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Chairman Pai: The Radio World Interview

He wants FCC rules to reflect the needs and structure of the current marketplace

BY PAUL McLANE

Radio World sat down with Federal Communications Commission Chairman Ajit Pai at FCC headquarters this month; it was his first interview with a radio broadcast trade publication since becoming chairman. He met with Editor in Chief Paul McLane and Contributing Editor Emily Reigart. The conversation touched on the main studio rule, cross-ownership, the future of digital radio, his regulatory philosophy and other topics. Questions and answers have been edited for brevity.



Bob Kovacs

Radio World: We've all been struck in the industry about your personal warmth for radio. Talk a little bit about why you have such an obvious connection with this medium.

Pai: Part of it to me is personal. I grew up in a small town in rural Kansas, and some of my fondest memories involve listening to radio, listening to KLKC, my local station, cover our high school team in 1987, when we were in the state basketball championship. My mom wouldn't let me go, so I was in my bedroom listening to my transistor radio, listening to KLKC cover the game.

Part of it is also in my current role here at the FCC. I've had a

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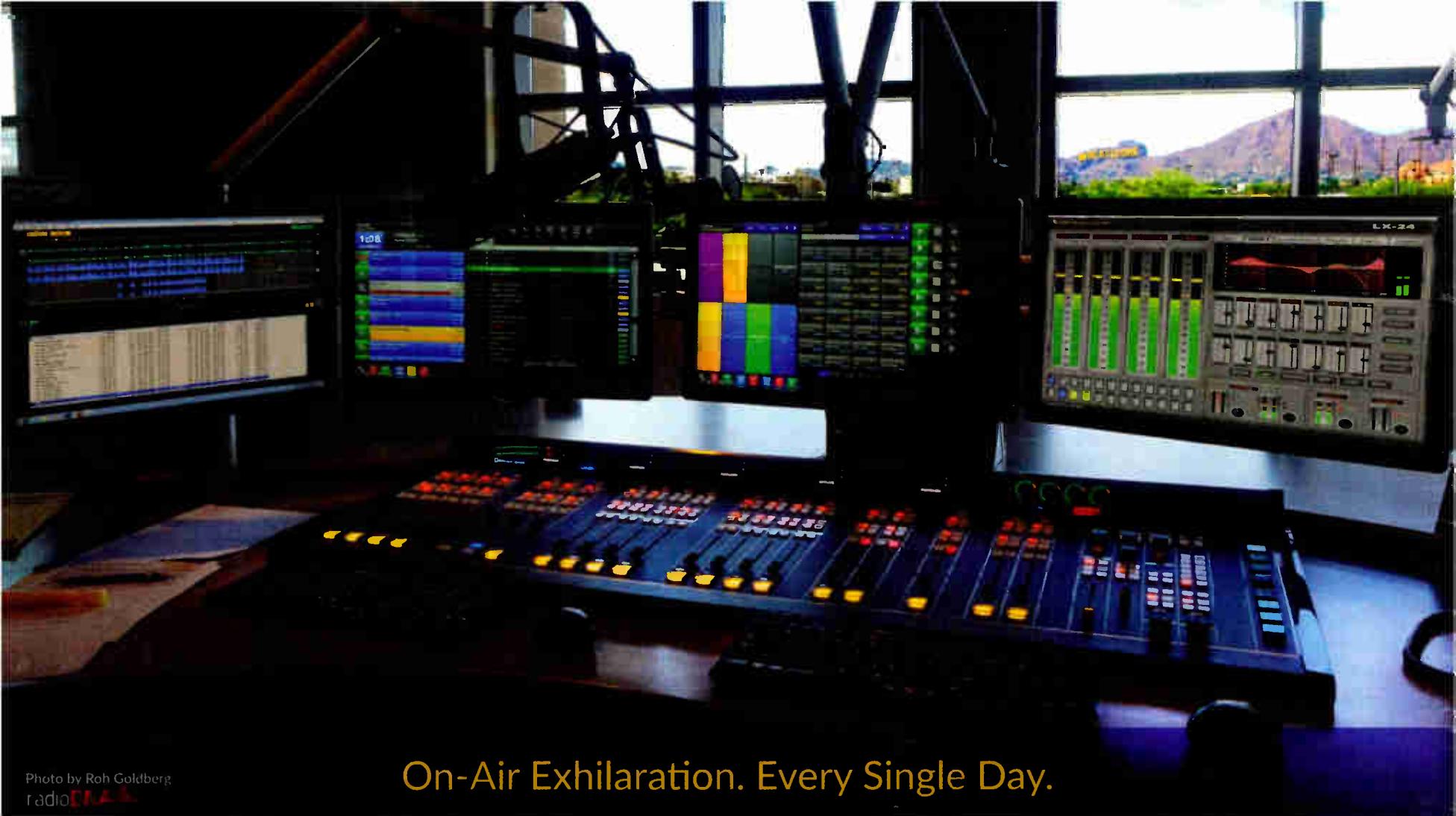


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PAI

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chance to visit with radio broadcasters around the country. I just love some of those visits.

To KDKA. That's history in the making — the first broadcast of the presidential race, calling the results of Harding's victory. Visiting station KZPA in Fort Yukon, Alaska, where literally I just popped in and talked to the program director unannounced. Didn't ask for his public file! But it's just great to be able to visit with him.

Wherever I go, I always try to visit some radio broadcasters if I can, because I think what they do is so unique, it's so local, it's so social, it's increasingly mobile too. People use the radios in their cars or apps on smartphones. I just think it's such a vital medium.

It speaks volumes, I think, that 93 percent of Americans above the age of 12 still listen to the radio regularly, about 12 hours a week, I think, is the figure. I'm glad to see there are many Americans like me who love it.

RW: How do you interact personally with radio content every day? You and your family.

Pai: It's mostly during drive-time for me. I have a combination of podcasts and an app that I use to listen to my hometown station. I use TuneIn to listen to KLKC, 1540. My wife, she's a doctor over at George Washington University,

"Wherever I go, I always try to visit some radio broadcasters if I can, because I think what they do is so unique, it's so local, it's so social, it's increasingly mobile too."

and during her day she doesn't have time to keep up with the news, so she usually listens to 88.5 NPR [WAMU] on the way in, and then either NPR or C-SPAN Radio on the way back.

Also, we have an Amazon Echo at home, so one of the great things about that is you can tell it, "Alexa, play 88.5," and you can listen while you're making dinner to whatever station you want. I certainly rely on that a lot. It's pretty handy.

RW: Your kids probably like talking to it.

Pai: Yeah. For better or worse they've learned how to use it, so now their current favorite song is "We Are Family," Sister Sledge. I used to like that song as



Bob Kovacs

Chairman Ajit Pai discussed regulatory issues with Radio World in this March 10 interview. His Acting Media Advisor Alison Nemeth is at right rear.

well, but now it's on a continuous loop, so I've just gotten sick of it.

RW: Let me ask you to talk about your understanding of the purpose of the FCC. The big picture. Why does the commission exist now, and what do you think it should be doing?

Pai: As you know, it originated because there was a need for the FCC to figure out problems of interference. In the 21st century, I think we have a pretty broad

scope. The big picture takeaway, for me, is to enable as many Americans as possible to benefit from all of the services that the communications sector seeks to provide: radio, TV, satellite, cable, telephone, internet, you name it. Our role is to make sure that as many Americans who want access to those services are able to get them in a competitive marketplace.

It's essentially vital for people to have access to that information. The bottom line is that we want to be able to help the private sector deliver these services to many Americans, while respecting the principles of economics and physics and law as best we can.

RW: What kind of a philosophy or temperament can we expect from you?

Pai: Past is prologue. I've served as a commissioner for about four and a half years; you can get a pretty good sense of where I'm going to be heading from where I've been — a very active participant in the commission's policy-making; somebody who is going to be very forward-thinking in terms of how to modernize our regulatory approach, to make sure that our rules match the realities of the modern marketplace; somebody who is going to be willing to have an open door and an open mind to anybody with a good idea.

We certainly don't claim to have a monopoly on wisdom. Some of the ideas we've championed have come to us from the outside. We're more than willing to share the credit with everybody if it gets a good result for the American people.

RW: You've been vocal about the desirability of turning on FM receiver chips, although you don't support a mandate. Will you use the bully pulpit of this office to put some friendly pressure on the people who can put this in action?

Pai: I will, and I have, actually. My very first speech as chairman, before the North American Broadcasters Association, I pointed out that both as a chairman and as a consumer, I would

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appreciate the functionality that FM chip activation in smartphones would provide.

It's a way for consumers to save battery life, to consume data exempt from any data limits they might have. Also, if you think about it, given the fact that 93 percent of Americans already rely on radio, if you enable this device that virtually every American seems to have now in their pocket to [receive] FM signals, that would be a really powerful proposition that I think a lot of people would take advantage of.

In a lot of cases, we are seeing consumer demand incentivizing carriers to activate that functionality. I think something like 44 percent of smartphones in the United States now include it. Obviously, through advocacy we'd like to get that number up. I met recently with my counterparts in Mexico, and I observed that 80 percent of the smartphones sold in Mexico have this functionality activated. My counterparts told me that's something they hear that consumers really enjoy.

As I pointed out in my speech, I don't think the FCC has the legal authority to issue a mandate; but hopefully working together, this is going to be something



that both sides of the coin, so to speak, can come to an agreement on for the benefit of consumers.

RW: *Have you had any conversations with Apple about this? They so far have been reluctant.*

Pai: I haven't yet had a chance to do that, but hopefully we'll have a chance to keep spreading this message, which I think is a good one for consumers and companies alike to hear.

RW: *Let's talk about cross-ownership. Do you think that we'll see that anytime soon? Will you be able to abolish those rules?*

Pai: I can't give you a specific time-



frame, but what I can tell you is that as a general matter, I do think that our media ownership regulations, like any regulations, have to match the realities of the modern marketplace.

In this area in particular, some of our rules have become yellowed with age. The core of them, as you know, were created in 1975, and anybody sentient would recognize that the marketplace has changed dramatically since then. There are many sources of information now that simply didn't exist back in 1975. Our goal is to make sure that we take stock of what the marketplace today is actually like, and tailor our regulations accordingly.

For example, the newspaper/radio cross-ownership limitation. I see no evidence in the record that that limitation continues to be necessary in the interest of competition or the public interest.

Conversely, I see a compelling market need for newspaper owners and radio broadcasters to be able to combine forces. Each of them, especially in smaller markets, seem to be facing economic challenges; and to me it seems to be an ideal case of, here are people who are expert at gathering information. What if we allowed them to join forces, then distribute that information among a number of different platforms? That could enable them to stay in business, but even thrive, especially in markets like Joplin or Topeka or Tulsa, places even smaller where it's often hard to build a business case for keeping the lights on.

RW: *Is there anything to stop the FCC now from going boldly down that road and lifting those? At what point do you run up against opposition from your colleagues or Congress?*

Pai: This is an area that has been fraught with a lot of political debates in the past, but I'm hopeful that this is going to be a bipartisan issue; that we can recognize that the bottom line is, we want Americans to have access to as much information as possible in terms of news. If there's a way to work together, we're certainly hopeful that we can do that. This an area where the courts



also had had a say; and the Third Circuit Court of Appeals in some cases had said pretty clearly to the FCC, "You need to take action. We don't believe that you've provided a factual foundation for this or that conclusion." Within those legal constraints and within the political constraints that we find, we want to be able to move forward in a way that's beneficial for consumers of news.

RW: *Many broadcasters advocate removing AM/FM sub-caps per market. Recognizing this is part of an ongoing proceeding, what do you foresee?*

Pai: That's one of the issues we're going to have to look at. I haven't had a chance recently to study the record with respect to that aspect of the rules; but I would imagine that as we do our comprehensive review of the media ownership regulations, this will be a part of it that we'll study.

RW: *The TV repack is on a lot of peoples' minds ...*

Pai: So I hear!

RW: *... but within FM specifically and the impact on their infrastructure, we get the sense the FCC wouldn't have a lot of patience for FMs that don't have a good backup site. And there's been talk about whether FMs should share in any of the compensation from the federal government. Should FMs share in any compensation package that broadcasters, TV, is getting out of this?*

Pai: We do know that's an area of concern for broadcasters, in part thanks to your own solid reporting on this issue. A couple of years ago, the FCC determined that the Spectrum Act did not authorize us to extend compensation to FM broadcasters who might incur costs as a result of the relocation efforts of TV broadcasters with whom they shared space on a tower. But the FCC did determine that to the extent that there are TV stations with an existing reimbursement agreement with co-tenants including FM stations, those TV stations could submit eligible expenses for reimbursement to the FCC, consistent with the Spectrum Act.

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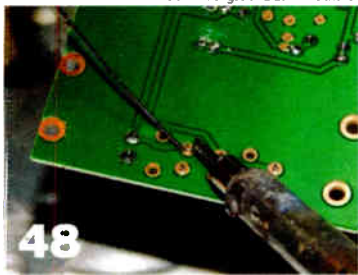
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Although I realize that might not be satisfactory to all, that is one way the FCC has tried to accommodate these interests as best as it can.

RW: *Is there a chance that might be broadened [to] a more liberal interpretation and get [radio] broadcasters more direct access to funding?*

Pai: We will have to take a look at it, but our understanding of the Spectrum Law based on the prior FCC's interpretation remains that there isn't latitude to authorize those —

RW: *Congress could do it.*

Pai: Congress, if it chooses to change the law, certainly the FCC would be duty bound to administer that faithfully.

RW: *There was language in the big AM 2015 notice about easing the main studio rules. And yet the FCC had said it was reluctant to make changes or take that away because of the importance to ensuring compliance with local service. Now there's no onsite public file anymore; and stations have so much connectivity. Is there a reasonable chance we'll see the main studio rule go away or be substantially changed? For both AM and FM?*

Pai: Good question. This was one of the issues that was teed up in the AM revitalization order, as you might remember. We put out a notice of inquiry, in part to tease out from the public what they thought about this.

We've been on the job just under six weeks at this point. One of the things we're going to be looking at is the record that was compiled in response to that NOI, and to try to figure out an appropriate way forward.

The running theme that I've emphasized, as you might have discerned by now, is that we want to make sure that our rules reflect the needs and the structure of the current marketplace. We'll take a look at that issue with particular care.

RW: *What's the timeframe for looking more closely at the comments from the NOI?*

Pai: The timeframe for looking at the comments is ongoing. We're working closely with our Media Bureau and my staff as well, of course, to try to figure out what's in the record, and are there areas of consensus where everyone can agree. I can't give you a specific timeframe on that, unfortunately, but it's an area of active consideration.

RW: *In what other areas do you hear general managers, when you visit, say, "By the way, I could use a little help on EEO" or whatever?*

Pai: That's a good example of how my visits to broadcasters actually have made

NEWS

a difference in terms of how I approach issues back here in Washington.

When we relaxed the requirements, for example, to maintain hard copies of correspondence from members of the public, I directly drew on my experience visiting KKOW in Pittsburg, Kan., a sta-

It brought home to me, these are folks who are trying to connect their local community with information and entertainment and public service. Instead of diverting them and having them maintain this stock of paperwork that nobody ever looks at, what if we freed them

Don't expect a digital radio mandate on Pai's watch, either. While he encourages experimentation with digital, he said, "We also want to accommodate the folks whose business plans don't envision that as well."

tion I grew up listening to. I remember seeing these file cabinets several years ago. The general manager there — in response to a question I asked, "Has anyone ever looked at these?" — after a laugh he said, "You're the first person who's ever, in living memory, requested to see any of this."

from that requirement? Since they're already required to post a lot of information online, what if we relax that requirement and allow them to do what they do best, which is connect with the communities?

Those are the kinds of things that I

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really treasure, to be able to hear from broadcasters firsthand, on their own turf, what's of concern to them. That's part of the reason I was inspired to kick off the AM revitalization initiative; that's part of what motivated our thinking on public file. We're always open to suggestions from folks in the broadcast business.

RW: About that 2015 order, FNPRM and NOI — there's a lot in there; and

you've been checking off some of those items. But aside from some minor technical tweaks, a lot of the emphasis to date has been on the translator strategy.

Pai: Right.

RW: Okay, you've accomplished a lot with that; but in some ways it feels more like a form of FM migration than about AM improvement. What do you think the future of the actual AM band is? And when will we see more action on the revitalization *within* that band?

Pai: We've gotten tremendous feedback on the translator reforms that we've had,

including just last month. We unanimously voted on the proposal that would make it easier for AM broadcasters to site their FM translators. That's a small step, but hopefully a big one in terms of enabling them to take advantage of that opportunity.

formalized process in mind. But what we would like to do is to be able to move forward in a way that reflects consensus.

Generally speaking, I try to reach consensus whenever I can, both within interested parties in the private sector,



“Both as a chairman and as a consumer, I would appreciate the functionality that FM chip activation in smartphones would provide.”

Moving forward, there are a lot of technical proposals that were considered in the further notice, and we're hopeful that we can move forward on them.

I know some of them are very challenging in nature. Some of them might be controversial in terms of the protection of clear channel stations. We're hopeful that we can find some sort of consensus working with interested stakeholders to move forward on those. Ultimately, our goal is to make sure that AM broadcasters, large and small, in big cities and in small towns, are going to be able to continue to make this band thrive. That's something that I think, at least at 60,000 feet, everyone should be able to agree on.

RW: Are you optimistic on that consensus? It does seem like you've taken care of, forgive the expression, the low-hanging fruit on AM; and now there's some tough nuts, like the Class A stuff. Are we going to see Class A protections eased?

Pai: That's one of the things we're going to have to tackle. Over the last couple of years, and especially over the last year, I've been speaking with AM broadcasters about that very issue. Now that we wield the gavel, so to speak, hopefully we can convene everybody and try to figure out a way forward that accommodates everybody's interests.

RW: Is there a need for an AM industry roundtable under your aegis to talk about these things? Or is it going to be the process that you've been going through so far — ex-parte meetings and what not, hearing from these stakeholders?

Pai: Thus far, it's been more of the latter. We've had really good conversations, in my previous position, with a lot of interested stakeholders on both sides of the issue. We don't have any

but also here at the commission. That's something I think ultimately gives our decisions more credence with the American people, and lets our choices stand the test of time.

RW: We have so many translators now, and FM congestion is actually an issue. Broadcast attorney John Garziglia recently argued that some stations are abusing the translator rules; and I think you had a written conversation with Congressman [Andre] Carson about this. Is it time to rethink translator interference policies to give *more* protection to translators?

Pai: That concern has been flagged to me, and if we get any complaints regarding interference or the like, we want to make sure that we take the appropriate action, investigate them and the like.

In response to broadcasters who might have concerns or elected officials, our door is always open. We want to make sure we give everybody a fair hearing. The last thing we want is for anyone to either abuse the rules, or for the FCC to allow a problem to persist that doesn't benefit broadcasters who are playing by the rules.

RW: What do you see as the FCC's role in any potential future digital radio solution? We, right now, have a hybrid solution in the marketplace, and there's been discussion about whether someday the bands should go all-digital and how that would happen, particularly on AM. What role should the FCC play now with digital radio advancements?

Pai: My understanding is there's something like 1,750 broadcasters, or something like 16 percent, engaging in hybrid transmissions, so that's something that people are experimenting with. From an FCC perspective, I'm generally not

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a fan of the government issuing mandates, that we must have a transition by a certain date. I think there are also some distinctions between a radio digital transition and a TV transition — for example, the co-terminus use of spectrum for digital and analog operations on the radio side, which we didn't necessarily see on the TV side.

“So long as I have the privilege of serving as chairman, you'll have both a listener and a regulator who is going to be attentive to [your] needs.”

Additionally, as you know, Congress took a very direct role in the DTV transition, both in terms of mandating a specific date and providing resources to enable that to happen.

We want to encourage broadcasters who want to experiment with the digital transition the ability to do that; and we also want to accommodate the folks whose business plans don't envision that as well. So no specific FCC mandate, but we always want to be encouraging of innovation for broadcasters who want to do it — which is part of the reason why on the TV side, one of the first things that we did was the ATSC 3.0 standard, because we think that broadcasters should be free to innovate, just as other areas of the communications marketplace should be able to do it.

RW: *A lot of broadcasters have been really disappointed with the cutbacks in the field offices and enforcement resources. Can you change direction with that at this point?*

Pai: The modernization plan, as it was called, was adopted; and as you might remember, I expressed some substantial concerns with the decision to close or to severely narrow some of those offices, primarily because the field offices represent the cop on the beat, so to speak, for the FCC. They are the eyes and the ears of the agency across this country, from New York to Honolulu.

One of my primary concerns is that when it comes to the broadcasters who have spectrum rights, whose rights are either abridged or impeded by those who don't play by the rules — for example, pirate radio operators — if we don't have a field presence in those marketplaces, we won't be able to take action. I think pirate radio's a serious concern, and I've heard about it from congressmen from New York, from representatives from Florida. It's a problem

that has to be addressed and addressed vigorously.

That's why, when I visited with our field office staff during a remote town hall just this week, the messages I had to them were: Number 1, you've got someone in this chairman's office who respects and values what you do. Number 2, we want you to be as active as you can be on issues like pirate radio because we recognize that it harms both broadcasters and listeners alike.

Number 3, if there's some way for us to improve coordination between the field offices in Washington, let me know, because we, at the end of the day, are all on the same team. We're all looking to promote the public interest. And in this case it means enforcing our rules; so that it's not just a case of the FCC issuing the rules, and enforcement is an afterthought. We want enforcement in this area to be a core part of our mission.

FAMILY MAN

There's nothing of the “stuffy Washington bureaucrat” about Ajit Pai. When Radio World's party of three entered his eighth-floor office, the new chairman was kneeling on the ground, adjusting a large rug with a member of his FCC team. Pai jumped up, shook hands and introduced himself as Ajit (pronounced “ah-JEET”), his trademark personal warmth and energy evident. He was chatty about northern Virginia restaurants and quick to point out his children's art, including an interpretation of a rainbow painted by his five-year-old.

The walls of the office put Pai's priorities and personality on full display. In addition to expected furnishings — a conference table, diplomas, a photograph with Majority Leader Mitch McConnell (R-Ky.), who recommended him for the FCC — his large desk is barricaded by family photos, showing his wife Janine, five-year-old son Alexander and three-year-old daughter Annabelle.

