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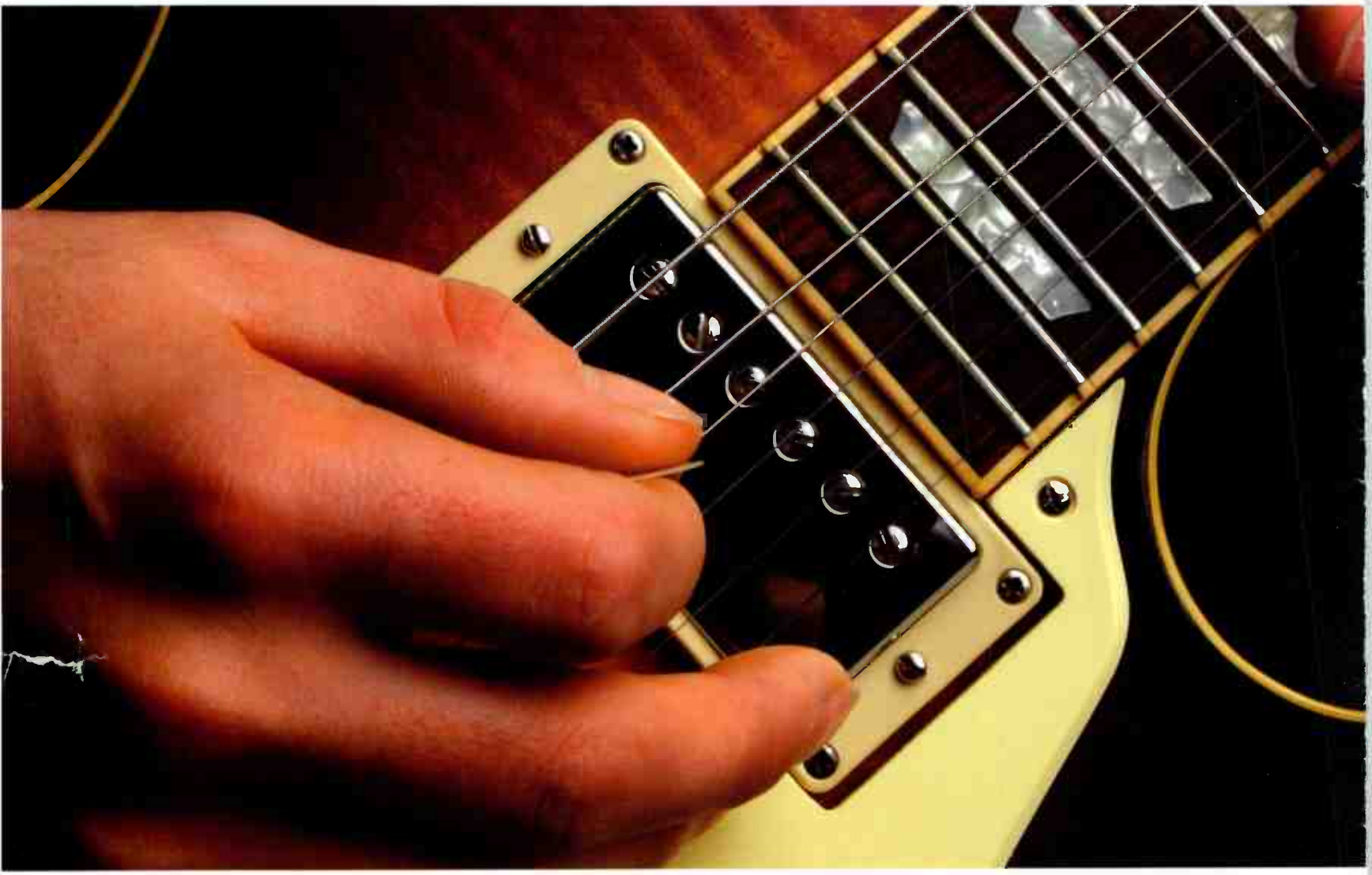

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*Cover photo by Dan Skinner, executive director and general manager, WKSU-FM.*

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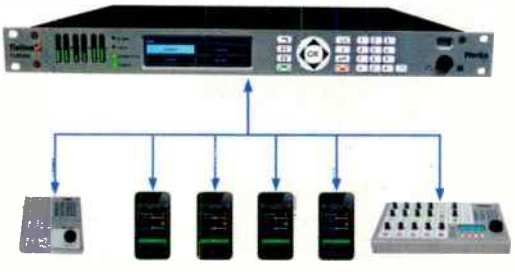

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# Obama Nominates Tom Wheeler as FCC Chief

The White House has announced that President Obama will nominate venture capitalist Thomas Wheeler to be the chairman of the Federal Communications Commission. Wheeler is currently managing director at Core Capital Partners, a venture capital firm based in Washington, DC. He has worked for several startup companies, and he has also worked as a lobbyist for the wireless and cable industries.

It's been stated that President Obama will make the announcement on May 1. From there, the Senate will have to confirm the nomination. He would replace Julius Genachowski, who has headed the Commission since June 2009.

Wheeler served as president of the CTIA from 1979 until 1984. He is also the cofounder of SmartBrief, an online news service. Wheeler worked in Obama's 2008 election campaign.

With Genachowski stepping out of the FCC, FCC Commissioner Mignon Clyburn will serve as acting chair of the FCC pending Wheeler's confirmation by the Senate.

## Katz Radio Report: Radio Listening Up in 2012

Radio sales rep Katz Radio Group released results of audio listening trends over the period from Oct. 2011 to Sept. 2012. In the most recent RADAR findings, broadcast radio continues to strongly dominate listening - reaching 243 million listeners per week and representing 92.4 percent of all listening. In comparison, digital listening currently represents only 7.6 percent of all audio listening.

"The latest findings bear out what we continue to find from all our research - and hear from consumers - that broadcast radio is still by far the overwhelming leader in audio listening," said Mary Beth Garber, EVP/radio analysis and insights at Katz Radio Group. "Broadcast radio isn't losing listeners - in fact just the opposite, which makes it clear that digital listening actually represents incremental listening. So as digital listening - which is both AM/FM digital listening and personal music collection digital listening - continues to grow, it is an expansion of broadcast radio listening, additive to it rather than a substitute. Research from Infinite Dial 2012 shows that digital listeners are also heavy broadcast users; digital extends the reach and popularity of broadcast radio to new devices and new listening opportunities. We're pleased with digital's growth and how it has added to the broadcast radio experience."

NABSHOW

The Society of Broadcast Engineers elevated Lawrence V. Behr, James B. Schoedler and Larry J. Wilkins to Fellow at the 2013 NAB Show. The Fellow honor is the highest membership level in the SBE.

2013 PICK HIT Radio

See the top 20 new products from the convention in the *Radio* magazine Pick Hits at RadioMagOnline.com.

NAB Executive Vice President and Chief Technology Officer Kevin Gage presented an overview of the first full year of work by NAB Labs, and charted a course for the industry's future at the 2013 NAB Show.

**92,414**

2013 NAB Show attendance. Registered attendance was slightly more than 2012 actual attendance.

Total Traffic Network will provide its 24/7 News Source newswire service to all of Univision's news and talk-formatted stations.

## FCC Releases Report on 2011 National EAS Test

Following the Nov. 9, 2011, national EAS test, the Federal Communications Commission says the test shows the EAS to be sound overall, but there are areas for improvement. Shortcomings included poor audio quality, no Primary Entry Point connection to FEMA, the inability for some stations to receive or retransmit the EAN, an overall short test length, and various anaolies in EAS equipment and programming. More details are at RadioMagOnline.com.

