

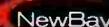
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World Radio History

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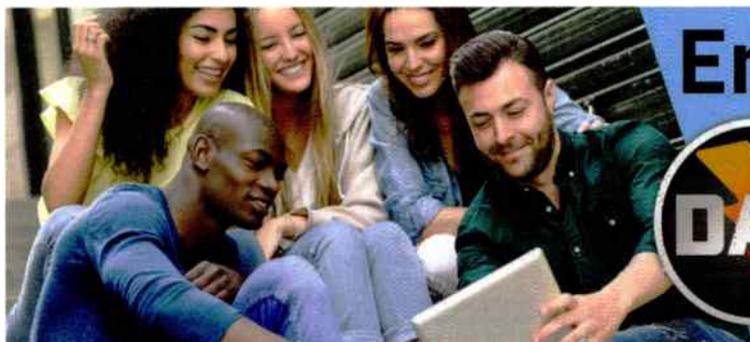
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On the cover: Talk radio 790 KABC(AM)'s control room, across the street from the new facility, both part of Westwood One's campus in Culver City, Calif.



FIND THE MIC AND WIN!

Tell us where you think the mic icon is placed on this issue's cover and you could win a **UXA-110 TRACKLINK USB Interface**. Send your entry to radio@RadioMagOnline.com by **September 10**. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules, go to RadioMagOnline.com.



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Delegating Is Hard to Do



Being a one-man or one-woman band in radio engineering has one advantage: You never have to tell anyone what to do. When you do all the work yourself, there's no explaining the steps (or the goal) to another person. It's all in your head or on a list, and you move forward, consulting no one else. No questions; no interruptions; no second guessing. It's kind of nice.

However, if you ever find yourself applying for a larger position, with staff to manage, you might find yourself asked this: "Can you delegate effectively?" Hopefully, you can answer that question with a "yes," but let's take a moment to delve into the subject. I've learned enough to speak with some authority on it (or so my coworkers tell me).

The goal of delegation is to have someone do a project that, for whatever reason, you cannot or should not be doing. Clearly, if you have a multi-person staff, there is more work than one person can do. You may find yourself doing higher-level management task (for example, working on engineering budgets), and while that is going on, you can't also install a transmitter, for example.

So you delegate the project. In so doing, you should make sure the goal is clear: The transmitter needs to be effectively installed and working by such-and-such a date. A certain amount of resources need to be made available to the person or persons doing the work. Explain how to obtain them (if that person doesn't already know how). Don't knock the station off the air while doing the work.

That's it. You now turn back to what you were doing before.

But wait, you say. How do I know it'll be done right? The answer is that you don't. That's it. The hard part of delegating is trusting that the delegate will do the job right.

But shouldn't I go visit the transmitter to see that the job is going well? No. That's called micro-management. If you are doing that, the person to whom you delegated will get this message: I'm not really trusted to do this correctly. As a manager, that's the last thing you want. Staff has to trust you, and the way you establish that is by trusting them.

It's obviously important to delegate a job to a person who you know can do it well. After you've done that, let them alone.

When the delegate says the job is done, you can then check to see how well it went. Here's another thing about delegation: Don't expect that it will be done exactly as you would have done it yourself. If the goal is met on time and satisfactorily, then the delegate did it right.

Don't micromanage after the fact, either. In other words, if your delegate used blue wire instead of black, that's too bad. If they ran the wires up the left hand side of the rack instead of the right, that's too bad.

Many of us have very particular ways we like to do things, but when you start managing a staff, you have to let them handle the details. If you can't do that, answer "no" to that interview question.

Thanks for reading this month's issue and have a great last month of summer! **O**

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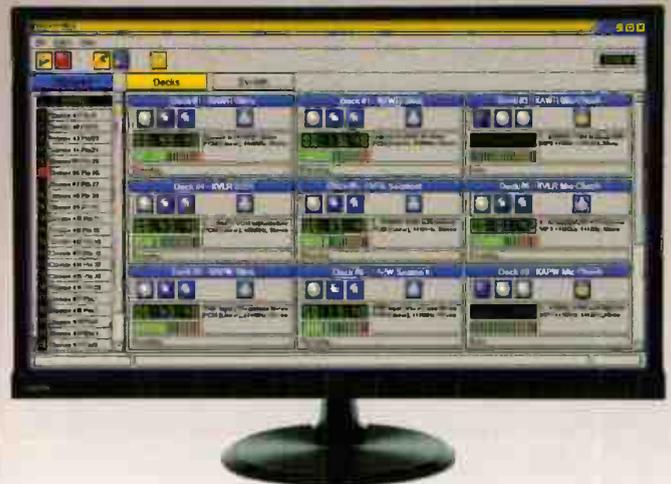
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by Lee G. Petro

Wireless Microphone Rules Updated

Last month, the Federal Communications Commission revised its rules for wireless microphones to address the availability of spectrum after the incentive auction and to make revisions to the applicable technical standards. The new rules build on the changes made in 2015 that set forth opportunities for licensed and unlicensed wireless microphone usage in a variety of spectral bands.

In 2015, the commission adopted rules to permit licensed wireless microphone usage in the very-high frequency television channels and reduced the co-channel spacing protection requirements. The commission also authorized entities eligible for low-power auxiliary station licenses to obtain licenses to operate in the 600 MHz Duplex Gap, which separates the uplink and downlink portions of the wireless systems authorized to operate after the incentive auction. Finally, the commission established licensing and technical standards for wireless microphones operating in five other spectral bands.

At the same time, the commission adopted rules to permit wireless microphones to use spectrum on an unlicensed basis in the 600 MHz guard band, which separates television and wireless operations, and in the 600 Duplex Gap. It also established the technical standards for unlicensed wireless microphones under the commission's Part 15 regime, and required unlicensed wireless microphones to coordinate spectrum usage with white spaces databases, so that the wireless microphones would not receive

interference from unlicensed white space devices.

With the incentive auction completed, the 600 MHz band is now restructured with broadcast television service is now limited to Channels 2-36 and wireless operations authorized to operate between 617 MHz and 696 MHz. The 600 MHz Guard Band is 614 MHz to 617 MHz, and the 600 Duplex Gap is 652 MHz to 663 MHz.

The new order responded to concerns expressed by wireless mic manufacturers that the spurious emission limits adopted in 2015 were impractical. Instead, it was recommended that the commission adopt the spurious emission limits established by the European Telecommunications Standards Institute. The commission agreed and revised its rules to require compliance with Section 8.4 of the ETSI standard for wireless microphones (EN 300 422-1).

