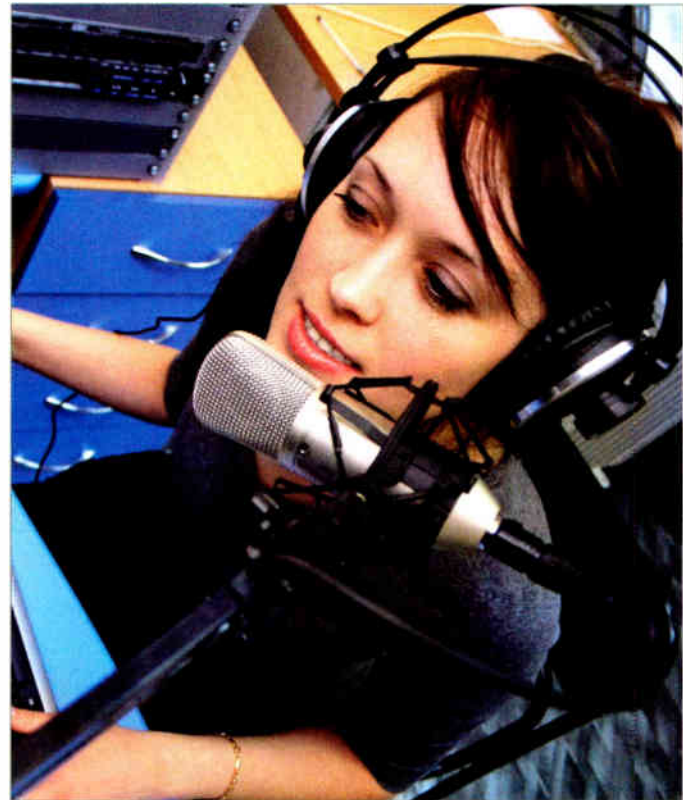


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ONLINE PUBLIC FILES

(continued from page 1)

six months to post older documents.

TV stations not in the top markets, and those not affiliated with the big networks, must comply within two years. (Political file contents of the public file are treated differently: stations are required only to upload new documents, not older material. Again, smaller stations have two years.)

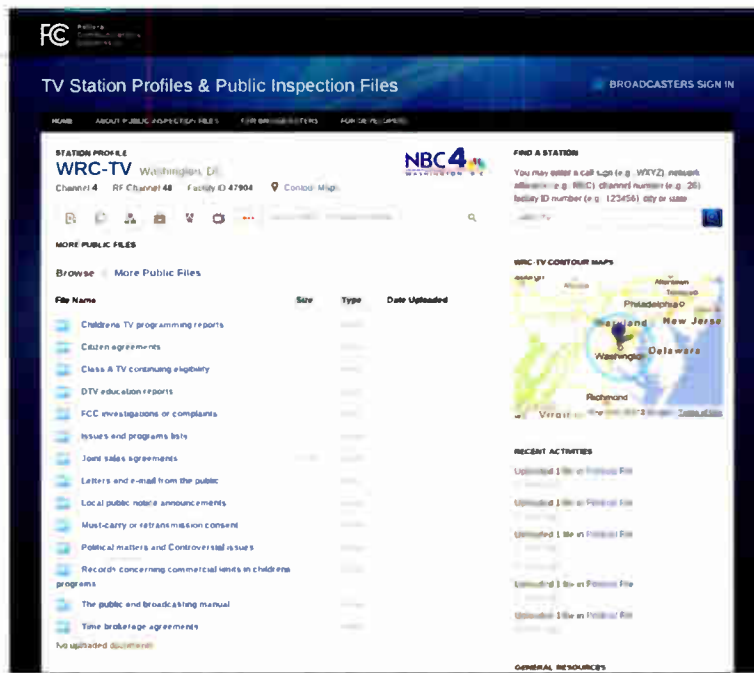
DISADVANTAGE?

Up to now, stations have kept their public file in paper form at their facilities or at other locations such as libraries that are easy for the public to access during business hours.

The new rules require moving them online. Media Bureau Chief Bill Lake said the point is to make files easier for the public and industry to access, moving from an "antiquated hard-copy filing system to Internet-based filing systems." Moving files out of station's basement filing cabinets "is a commonsense first step," said Lake.

Officials haven't said exactly when they intend to require radio stations to move public files online; they want to work out any bugs first with the TV version.

NAB and stations protested the rule, citing the administrative burden. They also don't like the idea of placing political



A beta version of the FCC's online TV public inspection file system shows a list of folders for WRC(TV) in Washington.

continue.

However, if your station has only one version of a paper document, and it's really old or long, it's okay to scan the document and send the document as a PDF to the FCC, according to Elin.

Dad saved so much at BSW, he could finally buy me the pony I wanted!



files — including information about pricing of political ad buys — online, arguing that this places TV stations at a disadvantage against competitors like cable and satellite, which are not required to do so.

UPLOAD LIMITS RAISED

FCC Chief Data Officer Greg Elin listed improvements to the agency's current online database used for other filings.

Each station has a profile page. Elin says the new interface will fewer user clicks than the current one. He demonstrated how a station staffer could drag and drop multiple documents into the database at the same time.

Elin said the commission recognized that the first stations would have a lot of files to upload over the next six months and might be filing every day. Managing numerous files might be unwieldy, so the FCC took a suggestion from NAB to implement Dropbox. The free online file-hosting service allows users to create a folder on each of their computers; Dropbox synchronizes those so they appear to be the same folder with the same contents regardless of which computer the material is viewed on.

The commission intends to support other file-sharing technologies as well.

Currently, the agency converts files submitted electronically to PDF format to block computer viruses. This practice will

The site will be able to handle several file formats such as PDF, text, word or HTML.

Once a station has uploaded documents to the FCC's system, the facility no longer needs to keep a paper file on-site for the public to inspect.

However, letters and e-mails from the public are an exception. The commission does not want stations to upload those for privacy reasons. Letters and e-mails from the public should remain at the stations. Text directing the public where they can find this material will be part of each station's online public file, according to Elin.

Many stations have had questions concerning what documents to upload for the political file in order to show the final price for an advertising purchase. He suggests stations upload an invoice or a contract that contains the final price of the ad buy.

Testing the system, some stations sent the commission documents for the political file; Elin said in an August demo that he's seen checks with bank numbers, social security numbers, credit card numbers and other personal information. All of that can be redacted from documents a station uploads to the FCC's new system.

"I recommend against putting a scanned copy of a check in the online public file," he said.

How big a file a station can upload at once is a question

(continued on page 8)

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Readers in Central and South America can receive Radio World América Latina, monthly, with content in Spanish and Portuguese. (Its editor Rogelio Ocampo assures me he hasn't published anything too outrageous; I

generally have to take his word for it.)

Parlez-vous français? If you live in France, sign up for Radio World édition francophone, mailed six times a year. And Radio World International edition, serving basically the rest of the world, is monthly plus a directory. Marguerite Clark has the enviable task of slaving over those two publications while based in Paris.

Sign up for the appropriate version at radioworld.com/subscribe.

Radio World Engineering Extra — What could be better than RW? More RW, more in depth! Free to broadcast engineers working in the United States, this comes six times a year and is headed by Technical Editor Michael LeClair (who I still think looks like David Brooks). It features in-depth technical articles, standards discussions, interviews with engineering newsmakers and articles by industry manufacturers spilling black ink in white papers that describe the red-hot science behind their innovations. If you are an engineer and not getting this, you should. Visit — you guessed it — radioworld.com/subscribe.

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Even if you read RW regularly, it's enlightening to browse sections like *Tech Tips*, *Milestones*, *Roots of Radio* and *Workbench*. You'll find a remarkable amount of educational and historical information there. I keep telling the company we oughta turn it all into a book.

(Two best-kept RW secrets: You can search past issues of RW from within any digital edition, thus putting your hands quickly on that story you simply *know* you read at some point but can't put your hands on. Also, you can find Spanish-language radio news, again from those sneaky editors of Radio

FROM THE
EDITOR

Paul McLane



World América Latina; look under RW *Noticieros*, via the website's News & Technology tab.)

Social — Catch up with news by and about Radio World on our Facebook page. Or glom onto us via Twitter @ [radioworld_news](https://twitter.com/radioworld_news). We'll share bits of the best of today's news plus musings. You gotta love musings.



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So, like radio, RW is becoming a multiplatform, multi-channel suit full of swagger. "With my New York brim and my gold tooth displayed ... Nobody give me trouble cause they know I got it made. I'm bad, I'm nationwide." (Sometimes, you just need a little 'ol band from Texas.) Heck, nationwide? We're actually global.

How else might we serve you? Let me know at radioworld@nbmedia.com. Or post a comment on the website. Or on Facebook. Or Twitter. Morse? Shortwave? Carrier pigeon anyone? Hmm.

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SEPTEMBER 1, 2012

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NEWSROUNDUP

WOR: Clear Channel Media & Entertainment is buying New York's WOR(AM) from Buckley Broadcasting Corp. Terms were not disclosed. If the deal receives regulatory approval, the sale would lead to Clear Channel's first AM in the market, where the company has five FMs. The Buckley family, which lost patriarch Rick Buckley last year, has owned WOR for more than 23 years. Founded in 1922, the 50,000 Watt WOR was one of the first radio stations to use a directional array to increase the scope and range of its coverage, and the station was the first AM in New York City to broadcast with HD Radio.

DIAL GLOBAL: For the engineering team at Dial Global, this summer has been like one long remote. The program syndicator designed, staged, tested and shipped two separate equipment packages, not only for the London Olympic Games, as RW reported earlier, but for the U.S. political conventions. Dial Global set up to record, route and distribute Olympics and convention audio for its affiliates.



The company acquired the radio rights to the games as part of its merger with Westwood One last fall; Executive Producer for Dial Global Sports Mike Eaby is seen here in the control room. American gold-medal-winning gymnasts are visible through the glass after an interview in the long-form studio, part of NBC Television's space within the International Broadcast Center. Mitch Glider is Dial Global vice president of engineering.

SIRIUSXM FUTURE: Liberty Media owner John Malone plans to spin off the Starz pay-television network into a separate company. Wall Street analysts say this would free up cash for Liberty, enabling the company eventually to take over another — for instance, SiriusXM. Liberty announced in August that Starz will become a separate

company with about \$1.5 billion of debt. Liberty bailed out SiriusXM from a debt crunch in 2009 and this year Liberty twice asked the FCC to declare it had "de facto" control of the satellite company. Liberty now owns 46 percent of SiriusXM. The FCC rejected the first attempt and Malone said he was waiting to hear from the commission on the second request. SiriusXM head Mel Karmazin has said he would do whatever's in the best interest of SiriusXM and its shareholders.



HD RADIO: Alpine Electronics of America is shipping to retailers the INE-Z928HD audio/video/navigation system with an eight-inch screen. Integration kits allow a "seamless" factory look in the dash, Alpine says. The INE-Z928HD incor-

porates an HD Radio tuner; Pandora Internet audio, with control from Android, BlackBerry and iPhone smartphones; iPod and iPhone music, and SiriusXM with the addition of a separate tuner. The unit plays CDs and DVDs, AAC and MP3 audio formats. It lists for \$1,499.95.

EAS: FEMA's IPAWS office addressed an unplanned outage in its EAS feed in early August. Required Weekly Tests have continued after the June 30 equipment deadline so that station engineers can confirm whether their EAS encoders/decoders can decode a Common Alerting Protocol-formatted alert. However on Aug. 6, the alert did not go out for at least two time zones, Central and Mountain. Neil Graves of the IPAWS Engineering Office said that in such instances, IPAWS conducts a series of diagnostics and troubleshooting steps to determine what went wrong, then retransmits the message manually. On the SBE-EAS Listserv, Graves wrote that the RWTs were designed as a temporary solution, meaning this functionality wasn't built into the IPAWS-OPEN application but resides on a computer outside of the FEMA/DHS networks. FEMA is looking for a more permanent solution.

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KAHN

(continued from page 1)

tions, was described with words like determined, eccentric, brilliant, argumentative, unique and, in his later years, litigious. Colleagues said he was a man of many layers wrapped into one body of genius.

Kahn was well known for his Kahn AM stereo system and later the Compatible AM Digital system, known as CAM-D. Colleagues remembered his legal attempt to block Motorola from using its C-QUAM system in the United States in the 1980s — saying C-QUAM violated FCC emission bandwidth specifications — and his later bitter lawsuits against iBiquity Digital Corp.

In the handbook, continues Tarsio, “is Leonard’s paper on compatible single-sideband operation for AM broadcasting. You will find real explanations of system operation and most importantly the mathematics of how it all worked.