## Silicon Labs Intros Single-die, All-in-one Digital Radio IC

Silicon Labs has unveiled its new monolithic Si468x receiver IC, what it says is the first single-die antenna-input-to-audio-output digital radio receiver chip. Using software-defined radio technology, the receiver IC brings FM, HD Radio and DAB/DAB+ broadcast capabilities to a wide range of consumer devices.

## SPX to Close Dielectric

In a letter sent to company customers on April 19, GM Mark Fichter made the announcement that SPX would discontinue manufacturing Dielectric products.

Since then, industry professionals have suggested that perhaps the company would be salvaged through another major antenna manufacturer.

This remains to be seen.

**FIND THE MIC AND WIN!**

Tell us where you think the mic icon is placed on this issue's cover and you could win Hosa USX-100 mic-to-USB interface. Send your entry to radio@RadioMagOnline.com by June 10. Be sure to include your guess, name, job title, company name, mailing address and phone number. No purchase necessary. For complete rules, go to RadioMagOnline.com



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VIEWPOINT

# A Silver Convention

Another NAB show has come and gone. For me, I'm running nearly nonstop for the six days I'm there. Much of my time is spent on the exhibit floor looking at new technology. On these rounds, there are three common questions I am asked: How are you holding up? How are your feet? (Funny how the feet are separated in this case.) How many NAB conventions have you attended?

This was my silver anniversary. I attended my first NAB convention in 1989 and have attended every year since. I know I don't hold a record, but it is something of a milestone. (Dave Hultsman of Continental Electronics was attending his 50th convention, by the way.) As I shared my career event, I kept thinking about what was different between then and now.

Of course Las Vegas has changed considerably. All but one (in 1990) of the conventions I attended have been in Las Vegas. The first two conventions I attended I stayed in a motel on the strip. Yes, a motel. But the Strip looked very different then. The Landmark, the Stardust, the Frontier and many other hotels were still standing.

But what about the technology? I had to go back and jog my memory to recall some of the specifics.

At the 2013 NAB Show, a renewed interest in revitalizing the AM band was a common theme. But it's not a new idea. In 1989, outgoing FCC Chairman Dennis Patrick was a speaker, and he noted the FCC's efforts to help the AM service. He also criticized the abuse of translators. Charlie Morgan popped champagne at the NRSC meeting to celebrate the FCC adoption of the AM RF mask standard NRSC-2.

An improvement for FM was also discussed so many years ago. FMX, a system intended to reduce the noise floor in stereo FM transmission, had been introduced a few years earlier, but it was not seeing the success anticipated by its inventors and subsequent intellectual property holders.

How about products from the exhibit floor?

Editing audio and video on a computer is a simple task today. There are even free audio editing tools available. But in 1989, a new product was introduced that claimed it broke new ground in price and performance. It was the AKG DSE 7000, a stand-alone, computer-based multitrack audio editor. And it only cost $30,000. I used the DSE 7000, and for the day, it was quite a machine. The ability to slip tracks was amazing for someone who used multitrack tape for many years. And unlike previous multitrack digital editors, edits were completed quickly without waiting for the processor to crunch all the data.

Cart machines were still the kings of audio playback. That year, a new model from Broadcast Electronics was unveiled. Dolby also showed SR noise reduction for cart machines. R-DAT was still on the rise as a portable and long-form recording format. Radio Systems showed the RsDAT, a DAT machine with broadcaster-friendly connections and controls, and Panasonic unveiled a prototype DAT editing system.

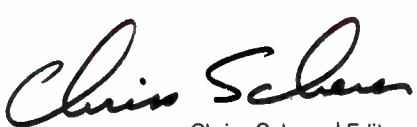
An idea that gathered interest in 2013 was Omnia Direct; an interface to digitally transmit the composite output of an Omnia on-air processor to a Nautel transmitter. In 1989, a digital composite STL was shown from QEI called the CAT/LINK. And on the transmitter side, improvements in solid-state transmitters were shown.

The Pacific Recorders and Engineering Radiomixer made its debut in 1989 as well. Stand-alone analog mixers are still available and viable today, but strong attention has turned to network audio routers and controllers.

For all the technology advances we have made, it's interesting to realize that in some ways the arguments and challenges are still the same.

The final comparison covers the convention attendance. In 2013, the NAB Show drew more than 94,400 people. In 1989 there was a record crowd of 50,136.

So now I have my next 25 NAB conventions to look forward to.



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Dan Jackson, engineer for 92.9 FM in Perth, Australia was faced with a unique challenge. Breakfast hosts Paul Hogan and Lisa Fernandez would be cycling for hours in strong winds and pouring rain as part of the 92.9 Kids Appeal for Telethon.

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# Standards of FM Allocation and Interference

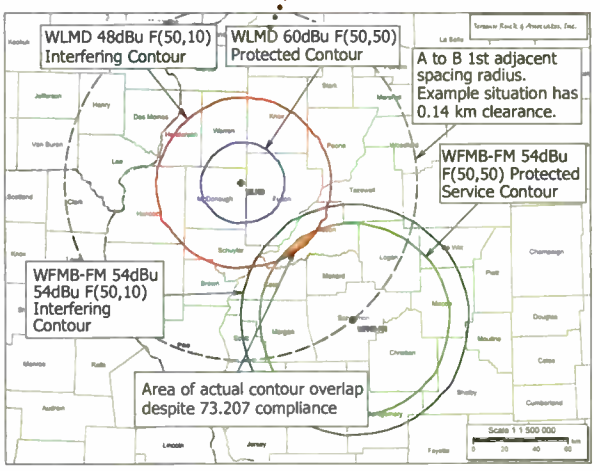
by Jeremy Ruck, PE

This month we look at the standards of FM allocation and interference. In essence there are two main sets of standards to consider when examining the FM band in total, with a third smaller hybrid set. The first is what affects all facilities in the non-reserved or commercial portion of the band. The second is what pertains to non-commercial stations, or those in the reserved portion of the band below 92.1MHz. The third set affects those in the border region between the two portions of the band.

One of the main foci of the FCC is to ensure the fair distribution of spectrum use among the various communities. Obviously, to distribute the spectrum in such a manner requires some degree of policing to ensure, to a reasonable extent, that interference between facilities is kept to a practical minimum. While there is room for improvement in the standards due to technological advances, in practice they seem to function adequately for the most part.

An oversimplified description of interference is the overlap of specific contours. This tends to overstate the area of interference. Interference is more accurately defined as a condition where a specific ratio of signal strengths between a desired/protected and an undesired/interfering facility. In FM, these ratios exist between co-channels as well as first-, second- and third-adjacent facilities. Current ratios are the result of receiver testing performed many moons ago. The D/U protection ratios for co-channel facilities is +20dB, +6dB for first adjacencies, and -40dB respectively for second- and third-adjacent situations.

The ratios between the desired and undesired facilities remain the same regardless of the class of the protected station, although that protected signal level will vary. For all class A and the various class C flavors, the protected contour is the 1mV/m or 60dBu. For non-reserved band B1 and B facilities the protected signal level is reduced to 0.7mV/m (57dBu) and 0.5mV/m (54dBu) respectively. NCE facilities regardless of their class are protected at the 60dBu signal level. Thus for example the interference contour to a co-channel class A facility would be 40dBu, while for a second-adjacent B the relevant field strength is 94dBu.




