are stepping back to ask how they might do things if they were starting from scratch today. They are giving their operations a fresh look."

Flick said some of his broadcast clients are adopting new business strategies in light of deregulation, specifically the elimination of the main studio rule, but though not in large quantities. "It takes time to implement changes, and ... leases are sometimes years long," he said.

In addition, deregulation of any industry typically increases the interest level of investors, Flick said; he expects that to be the case for radio.

"Any time you cut out the regulatory straightjacket, then you have people asking, 'Ok, now I might want to invest the money to figure out an alternate business plan,'" Flick said. "The risks are lower and the industry becomes less complicated with fewer government limits."

Not everyone feels the direction of radio deregulation is a good thing, Flick said; and on some issues, radio com-



Getty Images/EtiAmnos

panies don't speak with one voice. For example, iHeartMedia and Urban One are opposed to a change in the ownership subcaps that many others support.

"Of course, there will always be a split on any proposed deregulation between those who feel the rule constrains them and those who like the rule's constraining effect on their competitors," Flick said.

Susan Patrick, co-owner of Legend Communications, said the regulatory environment is presenting opportunities to improve operations and in some cases expand them.

"We are fans of deregulation. It's going to help small-market broadcasting and help us compete against all of the other audio services that are out there now," Patrick said.

Legend Communications, which has 23 radio stations, including several FM translators across Wyoming, is always looking for business efficiencies, she said.

"We have several situations where the main studio rule being eliminated could help us. We haven't made those changes yet. I have spoken to a number of small-

Broadcasters are stepping back to ask how they might do things if they were starting from scratch today.

— *Scott Flick*

market broadcasters who have combined studio facilities, and it has helped them use resources in a different manner that better serves their communities."

Patrick, who is also co-owner and managing partner of brokerage firm Patrick Communications, said she does see the potential for some broadcasters to utilize the new rules to cut staffing by consolidating facilities.

"To say otherwise is naïve. Some people given the opportunity to save money

will try to save money, while large operators are more likely to be able to afford to keep staff."

Beth Neuhoff, president and CEO of Neuhoff Communications, said the deregulatory mode of the FCC can help radio broadcasters increase value in their properties.

"I think with deregulation there is tremendous upside to a disciplined operator and investor. One of the basic rules of economics is that mature industries must consolidate to survive," Neuhoff said. "There is so much opportunity in the smaller market for a better, more efficient model."

Neuhoff said regulatory moves by the FCC offer broadcasters relief but they don't go far enough.

"I think there could be both top- and bottom-line growth opportunity with less regulation. The ability to streamline back-office and operations is certainly interesting," Neuhoff said.

"The bigger opportunity in my estimation is top line. With greater scale, I believe markets like ours could be better served with more offerings both that serve multiple markets and a larger portfolio of digital."

Those stations with market proximity "most certainly can and should take advantage of the main studio rule," Neuhoff said, but the challenge will be keeping a local presence visible on the street.

Neuhoff Communications, which owns 20 radio stations, is reviewing its best business practices, she said.

"Interestingly enough, our Fast Forward team, our next generation of company leadership, is designing the station workplace of the future as their capstone project. They identified main studio as a real opportunity for us," Neuhoff said.

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David Santrella, president of broadcast media for Salem Media Group, said the broadcaster is looking upon the recent FCC dereg moves favorably.

"I think now all broadcasters need to run more efficiently. There are broadcasters always looking for ways to run their operations with less money than they did the year prior and the year before that. And so I think the main studio rule will present opportunities going forward," Santrella said. "Salem will look at that."

The FCC is simply allowing broadcasters to make changes to operations to better fit new technology, he said.

California-based Salem, with just over 100 radio stations in just under 40 markets offering Christian-centric content, is "not behind" the movement for a change in the subcaps, Santrella said.

"If they change the subcaps I think you'll see more people abandoning the AM band and moving formats to FM. Such a move would devalue AM properties. We built a business based on the current model and regulations, so when you change the rules in a very long tail business, and radio is a long tail business, you severely impact the business model designed based on the rules as they exist," Santrella said.

Santrella, who also chairs the NAB Radio Board, said radio will need to balance moves based on fewer regulations while not losing touch with radio's greatest natural strength of being "a local community service" business.

What do you expect the impact of FCC rule changes to be on the U.S. radio business marketplace? Comment on this or any story. Email to radioworld@futurenet.com with "Letter to the Editor" in the subject field.

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Take a Look Inside the New WTOP

Here and on the following pages are photos from Radio World's video tour of the facility

Hubbard Radio's WTOP is the top-billing radio station in the United States and a leading media voice in the nation's capital. Photos here and on the following pages are from Radio World's 70-minute video-based tour that you can access at <https://tinyurl.com/rw-wtop> or by click-

ing Resource Center at radioworld.com and scrolling to Webinars. Our thanks to WTOP's Brian Olinger and Dave Garner, RadioDNA's Rob Goldberg, and webcast sponsors Wheatstone, Comrex, WideOrbit and Burli, who were key technical partners on the buildout.

WTOP is a 24/7 news operation with a flagship FM signal, three other on-air licenses, digital multicasts, a news network dedicated to the local federal government workforce, a digital agency and an extensive digital content department and social media operation (Fig. 1). Hubbard moved to its new location in Maryland right outside the D.C. city boundary (Fig. 2) for more room and to consolidate operations onto one floor. The 30,000-square-foot space includes 18 studios and booths plus some 50 newsroom workstations built around an AoIP infrastructure, a total of about 70 technical work areas serving 200 employees.



1



2



3



4

The lobby (Fig. 3) is large and welcoming, with a human receptionist. Visitors are greeted by the First Amendment etched in glass (Fig. 4) outside a large conference room. Staff and guests can get snacks at the News Bites Cafe (Fig. 5) or relax before a meeting on sofas in the sales area just off the lobby (Fig. 6).



5



6

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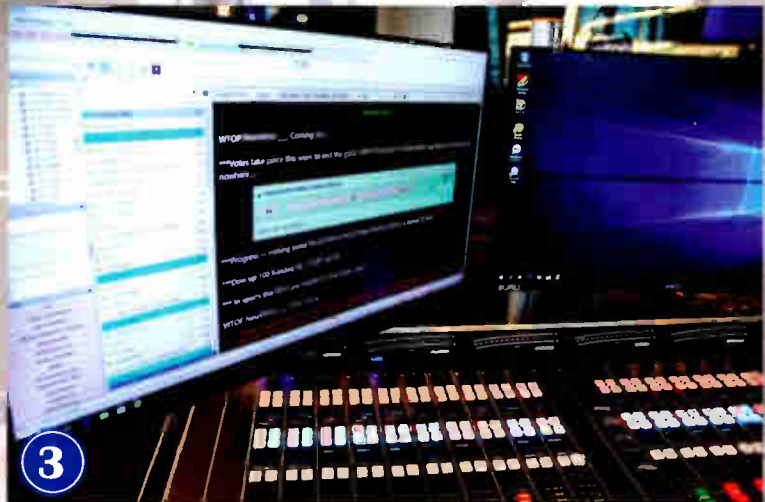
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COMREX

Studio A is "The Glass-Enclosed Nerve Center" (Fig. 1), a name rooted in the pre-PPM days of Arbitror and diary "recall." External sound isolating glass is important given that there's a noisy bus depot across the street. The studio can accommodate two anchors (Fig. 2) as well as sports, business and news reporters who come and go; guest interviewees such as a governor or mayor; TV cameras; and a Pet of the Week segment that is simulcast on Facebook Live. Wheatstone LXE surfaces and Burli NE software are central parts of the operation (Fig. 3).



Anchors can bring up any workstation in the big newsroom as well as remote codecs, a Capitol Hill bureau, weather forecasters on or off site and other sources. A transmitter facility in Wheaton, Md., has a backup newsroom and studio for emergencies. Outside Studio A is the Editor's Desk (Fig. 4), ringed inside and out by video monitors that are both impressive and practical for monitoring outside events. This is the central news hub, featuring nine workstations laid out around a half-moon-shaped desk. The main editor sits at a central position with line of sight to the anchors; he or she is flanked by the WTOP assistant editor and digital editor. These three have ultimate say over what goes on the air and online. Visible in Fig. 5 is the digital editor's position, including social media tools and a virtual mixer display at right. Outside of the half-moon and facing inward are six stations for news writers and anchors. Time-of-day considerations (Fig. 6) dominate the station operation. WTOP uses WideOrbit Automation for Radio for commercial playback, interfacing with a Marketron backend traffic system. Anchors play spots from WideOrbit using six on-screen widgets, as John Aaron does in Fig. 7.



 A graphic for a WTOP news broadcast. It features the WTOP logo, the text "WASHINGTON'S TOP NEWS", the time "12:28:38 pm", and the date "Thursday, July 13, 2019". Below this, there is a table of times for different cities:

| LOS ANGELES | UTC / ZULU | PARIS | HONG KONG | TOKYO |
|-------------|------------|---------|-----------|---------|
| 9:28 am | 4:28 pm | 6:28 pm | 12:28 am | 1:28 am |

 The temperature "87°" is also displayed.