At his elbow where he sat for the interview (Pai prefers a chair, with guests on the sofa) was his oversized orange coffee mug, emblazoned with the Reese's logo, which has made public appearances at commission meetings and which he said is more an indication of his caffeine dependence than a display of affinity for the candy.

In case Pai's persuasions weren't evident, the hallway outside his office features a large framed poster of the “Ron Swanson Pyramid of Greatness” — perhaps an indication that the chairman or a near team member is

RW: *Could you reopen some offices?*

Pai: I'm not sure if we have the resources to do that at this point. To some extent, I am playing the hand that I've been dealt; but what we do want to do is maximize the effectiveness of the resources we do have, and to the extent that additional resources may be forthcoming, allocate those resources in a way that will enable us to better discharge our duties on things like pirate radio.

RW: *I'm curious about your interactions with the president. Your public persona couldn't seem more different than his. You met with him recently. What did you talk about, and how do you see your personality and style integrating with his?*

Pai: I can't comment on the specifics of our conversation; that would be for the White House to choose to disclose or not as they see fit. I can say that it was a very warm meeting, both when I met with him this past Monday, and on Jan. 16.

The common thread, you might say, between our philosophies is that we want to set government policies that will unleash job creation and economic growth and consumer welfare across this country. My purview is obviously much narrower than his, but at least within my bailiwick, I want to make

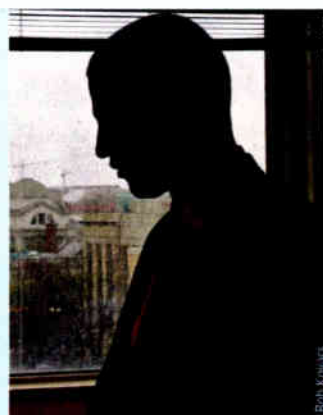
sure our rules across the board, whether it relates to broadcasting or broadband, or anything else, are modern. That they are forward-thinking, that they incentivize investment and innovation, but that they prioritize consumer needs as opposed to yesterday's regulatory categories.

I'm hopeful that moving forward, with the support of elected officials in the executive branch and the legislative branch, that we'll be able to produce a marketplace at the end of the day that gets consumers unparalleled benefits in the digital era. That's something I'm really optimistic about, and hopefully that's a vision he shares as well.

RW: *Anything else you'd want people in radio to know that we haven't touched on here in our brief chat?*

Pai: Just that I'm a big fan of the medium, and that under my chairmanship radio is not going to be neglected, as I have said before. It is a crucial piece of the media landscape; and so long as I have the privilege of serving as chairman, you'll have both a listener and a regulator who is going to be attentive to their needs.

Comment on this or any article. Email radioworld@nbmedia.com with “Letter to the Editor” in the subject field.



The chairman in silhouette, with the Smithsonian National Museum of Natural History visible in the background.

a “Parks and Recreation” fan or admirer of the libertarian Ron Swanson character? — and a nearby kitchen showcases a photo of President Ronald Reagan in his iconic cowboy hat, another clue to Pai's politics.

Pai, 44, was designated chairman by President Trump in January and subsequently renominated to a second five-year term. He has served since 2012 as a Republican commissioner, when he was appointed by President Obama and approved by the Senate.

The Harvard- and University of Chicago-educated lawyer doesn't shy from his Midwestern roots; he chooses to embrace the sensibility that comes from growing up in Parsons, Kan., the son of doctors who immigrated from India 45 years ago — as he has said, “with literally no assets other than \$10, a transistor radio and a desire to achieve the American Dream.”

After Pai earned a J.D. from the University of Chicago in 1997, he went on to clerk for the Hon. Martin L.C. Feldman, U.S. District Court for the Eastern District of Louisiana. He worked for the U.S. Department of Justice Antitrust Division's Telecommunications Task Force as a trial attorney, then transitioned to the private sector and worked for Verizon Communications Inc. as associate general counsel. After 2003, Pai had stints with the U.S. Senate Judiciary Committee and the Department of Justice's Office. From 2007–2011, Pai worked at the Federal Communications Commission as deputy general counsel, associate general counsel and special advisor to the general counsel. He also worked in private practice as partner at Jenner & Block LLP from 2011–2012.

— Emily M. Reigart

INSIDER

NAB SPECIAL EDITION

March / April 2017

What's Inside?

Pg 2. New Merlin/Genie/Bridge-IT Features

Pg 3. Report-IT Enterprise & SmartStream PLUS

Pg 4. Crocmedia broadcast the game with ViA

Win a Genie STL Codec at NAB2017

ViA Codec a Game Changer for Farm Journal Radio

By John Herath, Director of Operations, Farm Journal Radio

Farm Journal Radio is part of the Farm Journal Company which has properties in print, web, data, television and radio, all focusing on agriculture. On the radio side we have two syndicated talk shows called AgriTalk and Market Rally, plus daily syndicated features American Countryside and DairyLine.

When I first joined AgriTalk in 2003, Tieline Commander and i-Mix G3 codecs were used for all remotes. We mostly connected over POTS in those days, but now we use Tieline's ViA to broadcast AgriTalk and Market Rally exclusively over IP.

AgriTalk is a live, one-hour syndicated talk radio program focusing on agriculture and rural America. It airs on 98 affiliate stations throughout the Midwest. Mike Adams has hosted the show since 2001 and he travels over 100 days a year to do remote broadcasts, which facilitate discussions about issues and ideas important to rural America.

We purchased the ViA in 2016 and it has been on the road continuously since then. It's very compact and there's a lot in that small box that is easy to take with you anywhere. It also comes with a rugged and durable carry case which is light and easy to take on flights.

As you can imagine, IP connectivity can be difficult in many of the agricultural regions we visit, so flexibility is paramount. One day we may be at a convention center, and the next broadcasting directly from a farm in the Corn Belt.

The ViA lets us connect over a DSL or LAN connection when it's available, or we use the codec's built-in Wi-Fi to connect over a hotel or convention center hotspot. If required we can

Tieline 
The Codec Company



From Left to Right: Ryan Quarles, Kentucky Commissioner of Agriculture and Mike Adams, host of AgriTalk broadcasting with the ViA

connect using a PepWave wireless router and this works brilliantly. It nearly always gets a solid signal, even when everything else fails. We have also used a Verizon 551L USB modem attached
(Continued on Page 2)

WIN A GENIE STL CODEC

SEE PAGE 4 FOR DETAILS

(Continued from Page 1)

to one of the ViA's two USB ports, so we pretty much have every option covered. I can even connect to a cell-phone Wi-Fi hotspot if required.

ViA's touch screen is a game changer for us. It allows you to access what you want quickly and this is particularly useful when connecting over Wi-Fi. Most Wi-Fi hotspots we encounter on the road require a browser login and in the past this was extremely difficult to manage. ViA's support for Wi-Fi browser portals has been a massive plus and we can connect to hotspots in seconds. It's certainly a relief to no longer have to fight with hotel IT departments to get around the login!

The menus are intuitive and setup is a breeze. I have configured two programs which have been added as "Favorites" to the screen, so that non-technical staff can simply tap a pre-set connection and go live. These favorites automatically dial a studio Commander G3 or Bridge-IT codec in an instant.

The internal battery lasts for several hours of continuous broadcasting which

also increases mobility and broadcast possibilities. Last year we broadcasted AgriTalk from a pontoon boat on the Mississippi river, which required a generator and other ancillary equipment. This year we could do the same remote using the ViA alone!

Connections are rock solid. In all our broadcasts we haven't had a single flutter or drop! I am currently testing Tieline's Fuse-IP network bonding with a view to integrate this technology into our future broadcasts as well. We normally broadcast in mono using Tieline's Music algorithm at 128kbps and the default auto jitter settings work well. We receive a mix-minus from the studio codec and most of our communications are via text chat on an on-site PC.

Overall I'm highly pleased with the unit. When you look at the IP connection options, coupled with the internal battery, it makes it easy to do a remote from just about anywhere. It's performed well and has increased our flexibility and I'm looking forward to the next round of developments in ViA to increase its flexibility even further.

John Herath started his career in Jacksonville, Illinois with WLDS Radio and he has also worked in the Bloomington and Springfield markets as a news director, talk show co-host and producer. John joined AgriTalk in 2003 after nearly 5 years as chief spokesman for the Illinois Department of Agriculture.



The Tieline ViA Audio Codec in action

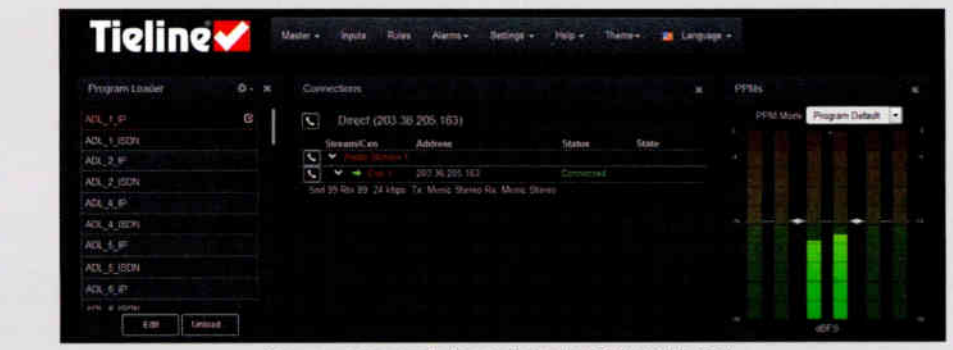
Exciting New Features Available in Genie, Merlin & Bridge-IT

The new v2.16.xx firmware upgrade for the Genie, Merlin and Bridge-IT codec families will deliver a huge range of exciting new features absolutely free to all Tieline customers.

New HTML5 Program Wizard

Tieline has fully integrated Program creation into the HTML5 Toolbox web-browser Graphical User Interface (GUI) for all Genie, Merlin and Bridge-IT codecs.

This was necessary because major web-browsers like Chrome and Edge have moved away from supporting Java and the new Toolbox HTML5 GUI runs



The new Program Editor in Tieline's HTML5 Web-GUI

seamlessly on modern browsers. As a result, firmware from v2.16.xx will no longer support the old Java Toolbox GUI.

In addition, some users experienced connectivity issues due to regular Java updates designed to mitigate exposure

to security vulnerabilities. By using the HTML5 Toolbox these issues are avoided.

The upgraded HTML5 Toolbox will run on Mac, Windows and Linux computers, expanding the range of devices engineers can use for program configuration.

(Continued from Page 2)

New Program Scheduler

The Program Scheduler is a powerful tool added to Merlin, Merlin PLUS, Genie STL and Genie Distribution codecs. This tool automatically connects and disconnects scheduled programs using a simple calendar-based user interface. Key features include:

- Drag and drop to add programs into the scheduler.
- Drag the top or bottom of a scheduled program to adjust the scheduled time.
- Customization of time-zones.
- Day, week, month, list and timeline views available.
- Enable and disable events in a snap.
- Automatically switch program types from dialing to answering.

Fuse-IP Support in Genie, Merlin and Bridge-IT

The v2.16.xx firmware release includes support for Fuse-IP network bonding in all Genie, Merlin and Bridge-IT codecs. This means all these codecs can now use Fuse-IP bonding when connecting to Tieline's ViA remote codec and other G5 codecs.

Wi-Fi Connectivity Added to Genies and Merlins

All Genie and Merlin codecs now support connecting a USB Wi-Fi modem and streaming IP audio over Wi-Fi. This feature delivers greater remote broadcast versatility for Merlin and Merlin PLUS codecs, and it delivers an additional backup transport for the Genie STL and Genie Distribution codecs. So now they support dual Ethernet interfaces, Wi-Fi and VLANs.

NEW: Enhanced Genie Output Backup Options

Genie STL and Distribution codecs can automatically switch between 4 backup audio sources to maintain program output at transmitter sites. Options include:

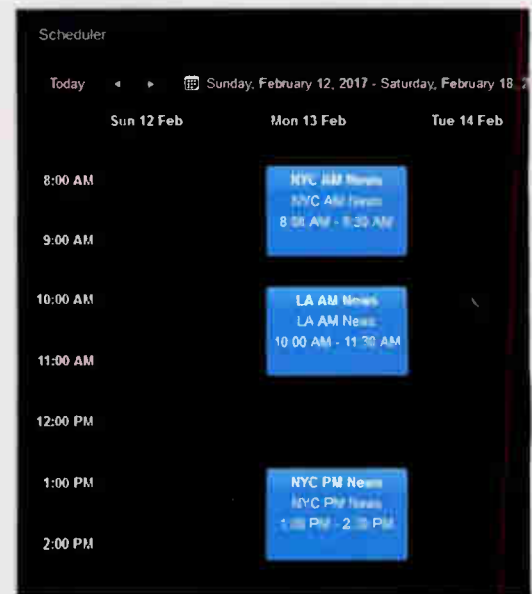
- Connection audio.
- Icecast streaming client.
- Audio file backup.
- Hardware bypass of audio inputs to outputs if power fails.

Other features in this release include support for:

- Deterministic SIP routing.

- Adding 6 SIP user accounts and 2 SIP interfaces.
- WheatNet-IP logic in WheatNet codecs.
- Round-robin call answering in Merlin and Genie codecs.
- Codec caller IDs
- Upgradable with USB stick or SD.

These features will be displayed on booth N7425 at the NAB Show and available soon after.



The new Program Scheduler

SmartStream PLUS Added to Report-IT Enterprise

Tieline has added SmartStream PLUS dual redundant streaming to Report-IT Enterprise v3.4.2, making it the most flexible and powerful smartphone codec app available.

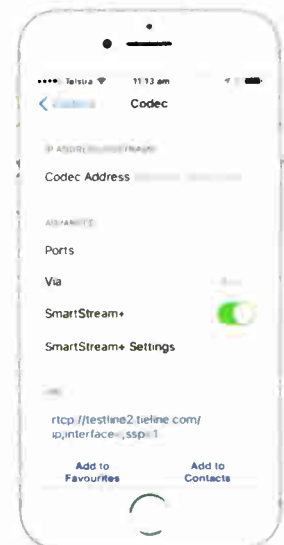
The integration of SmartStream PLUS delivers true network diversity for smartphone reporting. It allows users to stream using the phone's cellular LTE connection and simultaneously stream over commonly available Wi-Fi access points, or over an affordable MiFi (mobile Wi-Fi) device. If one connection is lost, the other will continue to stream reliable IP audio to the studio to ensure continuity of remote audio.

This significantly enhances the reliability of smartphone broadcasting when connecting to Tieline's Merlin and Merlin PLUS IP codecs, which both support SmartStream PLUS dual streaming technology. SmartStream PLUS was also added to the Report-IT Live Professional app (v.3.4.2) in late 2016.

Auto Jitter Options & FEC in Report-IT Enterprise

Report-IT Enterprise v3.4.2 also includes Tieline's renowned automatic jitter buffer management options.

Auto jitter management takes the guesswork out of connecting, by responding dynamically to variable network conditions over unmanaged IP networks like the public internet to ensure reliable streaming. Five presets are available and you can configure the maximum jitter depth.



Report-IT SmartStream PLUS

(Continued from Page 3)

FEC is another advanced streaming feature added to Report-IT Enterprise. FEC transmits a secondary stream of audio packets over a single connection. If the primary audio stream packets are lost or corrupted, then packets from the secondary stream can be substituted to replace them. These auto jitter and FEC features were also released in v.3.4.2 of Report-IT Lite, Report-IT Live and Report-IT Live Professional in 2016.

Tieline to Unveil New Smartphone App at NAB2017

Tieline will reveal a new and exciting smartphone app at the 2017 NAB Show. Visit Tieline at booth N7425 to find out more about this exciting new development...



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2. Prize is not redeemable for cash

Crocmedia Covers Houston's Big Game with ViA

Crocmedia's Off The Bench radio show in Australia travelled to radio row to cover the big game between the New England Patriots and the Atlanta Falcons in Houston. "This has turned into a regular annual gig for us and this year in Houston we did things a little differently," said George Biagioni, Crocmedia's IT Broadcast Engineering Director.

"We recently purchased 4 Tieline ViA remote codecs and a Genie Distribution codec for our AFL Nation show, which is syndicated nationally across Australia. As a result, I decided to road-test one of our new ViAs on radio row in Houston."

"Craig Hutchison and John Rothfield, aka Dr Turf were on the ground in Houston, and another announcer Liam "Pickers" Pickering was at our Melbourne studio for the show," said George. "Audio from the guys in Houston was mixed with Pickers' audio in Melbourne, so we needed very low latency audio communications between Melbourne and Houston to make it work."

"The guys have great chemistry and rely on being able to instinctively bounce off each other's comments. The ViA codec connected flawlessly to our Genie Distribution codec in Melbourne and delivered imperceptibly low latency audio over

IP for several hours of broadcasting. It never missed a beat."

"We are constantly doing live remote broadcasts and ViA offers the flexibility we require to stream from dozens of locations across Australia," said George. "The Australian Football League season starts in March and ViA will be at the front line of our national coverage. ViA's internal battery means we can broadcast from virtually anywhere for hours and we can stream using USB modems, Wi-Fi or Ethernet connections, so every option is covered."



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B-B-B-B-Bird Is the Word

Everybody's heard about AMC-18, but perhaps not these tips for a painless switch

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Now that service from the AMC-18 satellite is running, we engineers need to swing untold thousands of dishes off the dying "bird" over the central Pacific. As you plan for this, veteran projects and contract engineer Mike McCarthy offers readers a few things to consider.

First, do you have a clear boresight path to the new bird? And if not, what is needed to achieve this?

Then inspect your dish to verify you can mechanically move the dish. It may be impossible to re-aim the dish if the hardware is so corroded that there is a risk of breaking fasteners holding the dish in place.

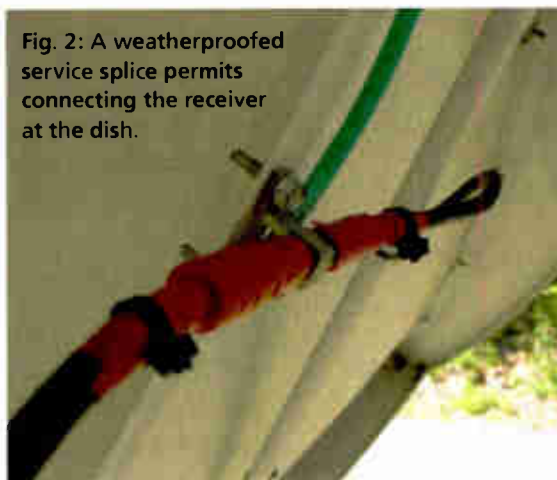


Fig. 2: A weatherproofed service splice permits connecting the receiver at the dish.

to the network's test channel to verify operation.

Once you're done testing the receiver on the bench, shut down the DC to the LNB and bring the receiver out to the dish, along with some AC power, a coax jumper, RF attenuator(s) and headphones. Open the service splice (Fig. 2) — you do have a service and arrestor/ground splice, right? Then connect the receiver to the dish, making sure to re-apply LNB power.

Presuming you have confirmed a clear boresight path, happily aim away (don't forget to adjust the polarization offset) until the best combination of Eb/No and AGC are realized on the receiver — adding attenuation as needed to verify fade margin headroom. As you do this, listen to your "confidence" audio on the new frequency, using the amplifier and headphones.

Once that's done, lube and secure the hardware, secure the dish, reconnect the coax back into the studio, restore the LNB DC and check the receiver

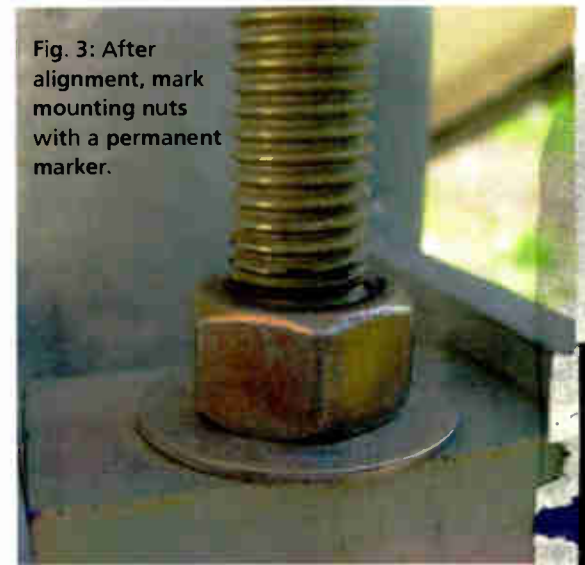


Fig. 3: After alignment, mark mounting nuts with a permanent marker.

general operation. Eb/No, AGC and RF levels, shown in Fig. 3, mark the mounting nut location with permanent marker. Add or remove previously installed attenuation to make sure you're in the sweet spot of each receiver. Once that is all done, then re-weather seal the coax service splice, and secure the cable using black tie-wraps, shown in Fig. 4.

Mike adds that if you don't have a spare StarGuide III, try eBay; that's where he got his.

In closing, Mike mentions www.dishpointer.com. They have a very accurate satellite overlay for checking azimuths. This is the first place Mike went to after seeing the change in birds. The site allows you to check look angle and bore sight.

Fortunately, all of Mike's sites are clear, except one contract station. It will take a transit to check boresight for that station, and there is a significant chance that they might need to replace the dish.

Mike included this definition, as it relates to parabolic dishes: Boresight is a virtual cylinder of approximately the same diameter as the parabolic dish extended and centered along the dish's axis of symmetry to maximum gain.

June 30, 2017, is the final date for affiliates to

their satellite downlink reported to 105 west, general information about the U.S. radio industry migration of satellite service to AMC-18, see amc8migration.com.

The clock is now...
Contribute to Workbench. You'll help fellow engineers and verify for SBE recertification credit. Send Workbench tips to johnpbisset@gmail.com. Fax to (603) 472-4941.

Author John Bisset spent 48 years in the broadcasting industry and is learning. He handles West Coast sales for the Telos Alliance. John is SBE-certified and is a past recipient of the SBE's Educator of the Year Award.