## THE FOCUS OF THE ISSUE

At the heart of the commercial allocation and interference considerations is the geographic spacing table. This primary table, found in Section 73.207, details the minimum distances that must exist between facilities. The table considers these ratios above assuming flat earth or uniform terrain, and facilities at the reference height and power. For example, the minimum separation between two class A stations on the same frequency is 115km, which is obtained from the sum of the 60dBu contour distance of 28.3km, and the 40dBu interfering contour of the other station at 86.7km. The flaw in the logic is that terrain is very rarely flat and uniform at all azimuths. As a result, contour overlap can exist between fully spaced stations. The Commission has left itself an escape clause: Section 73.209.

Short spacing is permitted under Sections 73.213 and 73.215; however, the former section involves grandfathered situations, and as such we will not consider them here. Under the 215, short spacings contour protection using the above described ratios is permitted to a certain extent. The facility seeking authorization under this part may employ combinations of ERP and height reduction as well as the use of a directional antenna. Since these concepts point to other requirements, there are absolute minimum spacings that must be maintained.

There are additional considerations under 73.215. If the station to which you are short-spacing is authorized under 73.215, it is protected to its actual facilities. If the facility is fully spaced to all other facilities, implying a 73.207 authorization, then it must be protected to class reference facilities regardless of the height and power at which it is operating. In areas with wildly varying terrain this can result in a situation where it is essentially impossible to employ contour protection without significantly neutering the proposed facility. Indeed, similar anomalous behavior was one of the reasons the second-adjacent ratios were changed. As receivers became more selective, it made more sense to change the ratios, and by extension the spacing table to eliminate this problem.

In the reserved part of the band, contour protection under Section 73.509 is king. There, whatever can be shoehorned in while meeting the coverage, directional antenna, and contour protection requirements can in practice be authorized. This allows for many more stations to exist in this portion of the band, but also gave rise to some bizarre theoretical directional patterns in the 2007 filing window. However, as you approach the demarcation point between the two band segments, both situations may need to be considered. Within three channels of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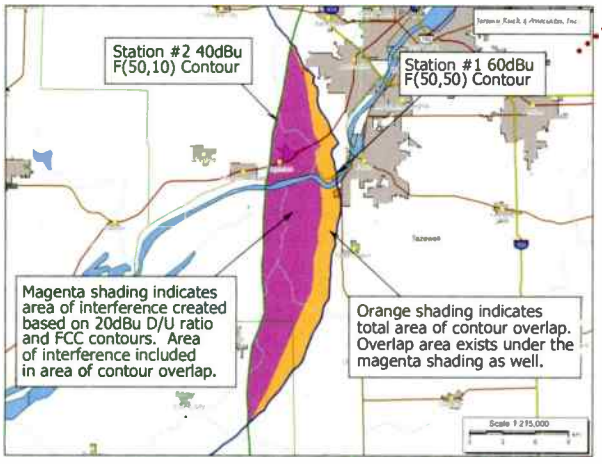


Actual contour overlap does not match the FCC model

92.1MHz, reserved band facilities have to meet spacing requirements to facilities on 92.1MHz and higher. To their fellow NCE facilities below 92.1MHz, contour protection must be employed.

## BUT THERE'S MORE

The other main piece of the puzzle is the pesky intermediate frequency situation. To make things simpler, facilities separated by 53 or 54 channels must meet minimum spacing requirements. There are some very limited grandfathered exceptions to this; however, in general if you have an ERP of greater than 99W, you must take into account facilities on these channels.

Although you can use alternate propagation methods to demonstrate coverage in a more broad sense following the *Skytower* decision, all of this interference and overlap stuff is still based on the standard FCC model, the mechanics of which we have previously discussed. Perhaps that may someday change, however, by limiting showings to the standard model, much uncertainty and interpretation can be eliminated, thus making the job of the staff easier.

One other allocation item of interest worth discussing is the *Raleigh Waiver*. This concept, available only to NCE facilities, allows a station to receive contour overlap, while not causing it. It applies only on second- and third-adjacent channel situations where the interference area is vastly smaller than the gain in the coverage area. While this can obviously enhance coverage of your facility, be aware it is not a one-sided deal, and the other station can also potentially overlap, so be sure to have your consulting engineer consider that situation before heading in that direction.

To round out the discussion from this month, two examples are provided. The first illustrates a situation where two actual fully spaced facilities wind up resulting in prohibited contour overlap. The second illustrates a contrived contour overlap situation, and how the interference area by the FCC model is not necessarily the same as the overlap area.

*Ruck is the principal engineer of Jeremy Ruck and Associates, Canton, IL.*


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# 2013 NAB Show in Review

by Lee Petro

A trip to the NAB Show in Las Vegas is always an adventure. While one gets used to Elvis impersonators and wedding chapels on every corner, the 2013 show had the added intrigue of taxi strikes, threats by a top broadcast network to go pay-only, and the never-ending discussion of television incentive auctions. For those who could not attend or are still suffering from sensory overload, here are a few highlights.

*Internet Radio.* Several panels discussed the growth of Internet radio services and the drive to get these services included on the dash of automobiles. Deemed to be the new Holy Grail, Internet radio providers are working hard to have car companies include their services on the digital displays for new cars. Currently, these displays contain icons for separate services (i.e., Pandora), but the costs associated with negotiating separate agreements with each auto company and conforming to different technical specifications are enormous. Thus, new platform services are being developed (i.e., Aha) that serve as an intermediary between auto companies and various service providers. These intermediaries may usher a flood of new services into your car, much as Apple's AppStore launched the invasion of your phone.

The other interesting tidbit is that none of these services have yet to turn a profit. In fact, for services like Pandora, adding subscribers actually causes the company to lose money due to the copyright royalties that must be paid. While they are certainly interested in expanding their subscriber base, how long can these companies continue to operate under the current copyright regime, and are new companies being held back from entering the space due to the copyright fees?

*Internet TV.* Also discussed was the ongoing lawsuit by the television stations in New York against Aereo. Aereo has set up thousands of mini antennas to pull in the over-the-air signal in New York City, and then streams the signal to their subscribers on demand. There is another function that permits the subscriber to record a signal, and then obtain the program at a later time. On April 1, the U.S. Court of Appeals for the Second Circuit denied the preliminary injunction motion by the New York broadcasters and permitted Aereo to continue to provide its service to New York state residents while the court case continues.

The main issue of the case is whether Aereo violates the copyright interests of the broadcasters, who have argued that they are entitled to protection. The decision to deny the request for preliminary injunction did not end the matter, though, as the court will still need to decide the case on the merits. During the NAB Show, the COO for News Corp. stated that if the court permitted Aereo to continue without paying copyright royalties to the broadcasters, they would consider pulling the signal and going to a subscription model.

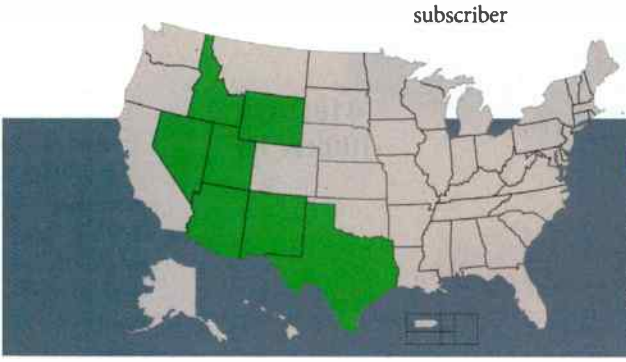
Compensation to copyright holders for the use of their material is the common thread between these issues. In both cases, the right to deliver content is directly affected by the royalties that must be paid. In the future, these battles over the rights to content, and the associated royalties that must be paid, will come to the forefront as the methods for distribution of content continue to expand.