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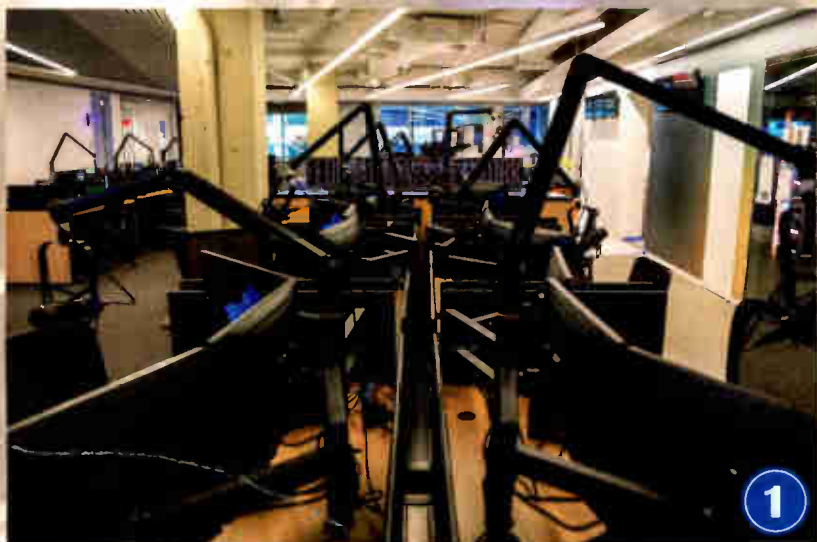
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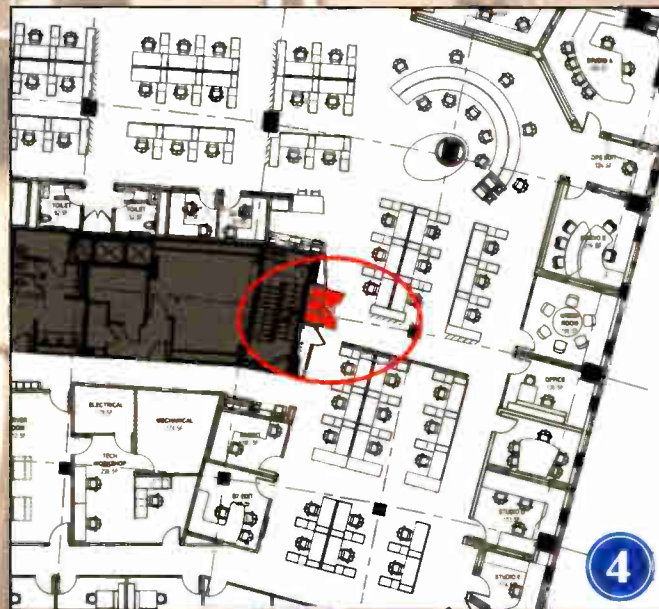
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The newsroom has dozens of identical workstations to support the broadcast and digital reporters of WTOP and Federal News Network (Figs. 1 and 5). Each has the same mic, virtual mixer, computer and adjustable-height desk. Integrator RadioDNA designed a virtual mixer using the Wheatstone ScreenBuilder software development tool (Fig. 2); functionality formerly done by hardware is on screen, with only a small physical turret for mic control, headphone jacks and inputting external sources like an iPhone or portable recorder. Audio editing is in Adobe Audition or Burli NE. The 50 workstations have 50 computers, but the system uses one program referenced off a file server; a computer is identified by an E number, and when a user launches the executable for ScreenBuilder, it knows the E name of the computer and looks it up on a lookup table to use its unique, location-based config file. Any workstation can go on the air.



Each cube has drops for WheatNet and logic; they terminate in a central hub (Figs. 3 and 4). Audio from the workstations is on XLR balanced shielded mic cables that connect to this stack of Wheatstone M4 blades. Utility mixers in the M4s are used as part of the ScreenBuilder system. If there's a change to make or trouble to shoot, engineers can handle it here rather than at 50 locations. The facility is virtually free of punchblocks; RJ-45 patch panels are the primary wiring infrastructure. AoIP Blades are installed near the gear, and the gear is wired to them. Back in the air studios, engineers created "scriptable" buttons on the consoles (Fig. 6), and logic control for functions like EAS and profanity delay will come along if the staff needs to change which studio is providing live audio on the air. For outside connectivity, no ISDN BRI here; the facility is entirely Comrex Access (Fig. 7), with availability in every studio.





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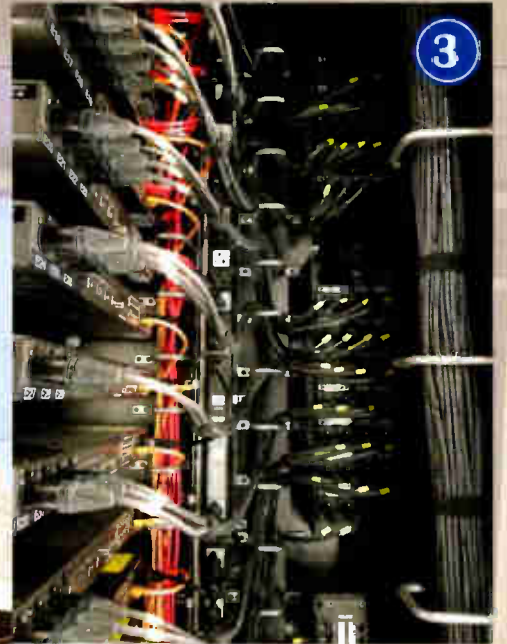
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World Radio History



1

The Technical Operations Center is visible to visitors through glass (Figs. 1 and 2). This row of racks supports, from left, WideOrbit automation, BurlI news system, satellite feeds, codecs, tuners, PPM encoding and connections to the outside including STLs. An InRow cooling solution from APC manages airflow for temperature stability. Brian Olinger created the display of many meters, at upper left in Fig. 1, using a Wheatstone application; it shows guests the activity in the various studios and signal paths. The "3D" graph in its center shows WTOP's on-air signal, giving a depiction of the audio spectrum and how the processing is working. Racks throughout the plant are lit for ease of service; wiring is color-coded by function (Fig. 3).



3



2



4

WTOP also has a customizable event space called "The Think Tank," with lighting and audio gear and a movable set (Fig. 4). Watch the Radio World webcast (<https://tinyurl.com/rw-wtop>) to learn about the traffic center (Fig. 5), local DC flavor (Fig. 6) and special studio routing to accommodate live sports production for pro hockey and basketball as well as college sports (Fig. 7).



7



5

The facility also has specialized booths for its business reporter, national security correspondent and weather forecasters, each with a small Wheatstone L8 console and a MultiPort in/out panel from Henry Engineering. Fig. 8 shows the weather booth; the radar monitor at upper left shows the GRLevel3 computer programming, displaying live NEXRAD Level 3 radar images, local storm reports and severe weather watches and warnings. The monitor at upper right shows data from the Earth Networks weather station on the roof. The image in the lower right is a framed picture of Hurricane Hugo.



8



6

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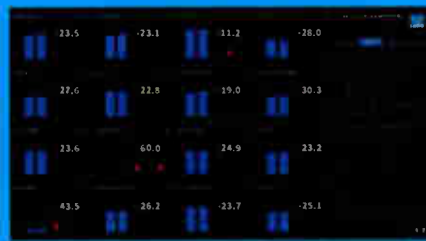
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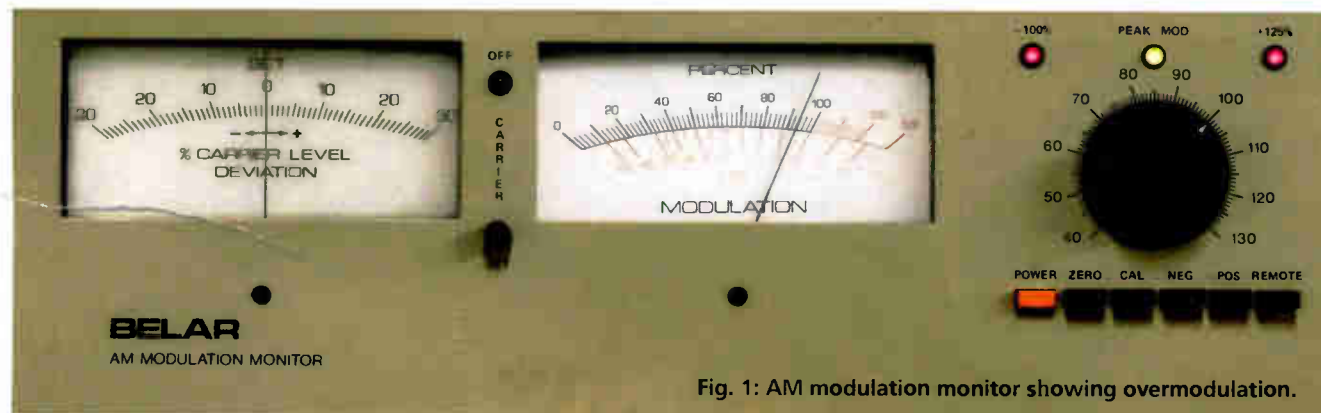


Fig. 1: AM modulation monitor showing overmodulation.

meter needle is in the right spot, as per manufacturer's instructions. A carrier meter misadjustment will result in inaccurate modulation monitor readings.

Fig. 1 shows an AM modulation monitor. The -100% and +125% lights are on and yet the analog modulation meter reads only 94%. It is normal for an analog meter to read lower than actual modulation. In fact, 85 to 90% is a more realistic meter display, because it cannot track peaks as lights do.

A monitor's audio output will sound excessively bright or harsh if a de-emphasis audio circuit is not included. Monitors traditionally do not have this, but often a simple capacitor and resistor modification will do the trick. The idea is to undo the high-

TECHTIPS

BY MARK PERSONS

First I'll tell what you already know. Back in the day, AM broadcasting was king and FM was commercial-free. Things changed in the 1970s as FM grew in popularity. Here we are 40+ years later with many AMs struggling. Some have gone away because they were no longer financially viable. To make matters worse, AM directional stations are more time-intensive and costly to maintain, especially when compared to FM stations.

On the positive side, I know a number of smaller AM/FM combination and stand-alone AM stations in Minnesota that are doing well. One town has a 1 kW AM with a 100 kW FM. The AM brings in 40% of the sales revenue because it has always been locally programmed

with live announcers until 1 p.m., then is live again during afternoon drive.

AM radio isn't supposed to sound bad. It can be a clean and pleasurable listening experience, even when there is only 3 kHz of audio bandwidth. On the other hand, AM can be ugly to the ear when there are maladjustments.

SCIENCE

Modulation is the process of adding audio to a transmitted signal. Amplitude modulation is aptly named. A station's carrier (transmitter power) is varied by the station's audio. Carrier power is depressed to zero watts to achieve 100% negative modulation. It increases to 1.5 times carrier power when 100% positive modulation is reached. That is why a thermocouple antenna ammeter reading rises with modulation. You read it during a programming pause to get an accurate measurement.