In addition, the commission agreed to permit wireless microphone manufacturers to show compliance with the commission's output power limits either by radiated or conducted power measurements for both licensed and unlicensed operations. At the same time, the commission rejected calls for the increase of the operating power for wireless microphones in the 600 MHz Duplex Gap and 600 MHz Guard Band.

Also, the commission affirmed its earlier decision to limit the operation of legacy unlicensed wireless microphones that do not comply with



the Part 15 technical standards after the end of the incentive auction transition period. Instead, the commission will permit manufacturers to modify devices in the field to limit their operation to Duplex Gap and Guard Band frequencies. If the devices can be modified, then the manu-

facturers can modify their existing equipment authorization to specify operations, pursuant to the applicable Part 15 technical standards. If the unlicensed wireless microphones cannot be modified to come into compliance, then the use of these devices must cease when the incentive auction transition has been completed.

Finally, the FCC rejected requests to increase the amount of spectrum available for wireless microphone use in the 1435-1525 MHz band at the same time at a particular location. Requests had been made to permit usage throughout the whole 90 MHz band at a particular location for large-scale events. The commission disagreed, noting that the 1435 MHz band was intended to be used by operators only when other spectral bands are not available. However, the FCC did clarify that each user would be permitted to use up to 30 MHz within the band, rather than requiring that all users be limited to 30 MHz at that location. The commission stated this should provide the operators with expanded flexibility.

The commission is seeking additional comments on a proposal to permit a limited class of unlicensed Part 74 authorizations for professional theater, music, performing arts organizations based on a demonstrated need and requisite professional ability. The deadline for comments, and the effective date for the revised rules, will be established upon publication in the Federal Register. **0**

DATELINE

Oct. 1 — Stations with five or more full-time employees in Alaska, Florida, Hawaii, Iowa, Missouri, Oregon, Washington, American Samoa, Guam, Mariana Islands, Puerto Rico, Saipan and Virgin Islands place annual EEO public file report in public inspection file.

Oct. 1 — Stations with 11 or more full-time employees in Alaska, American Samoa, Guam, Mariana Islands, Oregon and Washington file broadcast mid-term report (FCC Form 397) with FCC and place in public inspection file.

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HD Radio in 2017: What's New And What You Need to Know

by Doug Irwin, CPBE AMD DRB

We regularly take stock of the state of HD Radio. The NAB Show is likely still fresh in your mind, so let's start with what we learned in Las Vegas.

DRIVING THE COST DOWN

One of the criticisms I have heard from other radio engineers, and read in various publications, is that HD Radio is too expensive for smaller operations. I can't dispute this because, of course, what is too expensive

for one station or group might be doable for another.

However, there is an understanding in the HD Radio group within Xperi (which purchased DTS, the company that had previously purchased HD Radio parent company iBiquity) that in order to get smaller stations (and smaller markets) to add HD that the cost of implementation needs to come down. As the various generations of HD Radio technology have come out, the cost has substantially decreased.

GOOD OPPORTUNITY TO ADD HD

When I first installed HD Radio in the mid-2000s, installing an additional transmitter was really the only practical way to go, and naturally, this made the cost fairly high.

The other piece of the puzzle was getting the RF out there — you could either make use of a separate antenna or an injector, which would allow a small fraction of the IBOC RF generated by that new transmitter to reach the main antenna.

Needless to say, this was an inefficient way

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Nautel NVLT transmitters can now be field-upgraded to support HD Radio transmission with an add-on exciter.

to accomplish the goal.

Fortunately, over the last decade, transmitter technology has come a long way, and use of a combined amplifier is now common practice. This eliminates any need for an injector or a separate antenna. It also saves you space, and eliminates the need for more AC power and more air conditioning. The combined amplifiers, while not providing as good efficiency as an FM-only transmitter, are still efficient, especially when comparing them to the older tube-type rigs.

Over the last decade, transmitter technology has come a long way.

Each radio engineer has his or her favorite brand, so let's take a look at what is offered by several well-known transmitter manufacturers.

Nautel introduced the NVLT series of transmitters in 2012 and 2013, in the power range 3.5 kW to 40 kW. At that time, it was designed to handle analog FM only; however, during the NAB Show, the company announced that the NVLT line can now be

upgraded to support HD Radio transmission.

The company also introduced a new HD MultiCast+ Importer/Exporter, which combines an HD Radio Importer and Exporter in one unit. This 2-RU device makes use of

Xperi's Gen 4 HD code and includes a built-in multi-channel audio card, GPS receiver, Nautel Reliable HD Transport software and station logo support. Operation of the HD MultiCast+ platform is versatile, in that it can be used as an all-in-one product or separately

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In addition to FM and HD1 through HD8 sources for rebroadcast, the Inovonics Aaron 655 accepts analog, AES-digital and streaming program inputs with fallback-priority selection.

transmitter will operate from single-phase or three-phase power, Delta or Wye configurations, from 190 to 464 VAC.

For HD Radio applications, use of the FAX exciter means that the fourth-generation HD Radio Crest Factor Reduction and Adaptive Pre-Correction technology will be in use, serving to maximize transmitter efficiency, while allowing for a higher amount of IBOC output for a given amplifier size.

The transmitter front panel allows for configuration and diagnostics, and the embedded web server allows for control and monitoring from anywhere IP access is available. The transmitter also supports SNMP for monitoring and control.

Broadcast Electronics refers to their approach to the peak-to-average power problem as Vector Power Enhancement, and it's a standard feature in both of their STXe exciters, the STXe 60 and the STXe 500. The STXe exciters can operate in HD Radio (or DRM+) applications and would be used to drive a transmitter using a

combined amplifier (that is, amplifying both the analog FM and the IBOC carriers). The STXe 60 tops out at 60 W and is the standard for the S and T series transmitters; the STXe 500 is the standard for the T series.

The T-series comes in three power levels: The FMi-17T, the FMi-21T, and the FMi-25T.

Type	Max analog with -20 dBc HD	PA efficiency	Overall efficiency
FMi-17T	17.5 KW	67%	57%
FMi-21T	21 KW	67%	57%
FMi-25T	25 KW	67%	57%

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The FMi series is a linearized version of the classic FM-T series of BE single-tube transmitters.

If you are starting from scratch with your HD Radio implementation, then you'll need to outfit yourself with the importer and exporter as well; BE offers its XPi 10 Embedded Exporter, along with the IDi 40 Importer.

Continental Electronics continues to offer the 816HD and 816-HDR lines (HDR meaning "HD-ready") family of transmitters based on three different analog FM + HD power levels: the 816HD-20 for power up to 20 kW; the 816HD-25 up to 25 kW of power, and finally, the liquid-cooled 816HD-28L for applications up to 30 kW of analog power.