“Many so-called white papers that are written today are nothing more than sales pitches without science to back them up,” Tarsio said. “Verity in science and life — that was the kind of man Leonard Kahn was.”

RCA LABS

Kahn held many key patents in HF transmission and worked on shortwave and single-sideband transmission for RCA Labs early in his career. Tarsio considers Kahn to be one of the “leg-



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GENERAL DESCRIPTION OF SYMMETRA-PEAK

Symmetra-peak is a simple and thoroughly proven solution to the basic problem of maintaining optimum transmitter performance with non-symmetrical audio waves—particularly those of the human voice. Because of certain inherent characteristics, voice waves normally contain non-symmetrical positive or negative peaks. Actual measurements indicate that unequal peak ratios of 6 to 8 db can easily occur, although relatively little peak energy is present. Measurements also show that most voices contain asymmetrical peaks while those produced by music are usually symmetrical. In such instances, however, it is the peak value that determines the proper modulation adjustment of the transmitter.

Peak asymmetry is not corrected by the use of limiters or AGC amplifiers. Furthermore, microphone phasing and line polarity switching offer no practical solution because peaks are still unequal and transmitters are prevented from achieving 100 per cent modulation on both positive and negative peaks. Thus, the optimum

modulation capability of the transmitter is restricted, causing a noticeable drop in level when live or recorded voice programs and commercial announcements are compared with music.

Symmetra-peak avoids this problem simply by re-distributing unequal positive and negative peaks symmetrically about the zero axis. Therefore, proper modulation adjustments are no longer determined by low energy asymmetrical peak excursions but by the higher average peak energy contained in symmetrical speech and music. Since Symmetra-peak has no effect on symmetrical program sources, voice modulation improvements of up to 4 db or 2-1/2 times normal effective transmitter power can be realized.

In addition, overall audio system performance is improved because with non-symmetrical peak excursions removed, unnecessary limiter and AGC action is avoided. Thus, for best results the unit is normally installed at the output of the studio mixer or master control, ahead of the first AGC amplifier or program limiter.

SPECIFICATIONS

	Model SP-58-1A	Model SP-63-1A
Input Impedance	600 ohms, balanced or unbalanced.	600 ohms, balanced or unbalanced.
Output Impedance	600 ohms, balanced or unbalanced.	600 ohms, balanced or unbalanced.
Typical Harmonic Distortion Measurements	Less than .5% at 40 Hz, less than .2% from 100 to 15,000 Hz at +10 dbm.	Less than .25 at 15 Hz; less than .1% from 40 to 20,000 Hz, at +10 dbm.
Nominal Operating Level	+10 dbm maximum; 0 dbm minimum.	+10 dbm maximum; 0 dbm minimum.
Insertion Loss	Approximately 4 db.	Approximately 2 db.
Frequency Response	± 1 db from 40 to 15,000 Hz.	± 1/2 db from 15 to 20,000 Hz.
Mounting	3-1/2" x 19" relay rack panel.	3-1/2" x 19" relay rack panel.
Power Consumption	None.	None.
Price	\$345 FOB Freeport, N.Y.	\$485 FOB Freeport, N.Y.

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A Kahn Symmetra-peak brochure from the 1960s.

Broadcast Devices Inc. President Bob Tarsio said, “Leonard was not crazy or eccentric, which I have seen written. He was a driven engineer only interested in what was right both in engineering, business and his personal dealings.”

Tarsio, who met Kahn in 1983, points to the 1960 edition of the NAB Engineering Handbook as evidence of the kind of engineer Kahn was.

ends of broadcasting” because of his contributions, including his work with Envelope Elimination and Restoration, or EER, “which eliminated and then restored the carrier in a linear modulation system that allowed for the use of a Class C amplifier to be used in a more or less linear mode, which saved power and reduced electrical costs.

“He’s right there with Armstrong, de

Oct. 23, 1962

L. R. KAHN

3,060,389

AUDIO SIGNAL PEAK ENERGY EQUALIZATION

Filed March 19, 1959

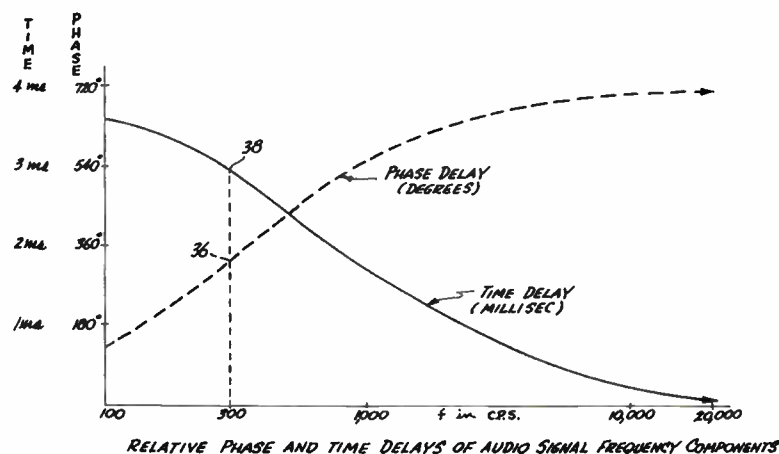
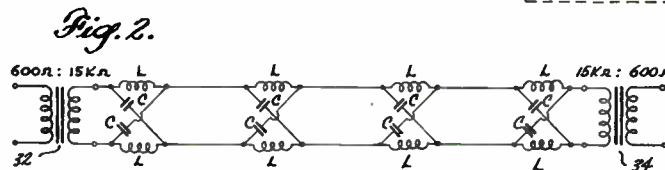
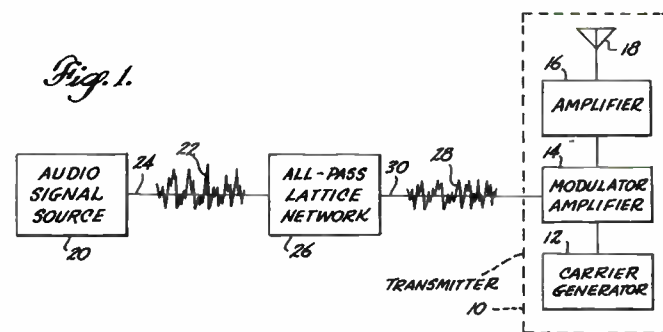


Fig. 3.

INVENTOR
LEONARD R. KAHN

BY
Mathis and Shaghal
ATTORNEYS

Kahn's Symmetra-peak patent application.

Forest, Hertz and Maxwell,” Tarsio said.

EER, sometimes referred to as the Kahn Method, is used in many digital transmission schemes worldwide, Tarsio added.

“Leonard’s impact was that he was one of the last broadcast innovators who believed that technology for technology’s sake was not enough. If you developed a system it had to have efficacy and provide a true improvement and it had to be the best solution.”

Kahn Research Laboratories proposed the concept of AM stereo in 1958 and 1959, according to earlier Radio World coverage. About that same time, Philco Corp. and Radio Corporation of America proposed competing systems. However, the FCC stalled on a rulemaking procedure, citing a lack of interest in AM stereo at the time.

By the 1980s, five companies, including Kahn Communications, had developed AM stereo systems. The oth-

ers were Harris, Motorola, Magnavox and Belar Electronics.

The FCC originally picked the Magnavox AM stereo system as the U.S. standard in April 1980, based on a complicated matrix of performance attributes to which the agency assigned scores, said an observer familiar with the selection process. Magnavox had the highest total of the five AM systems considered. However, many in the industry protested, calling the commission’s research and decision-making process incomplete and partially flawed. So the agency backtracked and decided to let market forces determine the winner.

However, by 1993, it became clear there needed to be one AM stereo standard in the United States. Other countries began adopting Motorola’s C-QUAM, and that’s what the FCC chose. At the time, of the 660 radio stations using AM stereo, 591 were using Motorola’s

(continued on page 8)



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The unique solution was to equip Dan's bike as a mobile production facility. The talent wore wireless mics AND in-the-ear monitors which communicated with receivers and transmitters in a rack bag on Dan's bike.



on-air feed as the trio traversed the winding roads of Perth. How did it all work out? Absolutely flawlessly – the show went on without as much as a speed bump!

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KAHN

(continued from page 6)

system. Fewer than 20 were using Kahn's system, according to the agency.

AM stereo ultimately did not flourish in the marketplace; over time, for many in radio, the experience would come to be seen as a poorly handled technical rollout and regulatory debacle.

Kahn also created Symmetra-peak while working at RCA. This was a passive device that equalized the positive and negative audio peaks being sent to a station's transmitter and helped increase modulation density before the days of sophisticated multiband audio processing systems, according to long-time acquaintance Herb Squire, vice president of engineering for DSI RF Systems Inc.

Another observer called Symmetra-peak "Kahn's single biggest contribution to broadcasting. The technology later went on to become standard in nearly every name brand audio processor you can think of."

Squire said, "Symmetra-peak restored the symmetry and balance between positive and negative peaks of voice signals, which tend to be asymmetric. It made the stations louder."

According to Kahn's marketing materials at the time, the Symmetra-peak "redistributed unequal positive and negative peaks symmetrically about the zero axis."

POWERSIDE, CAM-D

Squire, who knew Kahn since 1969, testified as an expert witness on behalf of Kahn in some of the lawsuits. Squire worked with Kahn's AM stereo system at WQXR(AM) and WQEW(AM) in New York.

"I was in regular contact with Leonard [during that time]. He and his guys would come out and tweak the system. WNBC(AM) also had his AM stereo system. He was right there with the technology. He lived his work. That was his life," Squire said.

Squire and other observers believe Kahn's development of his AM stereo system, which dates to the early 1960s, was complicated at first by the FCC's reluctance to adopt a standard while hoping the marketplace would settle the issue. Kahn used independently modulated upper- and lower-level sidebands for the Kahn-Hazeltine AM stereo system, used at one time by WLS(AM) Chicago.



Kahn colleague Herb Squire with his Symmetra-peak 58-1A.

Kahn's Powerside, a system to minimize distortion of selective fading such as skip conditions, eventually led to CAM-D, which was an in-band, on-channel technology for AM digital radio, several observers noted. However, his legal dealings against iBiquity and Clear Channel — chronicled in Radio World at the time — had him mired in court for years beginning in 2006.

Kahn touted CAM-D as a major improvement over iBiquity's digital AM system. Kahn claimed his system did not increase adjacent or co-channel interference. Kahn told Radio World then,

"I think he was extremely frustrated by that time, but he was so dedicated to his work," Squire said. "His years in the business overlapped so many generations. He knew Major Armstrong, of course," he continued, referring to FM pioneer Edwin H. Armstrong, "and when you look at those two lives, there were a lot of similarities at the end, with the lawsuits."

Kahn would often send Squire cassette tapes of various recordings to get his opinion on sound quality. He was

notorious for balking over any constructive criticism of his products. Rather "thin-skinned" is how one former colleague recalled Kahn.

Kahn's opinions and comments were published in Radio World, but he was critical of its coverage. During industry debate over AM IBOC operation, he wrote on his website that columns by "masked engineer" Guy Wire had taken his statements out of context. He called this "yet another example of Radio World type reporting and the reason we never send RW our press releases or authorize my associates at KCI to grant interviews to Radio World reporters." He did talk to Radio World reporters at other times.

But in a letter to its then-parent IMAS Publishing, he stated that Radio World had staged an interview with a radio corporate director of engineering and displayed a "willingness to participate in a plan to deceive the broadcasters and the public they serve" regarding engineering characteristics of the IBOC system.

Robert Meuser, chief technical offi-

cer for design engineering company Engineaux, described Kahn as "a very complex figure. You either loved him or hated him. He could push very hard, but single-sideband technology was truly dear to his heart."

Meuser read Kahn's technical writings before meeting him in the 1970s; he described the period of the AM stereo wars in the 1980s as the time "when I first saw the cantankerous side of Kahn. You were either with him or against him. He was kind and generous to those who was on his side. There was no middle ground.

"As brilliant as he was, he really liked to keep the technology to himself. His AM stereo equipment (STR-77 and STR-84) was very difficult to adjust. We told him it needed to be more solid mechanically. This annoyed Leonard, very much so," Meuser said. "I fell out of his favor around that time. But that is the way he was."

Still, Meuser acknowledged Kahn's work with the EER concept as "incredibly important" in the history of wireless communications.

Meuser said so many things in communications can be attributed to Kahn, from low-power digital devices to the way that HD Radio in the United States and Digital Radio Mondiale technology in Europe is used on AM.