*Incentive Auctions.* There were also many discussions associated with the FCC's plan to auction a portion of the television spectrum for wireless use. As proposed, the auction will involve the voluntary relinquishment of broadcast rights by television licensees (turning in their licenses, and either exiting the business or agreeing to share with another station in the market) in exchange for a portion of the revenue paid by the wireless carriers for the relinquished spectrum.

The auction plan involves a multitude of complicated moving parts, including proper valuation of the television spectrum, determining who gets to volunteer their spectrum, the post-auction band plan, and the repacking of the television stations in the smaller portion of the band. On the outside looking in are the low-power television licensees who do not get to participate in the auction, but face the possibility of losing their spectrum during the repacking process. On the line are the Class A television licensees, who are protected under the auction statute from losing their spectrum, but face increased scrutiny by the FCC's Media Bureau to ensure they are complying with the Class A rules, or suffer downgrade to the unprotected LPTV status.

While the discussions raised many interesting questions, there was, not surprisingly, a deficit of answers.

*Petro is of counsel at Drinker Biddle & Reath, LLP. Email: lee.petro@dbr.com.*



## DATELINE

**May 16**: Stations in Texas continue to run license renewal post-filing announcements. Stations in Arizona, Idaho, Nevada, New Mexico, Utah and Wyoming continue to run license renewal pre-filing announcements. **June 3**: Stations in Arizona, Idaho, Nevada, New Mexico, Utah and Wyoming file License Renewal Application and EEO Program Report, and noncommercial radio stations file Ownership Report (323-E). Commence running license renewal post-filing announcements, continuing on June 16, and July 1 and 16.



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# From Devastation Comes New Opportunity

*KWKS will use the station's new Pilot console to create internet radio programming and provide real-world training for high school students in the region.*

***The Media Center is proud to work alongside Logitek to lead the industry in modern technology and education.***
***- Grant Neuhold, KWKS***

On May 4, 2007, an EF5 tornado 1.5 miles wide leveled the town of Greensburg, Kansas. More than 95% of the buildings in the city were destroyed in the storm. As they began the arudous process of rebuilding their town, the people of Greensburg decided to build a modern, comprehensive media center to house the city library along with a new radio station and TV instruction studio. Now ready to go on-air, KWKS Media is offering video and audio instruction to regional students along with internet radio content.

Logitek is proud to be part of Greensburg's new media center and congratulates the city on its beautiful restoration and "can-do" spirit.

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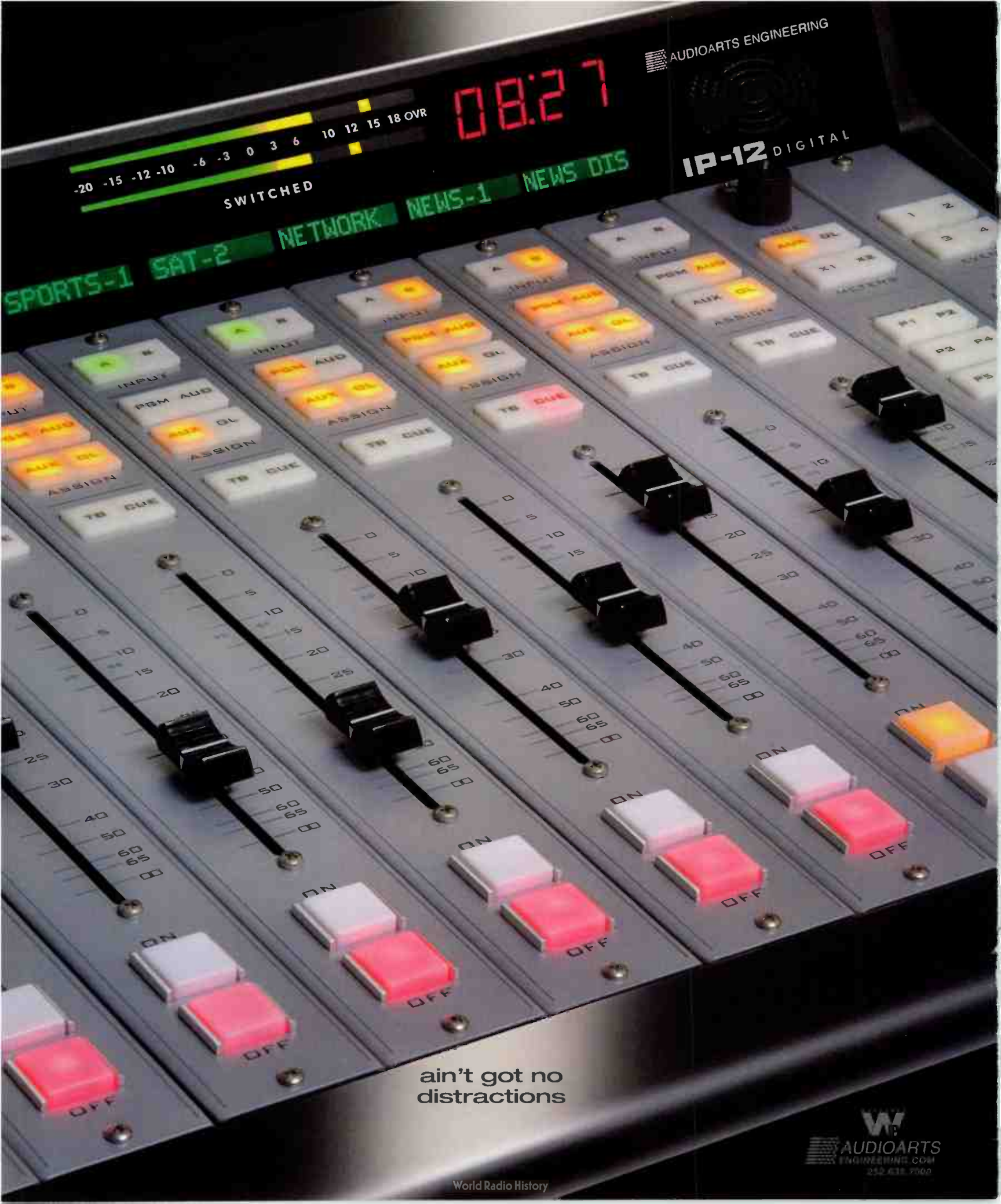


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# Remote Access and Site Connectivity: Wireless

## Solving the problem of remote connectivity

By Doug Irwin, CPBE DRB AMD

Getting an extension of your LAN to a transmitter site (or other remote site) is fairly easy if there are wire-based facilities there. That was our topic last month. However, some sites have no wire-line facilities of any sort, and that can leave you with a tough problem to solve. How does one get access to a studio LAN (and the Internet) from a remote site with no native connectivity? That's our topic this time around.

There are at least two different approaches to this problem. First, you can see if your remote site is covered by a local wireless ISP (WISP). Secondly, you can build your own system making use of unlicensed ISM band radios. We'll cover both methods.