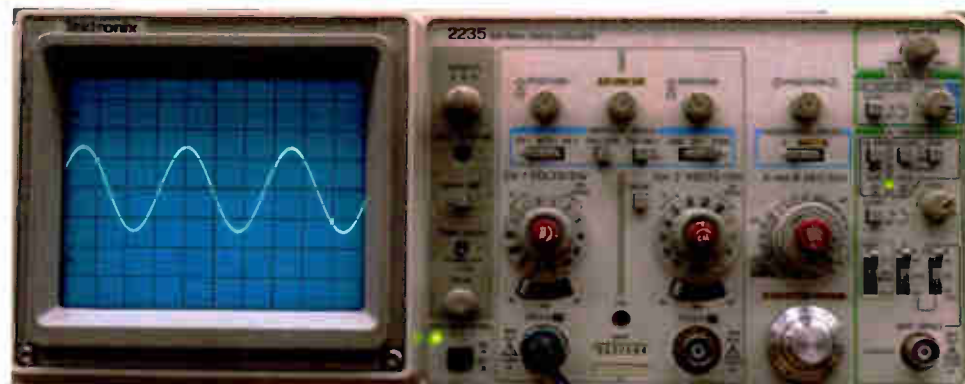


Fig. 2: An AM RF carrier wave on an oscilloscope.

METERING

AM modulation monitors have -100% and +125% lights indicating overmodulation. You really don't want those lights to come on. More is not better.

First, be sure to set the monitor's RF carrier level control so the carrier

frequency boost that is a part of the audio processing, per the National Radio Systems Committee (NRSC) standard. As you probably know, the transmitted audio has increased high-frequency response to overcome high-frequency rolloff in most receivers. The

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goal is to restore flat frequency response to the listener. Some audio processor manufacturers are using non-standard pre-emphasis curves to suit their taste. That complicates getting a realistic feel for frequency response. At least they are trying to make the best of receiver frequency response roll-off.

ON A SCOPE

An article I wrote regarding the operation of oscilloscopes, "Your Scope Is a Tool for all Seasons," appeared in the Jan. 13, 2013, edition of Radio World.

To refresh your memory, a scope has a display where a dot that travels from left to right is deflected up and down with voltage. In this case, we will look at a transmitter's RF output.

I'll begin with Fig. 2. It shows an oscilloscope with a view of the transmitter's carrier with the scope sweeping at high speed (0.2 microseconds per horizontal screen division) to see the actual carrier wave of an AM radio station. By carrier, I mean the transmitter's power output. What you see is an almost perfect sine wave at the station's operating frequency.

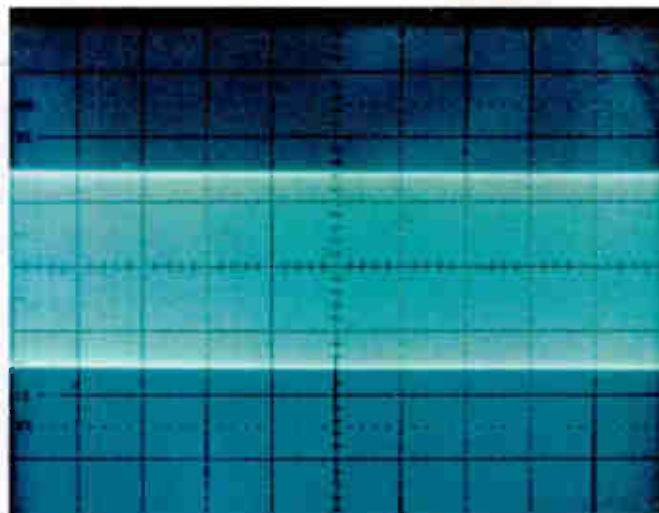


Fig. 3: A carrier with no modulation.

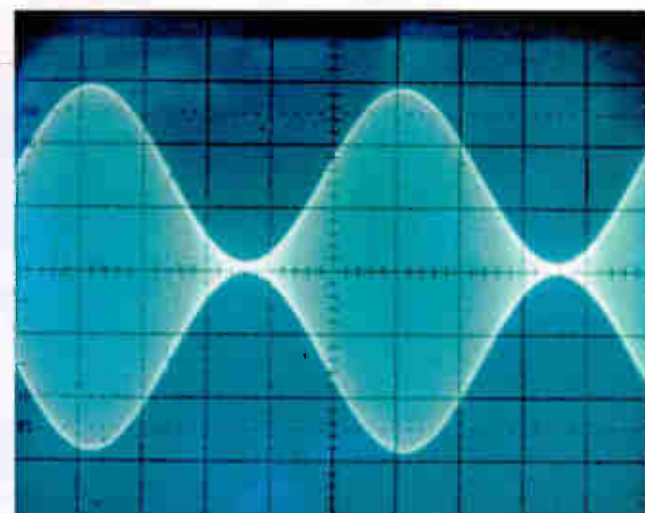


Fig. 4: A carrier modulated 100% with a 1 kHz sine wave.

It is a shame to lose listeners for that last 5% (about 0.5 dB) of modulation.

Let's zoom in to the scope's screen. Fig. 3 shows the carrier when the oscilloscope is slowed down to view audio (0.2 milliseconds per division). No modulation was present at that instant. Fig. 4 shows a 1 kHz sine wave modulating the carrier 100% positive and negative. The positive parts are the top and bottom peaks. They are mirror images of each other. The negative modulation part is where the carrier is just pinched-off at zero power in the center of the screen. This sine wave is relatively clean/undistorted, with less than 0.5% audio harmonic distortion.

Many receivers do not reproduce it that way. The last 5 or 10% of negative modulation, between 90 and 100%, is where receiver detectors have trouble faithfully reproducing what the transmitter is sending. The result is audio distortion. We all know that unwanted audio artifacts are a listener turnoff.

In Fig. 5, I've switched the oscilloscope to dual trace mode. It shows the transmitter at 100% modulation on the top trace. The bottom trace was sampled at the receiver's detector. I made the measurement there so it rules out additional audio harmonic

(continued on page 16)

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MODULATION

(continued from page 15)

distortion, which might be added in the output stage. By definition, harmonic distortion is where this 1 kHz audio tone will have unwanted audio products at 2 kHz, 3 kHz, 4 kHz etc. because of non-linear system performance. In this case, distortion from transmitter through the receiver detector measured 5.1%. It was only 3.1% at 90% modulation.

Fig. 6: Traditional analog audio processing used diodes to clip the negative side of audio before it went to the transmitter so it would not attempt to overmodulate the negative modulation while allowing positive modulation to go to 125%. The downside is that it added as much as 6.5% harmonic distortion in the process. Add the receiver's problems to the mix and you have a whopping 10.2% distortion. Ouch! You'd never allow that on FM.

Newer digital processors reduce but may not eliminate the problem. Yes, the station can be a bit (about 0.9 dB) louder on the dial, but it is irritating to many listeners. They don't know how to describe it, but *oops*, there goes another tune-out! Again, some people hear it and some don't. Best not to penalize the station with high modulation.

Fig. 7 shows the transmitter being modulated at over 100% negative modulation. I've moved the scope's trace up a bit so you can see detail. Negative peaks go flat to the center, which is no carrier at that instant. Modulation like this will not pass the required NRSC occupied bandwidth nor will it pass my ear test for listenability. It is tiring to hear.

Fig. 8 is where you want to be. No more than 95% negative modulation, the sweet spot between loudness and listenability.

It is a shame to lose listeners for that last 5% (about 0.5 dB) of modulation. Few if any will hear the loudness difference. Likely most will hear grit in the audio of transmitters modulated to the max. You can make up much of the modulation

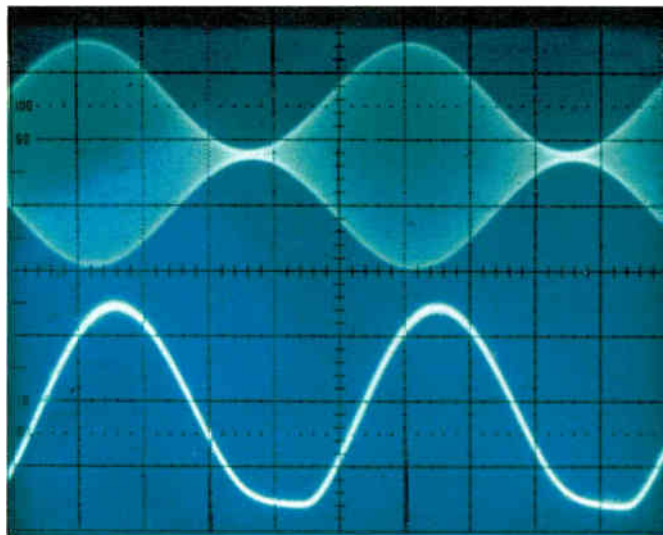


Fig. 5: 100% modulation with receiver detector output.

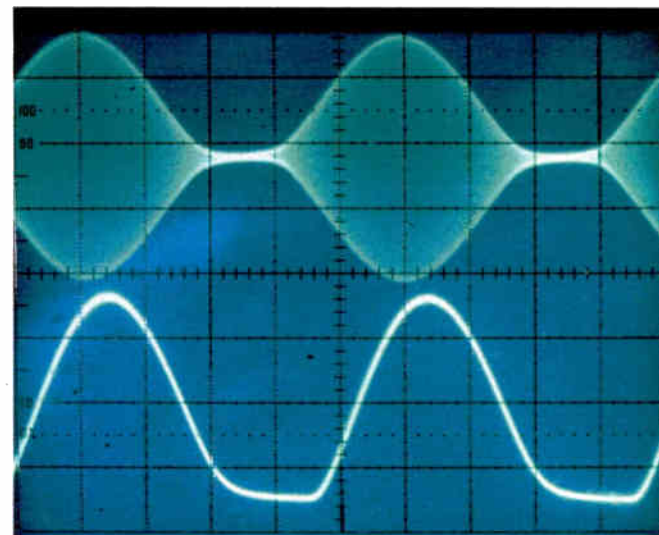


Fig. 6: 125% positive modulation, 100% negative modulation with receiver detector.