"They all basically use the EER concept. When you look at European technical papers they actually refer to it as the Kahn Method," Meuser said. "So deploying that and getting people to recognize EER is probably his biggest single contribution."

Kahn's wife, Ruth, preceded him in death in 2004, according to various reports. The couple had no children.

Comment on this or any story. Write to radioworld@nbmedia.com.

ONLINE PUBLIC FILES

(continued from page 3)

several broadcasters asked as well. In the past, station personnel or their attorneys needed to break up large files to send them electronically to the commission. Elin said the commission is now looking at limiting file size uploads to around 50 Megabytes.

Asked by Radio World about the risk of a system crash on the deadline when many stations would be uploading files, he replied that files from all broadcasters would be put on dedicated hardware, separate from the public access portal. There will be a 2,000-station cap on how many TV stations can file simultaneously. "If we have a high spike with the public," the agency can use caching and redundancy in the cloud to handle the volume, Elin added.

CHALLENGE?

Michael Richards, a communications attorney who attended the first demo, believes that for "mom and pop" radio stations, the process will be a "challenge to implement so [that] an important community-based source of local media is not further stressed by the already tough operating conditions in the modern media environment."

Fletcher Heald & Hildreth attorney Peter Tannenwald opposes the new requirement generally but said the initial demo made the process look "usable." He thinks conversion could prove to be a "mess" for radio, where stations have much smaller staffs.

For him, the online concept also brings up other concerns. "Probably 90 percent of public file inspections are by potential troublemakers." Stations are entitled to ask for a name and address of a person who comes to a station to look at the file, in part for safety reasons, he said. "That has helped my clients in many cases to spot potential trouble and try to deal with it before it gets out of control." It's unclear whether there will be a similar mechanism for online access.

Tannenwald continued: "Some stations don't care if they don't know who looked at the file. They would much rather put the file online and not admit strangers into their building."

Among other files, stations must place all their licensing, ownership and EEO documents, and any related to an FCC complaint, in their public file.

The commission planned to post instructional videos to its website that would detail exactly how to use the upload system. It included a "Frequently Asked Questions" tab on the interface at stationaccess.fcc.gov and established a hotline for TV stations: (877) 480-3201 or (717) 338-2888. It is staffed weekdays, 8 a.m. to 6 p.m. Eastern.



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Offer ends September 28 or may be withdrawn earlier if Frank Foti returns from his vacation and gets wind of this.

World Radio History

Navigating the Hazards of Engineering

Our past few issues have generated some interesting responses from our readers. Let's start with an observation from contract and projects engineer Ed Dulaney. After reading Mike Vanhooser's tip about using concrete to protect copper strap (*Workbench*, July 18), Ed said he had to shudder. He writes, "It's a very bad idea to put a ground strap into anything so rigid as concrete."

WORKBENCH

by John Bisset

Read more Workbench articles online at radioworld.com

Ed explains that, when lightning hits an electrical conductor, it induces a massive electromagnetic field. When this EMF travels along the conductor, it literally "vibrates" with the energy that is induced into it. Ed has seen photos of concrete pads that had copper rods in them, which were then struck by lightning. The damage is minimal and collateral damage is limited, as most of the pieces of concrete fall less than 10 feet from the point of entry. But the forces are evident.

However, imagine if the same thing happens to the base pier of a tower, where the strap is covered in concrete. A few fractures in the pier are all it would take for the tower to come tumbling down!

Ed says he's all for covering copper straps in tar, paint or other pliable material. But he'd never put anything that has the possibility of carrying a million

Joules of energy into a completely rigid environment.

Ed raises a valid point; but for the trenches in Mike's case, the strap was laying in the trench, covered with dirt, and the concrete was used as a cap to discourage digging. Amazing the schemes we have to come up with to save our copper! Ed Dulaney can be reached at eddulaney@townsquaremedia.com.

Marc Mann provides an interesting comment, after reading Greg Richwine's clean-up of beryllium contact shavings (*Workbench*, Aug. 1). To prevent the spread of the shavings and dust, Greg carefully wiped up the residue that lay under the contactor. His caution was warranted, as beryllium is a known carcinogen. Marc wanted to bounce Greg's procedure off a friend who is a retired industrial hygienist and OSHA inspector — but don't hold that against him, Marc adds.

More important, the OSHA inspector mentioned something that Marc hadn't considered: There is a reasonable probability that during the erosion of the beryllium contacts, a micro aerosol of BeO (beryllium oxide) may have been generated. If the device had a cooling system, i.e., a fan or blower, and the effluent (heat and BeO aerosol) was not vented to the exterior atmosphere, the room containing the transmitter may well be contaminated and an air test would be prudent.

Now in Greg's case, this was not

a transmitter, but a phasor cabinet — which I guess could have a blower associated with it but more than likely, does not. However, the hazard still remains and should be considered by engineers doing maintenance.

Anyone in a similar situation should stay aware of this and notify any employees who frequent the area of this potential health hazard. Marc realized some readers think OSHA requirements are too strict at times; however, beryllium is nasty stuff and should be treated with the same respect as when transformers with PCBs need remediation.

How much is too much, according to OSHA?

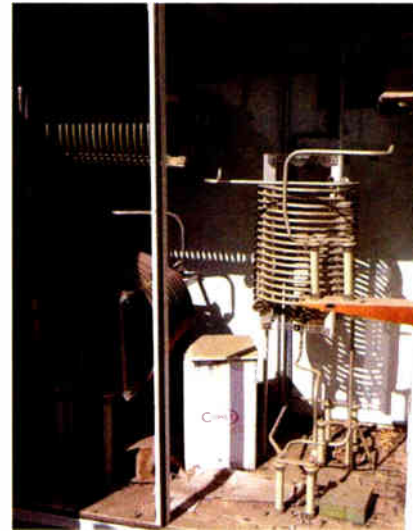


Fig. 1: Straw, grass and nesting materials don't mix with a 50 kW ATU.

The amount or length of exposure to beryllium necessary to cause a specific individual to develop CBD is not known, but recent information suggests that even short exposures to levels of beryllium below OSHA's Permissible Exposure Limit (PEL) of 2 µg/m3 averaged over an 8-hour day may lead to CBD in some workers.

Our Radio World Links page, radioworld.com/links, has a link to an OSHA safety bulletin that readers may find useful. Simply Googling "Beryllium contact hazard" will provide even more information. Thanks to Marc Mann for his thoughts. Marc can be reached at marcmmann001@san.rr.com.



Fig. 2: Check the tower base spark gap, making sure the balls are smooth.

No beryllium evident in Fig. 1; just a lot of rubbish, mostly collected by rodents. This abandoned 50 kW site is soon to be back on the air, but only after some extensive cleaning and maintenance. Be sure to use a facemask when removing the rodent droppings and nesting materials from inside ATUs. Tighten the connections, and ensure things like the spark gap on the tower (Fig. 2) is properly set.

Note the gouge on the bottom ball. To guard against sustained arcing across the gap, use crocus cloth to smooth out any pitting caused by lightning strikes. Thanks to Sim Mangga of Malben Engineering for the pictures.

Contribute to *Workbench*! You'll help your fellow engineers and qualify for SBE recertification credit. Send *Workbench* tips to johnpbisset@gmail.com. Fax to (603) 472-4944.

Author John Bisset has spent 43 years in the broadcasting industry, and is still learning! He is SBE certified, and is a past recipient of the SBE's Educator of the Year Award. He recently joined Elenos USA, an FM transmitter company based in Miami.



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WHAT CAN YOU DO WITH THEM? HERE ARE A FEW IDEAS.

- » **BUILD A ROUTING SWITCHER.** One stand-alone xNode is an 8x8 (4x4 stereo) routing switcher. Connect 8 xNodes to a switch and make a 64x64 routing switcher. Need more I/O? Connect more xNodes. Like all Ethernet-based networks, Axia systems are naturally scalable, up to 10,000 stereo signals (plus logic).
- » **STL OVER IP.** Today's cluttered RF spectrum makes IP a great alternative. Put an xNode at either end of a fiber run, OC-3 circuit or a pair of inexpensive Ethernet radios to send eight channels of uncompressed audio to your TX – and get eight channels of audio backhaul too.
- » **SAY SO LONG TO SOUND CARDS.** PCI, PCIe, USB3, FireWire... who needs 'em? Load the Axia IP-Audio Driver onto your PC workstation and connect it to an xNode to get eight professional, balanced outputs and eight inputs. Use an industry-standard DB-25 breakout cable for pro XLR connections. You'll get studio-quality audio and save some green, too.
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- » **MAKE AN A/D/A.** Take one analog and one AES/EBU xNode and rack-mount them side by side. Voila! Eight precision A/D converters and eight precision D/A converters, in just 1RU. Studio-grade, 48 kHz, 24-bit Delta-Sigma A/D and D/A converters, with 256x oversampling, make difference you can hear.
- » **SLIM DOWN YOUR SNAKE.** Connect two analog or AES xNodes with a single Ethernet cable for an instant 8x8 bi-directional snake and bid the multi-pair bundle goodbye. Add a few more xNodes on each end for a 16x16, 32x32 or 64x64 snake. Use off-the-shelf media converters for long-haul fiber connections.

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INFORMATION OVERLOAD? Not here. Sharp, high-res OLED displays put all the information you need right on the front panel, without the need for a distracting multi-colored lightshow.

xNODES WORK WITH BOTH LIVEWIRE AND RAVENNA AoIP networks — making them compatible with IP-Audio gear from over 40 major broadcast companies.

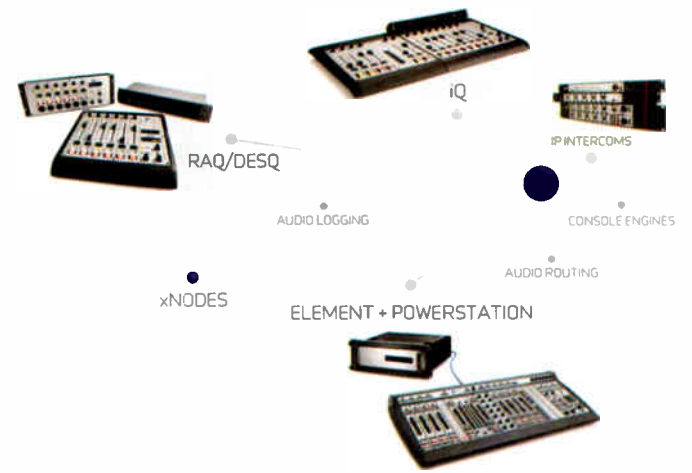


RAVENNA



NO NOISY FANS HERE. Front-mounted heat exchangers keep xNodes calm, cool and collected using air-conditioned air (instead of that hot air in the back of the rack).

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xNODES HAVE AUTORANGING INTERNAL POWER SUPPLIES, but can use PoE (Power over Ethernet) too. Perfect for those out-of-the-way places where a power cable is inconvenient. Hook 'em both up for redundant, auto-switching backup power.

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TWO xNODES MOUNT SIDE-BY-SIDE, so you can create your own custom mix of I/O types within a single rack space. Pair up an AES/EBU xNode with a microphone xNode, or match a GPIO xNode with an analog unit. Or combine a couple of Mixed Signal xNodes for the ultimate mix of mic, analog, AES3, Analog and logic I/O.

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SBE Looks Toward the Future

Strategic Planning Conference Convenes in Indianapolis

BY RALPH HOGAN

Every five or six years, the SBE steps back to take a comprehensive look at how to meet its members' needs, by

SBENEWS

conducting a strategic planning conference. We did just that on June 23, with the intention of evaluating the condition of the broadcast engineering profession and determining how the SBE can best serve the industry.

The Society of Broadcast Engineers was formed to support and promote broadcast engineering, and has helped build the careers of thousands of engineers working today. The SBE must take stock of industry changes and assess what the society needs to do to help members continue to progress in their field. It must routinely consider ways to continue this mission.

The meeting, held in Indianapolis, ran a full day, from 9 a.m. to 9 p.m. The 36 participants included members of the SBE and staff from across the country. There were 16 SBE chapter representa-



A gathering of 36 SBE members and staff take a break from brainstorming to smile for the camera.

tives, 14 directors, six members of the SBE staff, plus two facilitators participating in the day-long event.

The overall objective of the strategic planning session for the society was to create several proposals that could be taken to the board for action.

The SBE enlisted the services of a professional independent facilitator

team of Charlene Sullivan and Kenneth Harling to lead the participants through the strategic planning process. The facilitators helped the group to recognize and articulate the society's needs while building consensus on the best ways to chart the SBE's course over the next three to five years.