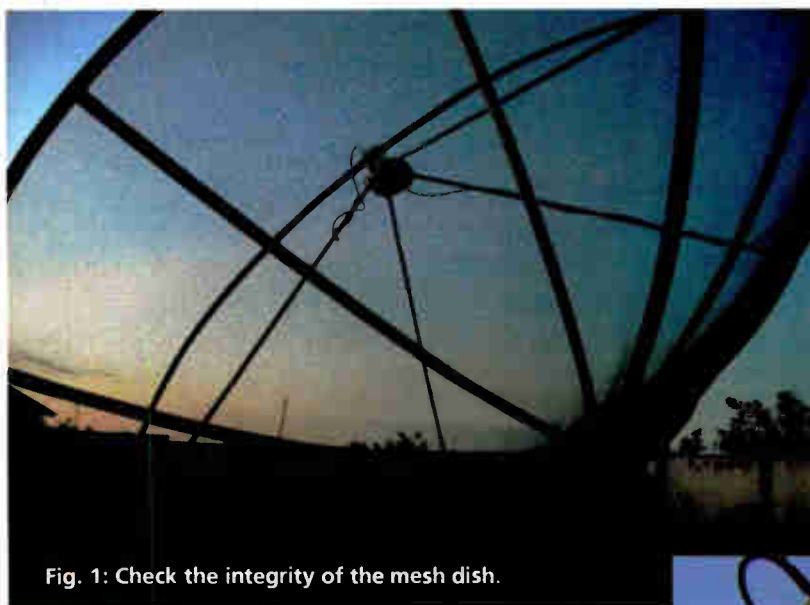


Fig. 1: Check the integrity of the mesh dish.

For mesh dishes, as shown in Fig. 1, ensure the parabola is structurally sound, not bent or damaged. If you have a mechanical issue, what do you do? You may be required to replace the dish, and for this, you need time!

Another consideration is determining the best time to do this re-aim. The answer, Mike writes, boils down to local conditions. For Mike's clients, he will perform the re-aim after the risk of snow storms has passed, permitting him to work wearing a windbreaker. However, you should verify the new alignment, look angle and boresight path clearance as soon as possible, in the event a more significant solution is required.

As for the actual realignment, Mike suggests you first set up on your workbench a surplus StarGuide III that is set to one of the remaining networks still using the platform. Before you begin, make sure the receiver works on the network test channel — just to be sure you're not dealing with a dead receiver or audio card. Next, wire in audio pairs for monitoring/testing using a battery powered amplifier and a pair of headphones set

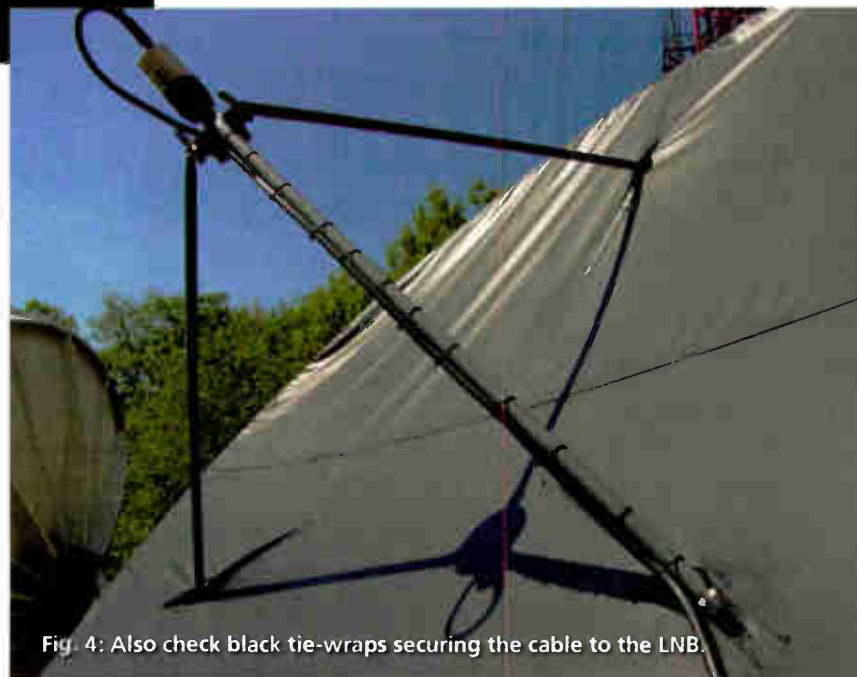


Fig. 4: Also check black tie-wraps securing the cable to the LNB.

Internet Radio Monitor



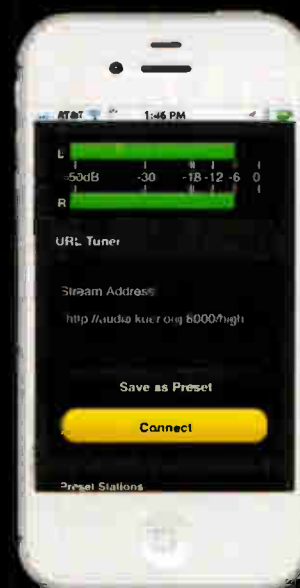
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Measurement of Broadcast Antennas Takes Off

John Kean introduces the Cavell Mertz UAV system for antenna testing

BY JOHN KEAN

Unmanned aerial vehicles — UAVs or “drones” — have been used for years by hobbyists and aircraft enthusiasts, but the field is now seeing rapidly expanding development in commercial applications.

One new use is for the collection of RF signal measurements from broadcast television and radio stations, as is being developed by consulting engineering firm Cavell Mertz & Associates. I will present on this topic at the Broadcast Engineering and Information Technology Conference at the 2017 NAB Show.

TEDIOUS AND COSTLY OPTIONS

Since the beginning of broadcasting nearly 100 years ago, engineers have sought to measure and verify their antenna systems to answer questions such as “Is my antenna radiating efficiently, especially in the direction of important population centers?” and “Have changes to the tower affected the performance of my antenna?” Unfortunately, the methods to collect signal radiation data from



television and radio transmitters have been quite involved.

Field strength measurements, such as those described in Sections 73.314 and 73.686 of the FCC rules, require tedious and expensive measurements, preferably using a receiving antenna at 30 feet above ground. Short mobile runs are taken at numerous, carefully

selected locations from which the data is gathered and analyzed.

In the last decade, some engineers have used fixed-wing aircraft or helicopters to gather signal data by flying circles around the tower. While this technique is faster, it can be even more costly. Accuracy is challenging because, at reasonable flight distances, the path

The Cavell Mertz UAV platform is a Tarot carbon-fiber frame with six motor arms. The broadband antenna, in blue, is mounted on carbon fiber rods and is counterbalanced by a battery hidden behind the body. The spectrum analyzer, measurement computer and two GPS sensors are atop the flight deck. Kean noted that the red motor mounts indicate the “front” of the craft; however, when measuring, the drone points this side toward the tower and flies “sideways” to maintain proper antenna orientation.

geometry may be influenced by ground reflections that are not accountable

“Drive test” measurements, using a vehicle-mounted antenna, are popular; but owing to the low receiving antenna height, they are strongly affected by terrain and ground clutter, which are almost impossible to remove from the collected data. This makes it hard to identify issues with the antenna system itself.

UAV drones are less costly to operate than manned aircraft and, when flown in proximity to a target tower, often have few FAA restrictions. Nevertheless, they do require consideration of the surrounding environment, weather conditions, consideration of FAA regulations, airspace restrictions and coordination with local airports and helipads. Some operations may require advance FAA approval and waivers. As such, not all planned flights may be possible — advance planning is always necessary. The UAV flight plan should always be prepared and flown by a trained and licensed operator.

(continued on page 14)

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UAV SYSTEM

(continued from page 12)

A TOOL FOR 2017

The Cavell Mertz UAV platform is a Tarot carbon-fiber frame with six motor arms. The brushless motors drive 12-inch props with a combined thrust that can lift a 10,000 mAh lithium battery and instrumentation for extended flights. The flight control computer has inertial sensors to provide a stable flight. The controller receives its flight plan via microwave communications link prior to takeoff, and with its integrated GPS can carry out detailed maneuvers:

- Takeoff and ascent automatically to the assigned elevation
- Undertake a precision orbit around a target antenna
- Manage winds aloft automatically
- Monitor all systems and, if necessary, abort the flight and return to its takeoff site.

More complex flight plans can be specified, for example if another tower is nearby and the UAV must maintain distance from both towers. There is a separate microwave radio link for manual control of the UAV that can be transferred to and from automatic control during flight.

The UAV is capable of ascent and descent over a given point on the ground, so it can collect vertical plane radiation measurements in a relatively precise corridor. This capability can verify that

antenna bays are phased properly and that the main antenna beam is formed correctly. On its programmed route, the UAV can fly at a speed of several meters per second, allowing a measurement "orbit" to be completed in a matter of minutes. Testing shows that the UAV can carry out its mission in under 12 minutes, including ascent to most antennas, measurement and descent, with a substantial margin of battery capacity.

PAYLOAD

The instrumentation payload was developed carefully, starting with the antenna. Despite its small size and weight, the biconical antenna spans approximately 30 MHz to 1 GHz, so all VHF and UHF bands can be covered with no tuning or antenna changes. It can be configured for either horizontal

or vertical polarization.

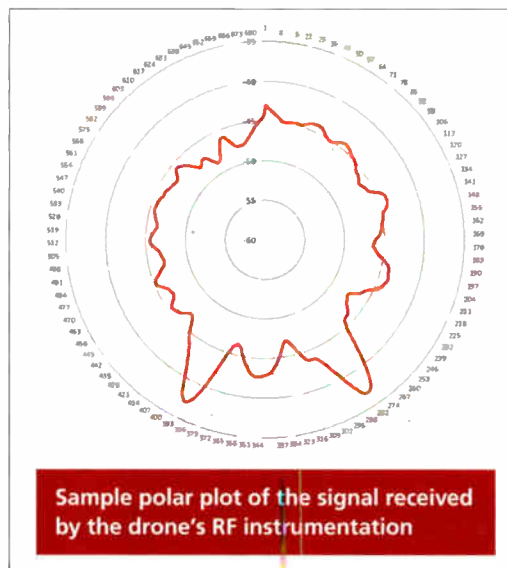
The biconical antenna feeds a tiny RF spectrum analyzer weighing less than 8 ounces. The analyzer has a screen and controls, which allows the engineer to check signal conditions and status. Attenuators and filters can be added to handle special conditions. The analyzer performs all digital signal processing, so that work is reduced on the Raspberry Pi computer, also on the payload deck, which stores the measurements and GPS-derived time and location data.

After the flight, a CSV file with the measurements are transferred to a laptop computer, which adjusts for angular speed, distance from the target antenna and re-sampling to a standard 360-degree display, such as the relative field polar chart shown. This type of measurement can be compared to a station's authorized radiation pattern or the antenna manufacturer's design specifications.

We believe the new UAV system may be a major advance for antenna testing. As we gain experience with it, it should make antenna performance verification quicker, less expensive and more accurate than previous techniques.

John Kean is a consultant with Cavell Mertz & Associates and a Radio World contributor. He will receive the 2017 NAB Radio Engineering Achievement Award from the National Association of Broadcasters at the NAB Show.

His presentation "Development of an Unmanned Aerial Vehicle for Measurement of Broadcast Antennas" will be held Tuesday afternoon of the convention.



Sample polar plot of the signal received by the drone's RF instrumentation

"FM/HD Radio Time, Level, Phase Alignment"

Ben Barber, president/CEO of Inovonics, will discuss the alignment between analog FM and HD Radio, which he calls a huge concern.

"The broadcast industry knows that FM/HD time alignment is an issue that needs attention, there's no news there," he said. "What I will do is explain in engineering terms how time alignment is measured and then corrected. It should be an interesting look under the hood of how the magic happens."

A common problem, Barber said, is even after you set everything up meticulously, your time and level alignment can still change. He recommends that stations watch for publication of new best practices that are currently under development by an industry technical committee to address this.

Who should attend? "Everyone who has FM/HD Radio on the air or is considering it. Anyone who's ever wondered how you correlate two audio samples, and then 'move time' in a manner that can't easily be heard, will want to come and listen to this presentation."

It's Sunday at 10:30 a.m. in the Broadcast Engineering and Information Technology Conference.



Barber said correct time alignment can take a station (top image) from ± 36 samples to ± 2 samples.

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Get Ready for the World of the IoT

Broadcasters and everyone else need to get ready for 50 billion connected devices

BY PAUL McLANE

"It's a sunny March morning in 2023. ... As you get into your car you are presented with an urgent message. Your car has been immobilized and you need to pay 4 Bitcoin in ransom."

The world will have 50 billion connected devices by 2020. What does this really mean for individuals and society? Talking about this at the NAB Show will be Gary Davis, chief consumer security evangelist for Intel Security Group. We called him for insights; text is edited for brevity.

RW: Give us a little bit of insight into what you will speak about.

Davis: We're basically bringing online about a million devices per hour right now; and one of the challenges we're seeing from a security perspective is that most of those devices are being brought online without any thought about security.

I met with another journalist at CES who said they bought a connected toast-

er, and within 20 seconds of connecting that toaster, it was called and someone tried to access it with its username and password. In our own labs we bought a DVR and had that same thing happen within 60 seconds, where somebody called the device, they tried the default username and password, tried a couple different options, got in and then tried to place malware.

These devices coming online with little concern or little thought put in for securing these devices is opening it up for some challenges.

RW: Most of the people listening won't be directly in a position to change the design element of the product. So is the message mostly about user awareness?

Davis: Sure. The most simple thing you can do is when you activate that new device — actually two things. First of all, in most cases that device was built five, six months, maybe a year ago, and there's been some sort of firmware update since then. In a lot of cases, these firmware updates include security



Davis: Yep. It's that simple. That has been the bane of security forever. That simple password change requirement, even if you look back to the Mirai Botnet that took down a big chunk of the East Coast a couple months ago. That continues to grow, using that exact same method I talked about before, they're crawling the internet constantly; as soon as they see a new device they try a default username and password; if they get in they install the Mirai malware, and the next time there's a botnet attack, that device is going to be used as part of the attack.

Most consumers don't want to be a part of that. If they knew they had a thermostat or a security camera that was involved in attacks, they would do all they can to make that not happen. If

Right now it is hard for someone to come in and take large amounts of data out of a business or home; but once everything is connected using 5G, you will have almost zero latency.

— Gary Davis

patches. So apply any firmware updates when you install the device.

The second thing you should do is set up a complex password. If you do that, you're going to make it orders of magnitude more difficult for a bad guy to get access to it.

And don't use the passwords that are typically used in every breach. Believe it or not, the top 10 passwords have never changed over the past several years, when there's been a major breach.

RW: I imagine you speak to a lot of professional audiences.

Davis: I spend a lot of time at industry events where the audience are device manufacturers or people from that domain. For example, we know they're solving for time and market convenience, but we say, "When you build the devices, if you put some security discipline into your development methodology, doing things like encrypted communications, requiring a password reset," if they do those four or five things there's less likely to be the headline in a Wall Street Journal, New York Times article saying "Device X was hacked and here's what you need to do."

RW: It's remarkable that, in our own technical business, instances we've heard about of ransomware or hacks of air chains and emergency alert boxes are often traced back to the simple failure to change a password.

they would just do those, it would ease their minds to know they are not supporting malicious activities.

RW: The scope of what's coming is probably hard for us to appreciate. The first device I think of for internet connectivity outside of the traditional computer has been my thermostat. Where else will these sensors and devices be in our lives?

Davis: They will be virtually everywhere. That's what's happening right now. It's everything from light bulbs, to TVs, to refrigerators, to toasters, to ovens, to every device that you use in your life is going to have the ability to be connected. And for the simplest devices that are online, it's going to make it that much easier for the bad guys to do whatever they want. That's what as an industry we need to work on right now, to make sure that doesn't happen.

Imagine every single device that you interact with having the ability to be connected. This situation is exacerbated in 2020 when 5G comes online. Right now, it is hard for someone to come in and take large amounts of data out of a business or home; but once everything is connected using 5G, you will have almost zero latency. You have 1 terabit per second speeds; the amount of data they can pull out quickly is going to make it really hard

(continued on page 18)

"The only source of knowledge is experience." ~Albert Einstein

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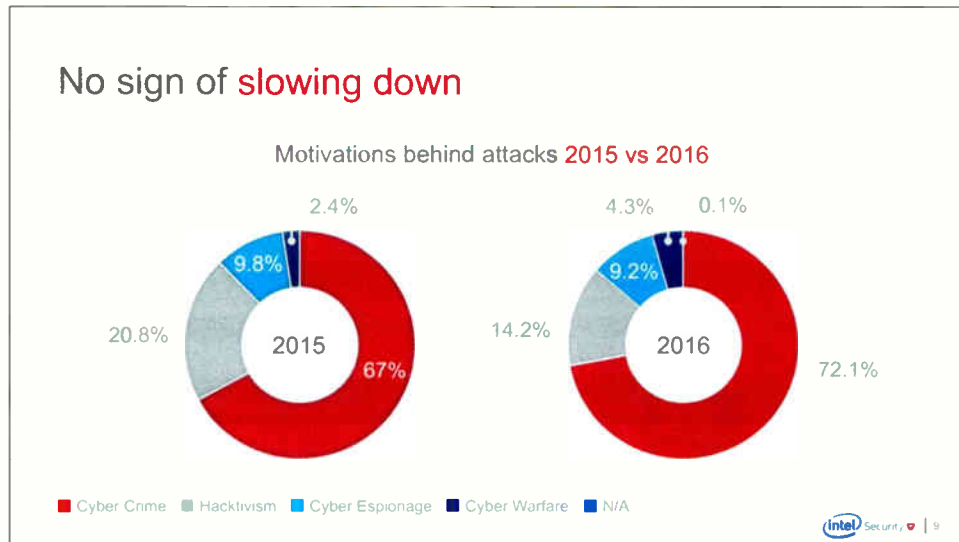
IOT SECURITY

(continued from page 16)

for businesses or consumers or small businesses to properly defend if they are under attack.

RW: Among the audience may be some who work on industry groups like NAB's Pilot department, which deals with technology, or the National Radio Systems Committee. What role do organizations like these have in trying to get the industry around a standardized approach?

Davis: There's a lot of groups that are coming online today that are really trying to build something as simple as a checklist. You know, one of the more popular discussions we're seeing today is basically a security equivalent to Energy Star. When you go into Lowe's or Home Depot, you see an Energy Star-compliant refrigerator or stove or washing machine; you pay attention to that. You know that if you buy that, you're going to save some money because you are using a more energy-compliant or energy-saving device. We're look-



ing at similar things for securing your devices, a simple checklist: Here are the 10 things you should do in order to earn the certification.

RW: What else should we know?

Davis: We're going to look at this from the volume of devices that are coming online and how exposed those are and

some use cases we've seen where these devices have been basically hacked. We're going to be talking about some examples from Def Con, which is basically a hacking event tied to Black Hat.

The other threat is really around this idea of the amount of activity going on in any given day. For exam-

ple, we have our Global Threat Intelligence Network, and we take almost 50 billion queries every day. That's more than Facebook, Twitter, Instagram and LinkedIn combined. We have this massive threat intelligence, and this is how we can tell with certainty there are three to four new pieces of malware every second of every day. It's because we have this rich data set that we're drawing from.

So we're going to talk about all these devices coming out, to the tune of a million per hour; and then you're countering that with a volume of activity that is security-centric. I'm going to draw the intersection between what happens when those two things collide, and talk through the impact to consumers and businesses alike.

The session "2020: Life With 50 Billion Connected Devices" will be held on Thursday of the NAB Show as part of the BEITC Conference.

"Single-Frequency Networks for HD Radio"

Nautel Ltd. Research Engineer Philipp Schmid will talk at the NAB Show about planning parameters required for a hybrid FM+IBOC booster installation that minimizes on-channel interference.

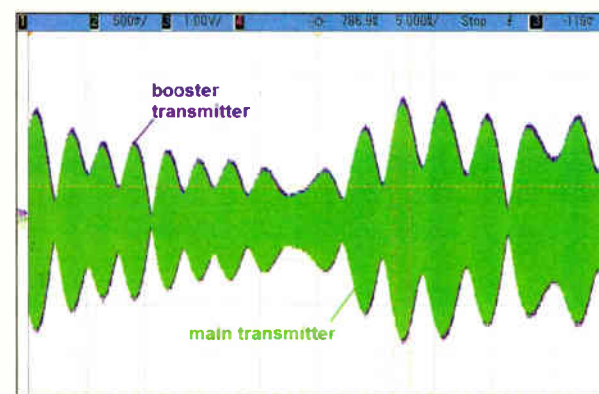
The topic should be of interest to FM broadcast engineers looking to improve or expand their station signal coverage through the use of single-frequency networks as well as technology "visionaries" looking to see what is possible with HD Radio technology down the road.

"With careful coverage planning," Schmid told us, "HD Radio SFNs allow seamless coverage between adjacent on-channel transmissions, providing clear audio in the transition region. Analog FM transmission can at best minimize audible interference in the transition region. HD Radio SFNs can be used to fill-in terrain obstruction today, and in the future can be deployed in cell-based configurations once all-digital transmission is adopted."

Schmid said he will present an HD Radio SFN implementation that can also solve the diversity delay problem that causes listener annoyance when blending between misaligned FM and HD-I audio streams.

"We control the HD-I audio throughput delay from the studio to the RF transmission waveform [see image] in order to meet very tight SFN timing requirements. As long as the FM throughput delay does not vary, the diversity delay can be dialed in very precisely using the HD-I audio as a reference, even if the station has no intention of operating in an SFN configuration at this time."

His session will be held Sunday afternoon during the Broadcast Engineering and Information Technology Conference.



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“Why 0.01% Distortion Sometimes Matters and 30% Often Doesn’t”

Steve Dove bears the title minister of algorithms for Wheatstone. The audio engineer will present a session with the title shown above.

Last year at the Broadcast Engineering Conference, he said, Dove made a rather contrary comment that “the simpler the system, the more complex its behavior.” This year’s discussion uses arguably the simplest practical audio

system, a one-stage power amplifier, as a vehicle to highlight types and degrees of distortion and their sonic effects and audibility.

“Along the way,” he wrote in an email, “it became plain that all was not well with conventional wisdom.” He listed examples of such wisdom: “All odd-order harmonic distortion products are dissonant? Nope. Even-order har-

monics make things sound warm? Nope. Thirty percent distortion of anything will be blindingly obvious? Nope. Not in context. Maybe not even 50 percent. Technically perfect always means better sounding? Totally nope. Better sounding always means it’s better, period? Still nope. Negative feedback makes everything better? Oh, nope.”