Common features of the Continental line of FM transmitters are the single-tube design; solid-state IPA; SCR "Soft-Start;" automatic power output control; use of the quarter-wave cavity in the output amplifier; use of the grounded screen grid circuit using screen neutralization; automatic filament voltage regulation; automatic power interrupt recycle; two independent VSWR protection circuits; and a positive-pressure cabinet, which helps to keep the inside of the transmitter clean.

Those of you who visited the spring show within the past two years may have seen Rohde and Schwarz's entry in to the U.S. FM and FM+HD transmitters market, the THR9.



The Inovonics Justin 808 can be added to the HD simulcast air chain only, making its time-alignment adjustments to the HD1 audio stream, leaving the analog FM air chain untouched.



The DaySequerra M4-FM front panel LCD display allows for monitoring of demodulated audio, carrier, pilot, composite and SCA level measurements with better than 1.0 percent accuracy, as well as RBDS and HD Radio PAD/SIS.

It's compact — up to 40 KW from one rack and 80 KW from two. And it uses a completely redundant (and highly efficient, according to their literature) liquid cooling system. This either negates or substantially reduces the need for air conditioning in the transmitter plant, thus increasing its overall efficiency and lowering on-going energy costs.

An Ethernet connector allows the transmitter to be operated locally or via the LAN interface; it can be operated remotely via its embedded web interface or integrated into a network management system via SNMP.

Inovonics recently introduced their Aaron 655, a new HD Radio receiver in their line of rebroadcast (translator) products. The Aaron 655 employs a sensitive FM / HD Radio SDR-based receiver that will return to the programmed frequency and reception mode following a power interruption. In addition to FM and HD1 through HD8 program sources for rebroadcast, the 655 accepts analog, AES-digital and streaming program inputs with fallback-priority selection; its outputs are composite, analog, AES digital and streaming. IP connectivity with a Web-browser interface



The Belar FMHD-1 features a 640x240 color LCD display and rotary encoder for its local user interface.

The THR9 makes use of HD Radio Generation 4, achieving substantially better crest factor reduction than third-generation IBOC transmitters, serving to maximize its efficiency while allowing for a higher amount of IBOC output for a given amplifier size.

OFF-AIR RECEPTION AND TIME ALIGNMENT

Clearly, if you are going to transmit HD Radio, you'll need a way of monitoring it at your studio headquarters. Time alignment of the analog signal and the simulcast HD is of extreme importance as well. (We have covered precise time alignment previously. Check out <http://tinyurl.com/ya8mttbz>.)



permits total remote control of the unit from any PC or mobile device, along with remote audio monitoring. Local GPIO failure alarms are augmented with email notifications, alarm logs, and full support of SNMP.

The Justin 808 is Inovonics' single-RU device designed to maintain the time alignment between the analog FM and HD1 channel to within 23 microseconds (± 1 sample). The Justin 808 can be added to the HD simulcast air chain only, making its time-alignment adjustments to the HD1 audio stream, leaving the analog FM air chain untouched.

In addition to continually checking the time alignment, it also matches the levels between the air chains and corrects out-of-phase conditions between the two. The entire synchronization process is 100-percent automatic. Justin's web interface features SNMP support and can be configured to send email

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The Belar FMHD-1 is their HD Radio monitor receiver, used to simultaneously decode the HD Radio signal and analog FM signal, while displaying HD Radio status, data, time alignment, and configuration information, as well as total, pilot, L, R, L+R and L-R metering and RF spectrums. The



DaySequerra's M4.2Si broadcast allows for the monitoring of AM, FM, the HD simulcast, and the HD2 through HD8 streams.

While it may seem like an easy way to save on implementation cost, it's proven unwise to use separate processors for analog FM and simulcast HD.

2RU device features a 640x240 color LCD display and rotary encoder for its local user interface. The FMHD-1 supports the monitoring multiple audio streams and simultaneous monitoring of two streams with an

optional second plug in HD decoder. It has eight user-assignable analog audio outputs and three assignable AES-3ID outputs; other features include frequency-agility, antenna and high RF level inputs, RF spectrum

analysis including NRSC mask and sideband power measurements, a time alignment graphic display analysis (± 16384 samples, ± 375 ms to ± 256 samples, ± 5.8 ms), audio polarity, level alignment graphic display analysis (± 20.0 dB), HD control and status information, HD SIS and PAD Data and bit error rate measurements. The ADC is the optional automatic delay correction module for the FMHD-1.

DaySequerra recently introduced its new M4FM-HD, a single-RU monitor receiver for FM and HD. It allows for monitoring of

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analog FM, the HD simulcast, and the multicast channels HD-2 through HD-8. It will stay tuned to FM analog, HD-1 or the selected multicast stream during power or I2E interruptions. The user can monitor the station's HD Radio HD-1/MPS diversity delay using the built-in Split-Mode feature. The front panel LCD display allows for monitoring of demodulated audio, carrier, pilot, composite and SCA level measurements with better than 1-percent accuracy, as well as RBDS and HD Radio PAD/SIS, along with network and alarm conditions, audio level, digital audio quality and carrier quality indications.

Rear panel balanced analog outputs provide +4 dBm @ 100-percent modulation and the front panel headphone output can deliver more than 1W into 8 ohm. Full-time AES3 digital audio output is also available. The M4FM-HD also provides a password protected embedded web server, allowing for full remote control and monitoring.

The M4.2Si Broadcast is another of Day-Sequerra's monitor receivers. It allows for the monitoring of AM, FM, the HD simulcast and the HD-2 through HD-8 streams. Like the M4FM-HD, the M4.2Si will return to its previous setting following a power interruption. The front panel LCD allows for the checking of all RBDS and HD Radio PAD and SIS, artist experience, analog audio levels, digital audio

quality and carrier quality indications.

With the optional TimeLock feature, the M4.2Si can be used to continually measure the time delay between the analog FM and the HD simulcast to an accuracy of one sample. Alignment issues can be reported through a rear-panel alarm or via email alerts.

FINAL STEPS

There is another important piece of gear that you may need to upgrade if you are adding HD Radio to your system: the audio processor.

While it may seem like an easy way to save on implementation cost, it's proven unwise to use separate processors for analog FM and simulcast HD.

The reason is simple: Even if the time alignment is exact, the blend between analog and digital audio will not sound good. This technique was used commonly ten years ago, but it is not considered good engineering practice today.

The big audio processor manufacturers, including Wheatstone, Omnia and Orban, all make audio processors with parallel processing chains, one optimized for analog FM, and the other for the simulcast HD stream.