To raise a set of critical action items,

the participants in the session were taken through a series of activities that allowed the assessment of internal strengths and weaknesses as well as a summary of external opportunities and threats.

The participants in the planning session were divided into teams of six. Throughout the day, the membership of each team shifted several times by design. All the facts and data collected were produced by the teams.

The most important objectives of the organization are professional recognition of the competence of broadcast engineers, promotion of the broadcast engineering profession, and to stimulate interest in the profession. The second most important category of objective was classified as education and professionalism of broadcast engineers and includes the creation and dissemination of knowledge of broadcast engineering. The third and fourth most important objectives were the promotion of ethical standards and to create alliances with all elements of the broadcast and communications industries.

Several discussions focused on programmatic efforts, such as increasing support to chapters, a reinvigorated effort to attract youth to broadcasting and revamping the awards program to involve more participants.

Looking towards the future, the group



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Todd Boettcher, CPBE, of Chapter 28 in Milwaukee presents ideas at the SBE Strategic Planning Conference. The conference took place at the Hilton Hotel in downtown Indianapolis.

thought SBE needed to identify whom the members of the society should or could be and reach out to them, understanding that technology and other factors continue to change the roles its members play and the skill sets they are expected to have. They also believed SBE should look at how the society brands itself to reflect these changes.

The group decided on the six areas of opportunity and challenges that should receive top priority and be forwarded to the board for consideration.

They include programmatic efforts, such as increasing support to chapters, a reinvigorated effort to attract youth to our field and revamping our awards program to involve more people. Build a strong public relations campaign to attract other industry partnerships. In addition, the SBE needs to identify who the members of the society should or could be and reach out to them, understanding that technology and other factors continue to change the roles its members play and the skill sets they are expected to have. The SBE should look at how the society brands itself to reflect these changes.

Finally, the group recommended that the SBE should use the unique opportunity of the society's 50th anniversary, which will come in 2014, to demonstrate to the broadcast industry and the public the significance that its members contribute to broadcasting.

At the fall 2012 SBE Board of Directors meeting in Denver, the final report will be discussed and the board will review each of the action item recommendations. Then after ample study, the board will make decisions of what, if any, of the items to implement.

Ralph Hogan is president of the Society of Broadcast Engineers.

MARKETPLACE

IN THE NEAR FIELD: Sonodyne has been making speakers since the late 1960s. It has been most active in the Indian market, but now the company has a U.S. distributor, TransAudio Group, and a speaker to show to the American buyer.

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Onboard EQ consists of bass and treble controls. Sonodyne specs the SM200AK at 40 Hz–20 kHz. Size: 12.4 inches x 16.9 inches x 12.7 inches. Price: \$1,790 per pair.

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This High School Station Impresses

Author Returns Home and Finds That Knightstown Panthers Really Are the Best

BY **ROBERT R. KEGERREIS**

A few years ago, Radio World published an article about my adventures building a bootleg radio station in Indiana.

FIRSTPERSON

In the spring of 1960 a little one-tube phone oscillator kit from Allied Radio got me into trouble. With the help of a couple high school buddies I strung an antenna from an electrical power pole in my backyard to the top of a church steeple. We launched WKPB — “Knightstown Panthers are the Best” — and would spend two or three hours a couple times a week playing 45 rpm rock ‘n’ roll records and gossiping about school events.

We thought it was pretty cool how our little station could radiate a signal all around the community. Classmates were tuning in.

An FCC field engineer saw nothing amazing about what we were doing to the AM spectrum. Our signal was riding on top of Indianapolis WIBC’s 50 kW signal all the way to Cincinnati. The engineer shut us down and took our phone oscillator, and it was the end of “WKPB — 1610 on your AM dial.”

After a couple years of technical college, I landed a job with the broadcast division of Sarkes Tarzian Corp. When not creating schematic drawings or writing technical manuals about stereo multiplex FM transmitters, I finagled my way into a gig as a substitute disk jockey at the local Tarzian-owned FM station. That’s how my real (and legal) studio adventures began.

Now fast forward 50 years. In 2011, an invitation arrived for a Knightstown High School Class of 1961 reunion. Some of my classmates knew I’d been producing television content and asked if I’d create a time-capsule video to show. I could grab an ENG camera and drive down to K-town, shoot footage and put together a story. I Googled Knightstown to see what was out there about my old stomping grounds. As I was reading the listings, up popped call letters: “WKPW(FM):

Knightstown’s classic hits station.”

Knightstown has its own station ... and the call letters are WKPW? My bootleg station was WKPB! Do their call letters stand for *Knightstown Panthers always Win?* It was a lightning bolt through my head. What started as an information-gathering session became a compelling need to check out the station. My first stop back in Knightstown was at the studios.

STARTING WITH THE BASICS

WKPW is a student-run noncommercial station operated by the New Castle Area Career Programs; it has been broadcasting since September 1993. It began with a seven-hour daily schedule and 250 watts. Today it runs 24 hours with a BE AudioVault automation system and carries a 4,400 watt punch. Originally the facilities were at the Indiana Soldiers and Sailors Children’s Home; the transmitter and tower remain there today.

In spring of 2011, the studio relocated into the new Knightstown High School facility. This noncom is like no school station I have visited.

Mike York, program director and instructor at WKPW, is a skilled electrical/mechanical guy with years of broadcast experience, a “hands-on, make-it-happen” personality who loves to motivate kids to do remarkable things. He led the



Mike York

effort to create a facility that included a lobby, air studio, three production rooms, classroom, office, rack room, microwave link and RPU.

He started by creating a floor plan with Auto-CAD showing where walls fit together, where the studs are to be

would have the opportunity to build a radio studio.

He showed the floor plan and described what the studio would look like; he sold them on the idea that this studio would be a showcase for the school and community. The labor was not going to pay a penny; it would be part of their course work, three hours a day. He guaranteed they’d have fun,



Cally Arnett in the air studio.

spaced, windows positioned and doors hung. He held an unusual classroom session for students who have signed up for vocational courses in radio broadcasting. He brought in donuts (on his dime) and explained that this year’s course work would include something different: Students

learn skills and eat lots of donuts. The donuts got attention.

The next day Mike was off to city hall to get permits and line up building contractors to perform work that he and his students could not. He worked with contractors to procure the best supplies and rates. When students showed up, Mike began by teaching them how to read a tape measure — 1 inch, 1/4 inch, 1/32

(continued on page 18)

KEY GEAR, OLD AND NEW

Air Studio

Audioarts R90 Console
Electro-Voice RE20 Microphones
Crown power amp
JBL monitors
dbx microphone processors
Marti remote system
Sage EAS
BE Audio Vault 2 Digital Storage System
Dell monitors
Adobe Audition 2.0 software
Gateway Touch Screen News Computers
24-inch Dell Monitors
Adobe Audition 2.0
50-inch HD Phillips LCD TV

The production and recording rooms have similar equipment to the above, with Shure SM 7B Microphones and Symetrix 528E Microphone Processors. The recording studio uses a Mackie mixer.

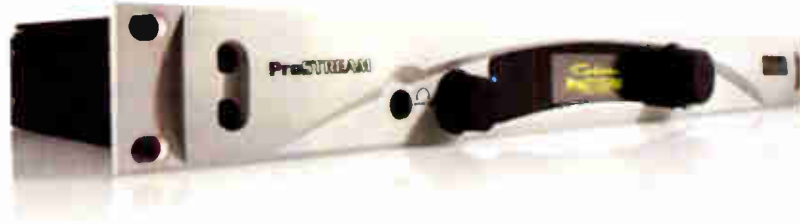
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And such audio... amazing. Thanks to our partnership with Fraunhofer (FhG), we were able to build a processing architecture that's specially optimized for MP3 and MPEG-AAC encoding algorithms. The result: detailed, commanding, blow-you-out-of-your-office-chair streaming audio, even at aggressive bit rates.

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Shown doing production work is Jennifer Farrington.

WKPW

(continued from page 16)

fractional differences. He showed them how to use a saw guide and cut boards safely. He taught them how to build studio walls 10 feet high and 8 inches thick and fill them with sound insulation.

The students framed in the walls. The stronger ones helped Mike hang the heavy studio doors. Contractors performed electrical work, ran the conduit and installed the HVAC. Most of the contractors were local residents who went out of their way with the job.

Windows and ceiling tiles were installed and ceiling lights turned on. Paint brushes came out and the studio began to take on luster. Carpet arrived and contractors laid it on the floors and some on the production room walls. Mike showed the students how to make air flow noise baffles.

Equipment from the old studio was moved, one truck- or car-load at a time. Studio furniture and audio equipment, some old some new, was set up and connected. The new Moseley STL arrived and was added to the racks. The directional antenna was mounted on the studio mast and dialed in on the transmitter site two miles away. At the transmitter, the receiving antenna was mounted and coax fed to the new receiver.

The studio began operation on May 24-26, 2011.

DONUTS ARE EXPENSIVE

The basics were in place. The station's Internet streaming was up and running, AudioVault had been programmed and audio was feeding the STL. The students began producing local news, community events, weather reports, station ID and school activities from one of the new production rooms. There was still work to be completed, and the school

year ended two weeks later.

At this point it would have been easy to postpone remaining work until fall but Mike wanted the studio finished by start of the school year. He continued working all summer, 70 days including weekends and holidays, 10 to 14 hours each day. Mike is a salaried teacher; he is not paid for summer work activity, nor does he receive overtime. Perhaps the Kingston Trio music coming across the new lobby speaker system best describes Mike's dedication:

*Charlie's wife goes down
To the Scollay Square station
Every day at quarter past two
And through the open window
She hands Charlie a sandwich
As the train comes rumblin' through.*

At the start of fall semester, returning students signed up for Radio Broadcasting I and II, new students signed up for Beginning Radio Broadcasting. It was a new year and a whole new radio studio.

When the bills arrived and everything was tallied and accounted, the project came in just under the school board-approved \$135,000. (The bill for donuts is unknown but according to Mike, it was a lot.)

In May 2012 the station completed its first year in the new studio. It recently was honored with an award from the Indiana Association of School Broadcasters.

This fall students will again be busy learning fundamentals of broadcasting at a best-in-class radio studio with station call letters WKPW. It sure beats the one-tube phone oscillator station of 50 years ago that a few students at Knightstown High School built and called WKPB.

To read the author's 2008 article "The Story of Bootleg Radio 1610," visit radioworld.com/links.

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Meet the LX-24...Wheatstone's flagship, multi-award-winning advanced modular networkable console control surface

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Assign any source of any type anywhere on your network to any fader. Each input channel can be assigned to four stereo busses, plus four pre/post-selectable aux sends, a stereo CUE bus, four mix-minuses and the panel's own bus-minus. Full Vorsis EQ and Dynamics let you sculpt and control your sound with the quality of the finest dedicated outboard

processors. The visually-stunning meter bridge features up to four sets of bright, high resolution LED meters, as well as circular LED displays for auxiliary send levels and pan control. A digital count-up/count-down timer is also included

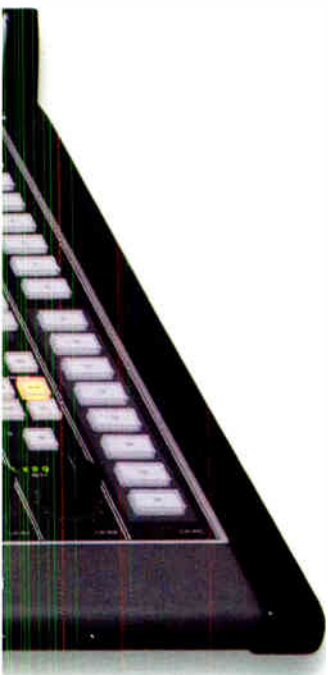
The LX-24 is advanced in ways that can make a HUGE difference in your capabilities. But it's also immediately familiar to anyone who has ever sat behind a board at a radio station. Use it to make your programming the best it can be. Just plug it into your WheatNet-IP Intelligent Network - with it, and the BLADES across the page, you can, dare we say it, rule the world.

THE LX-24 CONSOLE CONTROL SURFACE FEATURES

- Low-profile** table-top design - no cutout required
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- Control room and headphone outputs** with level control and source selection
- Two independent studio outputs**
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- Onboard VGA and USB-Mouse connectors**
- Event storage** (snapshots) and recall

- Each input channel features:**
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 - Four mix-minuses
 - Bus-Minus®
 - Source name display
 - A/B source selector
 - 2 programmable buttons
 - Vorsis EQ and Dynamics including 4-band parametric EQ, High- and Low-Pass filters, Compressor and Expander/Noise gate

price. it's called The WheatNet-IP Intelligent Network, and it rules.