Dove also says many “truths” are indeed true but not for the expected



reasons. He promises to expose “a minefield of completely wrong assumptions, abounding flailing contradictions and many common misattributions of effects — things being hung on something else entirely.”

His session is Sunday afternoon in the BEITC.

A FEW MORE BEITC SESSIONS THAT CAUGHT OUR EYE

Stories in this issue of Radio World provide a flavor of the Broadcast Engineering and Information Technology Conference; below and on page 26 are a few more that catch our eye.

SATURDAY APRIL 22

“The Origins of Our Digital Universe”

— A historical perspective on early voice synthesis and speech scrambling and the foundations of digital audio and video, presented by Jon Paul, vice president and founder of Scientific Conversion & Crypto-Museum.

“Satellite VSATs for Broadcast STL”

— Advances in Very Small Aperture Terminal science have made it possible to use satellite technology for the broadcast studio-to-transmitter link. Jim Dalke of Dalke Broadcast Services explains.

“The VOA Museum” — Jay Adrick of GatesAir talks about this labor of love in Ohio.

SUNDAY APRIL 23

“The Coming Virtualization of Radio Studios, or, Kiss Your Racks Goodbye!” — Michael Dosch and Stephan Turkay of Lawo say “going virtual” is radio’s next logical step: software tools running on powerful COTS computers.

“Interoperability of FM Composite Multiplex Signals in an IP-Based STL” — Junius Kim and Keyur Parikh of GatesAir.

“Metapub and the Great California Shakeout: Using Metadata During a Disaster” — You read about this project in Radio World, now hear from Michael Beach and Joseph Schifano about how NPR and the Public Radio Satellite System are working with local public stations to test delivery of emergency text messages simultaneously with over-the-air broadcast emergency alerts.

See more sessions on page 26

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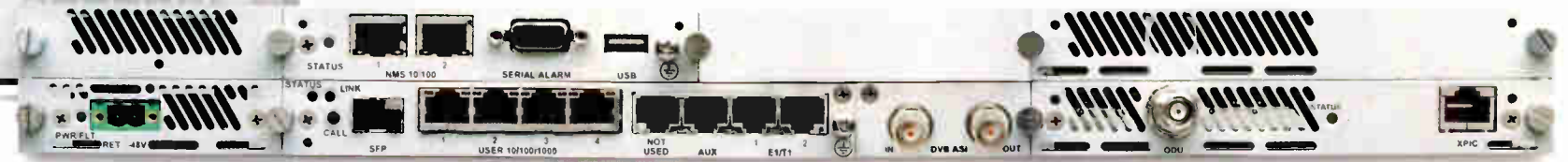
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BRR and Its Impact on Psychoacoustic Watermarks

Paul Shulins researches the topic using the TVC-15, a new offering from 25-Seven Systems

BY PAUL SHULINS

Why do broadcasters care about the transmission of acoustical watermarks? We care because the recovery of these watermarks, using hardware over which broadcasters have no control, is critical to the success of the radio industry.

When Arbitron decided to use technology to replace paper diaries for determining audience measurement, suddenly the technical component of this ratings system became critical to our industry. Today, there are many sources of audio that get broadcast, and the watermark quantity and density generated by Portable People Meter encoders, now provided by Nielsen Audio, are affected by the source material. When this source material is not pure linear audio, the effects on the ability of the watermarks to be transmitted can be quite real, and when combined with the different types of source materials present today, they can cause problems with regard to acoustical watermark transmission success.

My presentation at the NAB Show Broadcast Engineering and Information Technology Conference on Sunday April 23 will summarize research I have done over the past year to look at

the effects of bit rate reduction schemes on the ability of acoustical watermarks to be transported through normal radio signal paths and ultimately to the PPM appliance for proper decoding and subsequent ratings credit.

A THIRD WAY

To my knowledge there are only a few ways to measure the success of watermark transmissions over the air reliably.

One method is with access to a PPM appliance that a panelist would wear and the data that is recorded therein.

Bit rate reduction does seem to have an impact on watermark transmission and the ability to detect these watermarks reliably.

Unfortunately for the broadcasters, this data is not generally available in its raw form to use as measurements due to the control and ownership of the raw data by the company engaged in collecting the data.

A second method is to access data

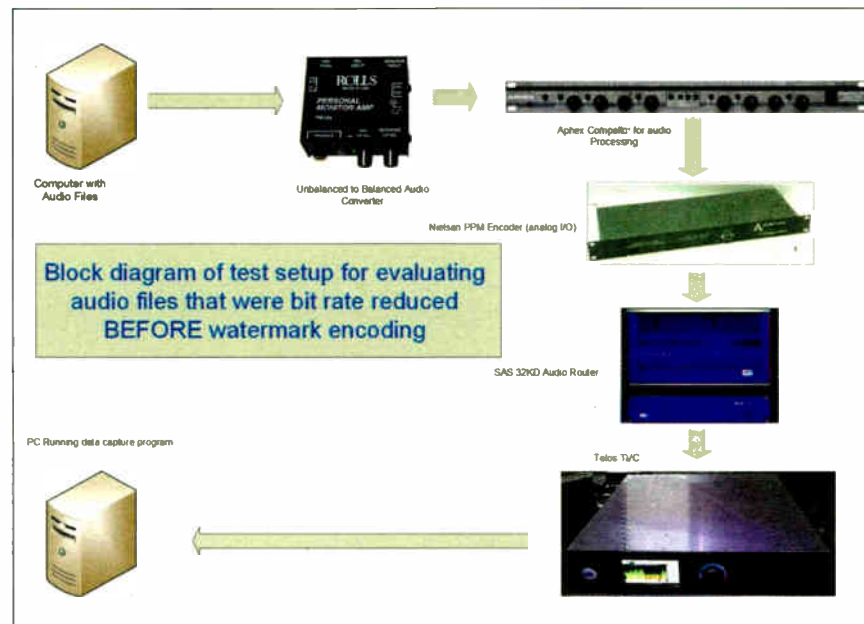


Fig. 1: A test setup used for determining the watermark transmission success rate for files that were compressed before encoding.

MAKING THE MEASUREMENTS

I selected the TVC-15 because it was the only method available that would supply the required data with sufficiently high time resolution to make meaningful measurements of watermark transmission possible.

Specifically, the TVC-15 came equipped with an Ethernet port supplying 400 millisecond data updates, as well as confidence level values (in the range of 0.00 to 1.00), and reset interval counts resetting each time a valid complete symbol was received and properly decoded.

I designed a program to capture the TVC-15 data in real time and then create text files that can be graphed. It also counts the reset intervals per minute or per 10-second interval depending on the duration of the program material being evaluated. The program also averages the confidence level per minute or 10-minute interval. In general, I employed one-minute averaging for long-form analysis, and 10-second averaging for songs.

CORRELATION WITH NIELSEN RESULTS

To legitimize the results, I decided to see if the values from the TVC-15 would correlate with real-world performance of the throughput of the watermarks.

The only way this could be accomplished was to obtain from Nielsen the actual meter counts obtained from real-world panelist listeners — Nielsen routinely makes these raw meter counts available to subscribers — and to match that information up with the TVC-15 data. A direct correlation between these data sets would give me the confidence to know that the TVC-15 data was tracking with what was going on in the real world.

(continued on page 24)

PRODUCT SPOTLIGHT

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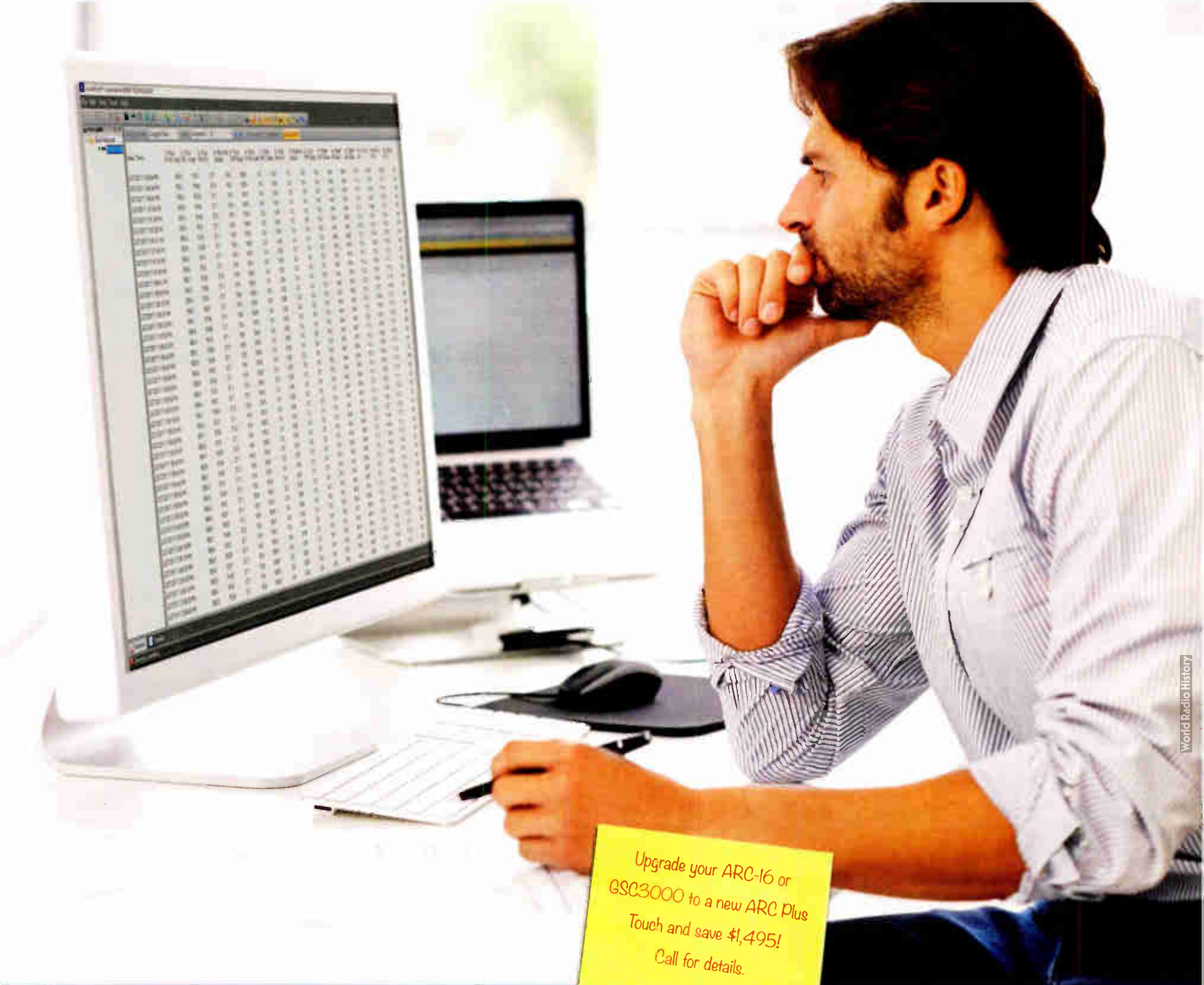
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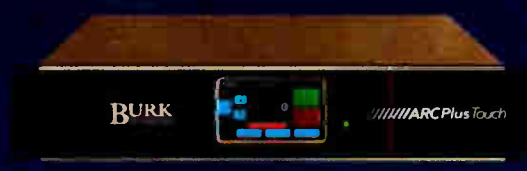
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BRR AND WATERMARKS

(continued from page 22)

Realizing this, I made several measurements with different program formats over a one-hour period. All these measurements compared raw meter counts obtained from Nielsen with message success rates as reported by the TVC-15. This work was done with the cooperation of several stations in Boston along with the lab work I performed. In all cases the actual real-world meter count numbers tracked proportionally with the TVC-15 reported confidence levels.

Another test to prove the usefulness of the TVC was to look at the repeatability of the data reported by the TVC. Using the same program material, I ran the same test six times with identical source material, then graphed the results. This information is part of my presentation at the NAB Show, and shows very good repeatability. After an extensive testing period, I was convinced the TVC-15 was for real and could help me gauge the watermark transmission success from a quantitative perspective.

I wanted to look at watermark success rates with different audio compression rates both before and after PPM encoding was applied. For example: Does a highly compressed MP3 encode any worse than the same audio in linear

form that gets compressed after PPM encoding, as would be the case with a compressed studio-to-transmitter link or HD Radio transmission?

Fig. 1 on page 22 shows one of the test setups used for determining the watermark transmission success rate for files that were compressed before encoding. A computer containing the files played audio to a PPM encoder, and then into the TVC-15. The TVC then measured the success rate and reported it to a second PC running custom software that was designed to capture and tabulate the TVC's real-time data. The data subsequently was written to a text file and graphed to produce comparison plots.

Fig. 2 is an unusual example of a surprise I found, showing that this particular voice sample seemed to transmit watermarks most effectively at 32 kbps, and linear audio trailed far behind.

I have much more data to share at the NAB BEITC, and a companion paper will be published in the conference proceedings in case you can't make it to Las Vegas.

CONCLUSIONS

Bit rate reduction does seem to have

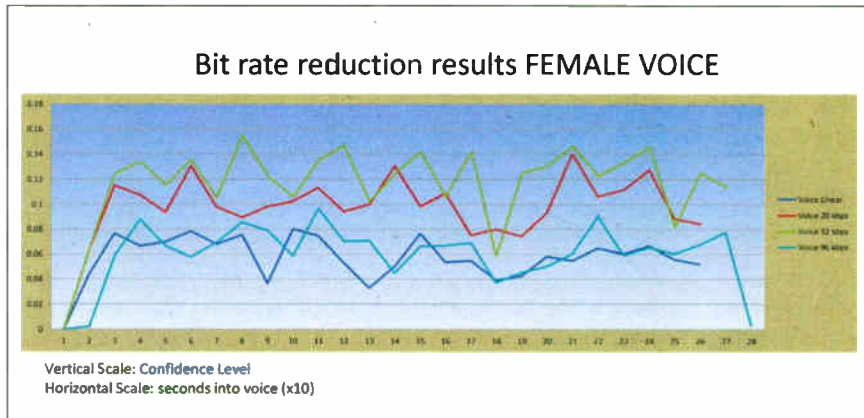


Fig. 2: This particular voice sample seemed to transmit watermarks most effectively at 32 kbps, and linear audio trailed far behind.

an impact on watermark transmission and the ability to detect these watermarks reliably. Most music seems to benefit from a higher bit rate, although 64 kbps does not seem to suffer much compared to linear audio. Voice seems to benefit from MP3 compression, perhaps because of artifacts in the spectral content, especially at 32 kbps.

The TVC-15 has proven to be a unique and valid tool for examining watermark transmission, and the application that I have used it for may just be the tip of the iceberg. Today electronic ratings are such a big part of what we do as radio broadcasters operating in

PPM-rated markets, and it is in our best interest to understand the technology as best we can.

These measurements are a moving target, and the more data obtained, the higher the confidence will be with regard to the relevance of the measurements made in this report. Certainly, more study is needed to raise confidence in the results presented in this paper.

The author is director of technical operations for Beasley Media Group's Boston operation.

For the BEITC session schedule and locations, see www.nabshow.com/education/conferences.

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Open Interface API

Experience real-time connection and metadata synchronization between MusicMaster and your third party systems and plugins through our open Nexus API.

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With individual/group permissions and change notifications, you can determine who has access to the data and can monitor what is being done.



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World Radio History

More BEITC Sessions

SUNDAY APRIL 23

"The Evolution of the In-Vehicle Broadcast Radio Experience" — A panel will focus on the in-car IP connection and how it can "evolve" the broadcast radio experience globally. Joe D'Angelo of DTS Inc./HD Radio speaks.

MONDAY APRIL 24

"Droning On & On" — Andrew Janitschek is director of program & operations support for Radio Free Asia and a drone dude. He explores what constitutes commercial use of a drone, the requirements that must be met to fly a drone for a station or network, and what the operational rules are now.

"Using Small Unmanned Aerial Vehicles (Drones) for News, Management and Engineering" — A panel discussion including Lisa Ellman of Hogan Lovells, who helped write federal drone rules for the Obama administration; Fred Morton of KMGZ/KWFB; Kent Jones of Kent Jones Productions; Casey Joseph of LS Telcom; and Jo Pappa of Dronelife.io.

TUESDAY APRIL 25

"FCC AM Revitalization: What It Is, the Impact and Consequences" — What's

the latest with this FCC effort; and what are the consequences? Doug Vernier of V-Soft Communications presents.

"We Passed the National IPAWS EAS Test; What's Next?" — Al Kenyon of FEMA's Integrated Public Alert and Warning System reviews last autumn's second national test and talks about what comes next.



FEMA team members are shown shortly after leading the second nationwide EAS test in September. Al Kenyon is third from right.

"Leveraging the Vast Public Media Broadcast System for Public Safety" — Public TV and radio stakeholders have partnerships with local and state law enforcement, emergency manage-

ment and first responder organizations; now the federal government has initiated funding of the FirstNet network. A panel will discuss what's going on in this arena.

"Virtual Talkshow Production: Now Here Can Be Anywhere" — Kirk Harnack and Joseph Talbot of the Telos Alliance explain that technologies like SIP/VoIP, fast internet and VPNs enable alternatives to single-studio or expensive remote solutions.

"Efficient RF Design and Implementation of Translator/Booster Stations" — Derek Small of Dielectric takes on a timely topic.

WEDNESDAY APRIL 26

"Building an Advanced Customizable RF Transmission System at One World Trade Center" — An update on one of the country's highest-profile transmission projects. Speakers are from the Durst Organization, Myat, Radio Frequency Systems, Skyline Towers and the Josh Gordon Group.

"Safety and Security at the Transmitter Site" — Jeff Welton of Nautel explores an important topic at a time when fewer engineers are tasked with more respon-

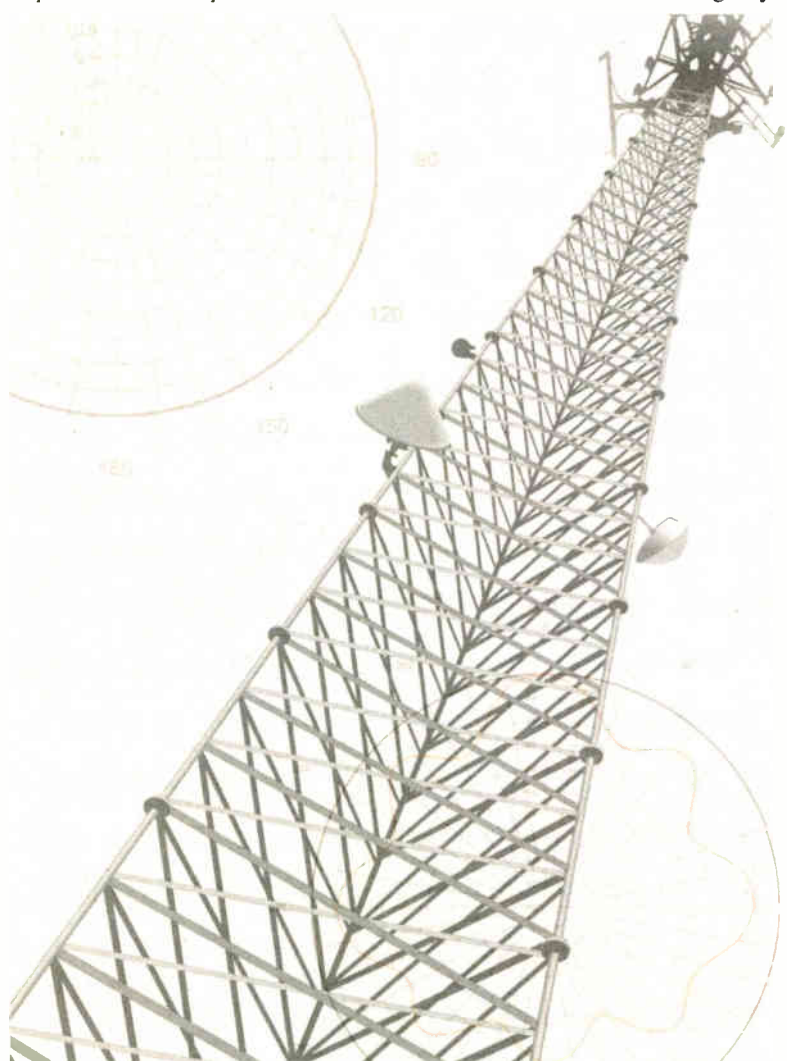
sibilities with lower budgets, while risks associated with the job increase proportionately.

"Is Your Network Really Secure?" — Attending a presentation by Wayne Pecena of Texas A&M University and KAMU is like going back to school for an hour or two to hear a particularly good professor. He talks about ways to ensure that network security provisions are in place, with a focus on public domain security tools.

THURSDAY APRIL 27

"The Cloud Will Kill Half of Us and Save the Rest" — Robert Ambrose of High Green Media explains his provocative session title. "Traditional NAB vendors must revolutionize their approach to designing, marketing, packaging and selling their products, or face extinction," according to a session summary.

"All Media and Entertainment Companies Have a Big Data Problem" — Aaron Edell is with GrayMeta. He takes on the challenges and decision-making processes required for storing and making use of incredible amounts of data, including a discussion of the "Three Vs" — (velocity, volume and variety) of big data.