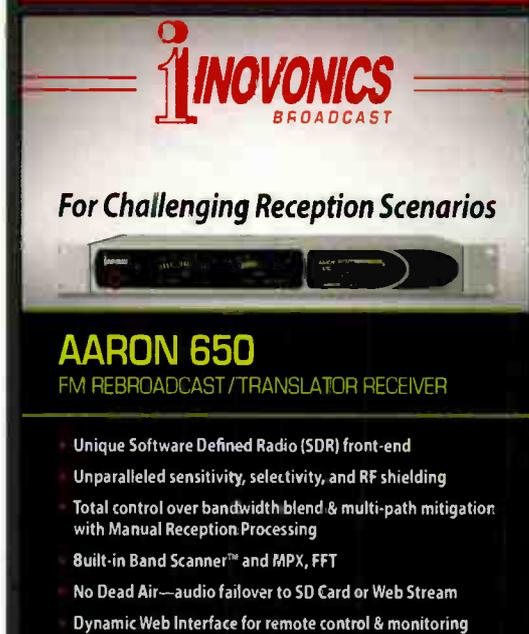
While installing a new transmitter is a good opportunity to add HD Radio, it also makes for a good opportunity to upgrade your on-air processing. 



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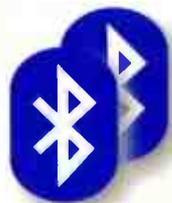
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Selecting Remote Radio Equipment for WJHI(LP)

by Tim Dench



ViA has a 4.3-inch color touchscreen with menus designed to provide a familiar and intuitive user experience.

Jeffersonville High School is closely tied to the community, and its student radio station is a great way to engage with them.

In Indiana, basketball is king. Therefore, live sports remotes were a key consideration when selecting remote radio equipment. Our gymnasium seats 5,000 spectators, and listeners are keen to follow our team, the Jeffersonville Red Devils.

I have tried lots of audio codecs and found that many are unreliable. I researched audio codecs heavily and heard about Teline's ViA remote codec before it was released.

From the day I saw it, I said that's the one! It appeared to have many of the features on my check-list: flexibility, top notch design, and most importantly, high-end quality and performance.

Because we use a Wheatstone AoIP network as the basis of our facility, it made sense to use Teline's Merlin PLUS with the Wheatnet-IP interface. This allows for a simple Ethernet connection back in to the entire AoIP network. The Merlin is a rackmounted

codec that receives incoming IP streams originating from our ViA codec, and we route them using WheatNet-IP Navigator software. Our installer, Dave Dreyer from Enterprise Technical Solutions, found the set up and installation to be easy and intuitive.

The Merlin PLUS accepts up to six simultaneous connections, and this was important because we wanted to integrate multiple simultaneous remotes and cross between each one.

To facilitate these additional remotes, we purchased a 10-pack of Teline's Report-IT Enterprise. This allows students to do live reports directly from their smartphones, either Android or iOS. They can do this directly by using the native mic on the phone, or by attaching external XLR adapter cables in order to use a hand-held mike. We use this feature often — the kids love the fact you can broadcast using an app, as they are so comfortable with smartphone technology. It's very easy to use and sounds awesome.

ON-AIR REMOTES WITH VIA

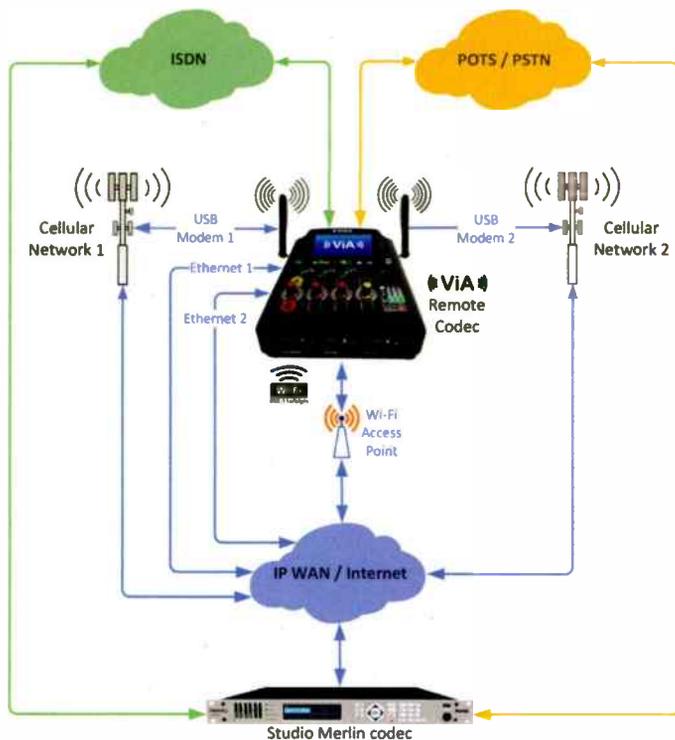
Our broadcasts are extremely popular, so the equipment has to be super reliable — it simply has to work.

Students create all their own content, and we broadcast around 10 to 15 hours of live remotes during quiet weeks and around 20 to 25 hours during busy sports seasons. We call most school sports including basketball, football, baseball, softball, volleyball and wrestling. We are also looking to expand into swimming and track and field coverage. Weekends are particularly busy times.

For sports with the ViA codec, we usually have three announcers — play-by-play, color commentary and stats coverage. We use the USB and line in inputs on the codec for digital playback of pre-recorded interviews, announcements and sponsorship messages. These come from a PC or stand-alone digital playback device.

We usually connect over a LAN or use the built-in Wi-Fi feature to connect to local access points. The integrated web-browser makes it simple to enter Wi-Fi network credentials if required.

We also use ViA to broadcast from outdoor concerts, local festivals, live shows at businesses and school board meetings, and we're looking into covering city meetings. Additionally, we do live "man on the street interviews" to feature a slice of community life, often using a cell phone



Teline's Fuse-IP data aggregation technology enables the user to bond multiple IP interfaces for a more reliable connection.

generated Wi-Fi hotspot.

The internal battery lasts for hours — I was going to buy a second battery as a backup but have found there's no need.

I have tried all of the high quality algorithms and they all sound great. Normally, we encode audio in stereo with Tieline's Music PLUS algorithm at 256 kbps, with Tieline's automatic

Talkback is sent from the studio out to the remote site in mono.

ADVANTAGES

The ViA codec is very easy to learn, and that's important, since we have new students each year. They pick it up easily, and with ViA, I can train them in a single day, and they will be

cover operating expenses, and both ViA and Report-IT allow us to do quick cut-ins from local businesses that are station contributors.