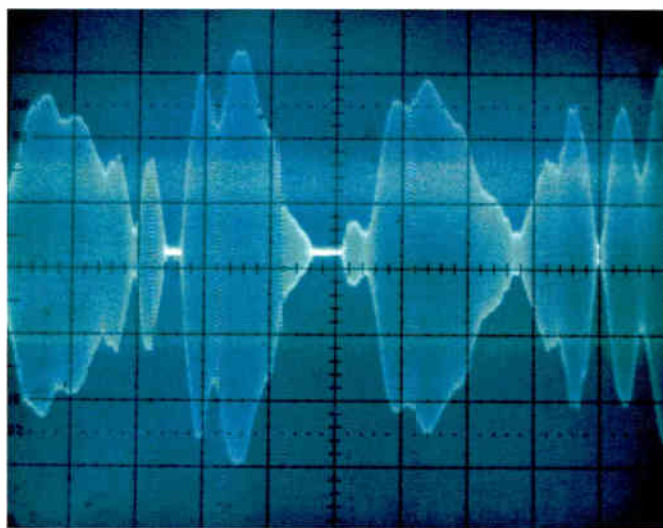


Fig. 7: The transmitter is being badly over-driven at 100% negative modulation.

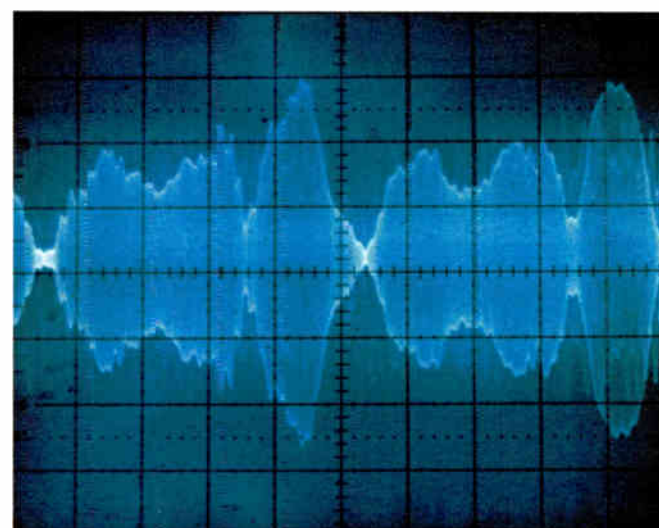


Fig. 8: 95% program modulation of the carrier.

percentage difference with careful adjustments of the audio processing, *before* it goes to the transmitter. Software-defined receivers eventually will solve much of this problem, but we need to deal with today's radios.

When I was installing AM stereo years ago, negative modulation was usually set at 95% and positive modulation at 95% for stations to sound clean. It was

positive +125% if the client preferred it. That extra positive modulation comes as "forced asymmetry" where the negative audio peaks are soft clipped so the positive peaks can go higher. Ouch!

Surprisingly, bad-sounding audio with less than 100% modulation will usually fit into the NRSC required bandwidth mask, in the FCC required annual measurement. That is because of

the required 9.5 kHz low-pass filter in audio processing.

AM stations competed in loudness wars to beat the other guy years ago. Now it is time to give listeners a pleasant experience with natural-sounding audio. Don't drive them away.

I grew up in a broadcasting family that owned two AM stations and no FM. Success was dependent on keeping listeners. Loudness was not the answer.

Comment on this or any article. Write to radioworld@futurenet.com.

Mark Persons, WØMH, is an SBE Certified Professional Broadcast Engineer. He recently retired after more than 40 years in business. His website is www.mwpersons.com.

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World Radio History

A Radio Sampler of the WBA Broadcasters Clinic

The popular annual regional trade event will also host the SBE national meeting

BY PAUL McLANE

The 2019 Broadcasters Clinic will be held Oct. 15 to 17 at the Madison Marriott West Hotel in Middleton, Wis. The annual national meeting of the Society of Broadcast Engineers will be held in conjunction.

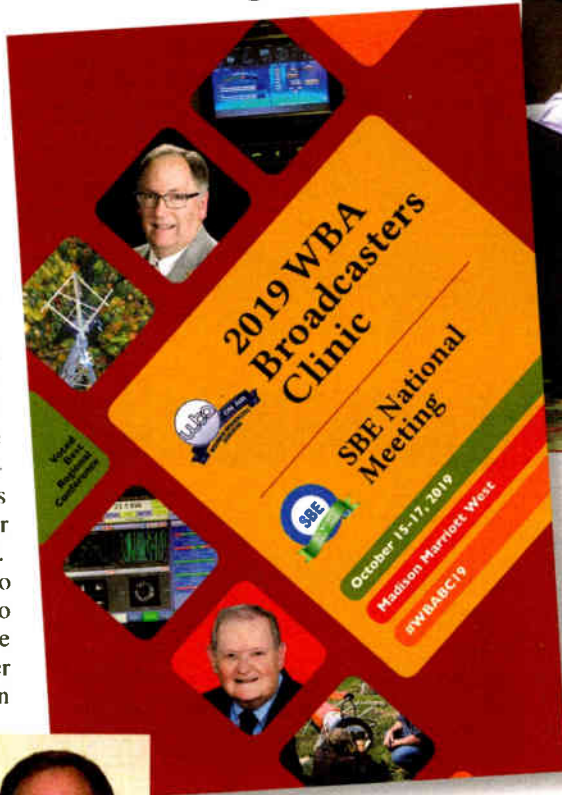
The "Madison clinic" is an industry tradition, kept vibrant even at a time when many regional events have disappeared. Its success has been thanks to an active leadership team, dedicated volunteers and ongoing association support.

Exhibitors and attendees have rewarded that investment by coming back year after year. Last year's event won the award for Best Chapter Regional Educational Event from SBE.

This year's clinic is dedicated to Gary Mach for 35 years of service to the Clinic Committee, from which he is retiring; organizers said his career has spanned nearly six decades "in every level of support from staff engineer to corporate engineer," working for organizations including Wisconsin Public Broadcasting and PBS.

"The word 'mentor' only begins to demonstrate how he carried himself throughout his career," WBA's Leonard Charles said of Mach.

Also being saluted is WBA Clinic Committee member Bill



Bill Hubbard

Hubbard, recently retired from his own long engineering career. A charter member of Chapter 80, he recently was named the 2019 James C. Wulliman Educator of the Year by the SBE. Among other achieve-



Last year's event won the award for Best Chapter Regional Educational Event from SBE.

ments, since 2013 he has contributed to the Media Technology Institute, a seminar to train new graduates in the basics of broadcast engineering. MTI was founded by Terry Baun who, in 2018, chose Hubbard to head the institute.

Below are sessions of interest to Radio World readers. See the full program, including TV-related presentations, at www.wi-broadcasters.org. For information about the SBE national meeting see sbe.org.

TUESDAY OCT. 15

8:30 a.m. — "War Stories: Tales from the Trenches"

Jeff Welton, Nautel

Show organizers remind us: "If you've seen any of Jeff's presentations you will have noticed that he occasionally makes use of a 'shouldn't have done it that way' photo — a picture taken demonstrating something that is done in a less-than-ideal manner." He'll share some of those and talk about what could be done to avoid such situations. "Names of stations shown will be withheld to protect the innocent."

9:15 a.m. — "Possible Applications for Use of AM Broadcast Tower Space"

Tom F. King, President and CEO,

Kintronic Labs Inc.

King will address solutions for using AM tower space for cellular telephone sites, broadband provider data services, LPTV antenna co-location for TV repack and other applications.

10:30 a.m. — "Faster, Cheaper, Better: Combining Today's Lower-Cost Technology for Perfect Audio Now"

Kirk Harnack, Senior Solutions Consultant, The Telos Alliance

"While we've witnessed individual broadcast systems turn to networking for lower cost and better utilization, we're now at the point where everything is connected with the same technology," Harnack says. He highlights the latest implementations of networked audio and control. "We know something about VoIP and AoIP, but we'll learn about MoIP and IoIP. Plus we'll see how the IT industry keeps building upon existing and trusted protocols to bring reliability and cost-savings to broadcasters."

11:15 a.m. — "Under the Hood, How AM HD Radio Works"

E. Glynn Walden, retired Senior VP of Engineering, CBS Radio

Walden, one of the fathers of IBOC, offers a brief discussion of how it came to be implemented as the U.S. digital radio platform over Eureka-147. He'll then describe the Xperi AM HD Radio system including basics of OFDM and the elements needed to make AM HD radio work, including interleaving, error correction, reference carriers, the low-latency backup channel and instant tuning. He will also talk about performance in the presence of grounded conductive structures and the presence of interference.

(continued on page 20)

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CLINIC*(continued from page 18)***1 p.m. — “Maximizing Your Content ROI with Podcasting”***Craig Bowman, Director R&D and Innovation, Futuri Media*

Radio people know how to make great audio, so it follows that they should be able to make great podcasts, no? Well, not automatically. Bowman will discuss how radio can use podcasting and on-demand platforms to improve the ROI on content they are already creating while growing audience with original content.

1:45 p.m. — “Hybrid and Digital Radio: What Every Broadcaster Should Know”*David Layer, Vice President, Advanced Engineering, National Association of Broadcasters*

“While the majority of radio listening still takes place on analog radios, broadcasters should be focusing on digital and hybrid (over-the-air plus internet) radio technologies as these represent radio’s future,” the organizers say. Layer will talk about radio technology work at the NAB dealing with digital and hybrid radio — “for the near term, making sure that broadcasters, manufacturers and service providers are



all working together, and for the long term, helping to foster advances that will ensure radio’s prominence in autos for decades to come.”

2:45 p.m. — “Troubleshooting Interactive Scenario/Heavy Duty Workbench”*Facilitators: John Bisset, Telos Alliance Radio Products Sales Manager for the Western U.S. and author of Radio World’s Workbench;**Greg Dahl, Second Opinion Communications*

An interactive presentation will troubleshoot common and uncommon problems at a broadcast facility. “Attendees will participate in small groups, learning and contributing during a condition of equipment failure and the scenario surrounding the failure.”