Our BLADES carry out your orders network-wide at Gigabit Ethernet speeds - no bottlenecks

As an integral part of the WheatNet-IP Intelligent Network, BLADES interface, move, bend, shape, route and control everything you want to do with your audio. If it's audio, a BLADE will handle it - at lightning speed.

Use them organically with our control surfaces, run them from our Glass-E software wherever you have internet access, or control them from the front panels. BLADES make your life incredibly easy and secure.

As you need more functionality, just plug in more BLADES - they come in configurations to handle whatever you need (analog, digital, a/d, mic, MADI). Each BLADE is self-configuring and has the DNA of the entire self-healing network.

With BLADES, you can do everything from a simple (or complex, if you like) snake to STL-over-IP to full-on multi-studio/facility networking - even processing. And because of Wheatstone's partnership with the top suppliers of automation and remote gear, you'll have control over your entire system right from WheatNet-IP. Ruling the world has never been easier.

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Four CAT-6 cables and a low-cost switch that handles the gigabit speed WheatNet-IP runs at.

Let's do the math - plug in eight connectors, power up a console and three BLADES, add your audio and you are ready to rock, roll and rule the radio world. Brilliant, you ask? Nah - just really, really intelligent.



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See us at IBC 2012 - Stand 14.119

EVERY BLADE FEATURES

Two 8x2 stereo virtual Utility Mixers that can be used for a wide range of applications; for example, using Wheatstone's ACI Automation Control Interface, your automation system can control the mix for satellite or local insertion switching

Front panel bar graph meters switchable to display source input level or destination output level after gain trim

Front panel routing control - any system source to any destination on that BLADE

Front panel headphone jack with source select and level control - monitor any system source

Flexible GPI logic - 12 universal logic ports, programmable as inputs or outputs, routable throughout the entire system

Built-in web server so you can configure and control locally or remotely without having to run dedicated software

SNMP messaging for alerts

Silence detection on each output that can trigger alarms or make a routing change

Silent - no fans - can safely be located in a studio with live mics



Comrex Access Works With 4G LTE

At the Races and the Fairgrounds, Wireless Broadband Makes the Broadcast a Winner

USERREPORT

BY ALAN JURISON

CSRE, AMD, DRB, CBNE
Senior Operations Engineer
Clear Channel, Cincinnati

SYRACUSE, N.Y. — The summer remote season is always busy, but a few key events require more attention. There were 100 hours of special event broadcasts that we did in the summer of 2011, when I was working with Citadel in that market. The big events that we were tasked to cover were the NASCAR race at Watkins Glen and the New York State Fair in Syracuse.

As an early adopter on the 4G LTE network for laptop connectivity, I had been working with Comrex getting 4G LTE driver support for their products. Their engineers were able to deliver drivers that are compatible with the Pantech UML 290 USB wireless modem in both 3G and 4G modes.

SPECIAL EVENTS

We did our first 4G LTE tests in early July in preparation for NASCAR races at Watkins Glen. Verizon launched 4G LTE in July at the site for the race and concert season. We sent one of our pro-

duction members down there to meet with management to find our location, and also test the Comrex Access portable codec.



Roundtrip transmission delay was around 100 – 150 ms for a 161 kbps/161 kbps codec, as opposed to our typical 500 ms – 1.2 sec roundtrip for a 30 kbps/80 kbps codec on Verizon 3G EVDO. Overall, the lower latency and higher bandwidth on the Verizon 4G LTE network is amazing.

We were able to achieve what we would have if we had dropped a DSL or cable modem at this spot. And here he was, standing with the Comrex Access in the infield, running on battery, no

cables at all.

The NASCAR broadcasts at Watkins Glen in August went flawlessly. We broadcast for three hours on Saturday and two hours on Sunday. We were able to use a higher quality codec (higher bitrate) than we would have used on 3G — not a single audio glitch reported.

That would have been impossible on 3G technology given the crowd of 85,000 of people at the venue.

The New York State Fair is held annually in Syracuse, and it generally has 900,000 to 1 million attendees for its 12-day run. Needless to say, broadcasting live from the fair is an annual tradition for all TV and most radio stations in the market. Over my years working there, we constantly strived to provide a better broadcast from the venue. Before my time, 15 kHz equal-

ized lines were used. When I started working there 18 years ago, we would use Marti RPU with a 67 kHz FM subcarrier as an IFB/backhaul. In the early 2000s, we switched to ISDN and we added Internet access in 2002 to help with remote control and show prep. As bandwidth and Internet reliability increased over the years, we switched to Comrex Access in 2010 via cable modems.

The fair moved the broadcast location of WAQX(FM) to a new site for 2011. While the site was good from a visibility perspective, it had no telco or cable service. With the 3G networks notoriously clogged with the daily 75,000 to 110,000 attendees, we didn't have many options. We briefly considered dropping a cable modem at another site on the grounds and then using a 5.8 GHz spread spectrum solution to deliver IP to the broadcast location. However, that would have taken significant resources to execute. With the Verizon 4G LTE network launching just a week before the fair, and given our success in Watkins Glen, we decided to use that as a primary, and then fall back to Marti RPU if needed.

WAQX broadcast daily from the fair and things went extremely well. For codecs, we used AAC stereo 96 kbps from the fair to the studio, and AAC-LD stereo 128 kbps from the studio to the fair. We also used the Ethernet port on the Comrex Access codec to provide Internet + VPN access to a computer for the hosts to do show prep, check email and remotely control the Scott Studios SS32 on-air automation system.

Interestingly enough, when we were testing before the fair, we decided to see if we could make the 4G LTE network choke. We transmitted stereo, linear 44.1 PCM audio in both directions for four minutes without any drops in audio. That's pretty impressive knowing you can do that if you wanted, and it's a good demonstration of the available bandwidth. We would have tested it longer, but alas, with a 5 GB monthly limit, we didn't want to eat all of our bandwidth up on a test.

Concurrently with the WAQX broadcasts over Verizon's 4G LTE network, we had WNTQ(FM) and WSKO(AM) broadcasting via cable modems in three separate areas of the fairgrounds.

Overall, the Comrex Access and Verizon's 4G LTE network provides a robust and flexible way to conduct remotes. My former colleagues in Syracuse report the combination of these two solutions continue to perform well for them, and in fact, Verizon has added additional 4G LTE sites to the market since last summer to improve coverage.

For information, contact Chris Crump at Comrex in Massachusetts at (978) 784-1776 or visit www.comrex.com.

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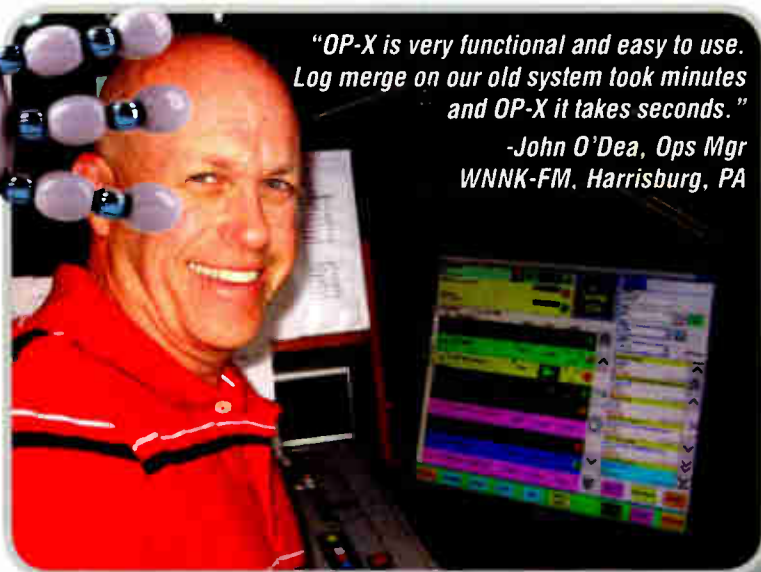
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*-John O'Dea, Ops Mgr
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iPad app Features

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World Radio History

Graham Studios Radius Pleases Salem

Furniture Arrived Early and Assembled Easily

USERREPORT

BY ANDY PICKARD
Director of Engineering
Salem Dallas

DALLAS — In January the corporation I work for bought a fifth radio station in the Dallas/Fort Worth market. When we originally built the Irving, Texas-located studios, Salem Communications had completed two extra studios. We called the studios KTBD, as in "to be determined," but they have long since been taken over by another station.

So it was time to build two new studios. We've all been through it — architects, contractors, equipment purchases, and, of course, furniture. I called the engineer from the previous owner to find out who had made the furniture in the control room we were acquiring. He informed me it was Graham Studios Furniture. I had not worked with Graham Studios before but if I could match the furniture that I was acquiring with the sale then I thought that would be great.

I called Rod Graham and then sent the architect's drawings to him. Over the next few days we exchanged emails. Rod and I agreed upon a modified Radius XP design. I asked for an extra rack pod and it was no problem. I

needed an extra hatch cut and it was no problem. I would like a quad electrical box in each rack.

Rod said we would want the AC electrical and lighting package. I was skeptical at first but the price seemed right and I thought how many steps I could save not having to get a flashlight every time I work in a rack.

I had also asked about a wiring cabinet and Rod told me the wiring cabinet is included in the furniture.

I was shocked when the furniture was ready two weeks before the rooms were actually completed by the contractors. I told Rod that there was plenty of storage space for early delivery. Plus I thought that would give me a head start on putting the furniture together. When it came in I had a couple of kids from promotions to help out. I was warned the tabletops would be 100 pounds or so.

I was worried about the two rooms of

furniture parts in boxes getting mixed up so before starting assembly I separated the boxes by room. I started opening boxes and kept contents of each box separate. I found that assembly was very



intuitive. My separating each box was not necessary.

I found that the hardware was exactly the amount required. Then I found an

extra bag with at least one extra of everything needed. I ended up using the extra hardware in the project.

First I built the pods and wiring cabinets. When the rooms were ready I moved the pods and wiring cabinets into the rooms respectively and bolted them together. I punched the room intercon-

nect multipair cables and the AC electrical and lighting package before adding the table tops. The electrical package was color-coded for easy installation. In fact, the electrician offered to do all of the interconnection for free.

The installation went smoothly. After the contractors finished with the rooms the station was on-site within two weeks. I found the Graham Studio Furniture one of the least stressful parts of the studio building experience.

For information, contact Rod Graham at Graham Studios in Colorado at (970) 225-1956 or visit www.graham-studios.com.

ABOUT BUYER'S GUIDE

Radio World publishes User Reports on products in various equipment classes throughout the year to help potential buyers understand why colleagues chose the equipment they did. A User Report is an unpaid testimonial by a user who has already purchased the gear. A Radio World Product Evaluation, by contrast, is a freelance article by a paid reviewer who typically receives a demo loaner. Do you have a story to tell? Write to bmoss@nbmedia.com.

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TECHUPDATES

STUDIO TECHNOLOGY PROVIDES FULL FURNITURE SERVICES

Studio Technology says that it designs, constructs, delivers and installs studio furniture for the broadcast industry nationwide.

It adds that its design and construction expertise enables the company to provide a range of standard and custom furniture to its customers.



Studio Technology says it can provide a simple custom configuration that is priced competitively with modular furniture, as well as higher-end furniture using solid-surface or other alternative materials.

It has provided furniture for one-room studio renovations as well as participated in major projects on both coasts and in Hawaii. It notes that it will work with any systems integrator or local and on-site staff. It also says that it can provide complete delivery and installation of the furniture they manufacture.

For information, contact Studio Technology in Pennsylvania at (610) 925-2785 or visit www.studiototechnology.com.

REALTRAPS MAKES QUIET PORTABLE

The RealTraps QuietZone is a portable recording booth that's large enough to create a quiet and acoustically dead recording environment for many recording or broadcast applications. It's ideal for singers and voiceover artists, as well as brass players. The RealTraps QuietZone is equally useful as a cellphone "privacy station" in restaurants, airports and other noisy locations. It assembles easily with just a screwdriver, and at 6 feet 7 inches high even very tall people can be accommodated.

The QuietZone features a much larger, free-standing setup that offers three times the absorbing surface area of the RealTraps Portable Vocal Booth, and double the surface area of the RealTraps Carrel.

Available fabric colors are black, white, wheat and gray, though the metal frame and legs come in black only. Price: \$599.99.

For information, contact RealTraps in Connecticut at (866) 732-5872 or visit www.realtraps.com.