As you stand at a transmitter site and contemplate the utter lack of wire-line facilities thereupon, take a look around you. What cities are near? Even though many transmitter sites are remote in the sense that there are no wire facilities and roads may be hazardous, clearly they're close enough to a town or towns that make up your audience. It's likely that one or more of those towns has a wireless Internet service provider. When you get back to the office, simply search online for the town plus wireless Internet service provider. I did this very thing recently as part of my work for Clear Channel in Los Angeles. We needed Internet access for our KSRY transmitter site near Tehachapi, CA. A quick online search showed that Creative Wireless is in business in the town of Tehachapi. Ultimately we received up/down speeds of around 3.5Mb/s from them—not bad at all, and more than adequate for the site. Of course since this is the public Internet, we'll be making use of the appropriate access and security techniques (discussed in last month's article).

"Sure," you say. "But that's in southern California. I'm in (fill-in-the-blank-here). We're really remote." Well, in an article I wrote for *Radio* magazine in August 2012 (radiomagonline.com/issue_20120801) I mentioned a WISP (called Wispernet) that covers Peace River, AB (among other towns). Peace River has a population of 6,750, and is located about 250 miles north of Edmonton. It provides a Layer-2 (Ethernet) connection to its clients CKHL and CKKX there. Some readers may be more remote, but my point is that there are almost always options.

### WIRELESS OPTIONS

The option that seems most familiar is probably using equipment provided by familiar manufacturers. One system worth looking at is the Intraplex HD Link from Harris Broadcast. It's a 950MHz radio system that passes not only the typical program audio, but also HD Radio traffic between a studio location and transmitter site. When integrated with an IP

Harris Broadcast Intraplex HD Link

return path from the transmitter site back to the studio, the system will pass TCP traffic between the two ends, and will manage packet routing, based on the user configuration, and path accessibility. In other words, it has two network inputs: one for passing HD Radio traffic, and a separate used in conjunction with a return path for TCP traffic.

But, without the benefit of wire-line access to the transmitter site, how would one obtain a return path? That's where the 900MHz ISM band (or perhaps 2.4GHz or 5.8 GHz) comes in to play. As just one example, let's take a look at the AvaLAN AW900S. This radio operates in the 902-928MHz ISM band; has 12 non-overlapping channels to choose from; will achieve up to 935kb/s of data throughput (Ethernet interfaces) and will go down to a -97dBm signal level with a 10E-4 BER. Maximum TPO is +21dBm. User configuration is via an embedded Web browser. Antennas that will work for this path are easy to find; you might even have a set of antennas around (like a pair of lawn chairs) that could be used for the link.

Once a return link is established from the transmitter site, integrate it with the Intraplex HD Link in such a way that the radio system will route packets in the appropriate manner so that a duplex IP link is established.

Another very familiar option for establishing a TCP/IP link to the transmitter site would be use of the Moseley LanLink. The HS900


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Moseley LanLink

version requires a set of external antennas. The HS900D includes a duplexer on both ends, which affords the user a convenient way to use 950MHz antennas that are already in place. (The current 950MHz radios loop through the duplexer.) Both versions operate in the 902-928MHz ISM band; data throughput up to 1Mb/s. Output power is limited at +30dBm; receive sensitivity specified as -92dBm with a 10E-6 BER at 1Mb/s throughput. Configuration is done via an embedded Web server; the unit supports SNMP as well.

Of course you may have no reasons whatsoever to use the 900MHz frequency range for your remote link; you could look at the 2.4 and 5.8GHz bands instead. Some of the available radios are TDM-based, so they have T1 (or perhaps even T3) interfaces. This is somewhat of an old-fashioned approach now, and would necessitate an Ethernet to TDM interface on both ends of the link. (This could be done with routers.) Some radios come with native TDM and Ethernet interfaces, allowing for the best of both worlds.

Ceragon manufactures an extensive line of microwave radio systems (several of which are used successfully at Clear Channel in New York). For this topic I'll point out the FibeAir 4800, which is its product for the license-exempt ISM bands (2.4 and 5.8GHz). The FibeAir 4800 is specified to operate at data rates of up to 48Mb/s; modulation schemes are user-configurable (QPSK, 16QAM or 64QAM); it has native T1 interfaces, along with its Ethernet interface; and comes in three different physical versions—all indoor, all outdoor, or split indoor/outdoor units.

Ubiquiti Rocket M2

Ubiquiti (used successfully at Clear Channel in Los Angeles) is another manufacturer of license-exempt Ethernet radios. Its Rocket M2 (2.4GHz) and Rocket M5 (5.8GHz) radios are specified to hit data rates as high as 150Mb/s, though 54Mb/s (at -75dBm receive signal level) at 2.4GHz, and 5.8GHz are found from a perusal of the spec sheets. Ubiquiti's AirView software is included in all the M units, allowing the user to do remote spectrum analysis—clearly useful in setting up the links for the first time, and also troubleshooting later on should the need arise. (The unlicensed bands are subject to interference from other users, after all.) Ubiquiti also offers a line of small dishes that are made to easily integrate with the radios. The Rocket is an outdoor unit; installation consists of the mounting of the dishes, physically connecting the outdoor unit to the chosen antenna, and powering the device over the Ethernet cable.

Ubiquiti Rocket

## SYSTEM EXPANSION

Once you've established your radio LAN extension to your remote site, there may be one other problem to consider. What if you have more than one building at the site (say on top of a mountain)? What's the best way to add all the buildings to the network? The correct answer will depend upon the circumstances, of course. If the buildings are adjacent to one another, then it may be possible to simply connect them via CAT-5e or CAT-6 cables (made for outside and/or direct burial). On the other hand, they may be too far away from each other (or say, across the street) making direct cable connections impractical. Here again you could make use of the same sort of inexpensive ISM band radios we have already gone over to make a network. Obviously you'll need to make sure you can configure the radios to operate on different channels inside the ISM band choice so the various links can coexist with one another. Some amount of experimentation may be necessary in order to find the best ISM band for the site. Making use of the 900MHz ISM band for example, could be very problematic in the presence of other transmitters operating around 900MHz at a mountain top or other remote site.

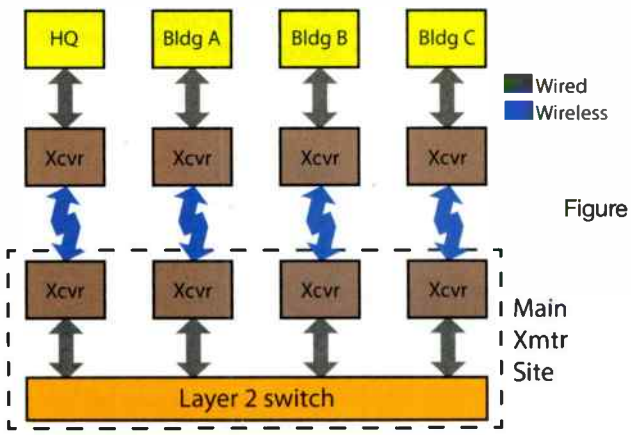


Figure 1

Figure 1 illustrates an implementation. At the terminal site for your radio link you'll simply connect more of the radios up to ports on a Layer-2 switch. Each subsidiary radio link will act as a LAN bridge, so hosts in each of the other buildings will need to be addressed with the same network numbers.

Establishing high-speed Ethernet at a remote site can be very beneficial to the operation of a radio station; access to remote controls, computers, cameras, off-site servers and the like will give your system more functionality and probably make your job easier in the long run. It's well worth the investment in time and money.