3:45 p.m. “Taking Your HD Signal to the Next Level Using**Generation 4 Exporter and Importer Technology”***Kevin Haider, Product Line Manager, GatesAir*

A walkthrough to better understand the differences between Generations 3 and 4 of HD Radio technology. Haider will address features such as the advantages of running a combined importer and exporter, and tools to help time alignment of the FM analog and digital audio.



WALLTIME

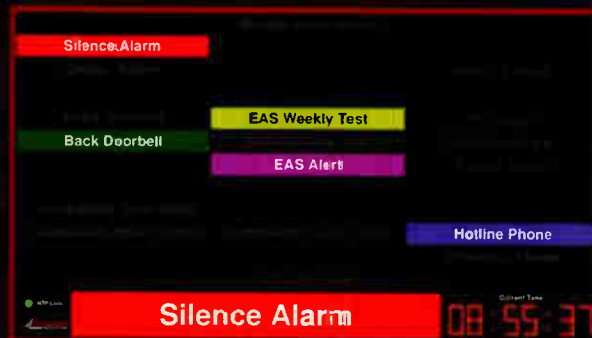
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7 p.m. — “Nuts and Bolts Session: Building the Perfect Pi”

Tim Wright, Cumulus Chicago

What’s cooler than solving a technical need by creating your own solution based on a Raspberry Pi microcomputer? Wright has developed various solutions at the Cumulus Chicago facility. Projects include Environmental monitoring, Axia Livewire routing control, making an older series XDS satellite receiver SNMP compatible, STL/TSL backups and a programmable studio clock/status display. Bring your laptop and your “wish list” projects for brainstorming.

WEDNESDAY OCT. 16

8 a.m. — “Broadcasting: What is Coming Next”

Steve Lampen, Consultant

What will the worlds of audio, video, broadcast and beyond look like in 10 years? In 20 years? “This presentation will depress some and excite others,” Lampen says. “I would love to hear your opinion on my predictions. Will we look back and laugh?”

8:45 a.m. — “Develop a COBO Plan for Your Station”

Manny Centeno, Project Manager, National Public Warning System (NPWS)

Centeno will provide a framework and best practices for developing a solid Continuity of Broadcast Operations Plan for your company or station to be prepared for major disasters.

1:30 p.m. — IT Security

*Moderator Jeff Welton, Nautel
Panelists: Alex Hartman, Optimized Media Group; Chris Tarr, Entercom Milwaukee; and Wayne Pecena, Texas A&M University*

This is a topic that unfortunately never goes out of fashion; indeed broadcast groups seem to be victimized by attacks ever more frequently.

3 p.m. — SBE Annual Membership Meeting

4 p.m. — Emergency Preparedness: From Tabletop to Action Plan

Tom Kujawa, recently retired Chief of Police for UW-Green Bay

Run a tabletop exercise at your facility to learn where the gaps are, identify solutions and refine your disaster planning in realistic ways. Chief Kujawa leads an interactive session that teaches you how to simulate a real-time, realistic event.

5–8 p.m. — SBE National Awards Reception & Awards Dinner (requires separate registration)

THURSDAY OCT. 17

8:30 a.m. — “Real Time Monitoring

of RF System Performance”

Dan Glavin, Dielectric Broadcast

“RF transmission systems are expensive and require annual maintenance to alleviate catastrophic failure, particularly for older systems,” Glavin says. “There are many monitoring systems that effectively measure VSWR and other performance issues in real time; however, fault location is not provided and requires additional resources.” He will discuss an IP-connected system providing broadcasters a way to monitor the RF system in real time, under full power with fault location.



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Deter Stinging Insects at the Transmitter Site

Also: Bill Ruck's capacitor experiences; and a unique and humane rat or mice trap

WORKBENCH

by John Bisset

Email Workbench tips to johnpbisset@gmail.com

Tom Johnson and I were talking about pests.

We met at the Alabama Broadcasters Association and Larry Wilkins' Engineering Day seminar, and as we talked about bugs infesting transmitter sites, Tom shared the picture in Fig. 1.

I don't know many engineers who care for wasps, hornets or other flying, stinging insects. Tom's photo is a great reminder to spray under eaves, and around door and window frames — any place that's protected from the weather.

Unfortunately, with cold weather approaching, it's not just vermin that seek shelter from the cold. An unoccupied transmitter building or AM antenna tuning unit is an ideal home for insects and rodents. Make sure it is sealed.

ATUs in particular can attract unwanted guests. If your ATU has a light fixture inside, wait til it's dark and then turn it on, then walk around the ATU looking for any escaping light (remember to look underneath, too; and also watch out for the "hot" tower). Any holes you spot, perhaps where bolts once held coils or other components, are "welcome signs" for insects, and usually the proper diameter for these insects to squeeze through. Plug those holes with RTV or caulk.

Remember also that before opening the ATU door, pause to watch whether stinging insects are flying around. They may have infested your enclosure already.

Check that entry panels or doors to the ATU also fit tight; again look for light leakage. Remember that field mice can squeeze through amazingly small crevices.

Tom waited till dark, then sprayed that nest and its occupants.

When I did contract work, a client was losing their satellite signal every day at dusk. I stood on a ladder and unscrewed the LNB. A swarm of angry wasps escaped the nest they built inside.

How we didn't get stung — or break a leg, frantically jumping off the ladder — still amazes me.

As I mention in my Workbench sessions, a one-liter clear plastic water bottle fits nicely in the throat of a satellite feed horn and will prevent infestation. As for your building, a good spritz of wasp and hornet spray applied under all the overhangs on your building is good preventive maintenance.

San Francisco contract and project engineer Bill Ruck writes, "Been there, done that." He was referring to the electrolytic capacitor woes we described recently.

Back around 1967, Bill learned about electrolytic capacitors working at a hi-fi store. Rule of thumb in those days was (1) if they've "puked their guts" by exploding, replace them; (2) if not, replace them anyway.

Since then, Bill's experience is only worse. Many times he has traced spurious outputs of an FM exciter to the power supply oscillating and modulating the carrier.

Recently, Bill had two BE FX-30 exciters with that problem. The issue was traced to the FMO module. The problem was that the FMO is potted and to dig out the potting compound to replace the capacitors would take a lot of time and was no longer cost-effective. The group owning the exciter preferred to purchase a new exciter rather than put a lot of money into reconditioning something that was over 30 years old.

Bill adds a few more nuggets to consider:

1. Although high ESR (equivalent series resistance) doesn't cause "ringing," it does let an unstable amplifier oscillate. Furthermore, most three-terminal regulators can be defined as an "unstable amplifier" and will oscillate. Bill learned in his own home-built power supplies to put a 1 uF tantalum bead capacitor and a 0.1 uF ceramic disc capacitor as close to the regulator IC input pins as possible.
2. Always put in 105 degree C electrolytic capacitors. They're slightly larger and slightly more expensive but they last a lot longer.
3. It takes the same effort to remove capacitors from a printed circuit board to measure them, than to just replace them. Yes, Bill can measure



Fig. 1: Eaves and overhangs at unmanned transmitter buildings can attract stinging insects.



Fig. 2: Find this DIY rat trap at the YouTube link in the text.

ESR and capacitance, but he does that *only* to confirm his suspicions, after putting in new low ESR 105 C replacement capacitors.

In summary, Bill writes that these days, component level repair is less cost-effective than during his misguided youth; but if you do make these repairs, replace!

Our Workbench Malaysian connection, broadcast engineer Paul Sagi, found an interesting YouTube video that we'll call "Curiosity Killed the Rat!" Here's the link: <https://m.youtube.com/watch?v=T-KJMM55A9A>

Paul comments that it appears that clear box sealing tape was used to hold the grain, and the "ramps" appear to be floor tiles, placed so the underside faces up. Placing two ramps on opposing

sides permit some rats to balance out each other, a single ramp may be better. Finally, for remote locations, Paul suggests affixing the ramp to the bucket, so it doesn't fall.

My comment? I sure hope this isn't someone's transmitter site! That's a lot of rats.

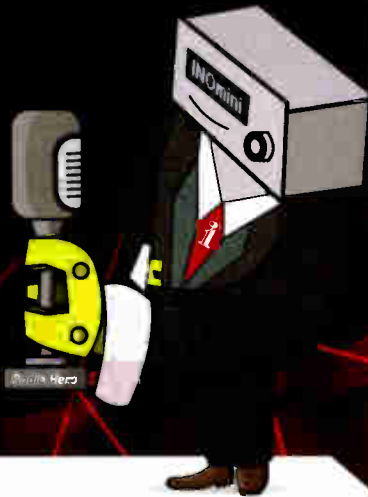
I also hope you'll contribute to Workbench. You'll help your fellow engineers and qualify for SBE recertification credit. Send Workbench tips and high-resolution photos to johnpbisset@gmail.com.

John Bisset has spent 50 years in the broadcasting industry and is still learning. He handles western U.S. radio sales for the Telos Alliance. He holds CPBE certification with the Society of Broadcast Engineers and is a past recipient of the SBE's Educator of the Year Award.



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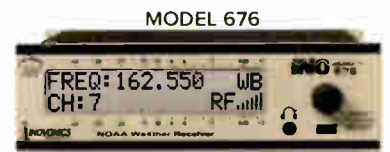
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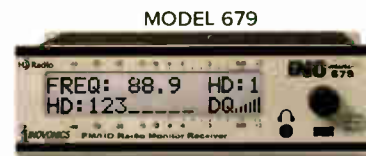
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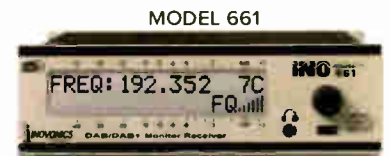
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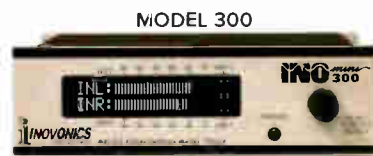
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Visual Radio: Creating a YouTube Channel

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PROMO POWER

Mark Lapidus



It's often said that kids keep a person young. I can attest that my three have kept me a bit more in touch with reality than I would have been otherwise from news or focus groups. And whether they belong to you, a friend or a relative, it's hard to miss that kids are the ultimate harbingers of change.