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Phoenix is the highly anticipated "productionization" of Innova. Now you can get the "best of" - a distillation of successful, proven custom designs - built with the same rugged materials and constructed with the same exacting techniques as the Innova line, but at a significant cost savings. The entire line is flexible and fluid, allowing for further modifications at surprisingly affordable prices.



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Cumulus Atlanta United With Omnirax

Engineering Manager Praises Smooth Process in Design and Build-Out

USERREPORT

BY MARC LEHMUTH
Engineering Manager
Cumulus Media Partners Atlanta

ATLANTA — Life at Cumulus Media's flagship facility in Atlanta is never dull. Our Cumulus stations here, all FMs, include Q100 (WWWQ), Rock 100.5 (WNNX), 99X (WWWQ-HD2), Journey 97.9 (WWWQ HD3), All News 106.7 (WYAY) and Kicks 101.5 (WKHX). We also house the Dickey Broadcasting Co.'s stations, all AMs, 680 The Fan (WCNN), 1230 The Fan 2 (WFOM) and 1340 The Fan 3 (WIFN). As of this writing, there are 18 air and production studios either operating or under construction.

We've been working with Omnirax since our first project in 2010 at the Atlanta Braves Turner Field where we built "a studio in a stadium" to serve Dickey Broadcasting Company's 680 the Fan and Cumulus Media's Rock 100.5. Since that project, Omnirax have become Cumulus' "go-to guys" when it comes to broadcast furniture.

ONGOING COLLABORATION

Working with Omnirax is not simply a matter of calling up and ordering some preconfigured furniture, instead, it is a collaborative design process. We've been at this address since 2001 and are constantly in the process of developing and improving the space. In these times of rapid change — in technology, format and business models, as well



as the necessity to maximize return on space — an efficient studio design is of paramount concern.

The process begins with our providing Omnirax with field dimensions and rough drawings of our proposed space and furniture layout. They then convert our rough drawings into precise CAD layouts and arrange to meet via the Web. I work directly with David Holland at Omnirax. He sits in his office in California while I'm in the Atlanta studios. We discuss each studio individually as well as the cluster as a whole to maximize workflow.

The starting point is describing what type of studio we're building — air, production, voice track — and what personnel we need to accommodate. We then get into specifics such as console size and rack requirements. For each position, we consider console, monitors, keyboards and whatever gear needs to

be in immediate arm's reach, within sight or concealed safely behind covers. As we're reviewing these considerations, David is placing elements in the drawing and roughing out the furniture layout. I'm able to present what's most important for function, and he's able to marry that with structural considerations so the furniture is rock-solid.

The beauty of this method is that we're easily able to play "what if." Testing a change in the layout requires just minutes as we rearrange the furniture on the fly. David is able to bring in illustrations of how Omnirax's expertise has handled similar situations in other studios — in the Cumulus network or beyond. Once we have a preliminary layout, David immediately creates a PDF for me to share with our people here: program directors, talent and management. We'll take their feedback and do a follow-up session to further refine

the design. I provide field measurements for power to enter the furniture system. We prefigure the cable runs and map out all the raceways and blocking areas. Whether it is conduit up from the floor or junction boxes in the wall, Omnirax will precision cut holes for monitors, mics, console and other accessories so that the furniture is ready to wire up as soon as it's built.

You might think that the price for this level of customization is high, but this active collaboration actually serves to keep the price down. Working together so closely enables us to "build to budget." Together we make judicious decisions which most often revolve around "putting the money where the mouth is," and we don't overspend for functionality we don't need. Plus, because of the way the furniture is conceived, built and packed for shipping, we save time and money in labor once it arrives. The furniture arrives with all racks fully-assembled including pre-mounted hardware and removable access ports. The supporting panel system and countertops are flat packed — securely shrink-wrapped with foamed edges for protection. Specialized tools and detailed instructions for each studio are provided (including photos of the studio fully assembled), but the truth is that after building so many Omnirax studios we barely have to look at the directions.

Our many projects with Omnirax receive consistent praise from our personnel, guests and engineering staff. Their CAD/CAM manufacturing process does not just offer high precision but comes in on time and on budget every time.

For information, contact Philip Zittel at Omnirax in California at (800) 332-3393 or visit www.omnirax.com.

TECHUPDATE

WHISPERROOM ADDS ACCESSORIES

WhisperRoom, a manufacturer of sound isolation enclosures, says it listens to clients' requests and has added new features based on client input.

An addition to the product line is the XLR Panel. The XLR Panel is a 40-inch wall component with a prewired XLR panel insert consisting of four XLR jacks and four 1/4-inch stereo jacks. This feature comes with a 26-inch x 36-inch window above and a 2-inch cable passage below the panel.

WhisperRoom also offers ceiling-mount ventilation on units that can accommodate the ventilation duct boxes on the ceiling. The standard ventilation system consists of two or more duct boxes (depending on the size of the WhisperRoom) mounted on an exterior wall and protrude 5.5 inches off the wall(s). The ceiling-mount option is great for situations where space is a concern or the client prefers the ventilation system to not be visible. It is important to determine if the host room ceiling will allow for the addition of this optional feature.

For information, contact WhisperRoom in Tennessee at (423) 585-5827 or visit www.whisperroom.com.



HOST CAN SEE GUEST WITH HEIL SB-2

Heil Sound offers a variety of microphone booms and stands.

In the company's view, broadcast studios have become filled with so many large articulated arms that hosts can hardly see their guests. Heil claims to have solved this problem with its low-profile SB-2 small boom.

The SB-2 is adjustable from 6 to 24 inches. It can mount with the unique DT-1 mount, a C clamp or on top of the Heil 13-inch riser.

For the host, the award-winning PL2T Topless is one of the leading booms. Internal springs make this a quiet boom and the Heil trademarked Topless feature allows the microphone cable to be laid into the channel without removing the connector.

Heil Sound's latest is new Heil HB-1 Economy boom, retailing for \$70.

Heil booms hold up to 3 pounds and fit all of Heil's C clamps, risers and wall mounts. The Heil CB-1 PTT desk stand is a reproduction of the original RCA desk stand, including chrome trim. An SPST button can be wired for push to talk or cough button relay control.

For information, contact Heil Sound in Illinois at (618) 257-3000 or visit www.heilsound.com.



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SPEAKER CALIBRATION
Built-in RTA and pink noise generator allow you to calibrate your speakers to ensure your processing decisions are made on accurate, calibrated monitors.

RDS ENCODING
Send RDS without losing loudness by using the built-in RDS encoder. Loudness is maintained due to the method of embedding the RDS signal. (More of that special sauce makes this possible)



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USERREPORT

BY GREG LOWE
Chief Engineer
CKFG(FM)

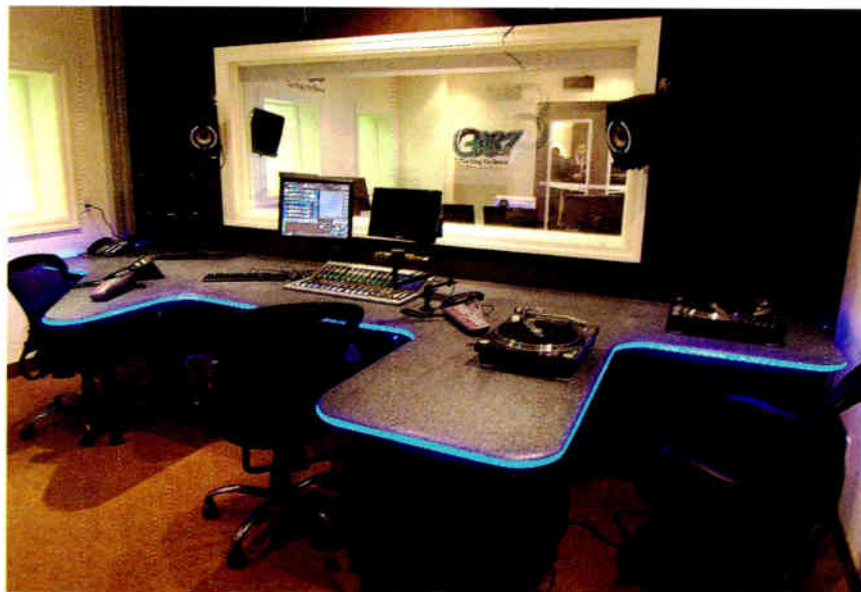
TORONTO — With large multiplatform media conglomerates ruling the radio landscape in the Toronto market, the design of individual radio stations has become “cookie-cutter,” resulting in studios that look more like office suites than lively spaces.

So, how does one plan the look of a radio station that would like to break away from the monolithic appearance of millwork in the Toronto area? In summer 2011, G98.7 FM (CKFG), Canada's first urban adult contemporary-formatted radio station, took on the task of answering this question.

Given that G98.7 FM is a standalone station, we wanted a unique design for our newly-licensed broadcast entity. From the get-go, it was decided that our studio facilities would be different.

CORIAN TOPS

With help from Ron Mitchell and his team from RAM Broadcast Systems, we chose a clever adaption of sturdy Corian surfaces for our master studios. The Corian tabletops were assembled in three pieces: a solid Corian top, a thin translucent Corian in the middle and a small Corian edge piece at the bottom. The result is a sandwich effect with the



translucent blue Corian backlit with blue LEDs. The solid surface looks sandy grey with hints of green and blue, and the effect is that of a tropical beach, ocean and blue sky. The result is impressive, as it complements our Wheatstone EI control surfaces well, and after a year of use, is thus far proving to be very durable.

While G98.7 FM is a music-intensive station, the station is also committed to delivering a substantial amount of spoken word and news programming. As a result, the master studios are configured to accommodate a talk format. Master Control accommodates an operator/host, as well as positions for a producer and DJ. The host or operator has the use of

two on-air computers and CD players and the ability to route any signal available thanks to the Wheatstone IP network.

The master studio, which can seat five people, is the home to the morning show and several weekend talk shows. Holes were drilled easily in the Corian for LCD monitor arms and low-profile microphone arms and grommets, which were also supplied by RAM Systems. Two racks are at each end below the table in this room that accommodates microphone processors, UPS and Wheatstone Blades. The tabletop is of generous size, and can accommodate six LCD monitors.

Other studios within G98.7's facility use more traditional laminate construc-

tion, also supplied by RAM Systems. Two production rooms and our newsroom and news booth were fitted with this furniture. The under-table racks are Middle Atlantic SRS slide-out rail systems. This allows easy access to rack-mounted equipment without having to crawl behind in order to access connections. In the production studios, small custom-built tabletop racks were supplied. These racks sit on round pedestals, allowing for cabling to run through them and below the tables' surfaces. This allows for greater use of the surface.

Before the project was approved 3D renderings were developed. These provided tangible sense of what the actual layout would look like, since, at that time, the entire physical radio station only existed on paper.

All the furniture was delivered by the RAM team, and assembled over several days. Final placement of holes for microphone arms and video mounts were done on-site. The Corian furniture came in pieces for each room. Assembly consisted of gluing and sanding, ending with a favorable result. One would never know that the surfaces in master control and master studio were constructed from several pieces. A combination of floor racks and steel legs and wood panels support the tables. Steel T-bracing helps with support of the counter. Since there is only an edge piece of Corian along the bottom of the table, cables of cable trays can be affixed to the wooden base underside.

The master studio and master control are the showcases of the radio station. As a visitor, when you enter the main lobby of the station, the master studio is directly in front of you. People are impressed by the furniture and blue LED glow that emanates from it. Coincidentally, the LED lighting on all of the peripheral equipment within the studios is of the same shade of blue. Our on-air guests, including Toronto's Police Chief Bill Blair, have stated how impressed they are with the look of our studios.

Overall, our experience with our furniture has been positive. The Corian remains robust after a year of use, and our laminate furniture in our production rooms and the newsroom has also been strong.

For information, contact Ron Mitchell at RAM Broadcast Systems in Illinois at (847) 487-7575 or visit www.ramsystemsonline.com.

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TECHUPDATE**RUSS BERGER DESIGN GROUP
CREATES BROADCAST STUDIOS**

More than just a space for broadcast activities, the radio studio is an integral component of the broadcast signal — a key tool production personnel use in creating broadcast programming. As acoustically sensitive spaces within a broadcast facility, these rooms, where audio programs will be recorded or monitored, require special acoustical design expertise.

Russ Berger Design Group (RBDG), which specializes in architectural and acoustical design for broadcast facilities, has created more than 400 such facilities to date, including 80 public radio studios. Recent clients include New Hampshire Public Radio (pictured), KUNV (which broadcasts from the University of Nevada, Las Vegas), Brigham Young University Broadcast and Southern California Public Radio.