*Irwin is RF engineer/project manager for Clear Channel Los Angeles. Contact him at doug@dougirwin.net.*



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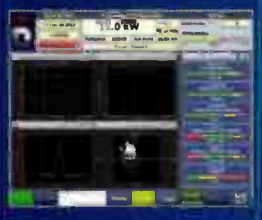

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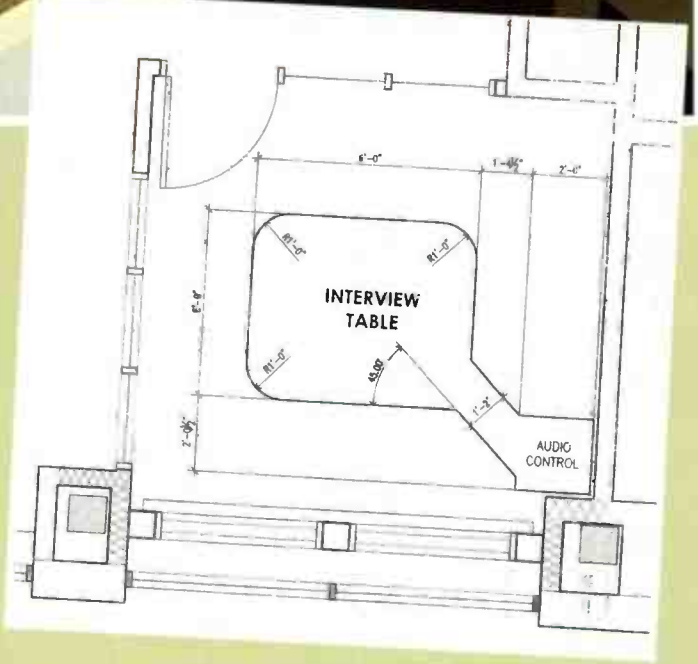
# Noise Elimination

## A high-visibility and high-traffic area gets the full acoustic treatment.

By Ron Bartlebaugh, CBNT

I stood in the 11'×12' room looking up at its 18'-high ceiling and out to Akron's noisy Main Street through the room's single-pane storefront window. The assignment was to turn the room situated within WKSU's Akron News Bureau based on the first floor of the city's historic United Building into a four-guest position, broadcast quality, street-side showcase studio that mirrors WKSU's on-air studio located 12 miles east of Akron on Kent State University's main campus. I already knew about the high hill located between Akron and Kent that prevented the use of an RF link between the two cities even though the building is eight stories high. I had experience designing and building a smaller, non-street-facing studio for this facility three years ago when Kent State University opened its WKSU Akron News Bureau on the corner of the city's busiest traffic intersection and across from the John F. Seiberling Federal Building



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and Courthouse. I also have lots of experience designing other regional news bureau studios including WKSU's news-gathering facilities in Cleveland and Canton. However, this room had the word *challenge* written all over it, and the time had finally arrived to meet that challenge.

My first call was to local acoustician friend Bill Hannon and the second call was to architect acquaintance Dave Molnar. I have employed their services on other projects with great success and knew having them on this project's team would yield the desired results. I then assembled the rest of the project team. With no second thoughts based on my past experiences using local company Cabinetworks Unlimited for broadcast studio furniture needs I contacted owners Ken and Brian Bagwell. Local contractor Dave Riley, who was intimately acquainted with the old building's structure as well as local building code and permit requirements, was employed to do the renovation work. WKSU's I.T. Department, consisting of Chuck Poulton and Dan Kuznicki along with my assistant Bob Kruppenbacher, rounded out the design and installation team.

The common use space has been occupied by Cleveland's WKYC-TV regional news bureau for many years and by Western Reserve Public Media's live television production facility along with WKSU's Akron News Bureau for the past four years. In addition to the street traffic noise problems, the internal common space noise issues included a high-level HVAC system sound level and all the other noises that go with three active broadcast organizations sharing the same facility. The proposed studio space was a former office – essentially a room within the larger and very open common space. The room's street side window faces west and the north and east facing internal walls each contain multiple eight-foot tall thin single pane windows. The construction of the north and east facing hollow cavity walls is typical studs covered with ½" drywall on each side. The HVAC system ambient noise as well as occupant conversations easily transmitted through the walls, internal windows, and existing wood core door. Our first focus was to determine how to eliminate the traffic noise, which, of course, includes noise from city busses and public safety vehicles.

To create a space for four guests in a tight space, the practical solution was a table in the middle of the room.

A Quest M-2900 dosimeter was positioned in the proposed studio space to measure noise levels by frequency and intensity over specific time periods. The measurement results were then graphed using custom designed software to visually indicate the frequencies, sound pressure levels, and period of time per occurrence of the various noise sources. Using that data and the calculated total room air volume based on a proposed 12' ceiling height, our acoustician was able to specify absorption specific by frequency acoustical products that would collectively work together as a system to isolate the noise and, equally important, acoustically tune the room in what was to be its resultant physical state. The acoustician designed a dual-pane acoustical window assembly that would supplement the existing storefront window. Because of the span of the existing window, a two-unit acoustical window system was specified to minimize potential structure resonances and also ease installation. Further design efforts determined the best size for the two acoustical windows as being 7' high by 4'5" wide for unit one and 4'6" wide for unit two in order to further minimize common-dimension resonant frequency possibilities. Each window was designed to contain a 1.25" inch bullet resistant plate glass and a ½" inch laminated plate glass separated by a 4" wide sealed air space. To accommodate the window assemblies, a new wall was built 18" away from the inside of the existing store front window. Custom designed steel frames were locally manufactured and installed to accommodate the new glass. Each piece of the 1-¼" glass weighed 450 pounds and required five professional glass installers to set it in place.

The major acoustic challenge: the large window facing the street.

For acoustical and physical appearance reasons, we installed a new ceiling below the existing 18'



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The common area is used to produce programming for WKYC-TV and Western Reserve Public Media.

high plaster ceiling with the new ceiling ending at the 12' elevation level. Based on the new window's 7' tall dimension, the acoustician designed and specified a custom header wall to fill in the space between the top of the new windows and the 12' ceiling height. A custom, made-for-the-project George Koch brand composite steel 4" thick acoustical wall was ordered and installed in the header space with a mineral wool insulated, carefully designed wall construction filling in the rest of the new front-of-room wall space.

A second layer of ½" laminated plate glass was installed in the existing 8' tall window frames of the north and east walls to provide additional noise isolation between the new studio and the existing common space. High-density mineral wool was blown into the north and east wall cavities and a layer of dense barium vinyl was layered over the entire existing common space side drywall surface. Thereafter, an additional layer of ⅝" drywall was added over that surface. The south wall, which is located adjacent to the building's main entry corridor, did not require additional acoustical isolation because of its high mass construction, which is typical of older buildings. The ceiling tile products were chosen for specific acoustical reasons with some being absorbent and others reflective. Dense mineral wool insulation batt 12" thick was installed above the ceiling to form an effective acoustical barrier. The acoustician chose a total of 12 ESSI brand rock wool cloth covered acoustical panels for specific location placement on the walls and two MPC brand fiberglass cloth-covered acoustical panels for adding acoustical isolation to the door. An automatic acoustical drop seal with mating threshold was added to the bottom of the door along with an acoustical seal on the sides and top of the door jamb to further reduce noise transmission into the studio from the common space area. Fabric covered vertical blinds mounted on the north and east facing internal windows provide variable acoustic control and minimize sound reflections between the glass surfaces. However, because of the resultant precise and very carefully designed acoustical parameters of the room along with the accurate cardioid pickup pattern of the Audio Technica AT-4050 /LE microphones, we have not experienced any room reflection problems—even when operating with the vertical blinds fully open.