There's no doubt we have a state of the art facility, and it wouldn't be possible without Tieline. We are only just scratching the surface as to the variety of broadcasts the ViA and Tieline systems will let us do in the future. The flexibility provided by the latest technology lets us dream up a new broadcast idea and then just go out and do it. **0**

The kids love the fact you can broadcast using an app, as they are so comfortable with smartphone technology.

jitter buffer settings.

We've never had any issue with latency, and our competitors want to know what we're using because it sounds so great. In fact, it's quite funny that when I explained latency over IP networks to a recent group of students, they didn't realize there was latency! They hadn't even noticed.

ready to go live.

They love the touchscreen which makes it simple to configure and connect — and so do I.

I can even preconfigure recallable setups as "programs" before the students take it out in the field.

Sponsorships are also important for us to

WJHI was covered in a previous Facility Showcase, which can be found online at <http://tinyurl.com/y9gwkupr>.

Dench is the station manager and radio and TV Instructor at Jeffersonville High School in Clark County, Ind. He has taught for 43 years at schools in both Kentucky and Indiana and was the project designer and project manager for equipment installation at WJHI.

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This Broadcast Pro Works From Home and Around the World

by James Cridland

In Australia, Trevor Long is a radio presenter with a regular radio show broadcaster across Brisbane, Melbourne and Sydney.

However, he almost never goes into the station's studios. Instead, he broadcasts live from his home and from locations around the world.

The station is Talking Lifestyle, a new style of talk radio with lifestyle content. The breakfast shows, seven days a week, provide news and information and a large amount of cross-promotion for the many other lifestyle

shows across the week, covering everything from finance and travel to technology. It broadcasts from studios in Pyrmont, a picturesque coastal suburb of Sydney, just a mile or so from the Sydney Harbor Bridge.

Trevor's show, "Talking Technology," is available in Brisbane, Melbourne and Sydney on AM and DAB+, as well as online. The program is anchored by Nick Bennett and airs weekdays, 8-9 p.m. Using Omny



Trevor's "studio" on the road.

Studio, the show is also available as a podcast.

Trevor's commute is normally as simple as walking into his home office. "I have three kids," he told Radio magazine via email. "Family and work balance is critical, so when the management at Talking Lifestyle asked me to do the nightly show, we made the decision to allow me to host it remotely to ensure I could still see my family as much as possible. Adam Lang and Michael Thompson, the senior management team at Talking Lifestyle, have been extremely supportive of that, and it's meant I can give the show 100 percent with almost no distractions."

Trevor's home studio was built as a podcast studio: the "Two Blokes Talking Tech" podcast with Stephen Fenech has been recorded there for over 300 episodes, and he also produces the "Your Tech Life" podcast.

Originally, he installed a Behringer analog mixer and installed three microphone positions, using Shure SM7B microphones. Recently, he replaced that mixer with a Mackie DL806 digital unit, which he's enthusiastic about.

"This thing is the bee's knees. Any iPad or iPhone on my Wi-Fi network with the app installed can control any fader or input and output. This means a guest mic position can

CONTINUED ON PAGE 26

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Origination point for the 400-station NBC sports network. In the back of the room, the producer's workspace; in front, the board operator position.

Westwood One Converges in Culver City

by Doug Irwin, CPBE AMD DRB

You've probably heard of Culver City, Calif., but likely couldn't place it on a map. It's another media suburb in the greater Los Angeles area.

That it isn't well known belies its importance in the country's media and broadcast landscape, since it's home to some rather large broadcast institutions (old and new), including Westwood One's west coast facility, the subject of our Facility Showcase this month.

The building was built in the 1920s, according to Cumulus Broadcasting Regional Director of Engineering for the Southwest/West Anthony Vitiello, whose office is located there. It originally served as a Ford and Maserati dealership.

"In the rafters, there's still a Maserati logo up there," said Vitiello. Brick walls and bow truss roofs were a typical construction style in the early part of the 20th century.

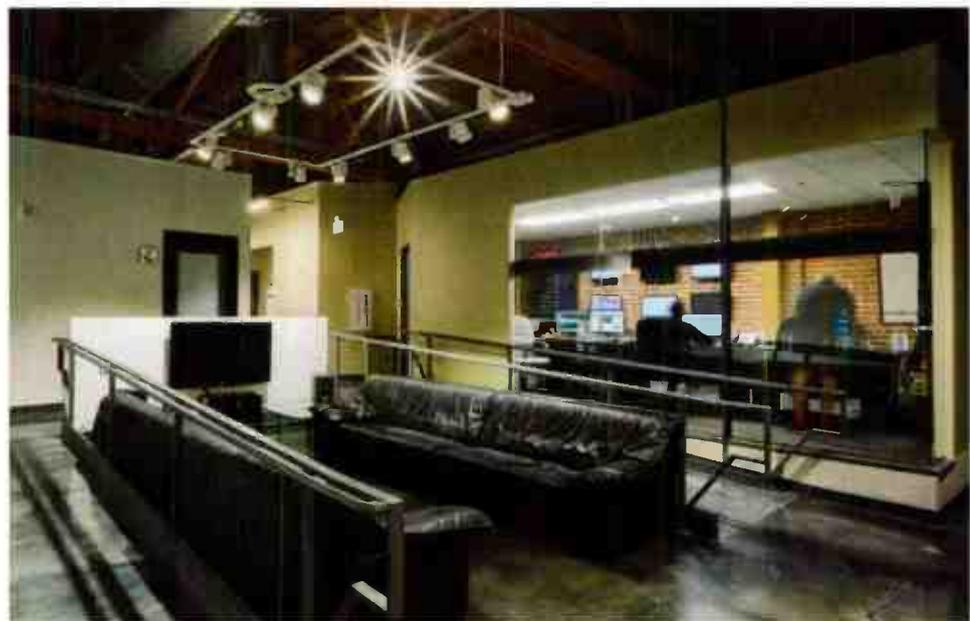
Westwood One bought the three buildings (one of which housed sales and admin personnel, including promotions) in 1990, and they became the headquarters for the national network. In 2003, Westwood One used McCormick Construction of Burbank, Calif., to build out the space. Studios for Metro Traffic were constructed — 28 independent studios for traffic reporters, along with three offices. The master control room was expanded to its

current size, as well.

Metro Traffic was sold and moved out in 2012, and afterward Westwood One ran a split operation between two buildings: One is the current building, and the other is across the street where KABC and KLOS now reside. Once the sale of the land on La Cienega occurred (the former home of the KABC(AM) transmitter, as well as both the KABC and

KLOS studios and office) arrangements were made to relocate KABC and KLOS into the Westwood One buildings in Culver City. This is what prompted the latest studio buildout.