I first noticed my kids utilizing YouTube for music consumption about six years ago. I recall the jolt at the time; it actually made me feel bad that broadcast radio wasn't totally meeting their needs.

Now I'd like to address the importance of having a radio station YouTube channel.

LEARN FROM THE SUCCESSFUL

Wanna hang on to listeners or win over new ones? You gotta go where your audience does.

You execute this all the time when you send DJs to host concerts and events. The issue for many years now is that much of your audience is spending significant time elsewhere — online and with music apps. If you want to go where the fish are, you need a real presence.

The best example I've seen of a highly successful radio YouTube channel was created by the BBC's Radio 1. I'm not alone in loving this channel; it has 6.9 million subscribers. Some vid-

ers but, like Z100 in New York, has a low viewing rate. This could indicate that the stations are not purchasing any YouTube advertising; that their audiences are not diggin' what they're posting; or that their frequency of posting (content velocity) is low, so the audience doesn't actually participate regularly anyway.

CONSIDERATIONS

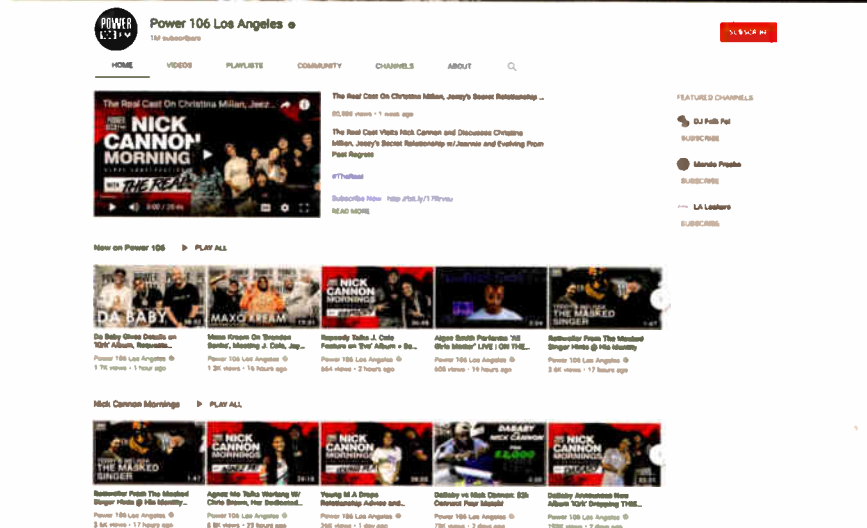
A few things to debate:

Should a morning show have its own YouTube channel, separate from the main radio station? While there's no definitive answer to this, my gut tells me that integration is preferable simply because it's desirous to maintain a

channel, but the effort and barriers to entry are low. Apple Music claims to be streaming 100,000+ radio stations. Is your station available?

Is there money to be made on YouTube? It doesn't turn into serious change until a station achieves a large number of video views with viewers who will watch full 30-second pre-roll ads. This ad-sense (pre-roll) that you can activate at any time, may be setting up a barrier to entry. It isn't something that requires serious discussion until you have a substantial audience. Another angle is to integrate sponsors into your content, probably the most appealing, as it could be tied to a station ad-buy.

A highly produced/professional YouTube channel does require an investment in money, time and resources, and



The YouTube channel of Power 106 Los Angeles, aka KPWR(FM), owned by Meruelo Media. A large subscriber base with low video views equals opportunity to invest in advertising to increase audience, while improving content and frequency of posting.

steady flow of content velocity. If both the morning show and the station are creating product, the overall posting frequency will increase.

Another advantage is exposing what could be two audiences to one brand. Some morning shows will fight this hard because, from a brand/ownership perspective, they may want their show to fly solo in case at some point they decide to depart the mothership.

What about other streaming services like Spotify and Apple Music? No reason why you shouldn't offer playlists of your own design or by artists who reside in your format. I'm not convinced it will have the same impact as a YouTube

I get that not all stations are able or willing to play. It would be very interesting to see if this can be done on a small- or medium-market level — highly localized with raw materials. Would it perform by itself and also help to maintain or grow ratings? Let me know of your own experience.

By the way, this isn't about being futuristic or obsessing over a passing fancy. YouTube has been growing for years. If we ignore advertising on it, or avoid even the notion of our own channel, it could be at our own detriment.

Mark Lapidus is a longtime Radio World contributor. Comment on this or any story to radioworld@futurenet.com.

Even if your budget is constrained, you can learn from successful radio-based YouTube channels such as BBC's Radio 1 and NPR Music.

Like you, I got over that feeling once I accepted the new on-demand enormity of YouTube, then recalled that radio still has a major role to play with its convenience, personalities, information and immediate relevance.

This evolution reminds me of when television first supplanted radio. The industry initially ignored the shift, but over time, adjusted — and when it did, what happened next? We made a U-turn and started advertising our product on TV!

In my previous article, we covered advertising on YouTube; if you haven't read it, please do (radioworld.com, keyword Lapidus).

eos have millions of views, many have hundreds of thousands of views and yes, they even have pieces in the mere thousands.

"Foul!" you cry. I can hear the haters now, saying in unison: "But the BBC is a fully funded network, propped up by the government. It doesn't even have to make a profit!"

Can't deny that. However, everyone needs something to aspire to, admire and emulate. I'm simply suggesting that you click around the channel and notice how they've constructed it, what videos are performing, how they promote their broadcast channel, and the amazing outpouring of emotion they get from their audience in the comments section.

If you want to go domestic, take a gander at NPR Music with its nearly 3 million subscribers or the other NPR channels with 206,000, 99,000 and 101,000, respectively. Try looking at your best-in-class format competitors to see what they've got brewing and what you're up against.

It's interesting to note that Power 106 in L.A. is at nearly a million subscrib-



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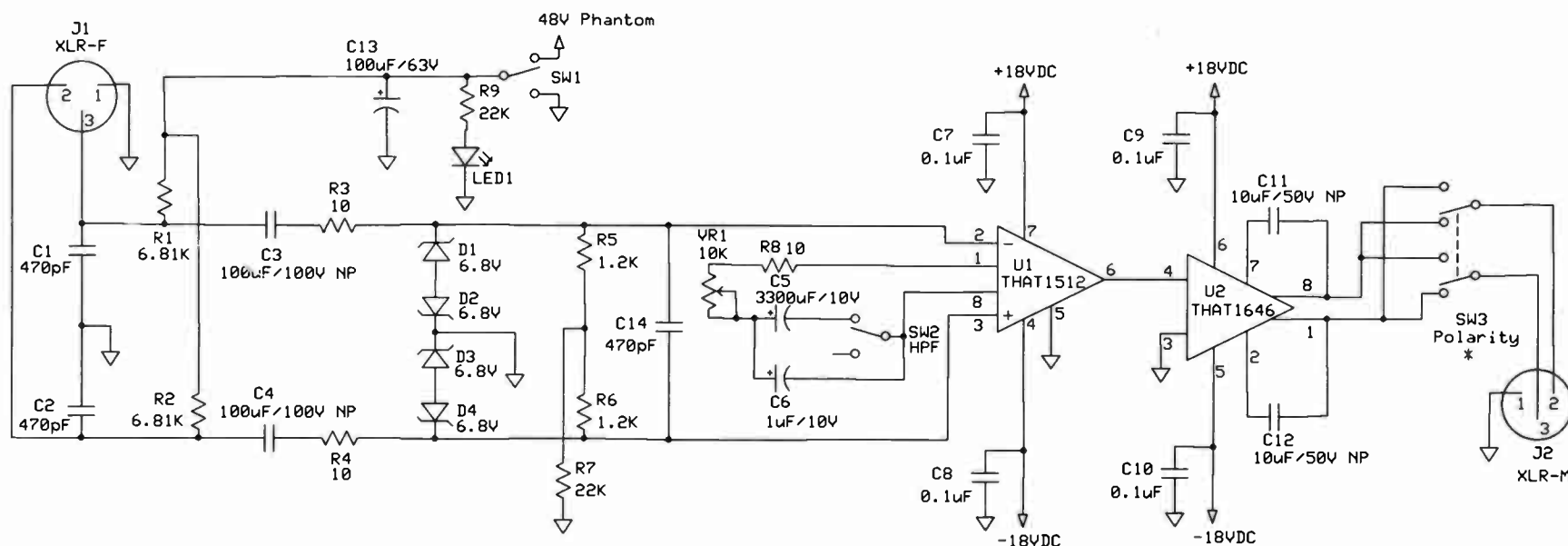


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“THAT Thing” — A Solid-State Mic Preamp Project



| | |
|-------------------------|--------------------|
| "That Thing" Mic Preamp | |
| Curt Yengst | |
| Radio World | Rev B 7/12/2019 |

Curt Yengst is back in his workshop on another product

DIYPROJECTS

BY CURT YENGST, CSRE

Over the years I've become a student of mic preamp design, building and modifying several along the way and learning a little more each time. Usually, I worked from a kit or published set of plans. Recently, I've tried some designs from "scratch," researching various components, studying earlier designs, and incorporating them into raw schematics, followed by circuit layout, design tweaks and final fabrication.

Since my last two builds were vacuum tube devices, I wanted to do a simple, solid-state design this time. I came across some old preamp ICs in a parts box and almost used them but discovered they had been obsolete for years.

Was there a viable updated replacement? Enter THAT Corp., a relatively small IC manufacturer that specializes in chips for audio applications. THAT makes a few chips that are direct replacements of some popular preamp ICs like the Analog Devices SSM2019 or Texas Instruments INA163. If you've ever cracked open a broadcast console, you may have seen one. THAT's website is a treasure trove of design notes and white papers on mic preamp design, with plenty of ideas to get a project going.