On the broadcast side, much time was spent working with Cabinetworks Unlimited to design the broadcast table and dual rack bays. Our goal was to accommodate the Axia Element 28 module work surface along with the announcer/show host position and four guest positions. The team created a design



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that met all of the requirements including an under-counter support structure, which served to eliminate the need for support legs. Our equipment selection was easy because of the goal to emulate the main WKSU on-air studio at its Kent State University main campus facility. WKSU's announcers and reporters can easily transition from the Kent to Akron facility because of the common physical and technical configurations. While the Akron News Bureau's newly constructed Main Street Studio is primarily used for regional news gathering and production, it is also set up to be WKSU's primary on-air studio should the need for evacuation of the station's Kent facility become necessary. A 100Mb/s fiber optic data path obtained with cooperation from the State of Ohio and the University of Akron provides us with the ability to transmit 8 streams of uncompressed 48kHz, 24-bit audio with data bi-directionally between Akron and Kent. The facility also has ISDN connectivity allowing for emergency connection to WKSU's main transmitter site in the event broadcasting does not become possible from the Kent located primary on-air studio facility.

The Akron Main Street Studio's location being close to local, state, and federal government offices makes it highly convenient for news gathering by the WKSU news team for the creation of news reports that air over WKSU's six-station regional network as well as frequently airing on National Public Radio newscasts.

*Bartlebaugh is director of broadcast engineering, the WKSU Stations, Kent State University, Kent, OH.*

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# Drilling Laminate, Furniture Design and Antenna Installation

by Doug Irwin
CPBE AMD

Last month I talked about drilling holes in Corian countertops. There are probably more sets of studio furniture out there with laminate tops though, so let's talk about drilling holes in those.

## CUTTING HOLES IN LAMINATE

I put the following question to Rod Graham of Graham Studios (graham-studios.com). What's the best way to cut holes in laminate furniture?

*"Most often we see the use of a Forstner Bit when precision is required. While these bits are primarily used in a drill press, with a little practice, they can be used in a hand held drill. They are similar to other drills in that they have a center point to help start the hole. The outer rim however, is the guide to ensuring that holes greater than 2" in diameter, are perpendicular to the surface. While Forstner bits are more expensive than center point drills, they create cleaner and larger holes than the center point drill. A less expensive hole saw/arbor can be substituted for the Forstner bit. Buy two or more saws as they will get dull half way through the first hole."*

What about larger holes, though, like one that would be beneath an equipment turret?

*"The use of a router and template is the best way to cut holes in laminate (HPL) table tops. The template is clamped to the surface to prevent movement, and the router is then used to plunge through the top. This method is usually used in professional mill work environments where dust collection systems are used. Rectangles can also be cut with a jig saw, a steady hand, and 1/4" holes at the corners. Use 2" wide masking tape to prevent chipping of the laminate, as well as scratches from the base plate of the jig saw. Some black paint will dress up the non-standard hole."*

## FLOOR PLANS AND FURNITURE DESIGN

On the topic of studio and furniture design: There is a step in studio designs that I have seen skipped time and time again—and if you have a studio construction project coming up, I recommend you take the time to do this. Take the studio floor plan and place the furniture design on top of it. Ideally you can get the design from your furniture manufacturer, and then have your architect drop that on top of floor plan (at least in two dimensions). In that way, you can see if sight lines are maintained through windows. This of course can end up being an iterative process.

Forstner bits

Another important step is to have the furniture plan laid down on the reflective ceiling plan. This is the drawing that your architect produces that shows how the lighting will be built in to the ceiling. By including the studio furniture plan in the reflective ceiling plan, you can get a good idea about how lights will shine down on the furniture, and thus how it will look in the work space. You can get a very good idea as to whether or not shadows will be cast on the console, or in front of your air talent. Again, this can be an iterative process.

## ANTENNA INSTALLATION

Often during an antenna installation (for example a 950MHz dish antenna), transmission line such as LDF4-50 or LDF5-50 is run up a tower or pole to the antenna. The antenna output (typically a type-N female) sticks out horizontally. At the same time, the transmission line comes up vertically. What often happens is that the installer makes a loop or otherwise shallow-bend turn in the coax, to transition the end from vertical to horizontal; and then the coax is mated to the connector directly. I've seen this time and time again. The trouble is that this loop in the coax gets jostled in the wind, and it has a lot of leverage against one mechanically weak spot: the connector. A certain number of years go by, and the connector eventually breaks.

The solution to this problem is to use a pigtail, which is a short jumper made of flexible coax, to make the transition from the end of the coax to the antenna connector itself. LMR-400 or a super-flex type of coax such as FSJ4-50 are good choices for pigtails. It's a little more work because you need to weatherproof one extra set of contacts, but in the long run it's better engineering practice.

*Irwin is RF engineer/project manager for Clear Channel Los Angeles. Contact him at doug@dougirwin.net.*

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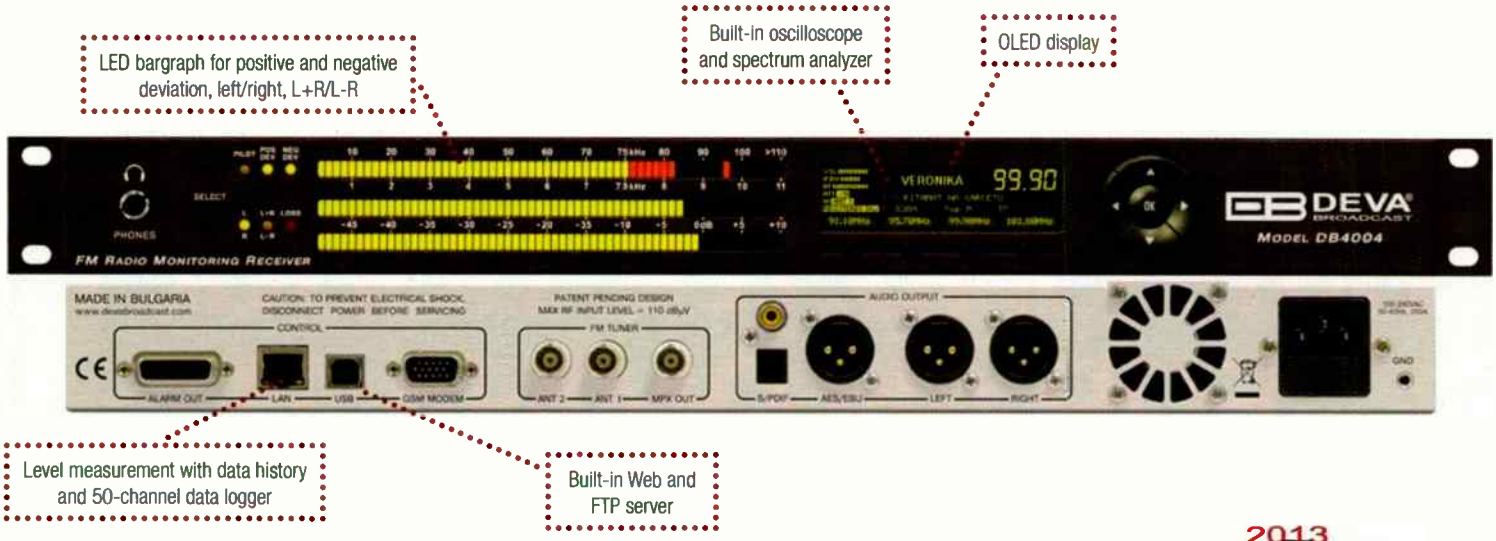


# Deva Broadcast DB4004

by Tom Atkins

2013 Pick Hit Radio

Deva Broadcast from Bulgaria is an innovative company that has many tools for the broadcaster. One item, the model DB4004 FM monitoring receiver, is just one of its products marketed here in the United States.