As part of the process, the interior of the building was remodeled, and during construction, the staff of Westwood One squeezed into the building across the street, while McCormick Construction had unobstructed reign to



Lobby waiting areas for guests. The NBC Sports network producer work space can also be seen through the window.

build the studios.

Eight studios were built-out during the 2016 remodel: Studio A, for Zach Sang; Studios B&C, which are multipurpose; Studios D&E for the NBC Sports network; studio K, for the “The Big Time with Whitney Allen;” and Studio L, for production. Other studios in the facility were pre-existing from the split building operation.

Staff moved into the newly renovated facility in August of 2016.

STUDIO LINEUPS

Sierra Automated Systems consoles and a three-frame 32KD router (supporting 1,536 inputs and outputs) make up the heart of the Westwood One west coast facility. On-air playback and automation is based on the ENCO system. All studio PCs, whether for general purposes or ENCO, are connected to the rack rooms via KVM extenders.

Furniture, next to consoles and routers, represents the greatest capital expense in a project like this, and so I asked David Holland of furniture maker Omnirax about their role in the project. He said collaboration with Vitiello was key to the success of the furniture designs.

“Most of the studios were fairly straightforward, derived and improving on designs we’d worked out a decade ago on our initial build [across the street]. One studio however, provided some unique challenges: Westwood



The Zach Sang studio in Culver City. Custom furniture designed by Omnirax.

had decided to move Zach Sang, their young phenom, from New York to California and to create a studio space that accommodated his ‘gang’ and the unique fresh vibe of his show,” said Holland.

“We had a big space to work with and wanted to create furniture that was at once intimate, video friendly and able to handle lots of technology,” he continued. “We chose to design within our ‘Shapes’ line, employing curved bent laminations to create a three-sided stage set with Zach on one wing and his engineer running a 32-Channel SAS Rubicon on the other. In between them are two positions for

gang members, with guests positioned opposite the set on a couch placed on a raised platform. We embedded Zach’s video monitors into the furniture, and built up an aluminum shroud to conceal the consoles, controllers and keyboards. To dress things up and add eye candy for the cameras, we placed video monitors on each of the three elements with light boxes behind them powered by an Acclaim computer controlled lighting system.”

Omnirax paid special attention to wire routing throughout the long runs, all concealed within a double wall design behind the light boxes. The set furniture was so large that its installation was deferred until a large set of double doors was installed for the studio at the entrance of the building.

UPLINK CONNECTIVITY

A tall bank of AoIP codecs occupies one entire rack in the Westwood One TOC.

“Telos Z/IP Ones are how we get our broadcasts to Denver, which is the uplink center,” said Vitiello. “We use the Z/IP as the primary and GatesAir’s Intraplex Net Express as a backup.”

The Net Express frames make use of IP as well, unlike the T1 systems that are still common across the US.

“Everything we do here is IP now,” said Vitiello.

The two systems use different internet connectivity as part of their main/backup functionality: The primary backhauls to the uplink



NBC Sports radio personnel busy producing a show for the 400-affiliate network.



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FACILITYSHOWCASE



The three-frame 32KD router makes up the heart of the SAS system at Westwood One's Culver City facility.

in Denver are on a private MPLS. The GatesAir NetXpress frames are on a network from a different provider. Tertiary backups are done via ISDN.

Westwood One makes use of Comrex rackmount Access units, as well.

"Ethan Bearman [of Cumulus' KGO radio] does a show between here and San Francisco through one of the Accesses," Vitiello said. "Some of our NBC Sports shows will come through on Access, and we're planning to get more in the near future."

The Maserati logo is still there, but Westwood One has already left its own indelible mark on this building. 



Trevor's studio at home.

CONTINUED FROM PAGE 22

have audio controls, and I can put the mixer off to the side and simply use an iPad in front of me when recording. It's the best thing I've ever bought," said Long. "Using my iMac, I have an IP phone connection, and use a USB to analog converter to feed that into the mixer allowing me to use my computer as a phone hybrid for taking and making calls — as my 'Your Tech Life' podcast is essentially a pre-recorded talkback show."

The studio itself cost around \$7,500 to build. Long uses also a Comrex Access unit and an additional cable internet service to keep a separate connection from his home network. He's hopeful that the NBN, Australia's high-speed broadband network, will reduce the need for this additional internet connection.

Long is a busy technology commentator, broadcasting nationally on Channel 9's "Today Show" and "A Current Affair" and he runs his own online men's lifestyle magazine EFTM.com.au which covers tech, cars and lifestyle. As a result, he's often travelling, but the show still needs to broadcast.

"I travel with a 4G modem, and ethernet and Wi-Fi connections for the Comrex. I've found that an Ethernet connection is by far and away the most reliable way to connect, though Wi-Fi in hotels is normally OK, with perhaps two or three 'blips' an hour. Using a Netgear Nighthawk M1, I can connect to the mobile network, but also have an Ethernet into the Comrex, this is my preferred approach when travelling in Australia."

WI-FI HACK

Long has an interesting tech tip for those of you making similar connections to hotel Wi-Fi.

"Most hotel WiFi networks require a web page login. The Comrex Access has a very old web browser and fails in most cases. In these circumstances, Hotel IT support can normally add the Comrex to their network using the MAC address which works seamlessly."

Since the program is multi-platform and doesn't just air on AM radio, audio quality has been important.

"I'm not an audiophile," Long says, "but I do notice when someone is using a crappy microphone. That's been my main concern, buying the Shure SM7B's lifted my podcast quality to a new level, and ensures my radio work is now on par with the studio. It's the one reason you can tell when I'm on the road, because I use a Beyer Dynamic DT 109 headset and microphone in my travel kit. I will probably switch to something else for a more studio like sound."

Long believes that more radio will be made this way in future. "With this technology getting smaller, and cheaper by the year, it's only going to increase." 

James Cridland is a radio futurologist, writer, consultant and conference speaker about the future of radio. He also blogs at Radiomagonline.com.

FACILITY FOCUS: OMNIRAX

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Lindblade St. in Culver City has fond memories for Omnirax, as it's the place where we first met Conrad Trautmann and began a long association with Westwood One, which began with a project in New York and continued with Houston, Denver, Washington and Valencia, Calif., just to name a few. This return to Culver was now under Conrad's direction in his current role as SVP of technology & operations at Cumulus Media. Cumulus has properties on both sides of the street, and we were working with Anthony Vitiello on one side for eight studios for Westwood One, and our old friend Mike Tosch on the other to outfit the new home of KABC/KLOS.