This project uses two ICs from THAT: the 1512 Low-Noise Audio Preamp, and the 1646 Balanced Line Driver. Using design notes from THAT and other sources, including advice from several more experienced DIYers, I was able to come up with a relatively low-cost design that has plenty of gain and good performance numbers for most applications.

The mic preamp can make or break a recording. Aside from the microphone, it's the first stage in the

signal chain before the recorder, and in some cases the only stage. It has to be clean and have ample headroom (unless noise and distortion are your thing), yet have sufficient gain to handle a wide variety of microphones.

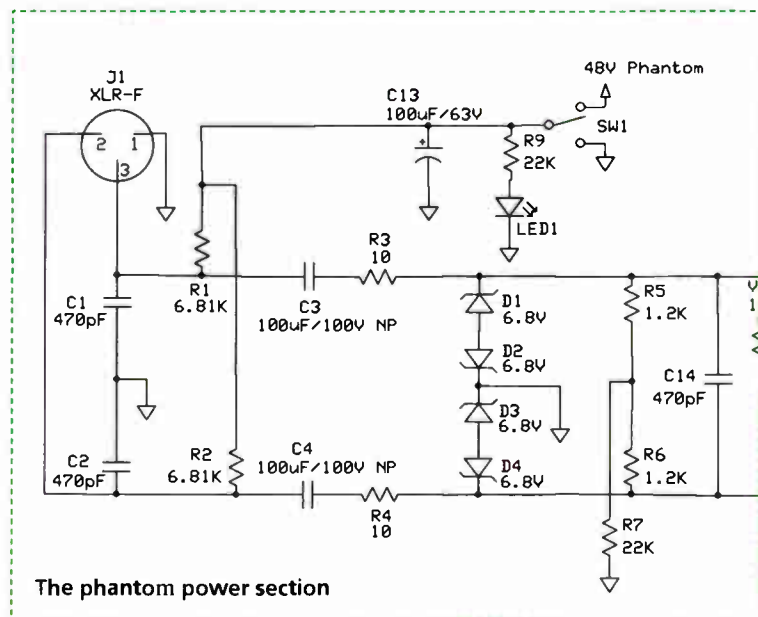
Professional microphones have a balanced output, so the preamp will have a balanced input. Normally this is accomplished either with transformer balancing, which is expensive, or by using a standard op-amp as a differential amplifier, usually involving two op-amp stages with their attendant gain feedback loops, etc. The THAT 1512 takes care of this within the chip, providing its own balanced input. All that's needed is a pretty standard input stage that can provide phantom power. The phantom power is sent to Pins 2 and 3 of the input XLR jack through a matched pair of 6.81K resistors, R1 and R2. These limit the current of the phantom supply.

In order to preserve common mode noise rejection, any components that are mirrored between positive and negative signal paths must be matched in value as closely as possible. SW1 [switch] allows for turning off phantom power when it is not needed, and LED1 illuminates to show the actual presence of phantom voltage. R9 limits current through the LED to keep it from going "poof!" Capacitor C13 is there to smooth out any ripples from the 48 V supply. Between Pins 2 and 3 of the input jack and ground, ceramic capacitors C1 and C2 shunt any RF noise that might hitch a ride on the mic cable. Bad mic cables make good radio antennas!

Obviously, we need to keep 48 VDC out of our audio circuit. In a transformer-based design, the transformer would

handle this, as transformers only pass AC. Likewise with capacitors, which are much cheaper and take up less space. This is why inexpensive designs use them. The problem is that inexpensive designs tend to skimp on these coupling capacitors. Years ago, I hot-rodded a mic preamp that originally had 4.7µF tantalum capacitors in the coupling stage. I replaced them with nonpolar electrolytics of a much higher value, and performance was improved.

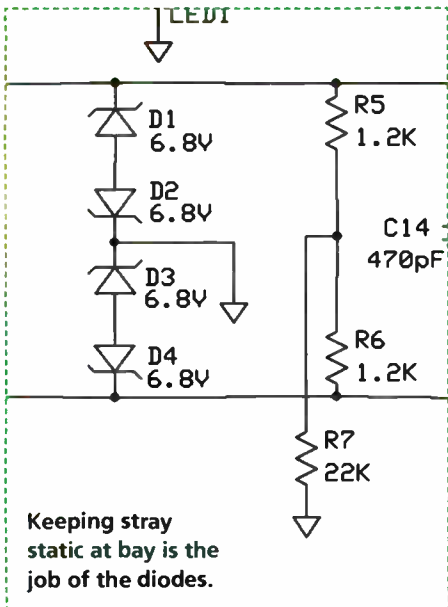
Here, for C3 and C4, I use the same ones. At 100µF it's overkill, I'll freely admit, but the higher value reduces low-frequency phase shift (the LF response here is in the single-digit Hz range). Anything around 22µF or greater will work. Besides, it's very difficult to match capacitors to such tight tolerances.



The phantom power section

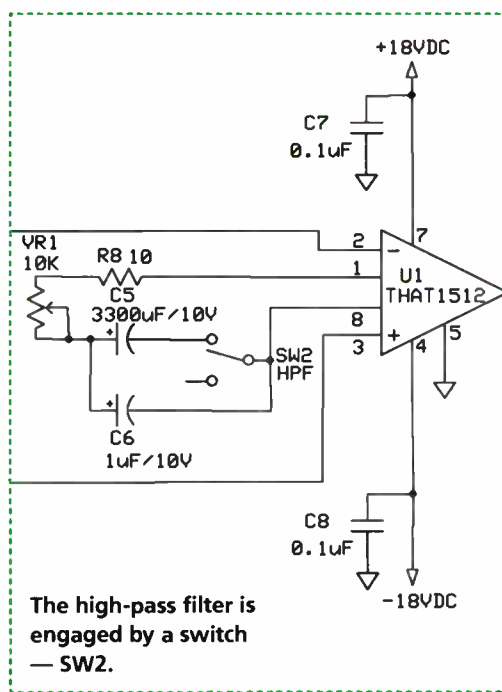
Here's where R5, R6, and R7 come in. They form what THAT calls a "T-bias" circuit, which boosts low-frequency common mode impedance. C14 is another ceramic capacitor across the inputs to clean up any remaining RF noise. By the way, R3 and R4 are there to limit any fault currents that might sneak by the capacitors. Their low value prevents input impedance issues.

Additional protection from stray static charges and other voltage transients is provided by diodes D1 through D4. This is a simplified version of a number of protection circuits I've seen. Anything ugly gets shunted to ground.



Now, it's on to the preamp IC, which does the heavy lifting in terms of gain: up to 60 dB of gain, in fact. While a lot of designs will set the chip at a fixed gain level and introduce level controls somewhere between subsequent stages, ours is a simple mic preamp. It would be a simple matter of just inserting a potentiometer (VR1) across the gain setting pins of the chip, right? Not that easy!

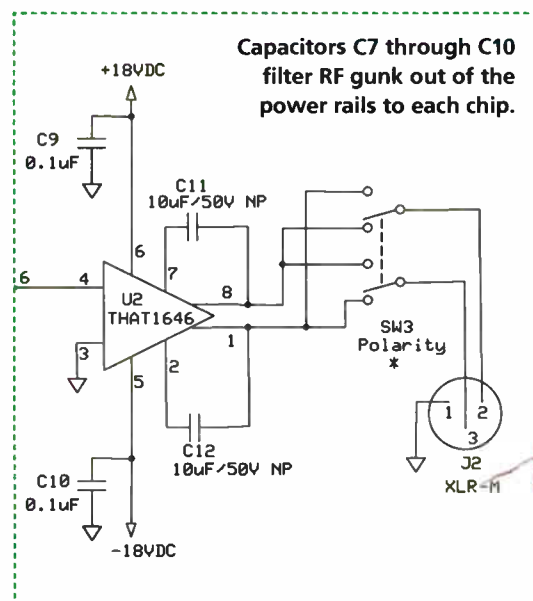
Rapid changes in that resistance can introduce DC offset in the chip, which translates to thumping and popping on the output. This is where C5 comes in; a very large capacitor to kill DC offset. Why so large? Because VR1, R8, and C5 comprise a high-pass filter, so the capacitance has to be large enough to bring the low-frequency response down. In this case, it puts it around 5 Hz at maximum gain, keeping any rolloff well below 20 Hz. VR1 is a reverse-log



The high-pass filter is engaged by a switch — SW2.

pot, which provides the correct gain vs. position curve.

Speaking of high-pass filters, I included one here to roll-off any mic or room rumble. C6 and SW2 provide a HPF, but this one has a twist. (Special thanks to the folks at www.groupdiy.com for this idea.) Because the changing resistance of VR1 naturally changes the characteristics of the HPF, this filter's rolloff actually increases somewhat at higher gain settings. At first, this may seem undesirable, but think about it — low frequency artifacts are more likely to be a problem at higher gains than at lower gains. At any rate, C6 is small enough to rolloff the low end, but not to the point of sounding thin.



Now on to the output stage, handled by the THAT 1646. It's one of the simplest I've ever seen.

One IC and a couple of nonpolar capacitors. Caution must be used if inserting any other stages or components before the 1646, as it is very sensitive with regard to impedance. C11 and C12 are there to address any common-mode DC

offset on the outputs. From there, it's on to the output XLR jack, passing through a simple polarity switch, SW3, to reverse phase if needed.

Finally, capacitors C7 through C10 filter RF gunk out of the power rails to each chip, a very important consideration in any design. Clean audio has to have clean power.

Since this whole thing is built around THAT ICs, I decided to simply call it "THAT Thing." Tune in next time, and we'll

talk about the power supply, breadboarding the prototype, and putting it all together.

Curt Yengst, CSRE, is a contributor to Radio World and an assistant engineer with WAWZ(FM) in Zarephath, N.J.

Email us with your own DIY ideas at radioworld@futurenet.com.

INFO

More information about the THAT 1512 and 1646 ICs, as well as design notes and other information can be found at:

- www.thatcorp.com/Design_Notes.shtml
- www.thatcorp.com/datashts/THAT_1510-1512_Datasheet.pdf
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National VOA Museum Asks for Your Support

Help celebrate the 75th anniversary of Voice of America
– Bethany Relay Station



COMMENTARY

BY JOE MOLTER

Her six massive transmitters may be quiet, but she is far from silent.