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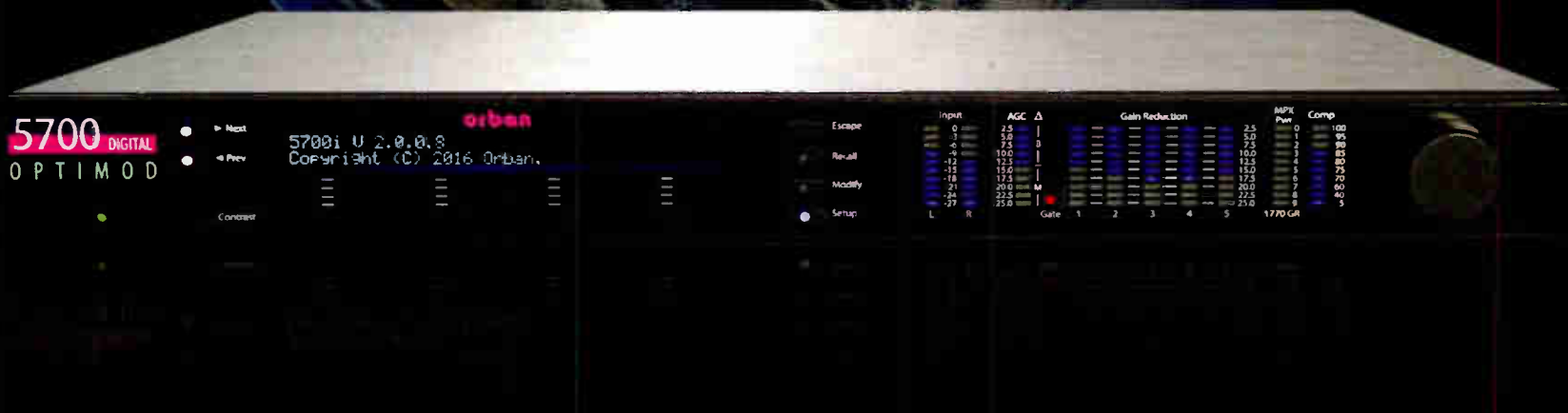
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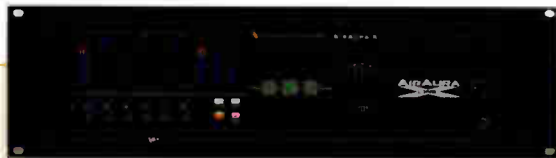
This finger has Irritable Tuner-Button Syndrome. It's caused by sound from outdated audio processors.

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Aura8-IP

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RADIO EXHIBITORS

This is a selection of exhibitors of interest at the 2017 NAB Show. Highlights are paid for by exhibitors; information is from the companies. Check on-site program for changes and full list. Booths preceded by C are in the Central Hall, N is North Hall, SL is South Lower, SU is South Upper, OE is Outdoor-Equipment, MR is Meeting Room, L is Lobby.



The High Roller is becoming a familiar part of the Las Vegas skyline. It is called the world's tallest observation wheel at 550 feet.

Jim Peck

Exhibit Hours

Monday April 24: 10 a.m. – 6 p.m.
 Tuesday April 25: 9 a.m. – 6 p.m.
 Wednesday April 26: 9 a.m. – 6 p.m.
 Thursday April 27: 9 a.m. – 2 p.m.

25-Seven Systems

N7724

Intro: TVC-15 is a modulation monitor for watermarking. It enables stations to detect, monitor and analyze how well programming elements support audio watermarking every 400 milliseconds. Also: Voltair Watermark Monitor & Processor is the disruptive, groundbreaking signal processor to monitor and enhance watermarked audio. Also: Program Delay Manager has set the bar for audio broadcast delays, especially PD-Alert, in which two time-stamped audio files capturing on- and off-air audio are internally archived/emailed to the PD every time questionable material is "dumped." PDM can delay contact closures, RS-232 serial streams, IP data.

AEQ SA

C3246

Intro: Olympia 3 is a third-generation commentary system built on AoIP multichannel network connectivity using Dante and AES67 standards, a scal-

able system that can consist in anything from a single unit for an OB van and part of the intercom system, up to several hundred or even thousands for large sporting events. Also: AEQ Forum IP Split is a version of the Forum IP Console for separate audio engine and control surface modules, offering unmatched flexibility when installing the console in space constrained radio studios. Also: AEQ Venus 3 comes with multichannel IP networking connectivity using Audinate Dante/AES67 protocol. This makes the Venus 3 available throughout your station. Also: Kroma by AEQ Xplorer wireless intercom system is a step further in the range of Kroma by AEQ intercoms.

Aldena Telecomunicazioni Srl

C1156

Intro: High-gain log-periodic directional antennas (ALP Series) offer excellent electrical performance with high gain and low front-to-back ratio. Custom directional pattern available. Also: Custom directional antenna pattern and FCC certification proof-of-performance available on our full-scale test range. Also: A new 19,000-square-meter headquarters, with indoor area 9,000 square meters and a 125 meter certified test plant area for antenna measurements. Also: EMLAB antenna design and coverage software is used to design/manage complex array radiation, patterns and calculate the coverage area prediction up to a complete network. EMLAB can identify health safety EM risk and facilitate EM resolutions.

Altronic Research Inc.

N3117

Ampegon

N6820

Intro: Solid-state shortwave transmitter line from 1.5 kW to 25 kW AM carrier power with integrated DRM solutions. The new Unified Control System platform (UCS) is used to oversee operation of the transmitter with all the advantages of a single common interface and in-house platform development.

Armstrong Transmitter Corp.

N8416

Established Products: STLs, FM exciters, FM transmitters, AM transmitters, remote controls

Arrakis Systems

N7806

Intro: ARC-Talk-Blue is an extremely affordable eight-channel board that comes with five mic channels, one USB channel and two Bluetooth channels. This is the ultimate for any talk studio or remote application. Also: Come check out the dramatic new changes we are making with our automation software and hardware. Also: AoIP Consoles. Dante/AES67 — Check out the new alternative to AoIP. It is extremely affordable and the ultimate solution for any studio. Using Dante and AES67, you can make any studio AoIP.

Associated Press/AP ENPS

SL7606

ATCi

N2016

Intro: Simulsat 7A Multibeam Antenna provides the ability to view up to 37 satellites over a 75° arc both C and Ku Band and only takes up the space of three parabolic antennas of equivalent performance. Also: 1.2 and 1.8 m Fast Deploy Uplinks. Also: Ku Band transmit packages with amplifier, encoder, modulator, IRD, cases and cabling.

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AudioScience **N7606**

Audio-Technica U.S. Inc. **C2622**

AVT Audio Video Technologies GmbH **N6921**

Intro: Dante/AES67 for Magic THipPro Talkshow System — Up to 32 channels for AoIP connection to mixing consoles supporting AES67 or Dante. Also: Ember+ and DHD SetLogic for Magic Hybrids to exchange control and signalling commands over IP with Lawo or DHD consoles.

Axel Technology **N7131**

Intro: RDSE3: Compatible with UECP EBU SP490 version 7.05, compliant with European CENELEC and USA NRSC standards, possibility of connection with all automated playout systems to generate PS/RT/RT+/TA/M-S, alternation between news/data-songs over RT/RT+/PS/PTY/PTYN. Also: Oxygen 3000 digital broadcast mixing console; Wolf 2MS double high-quality FM tuner.

Axia Audio **N7724**

Intro: Axia Fusion modular mixing console with four program and four auxiliary mixing buses, voice dynamics and EQ, automatic mix-minus, integrated IFB/talkback. Virtual Mixer technology, with 16 five-channel VMixers, extends mixing capacity. Also: Axia Pathfinder Pro Core Routing Control Appliance. The Linux-based appliance streamlines routing in complex facilities largely thanks to Logic Flow, a flow-chart-style events system that makes events easier to create, adjust and monitor in real-time. Also: xNode v2.0 with Matrix Mixer incorporates a 16x16 Matrix Mixer feature that allows you to mix both physical inputs (like mics) and digital network sources (like stream inputs) to a single output. Also: Axia iQ AoIP Mixing Console is perfect for any size studio. It can be configured with eight to 24 faders. A basic system has one iQ 8-Fader Main Frame and one QOR.32 Console Engine.

Azden Corp. **C1123**



Backbone Networks Corp. **N7226**

Intro: Backbone Backbone Talk™ for Windows is a cloud-based multiline, call-in phone system enabling talk radio stations to engage listeners from anywhere in the world, now using a Windows computer, without any additional hardware. Talent can focus on the conversation, while the local/remote call screener answers, conferences, blocks and/or records calls.

Backbone Co-Host™ with LUCI Global, for Windows is the cloud-based radio backhaul service enabling studio-quality collaborative, distributed broadcasts and remote correspondent/guest feeds for professional sports, news and talk stations, via iOS and Android phones/tables using free LUCI Global® app. No expensive hardware. Manages multiple bidirectional feeds — now with Windows-based producer/screener interface.

Established Products: Backbone Radio™ Your Station Anywhere

Mr. Richard Cerny, CEO

290 Turnpike Rd. #5-321
Westborough, MA 01581-2843 / United States
844-422-2526 ext. 707
508-887-6935
Email: info@backbone.com
Web: http://backbone.com

Barix (see LineQ) **C1139**

Belar Electronics **N7617**

Intro: FMHD1-Lite — Now shipping, the FMHD-1 Lite is a low-cost version of Belar's flagship FMHD-1 modulation monitor for HD Radio. The FMHD-1 Lite relies heavily on Belar's flexible WizWin software for

remote connectivity. It retains all pertinent features of the FMHD-1, including Belar's unique automatic delay correction software for HD Diversity Delay. Also: FMCS-1 Lite too is now shipping, a low-cost version of our flagship all-in-one FMCS-1 modulation monitor. It also relies on WizWin software for remote connectivity and retains all pertinent features of the FMCS-1, including automated, multichannel scanning of FM and HD Radio stations.

Belden **SL106**

Broadcast Bionics **N8731**

Established Products: PhoneBOX, Oasis, XScreen, Virtual Director

Broadcast Depot **N7809**

Intro: AVRA is advanced radio automation that integrates HD Video capabilities with built-in CG & graph generator to add station logo, news crawls and more, designed to work with social media like Skype, Facebook and Twitter. For the new era of "multimedia radio." Also: AVRA Social Master is a hub that lets you grab and send pictures, videos and posts from social media sources like Facebook, Twitter and Instagram for broadcasters to better interact with their audience. Social Master comes with an SDI output so you are ready to integrate it with your video workflow. Also: RVR TX10KSS 10.5 kW FM transmitter; PTX1000DDS 1 kW compact FM transmitter.



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Jim Peck

Beware hazardous voltages!
Richard Rivers knows his way
around this Dialight controller.

Broadcast Electronics N7512
Established Products: AudioVault FlexX, AudioVault Xpresso, STX 10, STX LP, TheRadioExperience, Commotion

Broadcast Software International N8109

Broadcast Supply Worldwide — BSW N8106
Intro: HDVmixer is a solution that makes video for your station possible. Streaming, social media, live, recorded video, you name it, HDVmixer can make your on-air needs for video, easy and affordable. Also: Wheatstone AirAura X1 broadcast processor is an affordable box that has everything you need to stand up to the more expensive processors on the market. Come see it at BSW.

Broadcasters General Store C1916

BroadView Software N4424
Established Products: Finance, reporting and analysis

Burk Technology N7430
Intro: Captures feature for ARC Plus Touch and SL stores months of channel values and alarm states on the ARC Plus. Download online to your PC anywhere, any time. Flexible reporting options allow trend analysis over long periods of time and pre-fault analysis over intervals of interest. Also: BTU-4D digital temperature sensor unit connects up to four digital temperature sensors to the ARC Plus or ARC Solo remote control system. Sensor cables up to 1,000 feet long are supported without measurement degradation. Line voltage telemetry is built in.

Burli Software N6618
Intro: Discover, organize and manage your news content across platforms, teams and locations with Burli's News Manager. Assign stories, see content from across systems and know when news stories and media are ready for use, whether in a single newsroom or across a national network.

BW Broadcast Ltd. N8631
Established Products: FM transmitters, FM amplifiers, FM translators, audio processors, rebroadcast

receivers, RDS encoders, silence detection, audio backup

Calrec Audio C3118
Intro: Brio compact digital audio console is the most powerful and compact digital broadcast audio console in its class. Only 892 millimeters (about 35 inches) wide and provides more faders in a given footprint than any other audio broadcast console. Also: RP1 remote production unit is a unique live broadcast product that directly addresses an increasingly more prevalent requirement for high-quality content from remote locations.

ChyronHego Corp. S109LMR, SL1210

Coaxial Dynamics N8408



Comrex C1633
Intro: ACCESS NX builds on the legacy of the original ACCESS Portable. New features include a five-inch touchscreen, a dedicated stereo line input and a pair of XLR switchable audio inputs. ACCESS NX includes CrossLock, Comrex's custom reliability layer that intelligently monitors network connections and adjusts data allotment in real-time.

Opal, short for Opus Portal, is an IP audio gateway. Opal allows remote guests to deliver "studio quality" sound, without special equipment. Opal is ideal for users who need to coordinate call-ins with non-technical remote guests. Opal establishes the link using the Opus encoder, for excellent fidelity and low delay.

Established Products: VH2, STAC VIP, ACCESS 2USB, BRIC-Link II, Codec Commander
 Ms. Grace Thomas, Sales & Marketing
 19 Pine Rd.
 Devens, MA 01434 / United States
 978-784-1776
 Email: grace@comrex.com
 Web: www.comrex.com

Continental Electronics Corp. N7520

CPI Eimac Operation N7610, SU5402
Established Products: Triodes, tetrodes, sockets and accessories

Crown Broadcast N6927

Dalet Digital Media Systems SL6210
Intro: Dalet Unified News Operations combines the traditional functions of news production & distribution into a comprehensive, agile and scalable solution. Implemented by news organizations across the globe, UNO enables broadcasters to rethink the way they work, deploy new collaboration models and build data-driven strategies, becoming more agile, efficient and effective. Also: Dalet Radio Solutions.

Dan Dugan Sound Design Inc. C6906
Intro: Model E-3A Automixer with AES and ADAT I/O automixer incorporates a bright OLED panel for

automix gain display, management of six matrix mixing buses and other control functions. It accommodates 16 channels of AES I/O at 48 kHz or 96 kHz, or users may utilize AES and ADAT I/O simultaneously for 32 channels at 48 kHz.



Site Monitoring Systems by Comlab

Davicom N8517
Intro: DV-TechnoStrobe Interface is an SNMP-based interface that allows full monitoring and control between TechnoStrobe SNMP-enabled lighting controllers and Davicom DV units. The interface consists of an Ethernet cable and a configuration file.

DVLC-1 Lightning Strike Counter is the perfect complement to Davicom's award-winning Lightning Detector (DVLD-1). The DVLC option allows Davicom Remote Control units to safely detect and count the actual lightning strikes sustained by a transmission tower.

DV-Open Standard Interfaces consist of Davicom's non-proprietary integrated SNMP and ModBus interfaces that allow easy (and free) interconnection of hundreds of modern devices that can be found at remote transmission sites.

Established Products: Davicom SNMP-enabled site remote controls

Mr. John Ahern, President
 2300 Leon-Harmel Suite 220
 Quebec City, Quebec G1N 4L2 / Canada
 418-682-3380
 Fax: 418-682-8996
 Email: dvsales@davicom.com
 Web: www.davicom.com

DAVID Systems GmbH C8133

DAWNco SU3407

Intro: Improved 3.7 meter stationary satellite antenna (dish) for TV /radio stations that require reliable reception of network from one satellite. The four-petal aluminum antenna has a 42.3 dB C Band gain rating, 1.4 dB better gain than competing eight-petal mesh-embedded fiberglass dish. Also: Top grade C and Ku Band LNBS to improve reception — Change out your old LNB with the newest DAWNco LNB, to improve your satellite reception. This is the fast and easy way to boost reception quality, when using "finicky" new satellite receivers. Our new C and Ku Band LNBS have the best specs for stability, phase noise and 1dB gain compression. Also: The new generation of DAWNco TI elimination filters will block airport and marine radar interfering signals, before they enter your LNB. Also: Super low-loss DAWNflex satellite signal cable for runs that are over 300 feet; FLEXtest satellite meter to boost signal quality at dish.

DB Broadcast N8931

Delta Meccanica Srl C1556

Intro: Delta Meccanica has improved its motorized coaxial switch family, introducing the smallest DPDT relay switch of its line, P/N 1743. This device may



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manage a power rating up to 150 W RMS CW. This switch has four N female ports.

DEVA Broadcast

N8717

Intro: DB4402 dual FM monitoring receiver is a superb and highly practical combination between a logger and streamer that allows you to easily and accurately monitor and store all important parameters of the FM signal while simultaneously giving you the opportunity to listen to a constant, uninterrupted audio stream. Also: DB9009 is DEVA's second-generation advanced IP audio codec. Providing top-quality signal over public IP networks and even connections behind NATs and firewalls, DB9009 delivers undeviating audio unaffected by the non-

persistent network conditions and without the need of user interference. HE-AAC 1 and 2, MP3 & PCM stream are supported.

Dialight Corp.

C1246

Dielectric

C2613

Intro: FutureFill Antenna — In anticipation of ATSC 3.0 services, Dielectric FutureFill antennas are designed and manufactured with adjustable null fill, which can be increased while the antenna is on the tower without any impact to VSWR performance. Also: Dielectric's ATSC 3.0-ready APT panel antenna is designed to help broadcasters offer new services to traditional and mobile receivers.

Digigram

N8414

Intro: "blu by digigram" cloud application for multiplex contributions is a cloud-based service. Its portal establishes high-quality real-time multiplex communication between a blu professional studio interface and any remote contributors equipped with an HTML5 browser on the internet, a traditional SIP codec, or even a telephone as a backup. Also: IQOYA *CLOUD Web Application now in SaaS mode for managing IP audio codecs in the cloud. Also: MPX Option on the IQOYA *LINK and LINK/LE STL audio-over-IP codecs enables direct MPX over IP transport from the studio to the transmitter. Dramatically lowers STL costs. IQOYA supports both analog MPX and digital MPX over AES192.



Also: IQOYA *VIP audio over IP encoding, transcoding and streaming engine middleware provides multiple high-performance encoding, transcoding and streaming capacity for Windows and Linux applications. Also: IQOYA *X/LINK system for cost-effective full IP delivery of multiple audio programs to multiple targets.

Digital Alert Systems

N5009

Intro: DASDEC V3.1 software continues our continuous improvement of advanced EAS/CAP compliance with the newest V3.1 software release for DASDEC. With dozens of new features like support for MPEG-DAS, enhanced logging and host of updated security refinements, Version 3.1 provides users with an optimum experience and control over EAS/CAP compliance management.

DJB Radio

N6234

Intro: DJB-iBroadcaster for iTunes-PC — The iTunes database comes to life for radio DJ use. Features Hot Keys, play, stack, drag n drop, scheduler, voice tracking and more. Also: DJB Radio Spiker, a 2013 Cool Stuff Award winner, has cool new features. An award contender once again. Also: More channels for DJB Webstream Logger, a 2014 Best of Show Award winner, has more features, more tracks, more monitoring and expanded web interface. Also: DJB Radio Automation Software adds new interfaces for programming, voice tracking, Now Playing and social media.

DPA Microphones

C3336

Intro: GSM4000 gooseneck shockmount accessory with MMP-G modular active cable for MicroDot — Accessories for the d:dicat microphone series gives users the ability to create a completely wireless microphone setup, while maintaining high-quality audio during live and recorded broadcasts. Used together with the d:dicat 4017 shotgun capsule or 4018 supercardioid capsules, the user will have a lightweight booming solution.

Econco

N7610

Established Products: Rebuilt transmitter tubes

Elber Srl

SU5805

Electronics Research Inc.

C2030

Intro: ERI's broadband side-mounted Axiom master FM antenna family has been expanded with two







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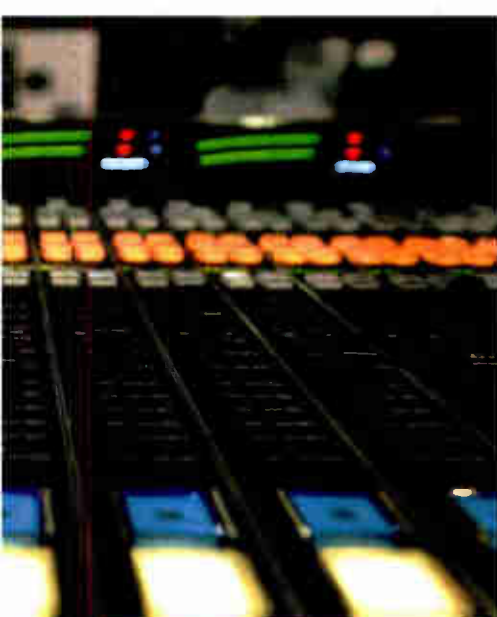


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Up close and personal in the Wheatstone booth.

Al Powers

models for lower power applications. The LPA and MPA Series Axiom master FM antennas are rated for a combined input power of 15 kW and 25 kW respectively. Also: HY0241 FM hybrid coupler is an updated FM hybrid design, a 3-dB, 90-degree hybrid coupler for combining the power of two FM transmitters. The hybrid has a "cross-over" configuration and is also used in ERI's constant impedance FM combiner systems and FM switchless combiners. Also: ERI VDM monitoring system is a state-of-the-art multichannel high-resolution data acquisition system that displays, monitors, records and communicates vital information regarding broadcast system performance characteristics.

ENCO Systems

N2024

Intro: WebDAD browser-based remote control for DAD radio automation. A new addition to ENCO's enCloud Suite of web-based production and connectivity tools, WebDAD provides browser-based control for DAD radio automation systems. WebDAD enables remote control of DAD's Presenter on-air interface, playlist manipulation, voice tracking and array button firing from a standard web browser on any device. Also: ENCO will demonstrate powerful enhancements in its Visual Radio solution, which enables radio broadcasters to deliver a complete multimedia experience to web and mobile audiences. New features include integrated, automatic camera switching, graphic composition tools and integration with third-party video production tools from Broadcast Pix, Newtek, ChyronHego and MultiCAM Systems.

ERI — See Electronics Research Inc.



ESE

C2539

Intro: DV-242 — SDI digital video quad 1 x 2 Distribution Amplifier. The unit features high performance & low cost and is able to distribute 3 Gbps, 1.5 Gbps & 270 Mbps data rates. The DV-242 automatically detects the data rate and

then reclocks and equalizes the signal.

ES-410 — Generates stable source of 10 MHz and 1 PPS using GPS satellites as reference. The unit provides 10 MHz in both sine and square wave form. Four sine wave and four square wave outputs are provided.

LX-5116U — Wall-mount analog clock with a 16-inch viewing diameter. The LX-5116U is designed to operate as a timecode reader, standalone clock or impulse clock. It can read, decode and display time information from most any master clock or other source of time code.

New Enclosure — Enhanced enclosure for

our variety of remote displays featuring 0.55-inch, 1-inch and 2.3-inch LED Displays.

ES-104E — GPS-referenced NTP time server that provides a practical method of putting accurate time information onto a network. If you already have a source of accurate time code we also have timecode referenced NTP servers, ES-289E (SMPTE, ESE), ES-299E (IRIG) and ES-911E/NTP(ASCII).