At Omnirax, we treasure our relationships with engineers and their tireless work behind the scenes. We believe that our Collaborative Ergonomics with these unsung heroes results in our ability to build furniture that enables radio to sound better.

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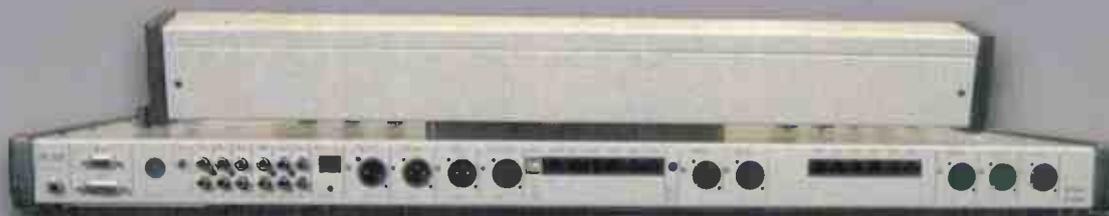
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Linux Installation Types: Server Vs. Desktop

by Chris Cottingham

I have previously covered obtaining and installing Ubuntu Linux, and this time I will touch on desktop and server installations. Both types of installation address certain needs. The different installs are downloaded separately from Ubuntu. You can choose which one you need from Ubuntu.com/downloads.

Regardless of the installation type, there are some similarities.

Both utilize the same kernel and package manager system. The package manager system is a repository of programs that are precompiled to run on almost any Ubuntu system. Programs are grouped into packages and then packages are installed. Packages can be added from the desktop system graphical user interface or from the server system command line.

Programs are installed with a program called apt-get. This is a package manager system or program manager system. The end user simply types at the command line "apt-get install (package-name)" and Ubuntu will automatically get the software package and install it.

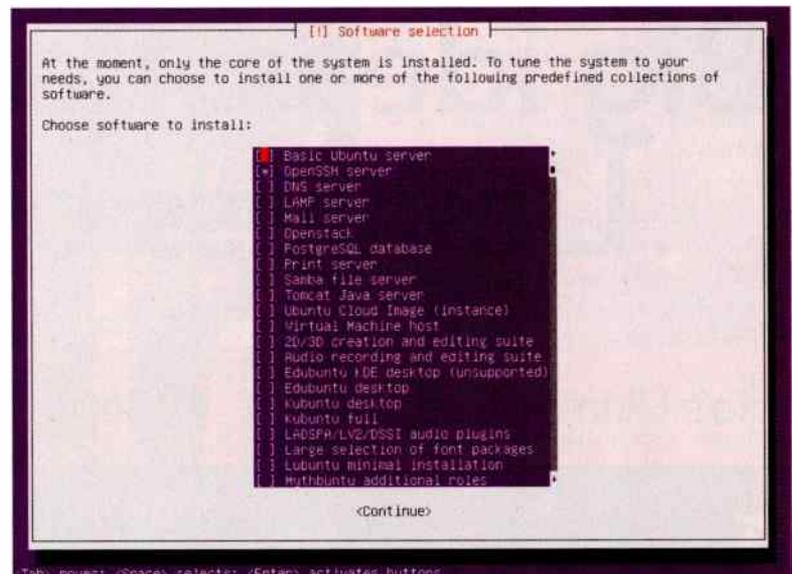
Packages usually install commands that have documentation that is accessed via the man pages (which is a topic unto itself). They are accessed by typing "man (command)." This will bring up a page that describes the command with details on usage. An end-user can also Google any Linux command or package and find a wealth of information about it, as well.

As an example, after installing the Network Attached Storage suite of packages, one would administer it via the command line, with the GUI, or with a program called Webmin. Webmin installs a web-based administrative interface for configuring most Linux packages, and it's popular with the server-only install crowd because it installs as a webpage and does not require a GUI. It also allows for administering the server remotely.

If you can think of a problem that requires a computerized solution, Linux probably has free or low-cost software to address that problem.

Most, if not all, of these Linux-based package installs have videos and web pages dedicated to helping you run whatever package you install. Just search YouTube for "Linux Ubuntu NAS," and you will find a video instructing you on how to setup and configure this service. There are also videos dedicated to the setup and operation of Webmin.

The kernel is the heart of any Linux installation. Since the kernel is



Packages can be added from the desktop system graphical user interface or from the server system command line.

modular, it is incredibly small (as the name suggests). I have run a Linux server installation from a small 32 MB compact flash. That is not a typo — 32 MB of space! Most of the space utilized by a Linux system is used by the packages installed.

SERVER

The server install ISO is the smallest download from Ubuntu. It is a stripped down version of the operating system optimized for server operations. This version does not have a GUI. By default, it is completely run from the command line.

Removing the GUI and other components streamlines the system and maximizes performance. Any necessary packages that are not initially installed can be added later via the command line package manager. Since there is no GUI, all configuration, troubleshooting and package management must be done from a command line. A lot of administrators will use the server installation to get a clean or minimal system and then add only the certain packages that they require. This includes the ability to add a desktop GUI system and make a streamlined desktop system.

A Linux server could be used at the radio station as an Apache web server or a database server. Those are the real apps that require the

horsepower, and that's why they are usually run with a server install and no GUI. SNORT and Cacti are other applications that could be run on your Linux server (both covered in a previous article, found here: <http://tinyurl.com/yd8dyegu>).

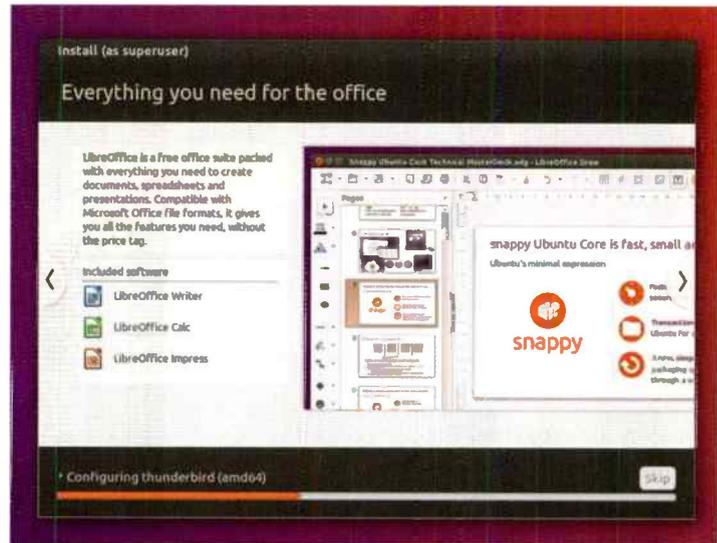
DESKTOP

The desktop install ISO is fairly large and has a number of optional install packages not found on the server install ISO. This installation is designed for workstation or daily desktop use. This installation type allows for the customization of packages (programs) or a default desktop configuration can be selected.