Amateur radio operators routinely talk to the world from station WC8VOA in West Chester, Ohio, located about 25 miles north of Cincinnati. This former VOA relay station is now a museum with collections from the Gray History of Wireless Radios; Powel Crosley Jr.,

and Cincinnati radio and TV broadcasting history; and the Voice of America.

The museum celebrated the 75th anniversary of the Bethany Station in September with a fundraiser to make the first floor of the museum accessible for people of all abilities.

SIT AT THE BOARD

The National Voice of America Museum of Broadcasting is open every

weekend from 1 to 4 p.m. Tours are given continuously on weekend afternoons by knowledgeable docents. It houses the Bethany station's last control room and one of the remaining 250 kW Collins shortwave transmitters.

You can sit at the massive audio console that controlled the six shortwave transmitters and literally take a tour inside one of the Collins transmitters. You can view the massive switch gear,

built during World War II, that changed Bethany's 24 rhombic antennas to its six transmitters.

At one time, Bethany Station covered a square mile of property on former farmland. Today the museum sits on 14 acres and the antennas are gone; but with surrounding park acreage, you get a sense of the massive scale the site covered with towers and the miles of transmission lines and antenna wire.

The museum houses a large collection of radios from the early part of the 20th century, including names such as Hallicrafters, National, Drake and Collins. A large collection of Drake Amateur Radio products is always a must-see by visiting radio enthusiasts and ham radio operators.

Drake radios were produced nearby in Miamisburg, Ohio. An area dedicated to the Crosley Corporation shows off many of the Crosley brothers' radio, TV and household products that were manufactured in Cincinnati. Crosley contributed heavily to the war effort during World War II, with the production of tens of thousands of portable radios for the U.S. Army and millions of proximity fuses for anti-aircraft ordinance.

(continued on page 30)

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WYBG 1050, Messina, NY, now off the air is selling: 250' tower w/building on 4 acres; 12' satellite dish on concrete base; prices drastically slashed or make offer. 315-287-1753 or 315-528-6040

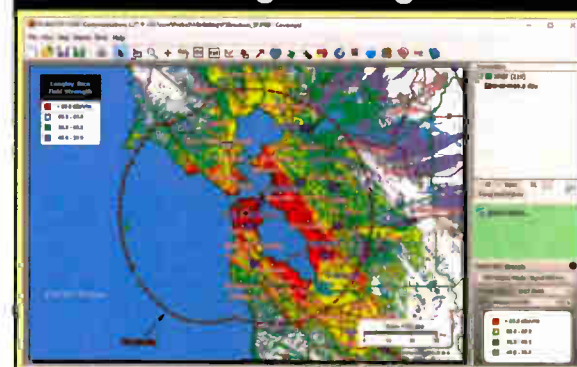
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I'm looking for KTIM, AM, FM radio shows from 1971-1988. The stations were located in San Rafael, Ca. Ron, 925-284-5428.

I'm looking for San Francisco radio recordings from the 1920's through the 1980's. For example newscast, talk shows, music shows, live band remotes, etc. Stations like KGO, KFRC, KSFO, KTAB, KDIA, KWBR, KSF, KOB, KCBS, KQW, KRE, KTIM, KYA, etc, I will pay for copies... Feel free to call me at 925-284-5428 or you can email me at ronwtamm@yahoo.com.

Looking for a broadcast excerpt of a San Francisco Giant's taped off of KSFO radio from 1959, interviews with Willie Mays, Dusty Rhodes & some play by play excerpts, also features a homerun by Willie Mays and Felipe Alou stealing second base, running time is 18:02, also looking for SF Giants games and/or highlights from 1958-1978 also taped off KSFO Radio. Ron, 925-284-5428 or ronwtamm@yahoo.com.

Looking for KFRC signoff radio broadcast from 1930 Andy Potter, running time is 0:22 & also the KLX kitchen the program guest is Susanne Caygill, a discussion of women's affairs with a long promotion for Caygill's appearance at a local store. Anne Truax, Susanne Caygill, running time is 13:44. Ron, 925-284-5428 or email ronwtamm@yahoo.com.

Looking for KSF radio shows, Disco 104 FM, 1975-1978. R Tamm, 925-284-5428.

Looking for KTIM FM radio shows from 1981-1984 if possible unscoped. R Tamm, 925-284-5428 or ronwtamm@yahoo.com.

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Are you a small market station needing a good nuts & bolts engineer in the Los Angeles area? I will make your station shine! CET, fully FCC Licensed. Available for Full/Part-time/Contract work. Available immediately. Mitchell Rakoff, 909-446-6820, mitchellrakoff@yahoo.com.

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Manager-engineer with multiple decades of experience in many areas, seeks full-time executive level position (G.M.) or higher with CCM, modern Inspo, or G-rated family-friendly secular format(s). Prefer warm climates. Send complete details to: radiogm@hotmail.com

BETHANY

(continued from page 28)

Not only did Crosley develop radios, but content as well, with its on-air radio station WLW, which still broadcasts today on 700 AM. WLW transmits from its original site and the large Blaw-Knox tower can be seen from the VOA museum. The museum contains the original 50-watt AM transmitter that WLW started with in 1922.

WLW was the only U.S. station allowed to operate at 500,000 watts of power during the 1930s. The collection includes a bright red Crosley Hot Shot sports car, too. Crosley Corporation developed a number of vehicles during the late 1930s and resumed production after World War II until shutting down in 1952.

An additional area of the museum houses artifacts and memorabilia from the early era of Cincinnati radio and TV broadcasting. The Cincinnati Media Heritage section includes many of the celebrities who got their start at WLW and other local broadcasting outlets. These WLW radio stars, many of whom

transitioned from radio to TV, include Rod Serling of Twilight Zone fame; sisters Rosemary and Betty Clooney; Eddie Albert; Doris Day; The Mills Brothers; and Ruth Lyons.

Housed in three of Bethany's old transmitter vaults, the history of broadcasting showcases the talent and equipment that made Cincinnati an early nursery for radio and television entertainment. Artifacts include equipment from a 1930s radio station; a 1950s AM station, including disc jockey's audio console and turntables; and a 1000-watt transmitter. A very early and massive

RCA Victor color television camera is on display, along with other television and video equipment.

RADIO LIVES HERE

Our amateur radio station is operated under FCC license WC8VOA and is manned by the West Chester Amateur Radio Association.

The station has seven operating positions equipped with modern and vintage amateur radio gear. Antennas cover the radio spectrum from two meters down to 160 meters. The former VOA receiving satellite dish has been converted to 10 GHz transmit and receive capabilities for EME (Earth Moon Earth) bounce. Signals are sent to the moon and the dish used as a passive satellite to communicate with other amateur radio operators.

The club participates in radio contests, portable operations and local STEM events. It averages some 6,000 contacts per year, covering modes of voice and digital and CW. The club also operates two FM repeaters on two meters and 440 Mhz.

Operators are in the shack every weekend and hold an open house every Wednesday night for radio enthusiasts and those interested in obtaining a ham radio license. Our WC8VOA call sign is recognized by many of our fellow radio amateurs around the world. We have made contacts from all seven continents and hundreds of countries.

Radio is still an important part of our lives. Whether it is listening to AM, FM or satellite services, radio remains a viable source of our news and entertainment.

CINCINNATI LIARS

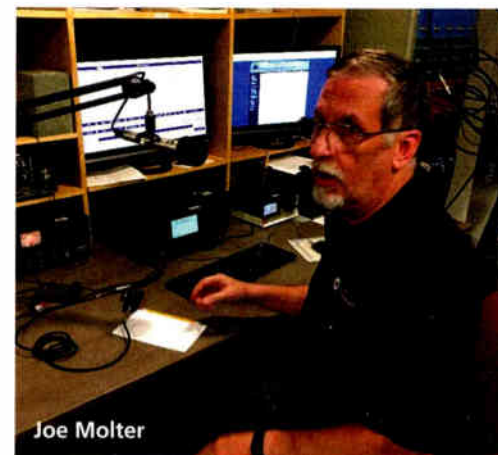
Voice of America broadcasts were never intended for Americans. They were targeted to people living in oppressed countries where media was censored to change people's minds by providing sourced and accurate news.

In fact, the VOA Charter (Public Law 94-350), which was passed in 1976 during the Ford administration, states that VOA news will be "accurate, objective and comprehensive." It will also "represent America, not any single segment of American society, and will there-

fore present a balanced and comprehensive projection of significant American thought and institutions." Last, the VOA is mandated to "present the policies of the United States clearly and effectively and will also present responsible discussions and opinion on these policies."

VOA news and feature stories are still broadcast and transmitted today to more than 275 million people weekly in 40-plus languages in nearly 100 countries. VOA programs are delivered on multiple platforms, including radio, television, web and mobile via a network of more than 3,000 media outlets worldwide.

Broadcasts have aired continually for more than 75 years, along with sister stations of Radio Free Europe; Radio Liberty; Radio Free Asia; and Radio Martí.



Joe Molter

Here is the crux of the matter for all of us at the VOA museum: Once Bethany Station began operation during mid-World War II, an infuriated Adolf Hitler was quoted as saying on one of his radio broadcasts to never listen to those "Cincinnati Liars." We're proud to be part of the VOA heritage we are entrusted with and even more proud to be related to those "liars" from Cincinnati.

But while we're proud of our heritage, I must be honest: The museum is housed in an aging, uninsulated, 75-year-old building that constantly needs repairs. We receive no federal funding, and this is our big fundraising push for the year.

Our workforce of docents, conservators and maintenance crews are all unpaid volunteers. And many of our volunteers come from our local radio club, the West Chester Amateur Radio Association.

Please help us out with a donation. For information on the museum and how you can help with donations, visit www.voamuseum.org. Please donate today. If you're interested in our amateur radio group, additional information is at wc8voa.org.

Joe Molter, WCARA, N8IDA, ARS Operator, is with the National VOA Museum of Broadcasting.

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