Working with a station's design team, RBDG says it anticipates facility needs for personnel space, adequate support functions, common areas, technical requirements and adjacencies, focusing on efficient traffic flow.

Services RBDG provides include:

- Sound isolation: Studios, booths and control rooms must be protected from extraneous noise outside the building or in adjacent spaces.
- Noise and vibration control: A radio station's acoustical environment must be sufficiently quiet to differentiate the subtleties of the audio program clearly from ambient background noise.
- Room acoustics: No amount of acoustical finishes can overcome the limitations of a room that is too small or improperly shaped. Adequate clear height is also critical to accommodating sound isolation systems.
- Appropriate layout: The adjacencies of the technical spaces to each other and to non-technical spaces are critical to their proper function.

- Technical infrastructure: The facility must accommodate the special needs of electronic broadcast equipment, not only for today's cabling requirements, but also for advancements in emerging technologies and inevitable equipment changes.

RBDG says that what makes it well-suited to broadcast design is its ability to handle all of these issues simultaneously and balance competing concerns.

For information, contact the Russ Berger Design Group in Texas at (972) 661-5222 or visit www.rbdg.com.

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Harris Plays Role in New WYSO Facility

Custom Furniture Along With Harris Equipment Fill Out Studios

USERREPORT

BY JAMES STITT
President
JMS & Associates, Inc.

YELLOW SPRINGS, OHIO — WYSO (FM), licensed to Antioch University in Yellow Springs, Ohio, has been providing the greater Dayton, Ohio market with NPR and other alternative public radio offerings for over half a century. This past year, WYSO experienced the culmination of a dream of moving into its long-overdue new facilities, including a 4,400-square-foot studio complex designed and installed by JMS & Associates Inc. The studio suite included an air studio, production studio, a 650 square-foot performance studio, newsroom, technical operations center, three edit booths and support areas.

The Harris Pacific Design Center's custom furniture division played a key role in realizing that dream. SCMS provided much of the equipment, including Harris PR&E NetWave consoles and a VistaMax Envoy routing switcher system.

NEW FACILITY

The new facility occupies a renovated university building, originally used as a research laboratory, that presented unique design and construction challenges. WYSO's diverse programming and extensive local production required a facility with more capability and flexibility than many commercial radio stations. For these reasons, plus the fact that this new facility would have to serve WYSO well into the future, it was important not to compromise on



the quality and functionality of the key components. Harris and equipment vendor SCMS rose to the occasion with excellent support.

It quickly became apparent that custom furniture was the best option after researching the modular studio furniture from various manufacturers. Thinking that a local furniture shop would be the most cost-effective, I spent considerable time trying to convey our needs and obtaining quotes with little success.

Our ultimate solution was the Harris Pacific Design Center's custom furniture. Broadcast furniture has many unique requirements that are difficult to convey to a local cabinet-maker, so working with an experienced broadcast furniture manufacturer solved so many potential problems. As a bonus, the cost was no more than using a local cabinet shop.

We worked together to arrive at con-



figurations to fit the available space in all six studios and edit booths, and meet the requested staff requirements — no small feat. The package includes a six-position interview desk that wheels out of the performance studio to accommodate large bands.

Quality and aesthetics were important considerations. This custom furniture was just that, furniture constructed out of real hardwood by skilled artisans with finishes coordinated to match the studio environment. The result is a functional, yet stunningly beautiful, studio centerpiece that will serve the station for many years.

Shipping from California was a non-issue as it arrived in a dedicated moving van that provided inside delivery. Installation was straightforward. Instructions and drawings were provided, which, like all red-blooded American males, we promptly ignored. Good thing everything fit together perfectly.

We chose Harris NetWave consoles and the Harris VistaMax Envoy routing

system, which allows each studio to stand alone without the vulnerability of depending on a single Cat-5 cable to be on the air. Yet, we also have the convenience of networking the entire station to link every studio.

The air studio and production studio utilize 24-channel NetWave frames and are setup identically so that an announcer moving from air to production will be familiar with the layout. Edit booths A, B and C are equipped with 16-channel NetWave frames; the newsroom features an eight-channel version. The companion mic control panels, headphone amps and other accessories combine to create an integrated system. The NetWave prewire kits simplify the wiring and minimize installation time.

All sources in and out of the station, such as the 14-satellite channels, eTech Ohio (a state educational technology initiative) interconnect, codecs for remotes and the automation system are

available on the VistaMax Envoy routing switcher. All six NetWave consoles are also networked via the Envoy. Every source, either from the outside or within any studio, is available everywhere in the station. The new PR&E Vista software makes configuration a breeze.

This project had many challenges, not the least of which was maintaining the existing operation on the air during construction and installation. The client did not have the budget to purchase all new equipment, so the move was carried out in choreographed phases as existing equipment was relocated. My thanks to both Harris and SCMS, who were accommodating in meeting our schedule and requirements.

WYSO is looking forward to a brighter future now that it has the facility and tools to realize its potential to provide the public radio audience with the best product possible.

For information, contact Brian Clifford at Harris in Ohio or visit www.broadcast.harris.com.

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TECHUPDATES

ARRAKIS PUTS THE ACCENT ON FURNITURE

With the introduction of its Accent line of advanced component studio furniture for radio, Arrakis says it is going a step further. According to the company, the metal structure is integrated artfully into the visible design décor of the cabinetry.

With its origins in the console market, Arrakis says it was a pioneer in the metal post and wood panel construction found in most high-end radio studio furniture. An internal metal structure dramatically improved manufacturing tolerances and made high-quality modularity possible.

Arrakis' wood products manufacturing facility is top-of-the-line, including a large-capacity CNC (computerized numerical control) router for complex geometries and surfaces.

Accent is available in standard as well as custom configurations. The hybrid metal frame and structural panel design combined with Arrakis' CNC manufacturing systems tailor the product to fit a studio's size and shape. Numerous colors and textures to match décor are available.

The Accent furniture collection is stylistic and functional, with brushed aluminum frame and customizable tabletops.

For information, contact Arrakis Systems in Colorado (970) 461-0730, ext. 309 or visit www.arrakis-systems.com.



CRENLO'S ESQ OFFERS FLEXIBILITY

According to manufacturer Crenlo, its Emcor ESQ enclosure product line is ideal for applications requiring a high-quality, economical means for housing electronic equipment with a need for flexibility.

Well-suited for broadcast settings, the ESQ is available in seven frame styles — vertical, slope front, low silhouette, wedge, turret, riser and instrument — each of which is modular. It can also be modified or built completely custom to meet the needs of nearly any studio setting.

The ESQ is available in a variety of sizes, including 19-, 24- and 30-inch rack-mount panel widths, vertical frames ranging in depths from 18.5 to 30.75 inches and heights ranging from 12U to 45U. With a number of available sizes, frame styles, work surfaces and configurations, the ESQ is versatile enough to meet the needs of most any broadcast studio, whether a client is looking to store servers or needs an adjustable, control station designed for sitting or standing work environments.

The ESQ ships assembled within two weeks, allowing for rapid installation into the destination studio. A range of accessories such as task lighting, fans, cable management and adjustable monitor mounts are available from Crenlo as well.


For more information contact Crenlo in Pennsylvania at (507) 287-3535 or visit crenlo.com/enclosures.

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ESE offers a variety of remote displays to complement its master clock and master timer product lines. ESE now offers attractive amber, blue, green or red LED displays ranging from 1-inch to 4-inch-high digits viewable from 35 feet to at least 120 feet. Multiple enclosure styles are available including desktop, console-mount, rack-mount and wall-mount.

ESE digital displays operate from the ESE, SMPTE or ASCII timecode outputs available on ESE master clocks/master timers. Also several units of remote displays include the ability to read NTP (network time protocol).

Popular options available on ESE remote displays include the ability to synchronize exclusively to NPR timecode and the ability to have displays showcase time zone offset or date information.

For information, contact ESE on California at (310) 322-2136 or visit www.e-se-web.com.



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ARGOSY CONSOLE OFFERS AURA SIT-STAND TECHNICAL WORKSTATION LINE

Argosy Console says that its Aura line of sit-stand workstations is designed to meet the demands of aesthetic design, durability, flexibility and ergonomic comfort required by engineers who spend rigorous days and nights working at their craft.

The powered Aura sit-stand line offers users the ability with a push of a button to smoothly raise or lower their workstation from 27 inches to 42 inches high in seconds — allowing them to alternatively sit and stand without disrupting their workflow. The Aura's electric lifting columns ensure stability of the workstation at any height, and offer nearly noiseless operation.

The Aura sit-stand line is available in a larger studio-size (model .520) as well as personal-size (model .260), offering flexible and personal options for the way that individual engineers work, with both sizes available in multiple configurations.

All models feature under-mount racks on the left and right. For the upper work area, users can choose from a large wrap-around desk surface or add upward facing racks on the left and/or right wing of the desk. All the Aura sit-stand models provide internal cabling accommodations and pass-through for computers and multiscreen monitoring needs and feature details such as a padded armrest, sliding accessory drawers and perforated steel cover panels.

For information, contact Argosy at (800) 315-0878 or visit www.argosyconsole.com.



MAP VIEWPOINT IS SEISMIC-CERTIFIED

Middle Atlantic says that its ViewPoint console furniture system, the first of its kind to be seismic-certified, offers unprecedented support and protection for mission-critical broadcast applications.

Seismic-certified to UBC, CBC, IBC, ASCE and NFPA requirements, the ViewPoint consoles are also UL Listed and, according to Middle Atlantic, feature exceptional strength and reliability to protect equipment in broadcast monitoring and production environments. They also meet BIFMA standards and are GreenGuard-certified, which Middle Atlantic says reflects the company's commitment to environmental responsibility, and may be used to obtain LEED credits.

ViewPoint consoles comprise fully-welded Uni-Frame workstation bays that simplify installation and can be configured for individual project needs. An array of customization options include wedges, bay extenders for rackmounting deeper equipment, turrets for smaller equipment, work surfaces tailored to each system, side panels and monitor mounts. Designed to maximize functionality and reliability, the ViewPoint system incorporates ergonomic factors, equipment cooling and cable management features.

Middle Atlantic's free Designer 3D layout software simplifies the creation and visualization of ViewPoint console designs, and is available via download from the company's website.

For information, contact Middle Atlantic Products in New Jersey at (973) 839-1011 or visit www.middleatlantic.com.



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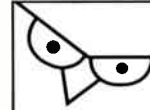
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READER'S FORUM

LOOKING FOR YOUNG ENGINEERS? HERE'S ONE

As a young engineer myself, 25 years old, I can tell you that I started in college radio as a broadcast technician learning AoIP, but I was also taught troubleshooting at the component level.

At the University of Indianapolis, I was tested weekly on basic engineering practice of soldering, crimping, cable construction and overall aspects of the field. I was very hands-on in building studios and doing weekly remotes. The job included weekly maintenance of both studio and transmitter facilities, which I was thrilled to do because when studios and transmitters are clean, you're a happy engineer.

Yes, as a college student and college athlete, being on call 24/7 had its moments. But the overall experience was challenging yet rewarding, because I got hired right out of college as a staff engineer for 10 stations. I'm now a station engineer for one FM and one AM directional.

I owe everything to my college station, WICR(FM). With the likes of their faculty and radio staff, I have no doubt they will keep pumping out new blood into all aspects of radio. The challenge we face today is in keeping the new blood we get and continuing to mold

and grow them.

Everyone can be taught and trained, just like we were — but the passion for radio and willingness to learn is something we can build from my generation.

*Jason J. Ornellas
Station Engineer
Greater Media New Jersey
Cedar Knolls, N.J.*

UNLOCKING THE 'MYSTERY MACHINE'

Apparently nobody from ABC Radio has stepped up yet to describe the New York "Mystery Machine" — two out of four equipment racks depicted by historian Don Browne in RW's June 6 edition.

So for those too young to know what he's asking about, I'll describe what network master control was and how it functioned, essentially unchanged, from as far back as the 1930s.

Back in the day, ABC, CBS, Mutual and NBC each had master control operations in New York, Chicago and Hollywood, and programs for these networks were sent via telephone lines that were leased from AT&T.

The concept of any master control system is plainly the routing of any source to any destination - or any number of destinations - at any time. This characteristic is clearly shown in Mr. Browne's photo. Above each meter are two groups of switches. The top group contains two rows of 12 switches with their associated tally lights. They represent 12 sources (such as Studios 1A, 2A, 3B, etc.).