Packages are installed via the apt-get package manager system, just like the server install. The difference between the two is that on a desktop install, the apt-get package manager has a nice GUI front end. This allows for packages to be installed or removed easily from the system with the click of a mouse! The desktop install will setup a GUI and a lot of packages related to a desktop operating system.

This system is ready to go after being installed and can be a nice replacement to your windows or Mac desktop computer. It has a lot of packages including an Office suite and web browser.

Linux is a mature and powerful operating system. Regardless of the



Packages are installed via the apt-get package manager system, just like the server install. The difference between the two is that on a desktop install, the apt-get package manager has a nice GUI front end.



The desktop install ISO is fairly large and has a number of optional install packages not found on the server install ISO. This installation is designed for workstation or daily desktop use.

Removing the GUI and other components streamlines the system and maximizes performance.

installation type, it can be configured to fit almost any need. From a powerful database server to a basic desktop operating system used for web browsing and writing letters to grandma, the sky is the limit and the packages available are almost inexhaustible. If you can think of a problem that requires a computerized solution, Linux probably has software for free or low cost to address that problem.

By offering two installation starting points, Ubuntu has done a great job of getting people started in the right direction. 0

Cottingham is a former radio chief engineer, now working in streaming media.



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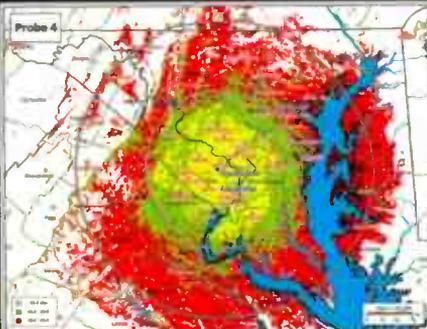
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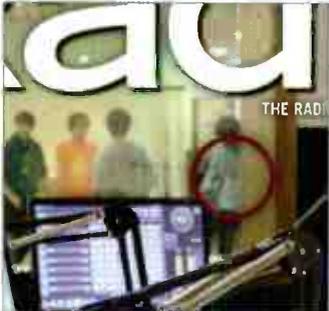
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The Coming IT Apocalypse

by The Wandering Engineer

It's happened again. One of my co-workers needs me to get a file off a machine so that I can take care of an issue.

Fortunately, the password is written on a sticky note under the keyboard. Took a minute to find it, but I knew it had to be there. It had to be there because this station group is terrified of IT, has no skills to manage it and has hobbled its management, engineering, and frankly, every productive employee to the rule of the IT department.

The IT department preaches fear. If we don't change our passwords every five days, if the passwords are not gibberish designed to be unmemorable and if we're not prohibited from reusing passwords in any manner, the world will come to an end. "Believe me!" claims a tattooed couch-potato wearing a T-shirt emblazoned with the firm belief that vaccines are a conspiracy. He's tossing red meat about what will all happen *when* — not if — the IT system is attacked.

THE LESSON OF 2000

Y2K was a lesson. For months, we filled out paperwork and planned. Hundreds of hours. Yards of file folders filled with documentation of protections for the coming disaster.

At one point, I explained that the toilets were not date-aware and thus would need no remediation. The conversation did not go well. HR insisted that I treat the IT/security team with more respect, and my boss said "just play along."

I have a document with plenty of pictures and descriptive text showing me in front of a "vulnerable" (by definition; any pre-1980 device was vulnerable) transmitter with no brains whatsoever, showing it a clock as the clock

artificially clicked past midnight simulating the date of doom. This "proof" of Y2K compliance was accepted.

I have a lot of tools. Some of them are software. Little utilities like a VSWR calculator or a text parser for a particular SNMP device. I connect the USB drive, and find a spreadsheet from an old project I want to use as a template for today's project. I print it out, then come back to see a computer screen listing the files on my tool drive that Symantec has identified as evil and is deleting. I try to stop/reverse this, but I'm locked out, the blood bath over. Time lost, not saved.

I foolishly go to the IT folks for help or sympathy. I'm told I violated the rules. I had the drive scanned by IT a few weeks ago just so I could do exactly this. They go into a rant of alternative facts. The GM hears this, but says nothing. They are thrilled that they tightened the Symantec end point protection, and their bot killed something. This is a victory. A demonstration of power. They drone on about how we need to build walls.

I go back to work. The phone buzzes with an email... there's one every day. IT is changing the guest password. Again.

We have few guests. No rational person would care if they logged in, and now I have to change the signs in the lobby and conference rooms. They don't. Not because they are lazy, but because they have absolutely no idea that there are consequences to their actions. Guest internet is a hole in their wall.

I follow the link to SharePoint, look up my un-memorizable password, because no way would just putting the new public guest password in the email be difficult, slow or secure enough.

Mention that IT voodoo wastes resources, and you get a rant on how someone is going to log into the lobby from a black van in the parking lot and steal our internet and compromise our systems. Management bows.

The equation is simple: Maybe waste resources or risk being culpable when an IT apocalypse comes. Who am I to say this risk is imaginary? I'm not the IT "professional."

I'm quiet, but I'll make three notes (because I can) in this anonymous column:

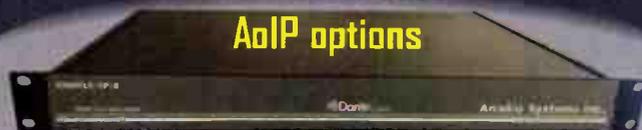
1. As a radio station group that specializes in playing music anyone can get from any number of sources, I don't think a cyberterror attack is going to be that big of a loss to society.
2. Security is a good thing, to a point, but what's going on here is irrational, counterproductive and just plain stupid. The cyberterrorists are down the hall, and it's more than OK, it's absolutely critical, that any useful employee beat the system. Every time you leave a note with a critical password where it will save the station, you are doing god's work.
3. Broadcast engineers are generally a lot better at IT than IT people are at broadcasting, and broadcasting is our business.

"It'll be great. It'll be the best IT system ever." There are a lot of IT emperors leading parades in invisible clothes. Why are we following? **0**

The Wandering Engineer is an industry stalwart who has been in broadcasting since the days of Marconi and Tesla. He gives his thoughts on the current state of broadcast engineering and the broadcast engineer.

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