Established Products: Master clocks, remote clock displays, NTP products, frequency standard, SMPTE/EBU timecode, timecode converters, digital clocks & timers, distribution amplifiers, video & audio products, time control systems

Mr. Bill Rajaniemi, Sales

142 Sierra St.

El Segundo, CA 90245 / United States

310-322-2136

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FEMA Integrated Public Alert and Warning Systems (IPAWS) C2635

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Forecast Consoles**C9912**

Intro: ImageMaster GCX-S — The next evolution in Forecast's Imagemaster line of workstations and edit consoles. The GCX line introduced removable and interchangeable turrets and dropwells along with an easy access cable chassis for hiding wiring, converters and SF PCs. The S line takes it to the next level with electric height-adjustable functionality.

Fraunhofer IIS**SU6110****Futuri Media****Encore Salon - J****GatesAir****N2613**

Intro: An enhanced version of Intraplex IP Link MPX, the MPXh is a dual-domain codec supporting both analog and digital FM MPX modes. Ideal for stations with limited WAN bandwidth or a need for simultaneous analog/digital MPX, it also enables customers to transport AES192 over HD Link with 64QAM modulation. Also: Intraplex IP Link Connect allows customers to reliably distribute external IP data across STLs using IP Link's stream splicing technology. IP Link Connect is the ideal tool for reliable distribution of HD Radio and other robust IP data streams.

Genelec Oy**C4742**

Intro: Genelec 8430 is the first commercially available AES67/AoIP-ready active audio monitor. The 8430A also carries Genelec's Smart Active Monitor Technology featuring automatic acoustic calibration of the monitor in the room it is being used. The 8430 features a 5-inch bass driver a 3/4-inch tweeter

and Class D amplification. Also: Genelec 8351 is the smallest three-way system in Genelec's SAM range of active monitoring products. The 8351 features Genelec's coaxial mid- and high-frequency driver and acoustically concealed bass drivers making for a completely unique and innovative design.

Glensound Electronics Ltd.**N5108**

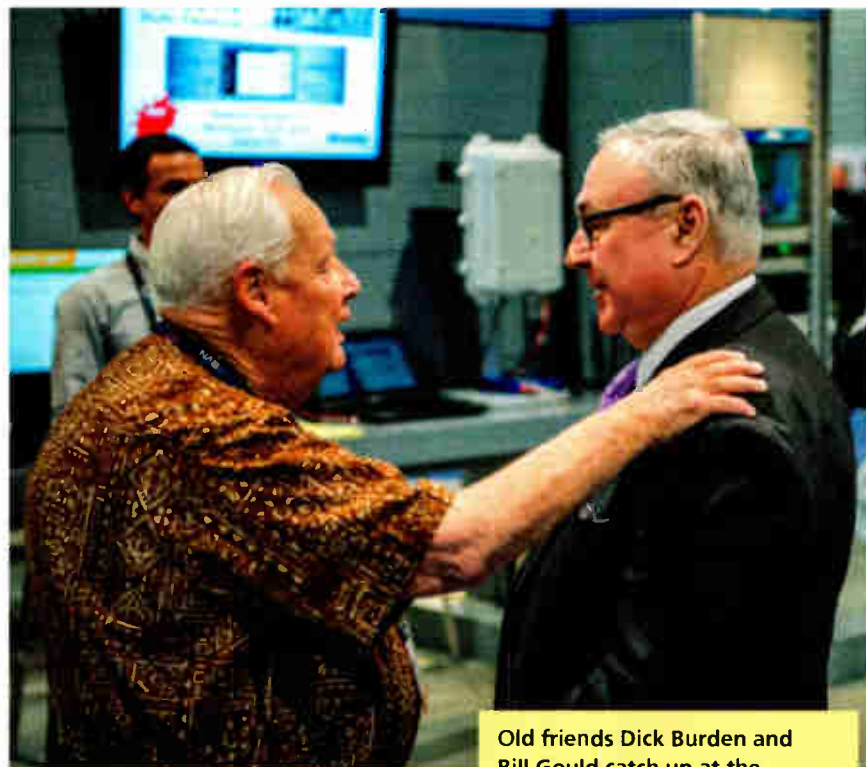
Intro: Paradiso is an AoIP Commentator's unit for Dante/AES67 networks, with facilities for three commentators. Each position has four talkback outputs and eight headphone monitoring inputs, plus local analog I/O, and can be powered using Power over Ethernet. Unique large e-paper displays for custom labelling make it look stunning. Also: Dark 1616M is a high-quality audio interface providing connections to a Dante or AES67 IP network. It has 16 analog inputs and outputs, with 16 digital outputs in parallel and 16 high-quality mic amps that can be remotely controlled from a computer via the Dark Controller app. Also: Vita + is a desktop version of the Vita Belt Pack and provides access to two channels of audio to and from the Dante IP network. It can be powered by PoE or external DC supply. Also: Divine is a 1RU audio monitoring unit with access to 64 channels of Dante IP audio network. It has built-in speakers, headphone outputs and line outputs.

Gorman Redlich Mfg. Co.**C1339**

Established Products: EAS equipment, CAP converter, digital antenna monitor, NOAA weather radio

Harman**C146**

Intro: Studer DIOS is the first I/O routing automation



Old friends Dick Burden and Bill Gould catch up at the Moseley booth.

Jim Peck

software designed for broadcasters. With automatic routing and expanded redundancy options, DIOS ensures you stay on the air when the unexpected occurs. This innovative solution identifies all potential I/O pathways, seamlessly reroutes data, recognizes and restores previous configurations and so much more. Also: Studer Glacier Series is a

customizable broadcast audio solution that provides comprehensive control, flexibility and interoperability for any on-air application. Two streamlined modules make operation faster and easier, and the multi-touch graphical user interface allows users to

ADAPT! with StudioHub+

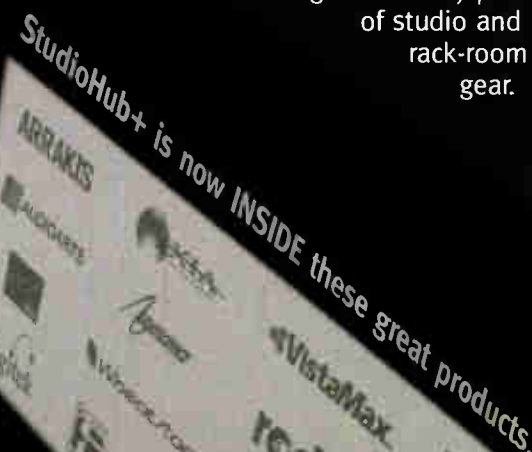
Your new console or IP router now comes with native StudioHub+ connectivity – making it easy to use the full range of StudioHub+ products.

Use **ADAPTERS** and powered peripherals like **MATCHJACK** format converters and **HEADPHONE** amps to connect seamlessly with CAT-5 pre-made **PATCH CABLES**. Plug-and-play all your analog or digital gear to every piece of studio and rack-room gear.



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Consumer demand and the speed of innovation is giving rise to many new opportunities for broadcasters. Our agile team is scaled up to meet customer demand, making us highly responsive; improvements and customisation are made without delay.

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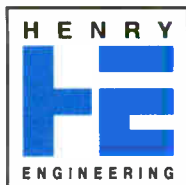
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customize controls to suit their needs. Also: Studer Micro Series; Studer Vista 1 Black Edition. Also: Studer JBL 7 Series reference monitors deliver extraordinary output, stunning detail and greater accuracy for broadcast production applications. Now available in powered and passive models, the modular 7 Series can fit any size room and accommodate any number of channels.

HD Radio/DTS N7820, Wynn Parlor K



Henry Engineering N7608

Intro: Systems Alert Monitor ("SAM") is a versatile "watchdog" that monitors the systems of a typical broadcast facility. SAM provides an instant visual, audible and email indication if anything goes wrong or needs attention. When a fault is detected, SAM generates an "Alert" text messages that is displayed on a video monitor.

Mike Alert is a control interface for use with Yellowtec "m!ka" mic arms that utilize a two-color red/white integrated tally light system. Each unit can control two mic arms.

Established Products: USB Matchbox, AES Digital DA, AES DigiSwitch, Matchbox, Superelay II,

SixMix, MultiPhones, MiniPod
Mr. Hank Landsberg, President
P.O. Box 3796
Seal Beach, CA 90740 / United States
562-493-3589
Email: henryeng@aol.com
Web: www.henryeng.com

IABM N4124

IEEE Broadcast Technology Society NL2

Independent Audio Inc C3036

Intro: Thermionic Culture Swift — Tube EQ



Inovonics Inc. N8029

Intro: AARON 655 FM/HD Rebroadcast Receiver — Designed for rebroadcast translators, this sensitive FM/HD SDR-based accepts FM & HD1-8 program sources for rebroadcast, as well as analog, AES digital and streaming inputs with fallback-priority selection. IP connectivity with a web interface permits total remote control of the unit from any PC or mobile device, along with

remote monitoring.

NOVIA 262 Stereo Processor — Powerful DSP-based three-band processor for FM and audio production. Intuitive, menu-driven setup, along with IP interface for remote Web access. Factory and user-defined processing presets streamline the setup process. IP connectivity provides local and email alarms, support for SNMP. Accepts both program line and streaming inputs. Remote IP monitoring.

NOVIA 272 FM Stereo Processor — DSP-based three-band processor with stereo-gen and RDS. Intuitive, menu-driven setup, with IP interface for remote Web access. Built-in RDS; compatible with all automation. IP connectivity provides local and email alarms, support for SNMP. Accepts both program line and streaming inputs. Remote IP monitoring. Analog, AES digital, streaming in; MPX/streaming out.

NOVIA 236 AM Audio Processor — Powerful DSP-based three-band processor for mono AM. Analog, AES digital, streaming in/out. Intuitive, menu-driven setup, along with IP interface for remote web access. Multiple factory- and user-defined processing presets streamline the setup process. IP connectivity provides local and email alarms, as well as, support for SNMP. Remote IP monitoring.

INOMini 662 DAB+ SiteStreamer — The new web-enabled 662 DAB+ SiteStreamer provides remote audio monitoring via the internet. The new 662 lets you monitor up to six sources of

DAB+ programming from a remote site over the Internet. You can tune in, switch modes, listen remotely via streamed audio and receive email or text alarms.

Established Products: AARON 655 FM/HD Rebroadcast Receiver, NOVIA 262 Stereo Processor, NOVIA 272 FM Stereo Processor, NOVIA 236 AM Audio Processor, 662 DAB+ SiteStreamer, JUSTIN 808 FM/HD Time Alignment Processor, 719 DAVID IV FM Processor, AARON 650 FM Rebroadcast Receiver, 730 RDS Encoder, 531N FM Modulation Analyzer, 525N AM Modulation Analyzer, 610 Internet Monitor

Mr. Gary Luhrman, Sales & Marketing Manager
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Felton, CA 95018 / United States
831-458-0552
800-733-0552

Email: sales@inovonicsbroadcast.com
Web: www.inovonicsbroadcast.com

Jampro Antennas Inc. C1913

Established Products: Broadband antenna systems, combiners, filters

JK Audio C6706

Established Products: RemoteMix series field mixers, AutoHybrid IP2, BluePack, Broadcast Host, Innkeeper 1/2/4 digital hybrids, Innkeeper PBX, Universal Host, Concierge 2x6 Switch Core, Guest modules, BlueDrivers, CompPack



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1x FM station on AM tower
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4x1kW FM combiner



4x FM or 5x FM stations
Isocoil ISO-100-FM-78EIA

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ON THE AIR

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Eventide Broadcast Delays are designed to keep profanity off your air, and angry listeners, embarrassed advertisers, and the FCC off your back. We invented the obscenity delay and have a solution for stations large and small that provides up to 80 seconds of the highest quality revenue and license-protecting delay.

Our new HD compatible BD600, 24-bit delay, comes standard with AES/EBU, and provides up to 80 seconds of memory — twice as much as other delays. There are fully adjustable Delay and Dump functions, and a Sneeze function which “edits” audio entering the delay, allowing the host to sneeze, cough, or make a short comment without being heard on air.

The BD600 offers two different methods of delay buildup and

reduction: Eventide's catch-up and catch-down system, and an exclusive fast-entry-and-exit feature which allows starting a broadcast with the delay already built up to a safe amount and ending it with a rapid reduction of delay.

For HD, the BD600 offers MicroPrecision Delay™ mode which allows up to 10 seconds of delay to be adjusted in real time in 100 nanosecond increments. This is useful for synchronizing analog and digital signals while on-air, without audible artifacts, to maintain a seamless user experience.

Whatever your size, whatever your format, you can't expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

Eventide®

HD COMPATIBLE

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See us at NAB Booth N6833
World Radio History

JLCooper Electronics **N3821**
Intro: Eclipse MXL2 eight-fader controller/expander with hi-res RGB LCD buttons and rotary encoders

Junger Audio GmbH **N4831**

Kathrein **C1446**

Kintronic Labs **N8720**
Intro: AM Synchronous Booster Demonstration — Kintronic Labs will have in our booth an audio simulation of the carrier beats that result in the overlap region of two or three co-channel stations with adjustable carrier frequency deviations and with adjustable desired/undesired ratios and to

demonstrate the elimination of carrier beats when the three sources are synchronized. Also: Model ISO-100-FM isocoil rated for a maximum of 3 kW FM transmitter power with an insertion loss of 0.4 dB for install at the base of AM base insulated towers with a maximum of 20kV peak voltage. Also: Titus II AM/FM/Shortwave DSP Receiver manufactured by PantronX is a digital software-defined AM/FM/HF analog/DRM receiver utilizing an Android tablet platform.

Lawo AG **N1424**
Intro: sapphire compact is the perfect mixer for modern radio studios. Innovative features like hands-free automix ease complicated talk shows;

one-touch AutoGain mic calibration sets gain in seconds while talent talks. Expandable 1RU mixing engine handles any signal found in today's digital plants and offers AoIP networking with full AES67-compliance. Also: Virtualize your studio with R3LAY VRX, the multitouch virtual radio mixer that runs on the same PC as your playout system and other audio software. Portable, too: install R3LAY on a multi-touch laptop and pair with Lawo OnAir 4 audio interface for a remote kit that fits in a backpack. Also: VisTool 5.0 is the latest major upgrade to Lawo's powerful screen building application software.

LineQ (Barix) **C1139**
Intro: Barix Redundix bolsters IP audio stream



Andrea Zambrano and Shannon Piagentini show off a Nicom 8-foot grid antenna for 950 MHz use.

integrity between points, such as STL applications, by overcoming network packet loss that impairs audio. Redundix's temporal redundancy sends two streams with a delay, correcting errors from the delayed stream, while path redundancy over two independent networks allows stream repair from the second link.

Link Electronics **N5613**

Logitek Electronic Systems **C1322**
Intro: To be introduced at the show.
Established Products: AoIP routing platforms and consoles; virtual consoles

Magnum Towers Inc. **C1118**

Marantz Professional **SL8530**
Established Products: PMD561 handheld recorder, PMD661MK3 handheld recorder, PMD-526C media player, ZP-1 microphone zeppelin, AudioScope SG-9P shotgun mic, AudioScope SG-17P shotgun mic

Marketron Broadcast Solutions, Inc. **Encore Salon E, Encore Salon F**

Moseley Associates Inc. **N7106**
Intro: Moseley Starlink, the world leader in digital microwave STL, now features a 5 W power output for those more difficult STL shots. Moseley is the world's largest manufacturer of digital studio-transmitter links for radio and television program transport. Moseley audio contribution/distribution (STL/TSL) microwave links operate in all worldwide STL bands and Moseley IP and T1/E¹ links support terrestrial transmission. Moseley has more than 15,000 microwave systems in service in over 120 countries.

MusicMaster **N7124**

AVOID INTERFERENCE



P-Cube offers a complete line of FM bandpass filters tunable across the entire FM band. These filters are available in both three-section and four-section models, from 500W up to, and including, 25kW.

The four-section models feature non-adjacent coupling for enhanced rejection and improved insertion loss - an ideal choice when closely-spaced interference signals are present. Both models are well suited for the construction of multi-station facilities that combine several units into a single antenna.

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FM BANDPASS FILTERS
PCUBE Inc



Hans Van Zutphen of the Telos Alliance, right, shares a laugh with Paul Shulins of Greater Media.

Myat Inc. C1919
Established Products: Rigid coax transmission line, coax switches, bandpass filters, multistation combiners, switchless combiners, N+1 switch matrix, patch panels, couplers.

Myers N3013
Intro: The newest ProTrack broadcast management software release provides enhanced interoperability, enabling users to interact with their data when, where and how they need to. Built on the next-generation HTML5 technology platform, the new A/R

module and sales environment provide the necessary visibility to capitalize on additional revenue opportunities.

National Association of Tower Erectors C3239
Nautel N8324
Intro: The NX Series is the proven choice for AM/MW transmission with over 20,000 kW of power installed worldwide. Now available with 3 kW, 5 kW,

10 kW and 15 kW outputs and the same powerful Advanced User Interface, built-in instrumentation and unmatched linearity that NX customers have come to expect. Also: Nautel's GV Series offers today's highest IBOC power, efficiency, HD spectrum/efficiency optimizer, HD PowerBoostGen4 (patented hybrid crest reduction) and first for MER instrumentation; asymmetrical sidebands; HD Reliable Transport. Nautel continues to extend HD technology by developing the HD multiplex concept for up to 15 HD channels on one FM frequency. Also: Even more Award-Winning Control for Nautel Transmitters — Over 7,000 transmitters have shipped supporting Nautel's award-winning Advanced User Interface, a common, easy-to-use interface across all AM/FM transmitters. This innovative built-in, commercial-grade instrumentation with metering and diagnostics, gives full monitoring and control via touchscreen and/or optional web access, helping broadcast engineers save trips, time and money.

securely outside the station's premises. By offering safe access to outside entities, the station can exchange with its affiliates.

MEDIA ASSIST, New Monitoring Tool for Media Assets — New monitoring tool provides radio staff with a single, easy-to-use interface for managing and optimizing multisite workflows. Staff can monitor priority levels on all launched processes to help minimize their impact on bandwidth, while facilitating content delivery within the group and increasing time-to-air ratios.

Established Products: NETIA RADIO ASSIST Automation and Playout Software
Mr. Joey Martin, Head of Operations
North America
377 chemin de farjou
Claret, 34270 / France
888-207-2480
Email: sales@netia.com
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Neutrik USA, Inc. C9515

NewBay Media/Radio World C6748
Featured: Multichannel marketing solutions and information to communities encompassing over 5 million professionals and nearly 8 million enthusiasts centered around three large technology-driven interrelated markets: radio/television and video, entertainment/educational technology and music.

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Lynx Studio Technology - Designed and Manufactured in the USA since 1998.



NewBay's platform provides its communities with award-winning content, trusted brands and high-profile network-building, informative events. Over 4,000 clients hire NewBay to connect them to its audience of key decision makers and influencers.

NextRadio App N5113

NicomUSA Inc. N7227

NPR Satellite Services SU6507

Octopus Newroom s.r.o. SL11021

Intro: Octopus 8 newsroom computer system for use by television and radio broadcasters. Our

software solution facilitates editorial collaboration between news team members at every stage of the newscast production process.

OMB Sistemas Electronicos N7729

Omnia Audio N7724

Intro: Omnia.7 FM Processor — Premium features. Spectacular performance. Surprisingly low price. Undo Technology re-creates peaks lost in poorly mastered tracks. Psychoacoustic-controlled distortion masking clipper removes virtually all distortion detectable by the human ear. Omnia Toolbox with built-in oscilloscopes, RTAs and FFTs. Available with HD, streaming pro-

cessing/encoding, RDS options. Also: Z/IPStream R/2 multichannel streaming encoder is ideal for high-density processing and encoding applications. It combines the simplicity and reliability of a dedicated hardware appliance with up to eight channels of either three-band Omnia processing or full Omnia.9 processing with adaptive stream encoding in a 1RU chassis. Also: With G-Force, Omnia.11's dynamics processing framework has been redesigned, enabling it to set the overall EQ for signature consistency, creating cleaner, clearer, louder and more pleasing sound. Also: Omnia.9sg final stage processor and stereo generator; Omnia X2 & 9X/2 broadcast streaming software.

Omnirax Furniture Co.

N7817

Intro: Contour Series — Ergonomically superior height-adjustable studio desk is available in three sizes, multiple configurations and a choice of finishes. Also: Our innovative ergonomic WeDesk design for private and open plan office furniture, provides more usable desk surface, for more people, in less space - while promoting collaboration in the workplace.



OMT Technologies Inc.

N8410

Intro: OMT iMediaTraffic is a flexible solution designed for local and national radio stations. All your advertising scheduling needs are supported, including advertising grid creation, client and campaign management, automatic spot insertion, synchronization across multiple stations, automatic filling, channel management, reconciliation, billing and data exporting.

OMT iMediaSales — Booking, revenue management and billing are critical business operations. OMT iMediaSales offers a solution that drives efficiency and enables new revenue streams. Fully-integrated with iMediaTraffic, iMediaSales streamlines booking and billing operations by providing real-time online, tailor-made customer relationship management and a wide range of planning, management, billing and reporting options.

OMT iMediaTouch Enterprise is a proven and advanced automation solution for small and large radio broadcasters. A unique and customizable user interface enables multiple users and preferences. Full on-air automation, production, log tools, voice tracking, remote voice tracking, iMediaPortal and iMediaImport are successfully deployed in a wide range of station environments.

OMT iMediaLogger 5 — Proven, flexible, powerful, with client installations of all sizes and formats. iMediaLogger can be employed anywhere, since it seamlessly integrates with OMT iMediaTouch as well as all other automation systems. iMediaLogger works easily and efficiently with tuner cards, switchers, satellite receivers, external closure devices and silence alarms.

OMT iMedia PixPlus is based on OMT's large-station solution, iMediaTouch Enterprise, with features and a price point better suited to small stations. iMediaTouch PixPlus is OMT's "All-in-One" automation solution for LPFM, single-station environments, educational institutions and internet broadcasters.

Established Products: iMediaTouch Automation, iMediaTraffic, iMediaSales, iMediaLogger

Mr. Gary Kristiansen, Sales Manager

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Onair Medya Ltd.