Beneath are another group representing a dozen more sources. With this capability, while, say, the left-hand group (Group-A) is on air, the tech will be setting appropriate Group-B switches to go to air at the next switching interval. So all the sources are either on air or ready to be, as desired. The system continually bounces between Group-A and Group-B settings.

Also, with Master Control, program sources can be

can be sent to all eight of the available destinations, thus requiring four identically wired racks in a typical crossbar system. MCR routed both outgoing and incoming programs to their proper destinations.

*Oliver Berliner
SoundDesign Engineers
Beverly Hills, Calif.*

RAISE A GLASS FOR HEATHKIT

It's too bad that Heathkit and its era are gone ("Heathkit Folds," *radioworld.com*, July 26). Many of us in engineering learned quite a bit from building a Heathkit or two. The pride in soldering the wires and PCB assemblies to form a finished product was always great. Times are changing to the point that in a few years Radio Shack won't even carry items like soldering irons. It's even getting hard to find parts at Fry's.

*Bill Ammons
Director of Sales and Marketing
Micronetixx Communications
Lewiston, Maine*

A KIT THAT WOULDN'T QUIT

I built probably 100 Heathkits over the years, including three color TV sets. Heath incorporated features into their kits that could be found nowhere else, at any price. It was always a thrill to have a kit work the first time, but if necessary, troubleshooting was easy. Most problems could be traced to cold solder joints or silly mistakes made by working on a kit when one was tired.

*John Bauer
Retired Engineer
ABC News
Burke, Va.*

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Mike Payne
Payne Engineering
Twin Falls, Idaho

Show: Heil PR 20

Finding Interoperability in Unlikely Places

Wheatstone VP Says Open Standards Create 'Intelligent Network'

COMMENTARY

BY ANDREW CALVANESE

How many times have you lost your car keys or wallet, only to find it was in your pocket all along? It seems our search for studio interoperability is no different.

As engineers, we're always looking for new standards that can solve problems and make life easier. That's why I am a member of the Audio Engineering Society Standards Committee X192 task group. I have no doubt that the work we

with true IP and Ethernet connectivity, which in turn makes it possible to control consoles, devices and studios through a common interface: the intelligent network.

Every single device in our WheatNet-IP system, from the largest console to the smallest button panel, connects over IP and communicates using these standard protocols, giving every device visibility and control of every other device on the network. This is the ultimate goal of the standards groups and Wheatstone and its partners are already there.

Even those earlier methods that are used in lieu of true IP, such as the CAN

events that require sending multiple audio streams to large speaker clusters in a stadium, for example. And the pro audio market, being many times larger than the broadcast market, has many more device types and manufacturers to deal with. That's why the AES is trying to develop these standards.

We're interested in these standards as an industry because AoIP manufacturers also deal with clocking and latency issues to varying degrees, and Wheatstone is no different. Lacking a sufficient standard for this, we all have developed our own clocking schemes for striking that balance between the amount



iStockphoto/porcorex

are doing there will result in interoperability standards for audio, some of which are already tried and tested in our WheatNet-IP AoIP system.

For example, a lot of our automatic discovery technology for polling the AoIP network and adding new devices as they come up is also being pursued by the X192 task force.

But what is missing in the open standards discussion is the fact that for us broadcasters, studio interoperability already exists. In terms of being able to pot up a fader from two rooms away or turn mics on and off, raise or lower levels on processing, and select mixers or codec gear from anywhere in the AoIP network, we're already there. And have been for quite some time.

An infrastructure already exists whereby broadcasters can control the entire studio, from the automation on down to the microphone level. And in case you're wondering, we can do all this and control levels, set gain and do so much more without having to run a slew of individual apps from different vendors.

I know of a thousand or more stations that are doing exactly that, all day, every day.

Ironically, the reason why we are so far ahead in this regard is because of open standards. IEEE standards like TCP/IP, RTP, IGMP, and so many others are what make interconnectivity feasible and interoperability between sources, devices, consoles and studios possible. Without these, we wouldn't have been able to design an AoIP system

bus, RS232, RS485, etc. serial bus protocols used in other AoIP systems to connect consoles and IP engines, are standards-based. As limited as these are in their ability to pass on the full control and logic necessary for true interoperability due to their point-to-point connectivity, they are stepping stones along the way.

The same goes for early audio standards like MADI, which is still going strong, as evidenced by the racks full of MADI I/O boxes and intercoms out there. It's the reason we added a MADI port to our Blade IP access unit; we wanted studios to interconnect to all that gear that existed throughout the facility, and we recognized that a MADI interface could create that bridge for broadcasters.

In truth, interoperability exists on so many levels already. All the metering packets, command controls — starts, stops, audio processing — all the intelligence that needs to exist to oversee a large networked audio system, all that is taking place in studios today.

So what new open standards are we really talking about here? Specifically, we're all examining the protocols and standards needed to solve latency and clocking issues when dealing with multiple streams of audio in the context of the economic advantages of Cat-5 cables, issues that are of critical importance to pro audio more so than the everyday radio operator.

After all, it's the pro audio guys who have to deal with OoS, or lack thereof, inherent in IP when covering live, staged

of buffering needed to align audio packets in time and the very time it takes to buffer the audio samples, hence latency.

Wheatstone's approach is somewhat different than that of other manufacturers because our system happens to run on a later, and therefore much faster, generation of IP connectivity protocols. One gigabit/second transference, compared to others' 100 mbps network speed, gives us a more acceptable latency versus buffering tradeoff. You don't have to specifically choose to make a stream low-latency; they all are.

It's understandable, then, that AoIP manufacturers lacking the network speed, especially those focused on the pro audio market, would look to new standards to help solve some of those problems and give them the ability to connect their devices together and pass audio between them.

One of our goals for the AES-X192 task group is to create this standard so that one day you'll be able to stream your console monitor output directly to your X192-enabled power amplifier or speakers. Protocols like Ravenna are a good first step.

In the grand scheme of things, we all benefit from open standards. But while we're searching for the next open standard to solve these and other issues for the entire audio industry, it helps to remember that the Holy Grail of true interoperability can be found in a good many broadcast studios today. All we have to do is look.

Andrew Calvanese is vice president, engineering at Wheatstone Corp.

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Website: www.radioworld.com
Email: radioworld@nbmedia.com | Telephone: (703) 852-4600
Business Fax: (703) 852-4582 | Editorial Fax: (703) 852-4585

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SUBSCRIPTIONS

Radio World, P.O. Box 282, Lowell, MA 01853
TELEPHONE: 888-266-5828 (USA only 8:30 a.m.–5 p.m. EST)
978-667-0352 (Outside the US) FAX: 978-671-0460
WEBSITE: www.myRWNews.com
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T: +34-607-31-40-71
SOUTHERN EUROPE, AFRICA, MIDDLE EAST:
Raffaella Calabrese, rcalabrese@broadcast.it
T: +39-02-9288-4940 | F: +39-02-7004-36999
UK & IRELAND, CENTRAL & NORTHERN EUROPE:
Graham Kirk, g.kirk@audiomedia.com
T: +44-1480-461555 | F: +44-1480-461550
JAPAN: Eiji Yoshikawa, callem@world.odn.ne.jp
T: +81-3-3327-5759 | F: +81-3-3322-7933
ASIA-PACIFIC: Wengong Wang, wwg@imaschina.com
T: +86-755-83862930/40/50 | F: +86-755-83862920
CLASSIFIEDS: David Carson, dcarson@nbmedia.com
T: 212-378-0400, ext. 511 | F: 866-572-6156

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PHILADELPHIA, PENNSYLVANIA



left:
Morning show co-hosts Philadelphia
Veteran Newscasters: **Larry Mendte** (left)
Al Gardner (right) in the Air Studio
below:
Mitch Merman at the Editor's Desk
below left:
Taylor Miller in Master Control



FM MAKES THE NEWS IN PHILADELPHIA



"I don't pick equipment – I pick the best broadcast and IT professionals, put them together and leave them alone to create a great technical plant."

Randy Michaels, Founder and CEO, Merlin Media, LLC

"Broadcasting from an abandoned power plant in Fishtown" Merlin Media's veteran news anchors enjoy a commanding view of a town that's not accustomed to news on the FM dial.

Control points in the large air studio feed consoles in master control and the editors desk and are supplemented by 4 editor's pods and a bank of satellite-delivered programming. So each broadcast can range from a collaboration of talent, to a diatribe of one.

In these studios, built on IP audio standards, Ethernet controlled Airtools mic processors talk to Radio Systems Network consoles which air RCS and Burli audio storage/delivery systems (without a sound card in the building) and callers from the Telos VX phone systems, to Tie-Line codecs that reporters manage over Android

smart-phone apps all connected by the plug-and-play StudioHub+ CAT-5 wiring backbone.

There is no such thing as a "standard" news operation. But now that radio has IP audio standards, with the right integration we can talk to a vast world of Cloud and Internet based systems. That's what IP stands for at Radio Systems – an Integration Protocol – for total connectivity.

below, from left to right:

Gerrett Conover
Vice President

Daniel Braverman
President

Michael Sirkis
Chief Engineer

Dennis Greben
Manufacturing Manager

Jo-Ann Dunn
Sales Manager



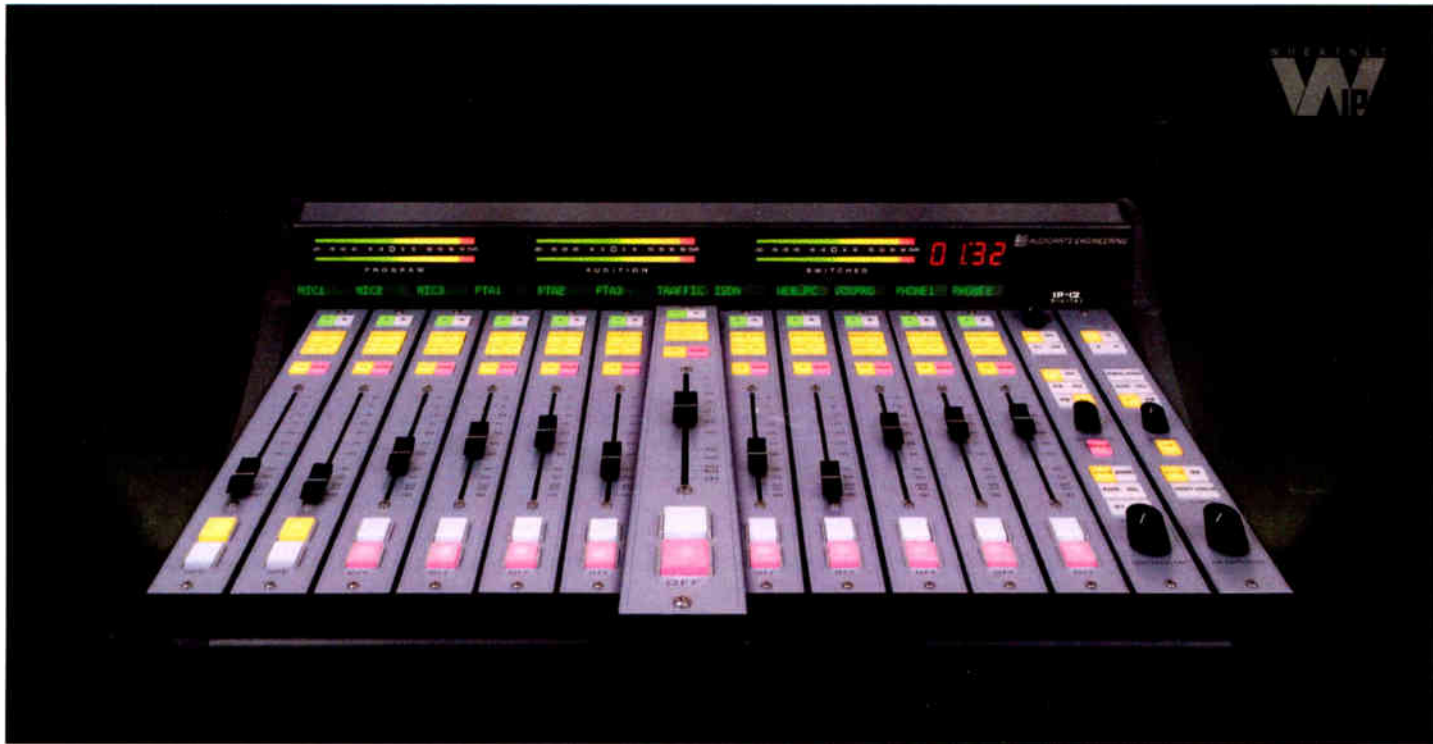
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