C6636

Intro: FTC1K model 1 kW FM compact transmitter has DDS modulator, perfect audio and stereo quality.

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We have
what you
need

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The FCC CAP rules took effect in 2012, and more radio stations chose the Sage Digital ENDEC 3644 than any other for CAP compliance. Building a new station? Ready to upgrade? LPFM? We have what you need.

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World Radio History

No need to adjust RDS. Built-in RDS encoder programmable from front-panel LCD and keys. The latest generation, rugged against reflected power, powerful and high-gain LDMOS transistors. Also: FT4K model 4 kW FM transmitter has DDS type digital exciter, remote control with Ethernet or GSM modem optional, can save 100 event logs monitored on LCD or remotely via internet. Has SMS and email warning in case of breakdown. GPIO switch, automatic start of the air conditioner when the room temperature or humidity reaches the limit.

Orban Labs Inc. N3203

Intro: Optimod-FM 8700i processor features versatile five-band processing for both analog and digital FM and is packed with new features including AES67 AoIP and Orban's patented Xponential Loudness designed to decrease listener fatigue and increase time spent listening. Orban's 8700i provides the industry's most consistent sound, track-to-track and source-to-source. Also: Orban's 8600i combines all of the Orban 8600 FM and HD features in a single 3RU unit. The exclusive MX FM limiters produce lowest distortion, dramatic transient impact and up to 3 dB more high-frequency energy allowing you to create a unique sonic signature for your station. Also: The upgraded 5700i combines the features of the Orban 5700 and 8500s into one cost-effective package.

Orbital Media Networks N7917

Paravel Systems N7918

Playlist Software Solutions N8628

Intro: Playlist Automation Suite — Easy, productive and reliable. A complete system for radio stations. Also: Logger 2.0 — Log multiple radio stations 24/7. Access, aircheck and listen anytime, anywhere.

Propagation Systems Inc. (PSI) C1637

PTEK N7216

R.V.R Elettronica S.p.A N7809

Intro: PJ6000U-K is a 6 kW high-efficiency LD-MOSFET compact power amplifier. Ideal as stand-alone amplifier or as element for single-rack high-power transmitters (20 kW, 30 kW, 40 kW in single rack). Better than 70 percent across the bandwidth. Compliance with CCIR, ETSI and FC standards.

Radio Design Labs C3027

RadioDNS N8417

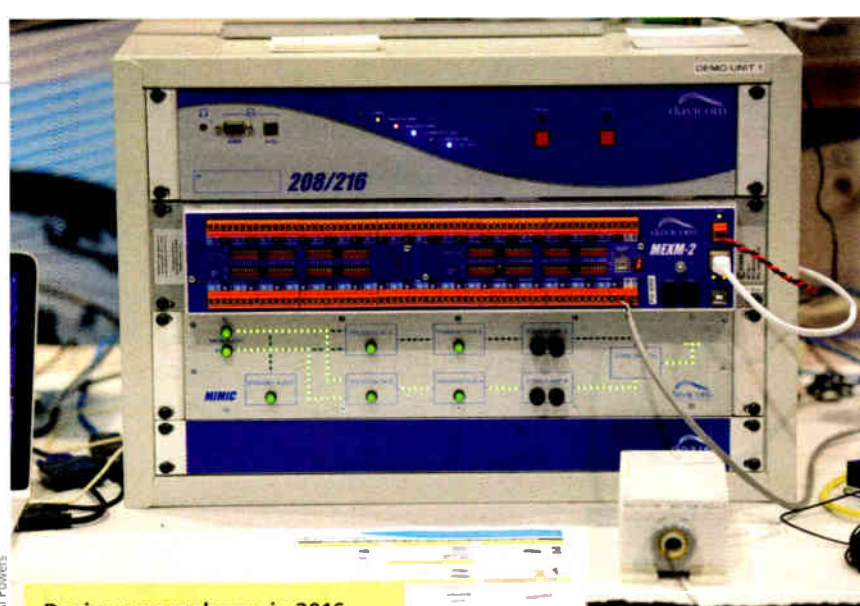
Established Products: Hybrid radio — open standards and demonstrations

Radio Frequency Systems C2022

RadioTraffic.com N7607

Radio World C6748

Featured: Radio World NewsBytes newsletter is now easier to read than ever on mobile and tablets thanks to the our new responsive design format. Also: Radio World eBooks are a smash success, now approaching the 30th edition. Recent topics include visual radio; HD Radio's case for ROI; radio in developing countries; and monitoring essentials. Find the entire library online at radioworld.com/ebooks.



Al Powers

Davicom gear shown in 2016.



RCS N2519

Intro: Zetta2GO gives users control of Zetta automation/payout from an Internet browser. From a tablet or smartphone users can view and fire off Hot Keys for a station. Perfect for remote broadcasts.

Selector2GO works on all of today's contemporary browsers and across platforms and mobile devices. Selector2GO provides powerful core scheduling and editing, plus essential analysis of your rotations right in the palm of your hand.

Aqira2GO, a browser-based application, helps optimize the selling and traffic activities of the staff. Part customer relationship manager, part sales proposal tool, Aqira2GO lets the account executives remotely access data for their clients.

Established Products: Zetta, GSelector, Aqira, RCSnews

Mr. Neal Perchuk, VP Sales
445 Hamilton Ave.

White Plains, NY 10601 / United States
914-428-4600

Email: sales@rcsworks.com
Web: rcsworks.com

Renegade Labs C3244

Established Products: BlueI328 digital audio mixer is a small but powerful digital audio mixer to address the audio needs of video/audio professionals.

Rohde & Schwarz Inc. SL1205

Established Products: R&S THR9 liquid-cooled FM transmitter family

RTS Intercom Systems C5409

RTW N7220

Intro: TM3 rackmount solution for TM3 and TM3-Primus series of products enables the user to integrate up to two devices in one carrier. The TM3-Pri-2U mounting solution is designed for the

TM3-Primus, while the TM3-2U mount is designed for the TM3 series, including the TM3, TM3S, TM3-3G and TM3-3GS.

RUSHWORKS SL12713

RVR Elettronica/Broadcast Depot N7809

Sabre Towers & Poles N8516

SCISYS Deutschland GmbH N7731

Established Products: dira! On-air player, dira! Scotty, dira! Discovery, dira! Highlander, dira! Scheduler, dira! Startrack, dira! Cartplayer

Sennheiser Electronic Corp. C2213

Shattuc Cord Specialties Inc. C12031

Intro: Data-X Tactical Cat-6A — Heavy-duty indoor/outdoor Cat-6A data cable.

Shively Labs N8420

Shure Inc. C2218

Sierra Automated Systems & Eng. Corp. N8328

Sonifex Ltd. C2839

SoundExchange N6032

Staco Energy Products Company N7518

Stainless C1111

Stirlitz Media SU6224

Intro: SML5 Stirlitz Media Logger — The fastest after-broadcast logging software with IP (HLS/UDP) or card-based capture, multiscreen viewer and a user-friendly HTML5 web player. Record up to 50 TV or radio stations, together with subtitles and meta-data, on a single generic 12-core server.

Stream Labs SL9408

Switchcraft Inc. C7838

S.W.R. Inc. C1126

Tascam SL6305

TBC Consoles C9015

Intro: Double-Sided IntelliTrac — Showcasing the versatility of our IntelliTrac console, this back-to-

back console is configured for four operators and large screen displays. Low-profile rack turrets are included to allow for the best sightlines. Also: SmartTrac v2.1 with new accessories and finish options — shows the basic versions of our most popular and customizable SmartTrac consoles, with optional producer table and new accessories, including an undercounter MacPro holder. Complete cable management spans the rear of the console. Also: SmartTrac Radio Console is another version of our SmartTrac table that is customized for the radio space. This is a sit-stand model with a spot available for talent to sit across from the operator and wrap-around carts for rack-mounted equipment or table-top turrets. Also: ControlTrac LT is similar to our IntelliTrac console but at a lower price point. This model features a new urethane edge treatment and metal turrets for rack-mounted equipment.

Tektronix Inc. SU5006

Telos Systems N7724

Intro: Z/IP Stream R/2 Multichannel Streaming Encoder is ideal for high-density processing and encoding applications. It combines the simplicity and reliability of a dedicated hardware appliance with up to eight channels of either three-band Omnia processing or full Omnia.9 processing with adaptive stream encoding in a 1RU chassis. Also: VX Prime VoIP Talkshow System — If you want the performance of Telos VX but don't need that much phone system, VX Prime is the answer. This powerful broadcast phone solution is economical enough for stations with two to three studios, while offering incredible operational power, adaptable workflows and superior audio quality. Also: HX6 six-line talkshow system; HX1 & HX2 Digital Phone Hybrids.

Thermo Bond Buildings N7818

Tieline Technology N7425

Intro: VIA Remote Audio Codec sets a new standard in remote broadcasting. Connect using dual Ethernet LAN ports, or two USB modems, or use built-in Wi-Fi and stream using a cell-phone Wi-Fi hotspot, or connect to hotels and other public Wi-Fi access points. Optional POTS or ISDN modules. Also: Genie Distribution Audio Codec delivers multipoint audio distribution solutions including six channels point-to-point, 3x bidirectional stereo or 6x bidirectional mono, multicasting and multi-unicasting. Supports six simultaneous SIP connections. Optional ISDN and POTS modules, dual Gigabit LAN ports, dual internal power supplies, IPv4/v6, 24-bit 96 kHz sampling, plus SmartStream PLUS redundant streaming. Also: Save on hardware costs with Merlin Plus audio codec. Create two bidirectional mono or stereo remotes, each with separate bidirectional IFB channels, or create six independent bidirectional mono connections with IP codecs or smartphones using Report-IT. Supports six simultaneous SIP connections. Optional ISDN and POTS modules allow IP, ISDN and POTS remotes. Also: Genie STL audio codec; Report-IT Enterprise.

TWR Lighting Inc. C1839

Established Products: L550-864/865 dual LED obstruction lighting system with integrated monitoring

V-Soft Communications

N5106

Intro: Probe 4 propagation analysis for Windows produces stunning, atlas-like, coverage and interference maps for TV and FM. Integrates high-resolution terrain and population databases with state-of-the-art polygon-mapping. Uses FCC, ITU-R, Okamura/Hata/Davison, Cost 231/Hata, PTP and Longley-Rice routines. Plots radio terrain profiles and Fresnel zones for point-to-point analysis. Also: FMCommander FM allocation and mapping software provides essential allocations data and mapping to move or upgrade an FM station, translator, booster or LPFM station and to expertly design directional antenna patterns. Incorporates, atlas-like, polygon mapping for coverage and interference analysis. Accesses the complete FCC FM, AM, census, terrain, towers and airports databases. Also: AM-Pro 2 AM allocation and mapping software calculates and plots standard and grid-based AM coverage and interference contours and areas based on the FCC AM rules. AM-Pro 2 performs AM ground-wave and automated sky-wave RSS allocation studies and it creates detailed allocation maps with polygon shaping. AM-Pro is used daily by FCC engineers and consultants. Also: Microwave-Pro-2 adds bidirectional channel analysis and polygon mapping. Microwave-Pro produces PCN mailing lists for notification to other microwave users.

Vertical Bridge

Wynn Salon Conference - B

VoicelInteraction

SU9921

Intro: MMS BE is an automatic system for broadcast monitoring, 24x7 legal and compliance recording, rating and loudness analysis, advertisement watching, real-time content segmentation and metadata extraction.

Waves Audio Ltd.

C4746

Wedel Software

N6224

Wheatstone Corp.

N6531

Intro: Newly designed AES67 compatible digital audio network system with integrated digital audio control surface. Also: New digital audio signal processing technology — innovative processing technology for live on-air broadcast audio. Also: At-home remote mixing and production system — live at-home control and production mixing of remote location audio without the expense of a full-fledged remote truck full of gear and personnel. Also: Customizable graphical user software interface — easy-to-use, customizable (drag and drop) GUI control and monitoring of extended audio network systems.

Established Products: Digital audio consoles and control surfaces, analog audio consoles, networked audio systems, audio over IP, digital audio editing hardware and software, signal processing, software control and monitoring packages.

Whirlwind

C5649

WhisperRoom Inc.

SL11113

Intro: ADA Package includes all components needed to meet the Americans with Disabilities Act: 32-inch-wide door opening, a 1:12 ratio ramp, door handle operable with closed fist, raised floor, "no threshold" door design. Available in both our single-wall and

double-wall versions. Must be specified at initial order. Also: Acoustic Tuning Package provides a flexible and cost-effective solution to create the desired interior acoustical environment. Angled deflector panels coupled with LENRD bass traps eliminate "standing waves" and create a pure, robust sound inside the WhisperRoom.

WideOrbit

N3831

Established Products: WO Traffic ad sales and operations software, WO Automation for Radio station automation solution, WO Streaming digital audio platform, WO On Demand podcast management and monetization platform, WO Programmatic Radio advertising marketplace, WO Media Sales advertising proposal software

Will-Burt Company, The

C1505

WinMedia
radio & tv software suite

WinMedia

N8111

Intro: WinMedia TV is a full-featured TV solution that manages TV and digital content production — all within a single system. MAM-based, it covers every aspect of content creation — from ingest through automated playout, archives, multiplatform delivery and interactions with social media sites.

WinMedia Radio covers the entire news and music production chain and facilitates fast content delivery to multiple devices. MAM-based, WinMedia Radio streamlines every aspect of the digital production chain helping radio stations leverage their programming efforts and increase productivity.

WinPublish is a new cost-effective module that streamlines publishing on multiple platforms and provides a complete suite for the creation and playout of high-quality graphics. WinPublish also adds an amazing new interactive dimension to TV and radio programs by expertly managing social media content.

WinBizz optimizes business management and real-time online ad booking as well as TV and radio sales. Fully integrated with WinMedia TV and WinMedia Radio, this solution allows users to increase productivity and facilitates ad workflow organization while providing



Jim Peck

broadcasters with tailor-made customer relationship management.

WM Web is a complete solution for broadcasters looking to extend their potential reach to the Internet and to every phone. Including a customizable web template and a mobile application, WM Web let your listeners bring the station with them wherever they go.

Established Products: WM Playout, WM Bizz, WM Traffic, WM News, WM Logger, WM Publish

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+33-494-101-102
Email: arthur@winmedia.org
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Wohler Technologies Inc.

N3417

WorldCast Systems Inc.

N8924

Intro: Simple to use, the WorldCast Manager Server is a powerful network monitoring solution that displays the real-time status of SNMP-enabled devices from any manufacturer. You can also view detailed logs of events and recorded measurements from the field. Comprehensive alarm management provides alarms via SMS or email. Also: Solar FM,

designed for areas with limited electrical infrastructure. The hybrid-powered Solar FM retransmitter can broadcast up to 10 hours a day covering 10 km on solar power alone. Capable of receiving audio from FM, satellite, analog and/or AES inputs, the system comes complete with antennas and a dedicated smartphone application for control. Also: A significant update to compact Egreso FM transmitters features a new digital multi-band sound processor. The new integrated processor adds no additional hardware providing a reliable solution with very clean sound. The compact FM transmitters offer powerful, multiband processing with exceptional quality. Existing Egreso FM transmitters can be upgraded remotely. Also: Burk Interface for Audemat Control.

Yamaha Professional Audio

C1725

Yellowtec

N6924

Intro: Intellimix Two-Desktop Audio Mixer — Experience intelligent audio mixing with a compact footprint, expansive audio over IP features and feel the new G-Touch faders. Designed to fit into any pre/post or live production for both audio and video applications. Also: Combining the best technology of microphone preamps and Yellowtec's exclusive LEA technology, the PUC 2 LEA is designed for high quality consistent audio to be sent to a computer via USB or distributed via AES audio.

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Stations, It's Time to Reconnect

Take your listeners out of their cars and into your time machine

Who remembers the short-lived 1960s TV show, "Time Tunnel"? How about H.G. Wells' groundbreaking "The Time Machine"? Or the romantic novel "The Time Traveler's Wife"?

What does our medium have in common with all of these time-centric tales? Radio has the unique ability to take the listener to any time or place through the avenue of imagination.

It's an awesome capability, and I urge you to consider how you can utilize the past, the present and the future to stimulate interest and excitement about your format generally and your station specifically.

The jukebox music station is an unsustainable dead end. I have Spotify, Pandora and more than 1,000 songs on my phone, and I am not alone. Even talk and news stations that tend to stick to one time zone can benefit from a little time travel. Here's how.

THE FUTURE

Let's start with the future. Oh sure, there's tomorrow's weather — that's vital to everyone. But there are upcoming local events that we rarely even mention on-air. Along with sporting events and concerts, there are movie premieres in theatres and on streaming services. There are upcoming holidays that require pre-planning for proper

WayBack Machine

With millions of audio clips, The WayBack Machine takes listeners back through time. (Read license requirements prior to on-air use.)

participation. Or tell me how I can make money on the stock market tomorrow, and even if I never make a move, for a few minutes, I will at least dream of what I'm going to do with that all money.

People enjoy hearing about the future because it holds the promise of new possibilities or the answers to our most soul-searching questions. Whether it's social scientists predicting new technology trends, physicists debating the "Big Crunch" that will end the universe or religious folks anticipating the "End of Days," talk of the future is always exciting.

THE PAST

The past portrayed on radio makes people nostalgic; it's often bittersweet yet always emotionally vibrant.

Play me a sound bite from a major news event of the day, and in 10 sec-

onds, you can take me back 10 years. Interview people who were eyewitnesses to local or national events, and I am captivated by their first-hand tales. You'll not only connect me with my younger self, you will also make me analyze how I feel about that specific memory today.

Offer me a retrospective of a person, a place or even a thing during a certain era and I travel there with you. Remind me of the good times, but don't be afraid to give me sound from bitter times as well, because they make me part of something larger than myself.

THE PRESENT

Exhibiting the present on radio has become more challenging than ever, mainly because of overtasked voice-tracking DJs, who may be on two or three stations daily and are struggling just to introduce songs and make each

PROMO POWER



Mark Lapidus

hour time out properly.

However, living in the present means actually telling me what's going on in my community in as close to real-time as possible.

The present brings me local events in progress; developing news and crime stories; the beauty of a sunrise or sunset in action; the might of a storm blowing trees down in my neighborhood; a ninth-inning baseball game going into overtime; an animal loose from the zoo sighted on the run; an election in progress; or a kid at a nearby high school football game who just scored his third touchdown of the night. Ironically, finding this information is easier than ever thanks to social media and incoming text messages to your station. Verify, or qualify in some way; but do get the information out.

The concept of time travel is just one of the many ways to help you add some vibrancy to your broadcasts.

That mobile phone in your pocket can do a lot more than just take pictures. Go get some great sound from yesterday, today and tomorrow. Take your listeners out of their cars and into your time machine!

Comment on this or any story. Email radioworld@nbmedia.com.

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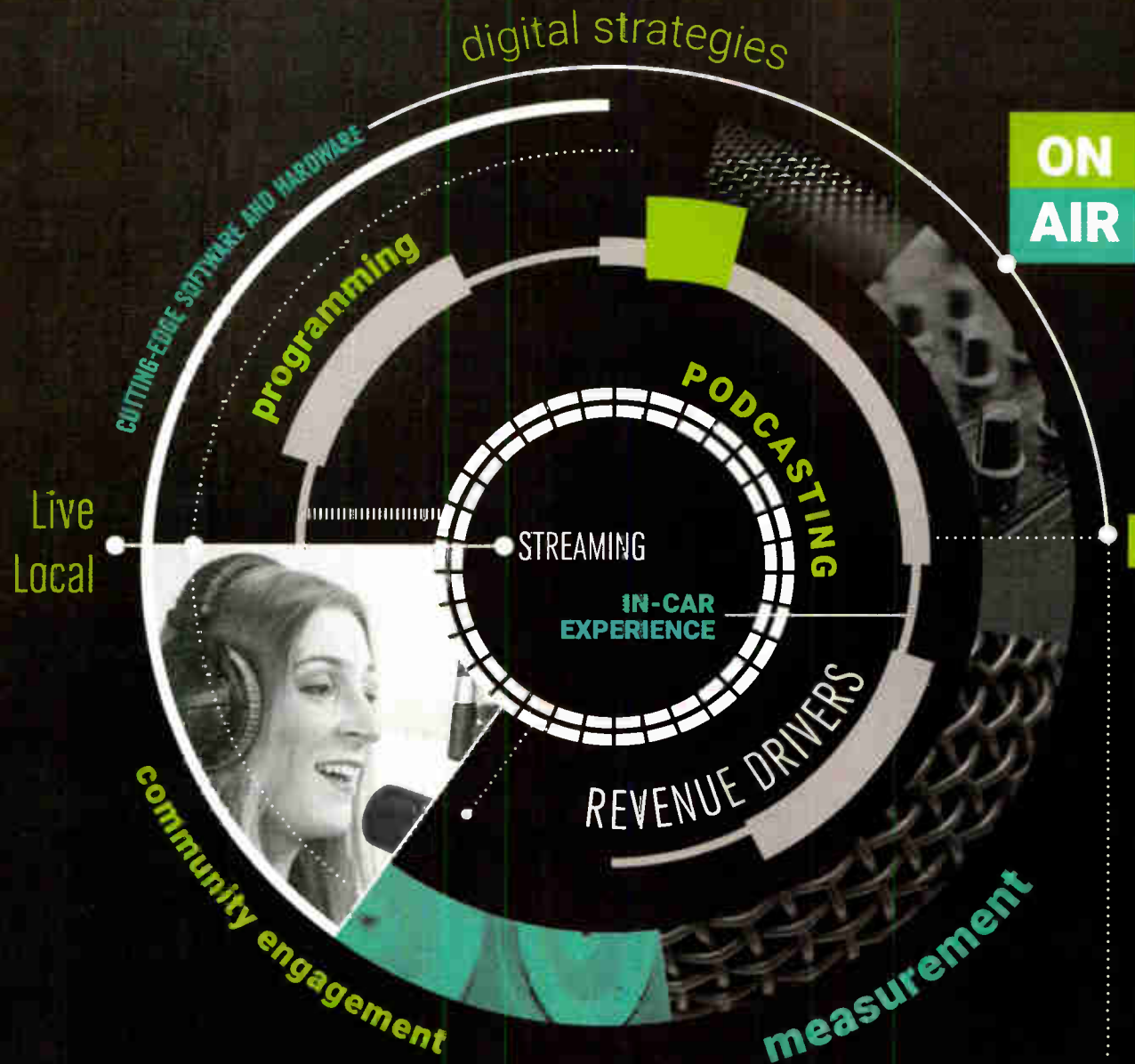
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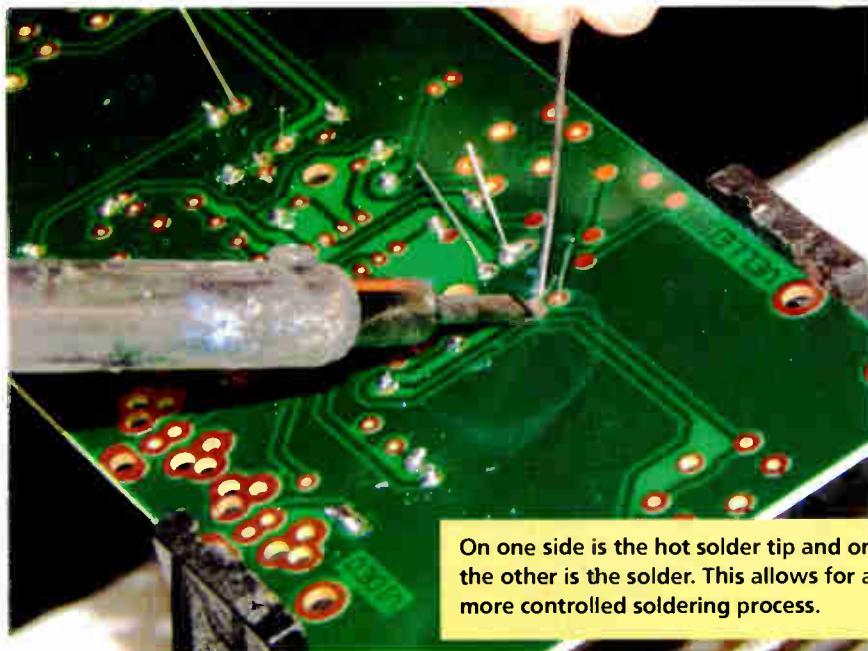
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LET'S THRIVE.

Soldering Tips for Beginners



Photos by Dawn Yengst and LuAnn Schaler

On one side is the hot solder tip and on the other is the solder. This allows for a more controlled soldering process.

Learning the basics is smart for any skill

BY CURT YENGST

Recently, I wrote about building a DIY headphone project (June 2, 2016, issue), and creating your own printed circuit boards (Dec. 16, 2016). Since these articles dealt with design and fabrication from a beginner's standpoint, it might be a good idea to cover the basics of soldering for electronics.

Most, if not all, engineers know how

to handle a soldering iron. But there are a few folks in the industry who want to know more about those wisps of smoke they sometimes see rising from our workbenches.

FIRST THINGS FIRST

First, you need the right tools for the job. As is often the case, the amount of money you spend can vary greatly. For years, I've been using a Radio

Shack soldering station that set me back all of \$25, and it's been very reliable. Someday, before I retire, I plan to splurge on a nice \$50-\$60 soldering iron from Weller. I've seen some units costing hundreds of dollars.

They all perform the same basic function: get hot enough to melt solder. The better units have some form of temperature control, either a rheostat or a simple two-position switch to determine wattage. On the other end of the scale is your basic soldering iron without the stand or temperature control, which some of us keep in our tool bag.

Next, choose a solder with the right alloy formulation and flux. The most common alloy is 60 percent tin and 40 percent other metals, like silver or antimony. Lead has been commonly used but is being phased out.

Flux is a reducing agent that prevents oxidization and improves the chemical bond between metals. Always use rosin flux solder for electronics, *never* acid flux. That's the kind plumbers use to join or "sweat" pieces of copper pipe. As the name implies, it contains an acid that etches the copper to ensure a good joint. Used on electronics, it can damage components and wear out the tip of your iron much faster.

Temperature settings are important when working with delicate components. Too much heat can damage some semiconductors. You want the iron hot

enough to get solder flowing properly over the joint, but if it starts melting everything around it, you'll want to back off on the heat.

Keep the tip clean and in good condition. This is vital. Some tips wear out faster than others, so keep a spare on hand. Most soldering stations have a spot for a damp sponge to wipe excess solder and other residue off the tip. I've seen engineers use a kitchen scour pad.

Eye protection when soldering is a must. Molten solder can splash, and flipping a drop into your eye is no way to spend a Saturday night!

Good ventilation is important, too. Remember, the metal alloy in solder can contain lead (especially older solder), and you don't want to inhale that smoke. A small fan on your bench is helpful. If a fan is not available, at least try not to park your face right above your work. Wash your hands after soldering, so any residue doesn't end up in your mouth or eyes.

Obviously, burn prevention is the rule. These tools reach about 600-800 degrees Fahrenheit. You definitely want to rest the iron somewhere safe. Soldering stations address this with a dedicated holder. Some irons come with a little folding rest to keep the heating element off the work surface. Personally, I'm not fond of these. A bump or a tug on the cord can send the iron rolling across the bench. Make sure the tip is on tight before you turn it on. I once had a loose tip fly off in the middle

(continued on page 50)

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SOLDERING

(continued from page 48)

of a job. Thankfully, that 800-degree piece of metal didn't land in my lap, but the burn mark in the rug was there to remind me for years!

HOT IRON

So now you've got your iron hot and your solder ready.

When working on a PCB, make sure the piece is planted firmly so it can't slide around while you're working. A Panavise or similar clamp is handy.

On the trace side of the board, the component leads will protrude through the holes in the traces. Place the tip of the iron at an angle with one side against the lead and the other against the trace. In just a few seconds everything will be hot enough to introduce the solder.

Place the tip of the solder wire on the opposite side of the lead from the tip of the iron. The solder should immediately flow around the joint.

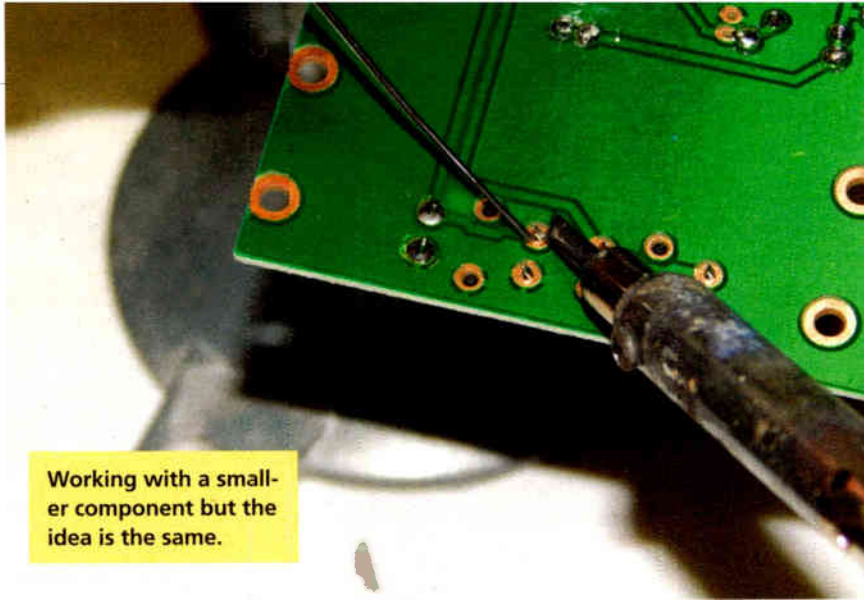
Quickly remove the solder wire. Too much can spread beyond that trace and cause short circuits, or "solder bridges" to other traces.

The finished joint should look like a nice, little shiny mound of solder. If the joint looks crystallized or cracked, or you can still see the hole, this is an incomplete, or "cold," joint. Apply the tip of the iron again for a few seconds to "reflow" the joint.

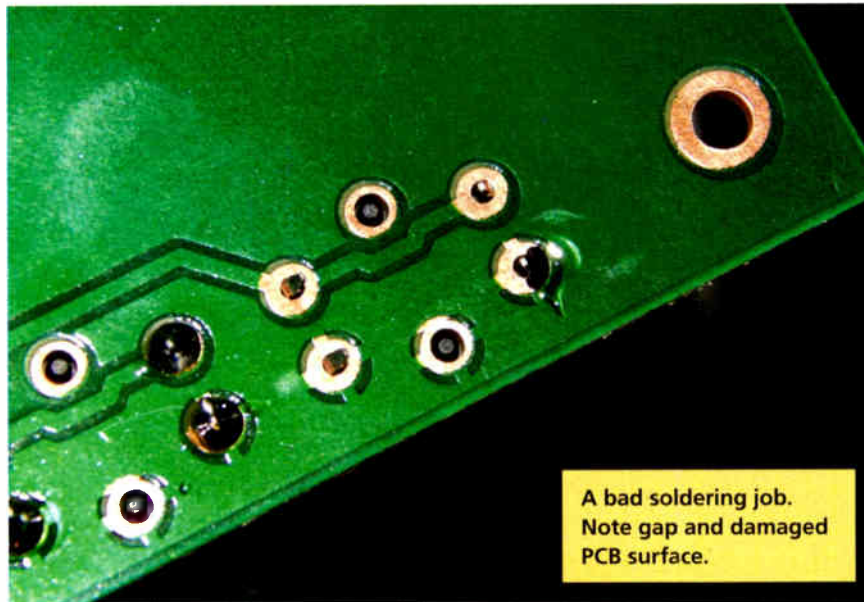
After the joint solidifies, clip off the excess wire as closely as possible. If you're working on IC pads or very tiny components, a finer tip might be necessary.

What about when you are working with connectors or panel-mounted parts?

There are usually solder lugs or pins provided. First, strip the end of the wire just enough to make the connection. An



Working with a smaller component but the idea is the same.



A bad soldering job. Note gap and damaged PCB surface.

eighth to a quarter of an inch is usually adequate. It helps, especially when working with stranded wire, to heat the exposed wire and apply a bit of solder. This "tinning" keeps the strands together and makes it easier to bend the wire around a lug or pin.

Putting a small bend in the end of the wire, place it in the lug. Then place the

iron tip against the lug, making contact with the wire as well, and introduce the solder. As with the PCB joint, the solder should flow evenly and solidify smoothly.

Be sure to apply heat just long enough to melt the solder, but not the insulation on the wire. On XLR or D-sub connectors, the contact pins usually feature

tiny cups on the soldering side. Before creating the joint, it helps to flow a bit of solder into each cup.

By the way, when working with in-line connectors, make sure to slide the connector's outer shell on the cable *before* you solder the connector. Many harsh words have been uttered over the years by engineers who smiled over a fine soldering job only to have to take it apart because they forgot this step!

Speaking of which, occasionally you'll have to remove soldered components. For this you'll need a desoldering suction tool or desoldering braid. The braid uses the wick effect to remove solder.

Heat the joint you wish to remove until the hardened solder melts, then place the end of the braid against the tip of the iron. The softened solder should wick out of the joint and into the braid. The suction tool works by using a spring loaded plunger to create a burst of vacuum pressure to suck the molten solder away.

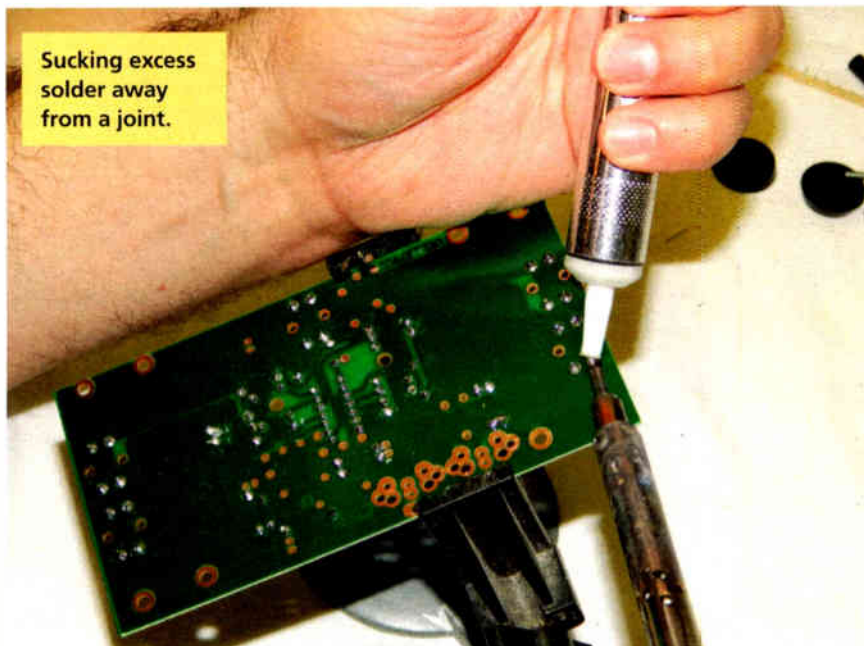
Sometimes, the old solder joint won't melt right away. If this happens, introduce some fresh solder as you apply heat. The flux in the fresh solder will help break down the old joint.

As with any skill, good soldering takes practice. If it's something you'd like to pick up, find an inexpensive iron and start by working on cable connectors. Once you get the hang of it, improve your skills on the connectors. When you're comfortable, find a small electronic kit with a PCB and try your hand at that.

With practice and experience, you'll find this a very useful skill to have. Happy soldering!

Share your own practical tips. Email radioworld@nbmedia.com.

Curt Yengst, CSRE, is assistant engineer for WAWZ(FM) and a regular contributor to Radio World.

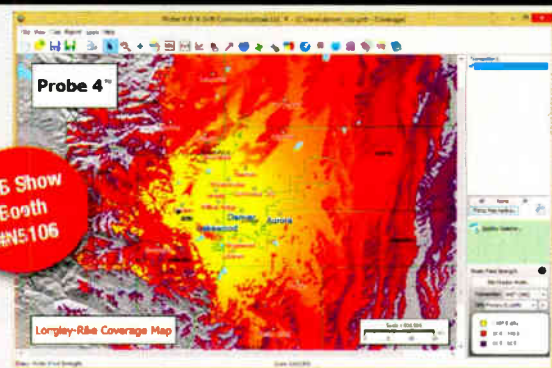


Sucking excess solder away from a joint.



Curt passes "mad soldering skillz" to son.

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some college football games that are on cassette tapes, approx 100 to 125 games, time period of entire collection os from the 1950's - 1970's, BO. Must purchase entire collection. Contact Ron, 925-284-5428 or ronwtamm@yahoo.com

WYBG 1050, Messina, NY, now off the air is selling: 8-channel Harris/Gates console; 250' tower w/building on 4 acres; collection of very old 78s dating back to 1904; 12' satellite dish on concrete base; prices drastically slashed. 315-287-1753 or 315-528-6040

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Equipment Wanted: obsolete, or out of service broad-

cast and recording gear, amplifiers, processing, radio or mixing consoles, microphones, etc. Large lots preferred. Pickup or shipping can be discussed. 443-854-0725 or ajkivi@gmail.com.

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 promo-

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tion 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.

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READER'S FORUM

TOWER

While we didn't have the catastrophic failures of the KLIZ tower ("Lessons of a Major Guy Line Project," March 1), WLIB (1190NJ) had several other types of guy problems and had to change all the Phillystran on our five-tower DA.

Fortunately, we had nondirectional towers, so lowering power and shifting tower feeds was the trick. Still, your heart is in your throat when they are doing each tower. Not as bad as a tower lift to replace a base insulator, but close.

Timothy Braddock, KD2MRW
Long Valley, N.J.

ROYALTIES

Responding to "BMI Asks Court to Maintain Most Recent Rate," reported in January at radioworld.com:

Why don't you tell it like it is with the organizations that have proliferated to obtain monies from radio and television in the US? BMI has petitioned the court to leave the rates as they have been, not disclosing that a lot of their star artists have fled to GMR. Therefore, we as radio and TV should pay less based upon the number or percentage of artists they represent having moved to GMR. And if artists flee ASCAP or SESAC, those organizations too should take a hit in what we pay, if we have to pay GMR more.

What is not being said is: There is only one pie, one amount that radio and TV should have to pay writers, and if there are four or 20 or 100

little "lemonade stands" (i.e. licensing rights organizations), we as an industry should not have to pay more and more and more, but split what we've been paying more ways. I can't stand the hypocrisy of the artists saying "we don't need radio," yet they certainly want their music played on radio, and they want the payments.

Stop beating around the bush and put it out there that the licensing organizations are demanding ever more from an industry that is showing little to no growth. They are trying to kill the goose that lays the golden eggs.

Rick Fritsch
KBZQ(FM)
Lawton, Okla.

VISUAL RADIO

After reading the article about visual radio in the March 1 issue, my first thought was that broadcasters like the late great Steve Cannon from WCCO radio wouldn't fit in this modern environment. Lash Larue and Ma Linger were something that he wanted to be entirely theater of the mind.

Scott Todd
Field Engineer
EMF Broadcasting
Cambridge, Minn.

LOCAL RADIO

I read the featured story, "We Are the Heartbeat of the Town" about the Giant 96 radio station (RW March 15). I found this story to be very interesting because this station sounds very similar to our stations. Ours

is a family business with my wife Loretta, our son Joseph (JR) and our 13-year-old grandson, who also works behind the board during local games.

Our AM station, KFUN, went on the air on Christmas day 1941, 18 days after the bombing of Pearl Harbor, which sent the US into World War II. Soon after that, the War & Censorship Department officials started going around the country ordering radio stations not to announce war news in a foreign language. Back then, KFUN(AM) was the only station serving Northeastern New Mexico and is the sixth oldest station in the state of New Mexico. This past Christmas, we celebrated our 75th year of broadcasting.

The founders were in a battle of their own with the U.S. government because the owner refused to obey the "war law" and would not stop broadcasting war news in the Spanish language, which at the time War Department officials considered to be a foreign language. Long story short, he was threatened with losing his FCC license, a \$10,000 fine and 10 years in prison, and the government would also take all his and his wife's personal belongings away, including losing the radio station and private land where the station building and tower stood. There were many other stations back then that were also ordered to obey the war law, which today's owners or managers most likely don't know this history about their station.

Joseph P. Baca
Owner/Partner
Las Vegas, N.M.
KFUN(AM) & KLVF(FM)

CLARIFICATION

Our page 6 story in the March 15 issue about Wheatstone acquiring the PR&E brand from GatesAir omitted the first name of company spokeswoman Dee McVicker.



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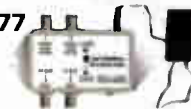
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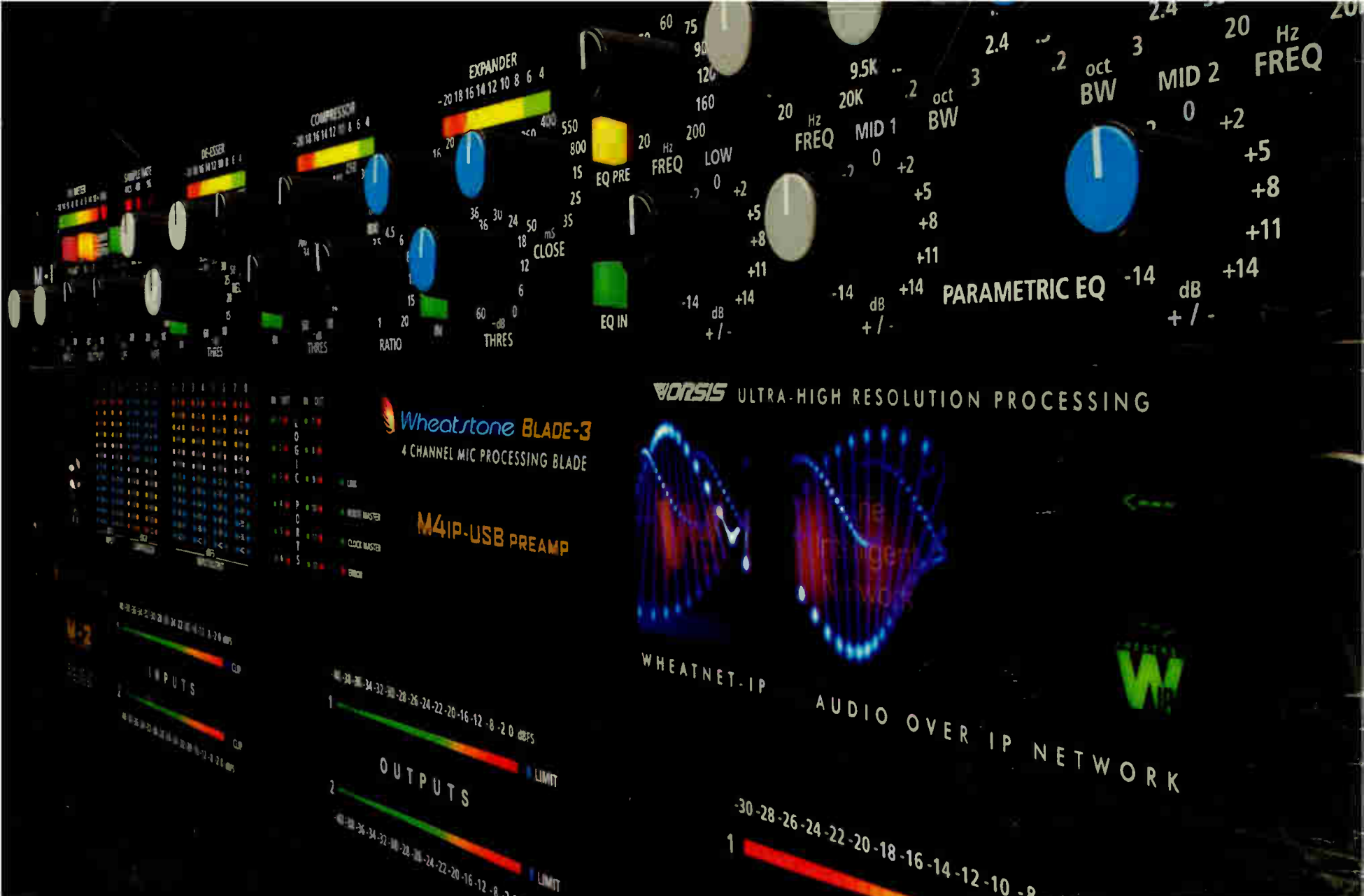
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