This little gem, which takes up one rack unit of space, is a feature-packed tool for anyone monitoring single or multiple FM analog station clusters. Because it is DSP-based, the DB4004 can take monitoring of FM analog signals to a different level.

While mounted in a rack, the front panel provides access to a variety of settings and station presets, but it is not until you connect to its TCP/IP port that it shows its true strength. Once you are logged into the DB4004 Web server, it displays the main page where you have modulation meters showing everything from total modulation to multipath in real time. Here you will also have the ability to click through 20 station presets, switch between the dual antenna ports, or do a direct frequency entry. The two antenna ports give the monitor the ability to accurately monitor stations located in different physical directions. Automatic switching between them is a feature available when setting up the presets. Here you can select which antenna will be selected when calling up a particular frequency preset. If need be, a selectable attenuator can also be programmed.

A built-in spectrum analyzer can check the RF signal. If an oscilloscope display is more your style, the built-in oscilloscope can display everything from left and right audio, stereo Lissajous pattern to an RDS display. The spectrum analyzer and oscilloscope features can be accessed via the Web server for remote observations.

## MORE TO SHOW

The DB4004 comes with a logging function capable of scanning and logging a total of 50 preset frequencies and allows monitoring of left and right audio, pilot, RDS, RF level and more. The adjustable hold time of 10 seconds to 10 minutes on each preset tailors the logging interval. If set, the alarm functions can notify anyone of a potential problem with its configurable alarm settings. Notifications are sent via email, SMS, SNMP or GPO and can be customized with adjustments for alarm level thresholds and trigger/release times. This comes in handy to eliminate false alarms. When set up to scan and log the preset stations, the DB4004 generates a log file, which if need be, can be downloaded via its built-in FTP server for review at a later time.

Have you ever needed the ability to monitor the actual audio of a station from a remote location? If you are like me, there are times when it becomes a valuable tool to be able to listen to one of your stations when you are not in listening range. The DB4004 comes equipped with an audio stream encoder.

Access to the encoder is from the built-in Web server. The folks at Deva Broadcast have included the ability to adjust the quality of the stream as well anywhere from 64kb/s to 256kb/s.

This monitoring receiver includes a windows program that mimics most of the functions on the Web server. However, with the Windows program, the user is can place multiple DB4004s on a map and call them up by clicking on the map. This is convenient for those at the corporate level keeping an eye on things. A future release of the windows software will include a log manager section for downloading logs, managing logs in a database, and options to visualize the measurements versus time.

I did find one anomaly with the unit. For those wishing to monitor an analog transmission on a station that also transmits the HD Radio digital sidebands, the front panel modulation meter tends to read the analog modulation level 5-10 percent higher than what is actually being transmitted. This does not appear to affect its other monitoring capabilities.

*Atkins is vice president/director of engineering of Backyard Broadcasting, Jacksonville, FL, and a member of the Society of Broadcast Engineers.*

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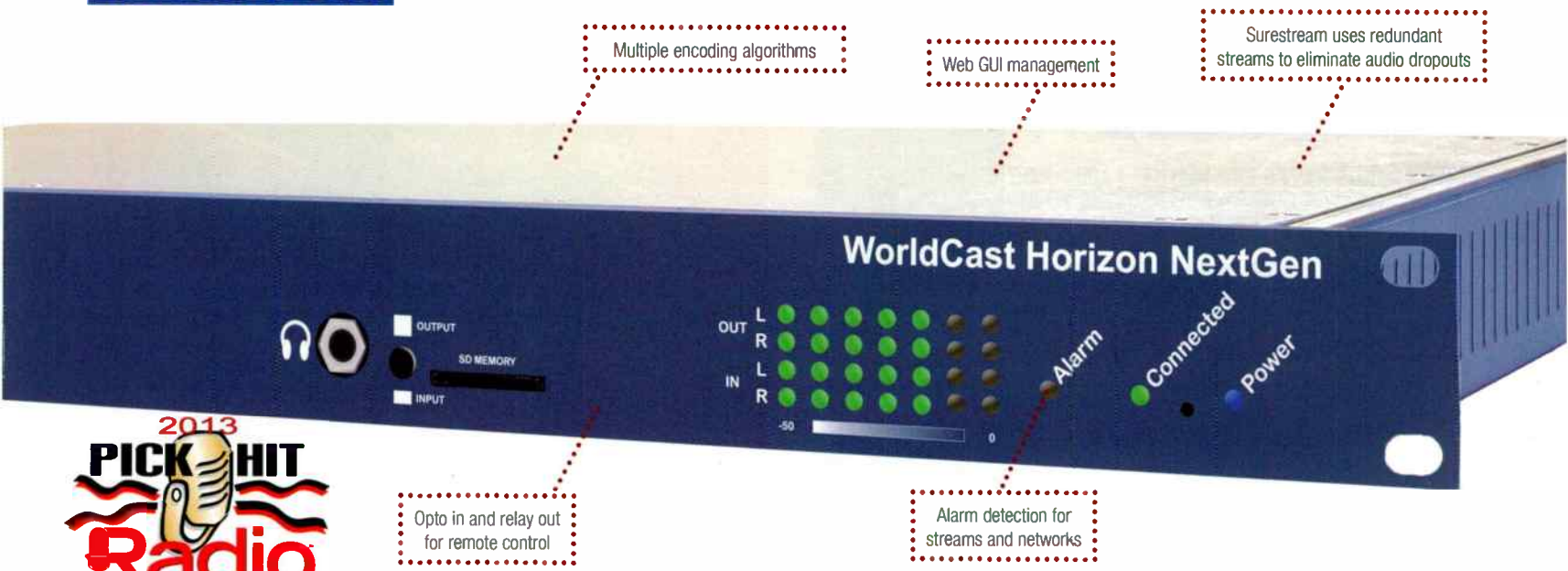


2013 PICK HIT Radio

# APT WorldCast Systems Horizon NextGen

by Larry Holtz

We all know the satisfying feeling of solving a tough issue with equipment that truly works as advertized. Such is our experience at All Classical Public Media, Portland, OR, with the APT WorldCast Systems Horizon NextGen audio codec units.

The APT WorldCast Horizon NextGen with SureStream technology is a big name for the first system to provide seamless audio throughput in the presence of Internet congestion and dropouts by using two or more separate Internet circuits. We recently installed two units on a problematic public Internet link and put them through their paces. All Classical operates a small group of 100 percent simulcast FM stations and translators that require a modest-cost approach to delivering uninterrupted studio-to-transmitter program links over extended distances. Many of us in the industry have experienced only partial success with audio codecs over the open Internet, even when backing them up with redundant units, additional Internet connections and silence-sensing failover systems.

WORLDCAST SYSTEMS
305-249-3110
aptcodecs.com
contact@worldcastsystems.com

The Horizon NextGen supports multiple Internet connections with two physical Ethernet ports, and as long as at least one of the connections is receiving UDP packets from the studio, audio flows without interruption. We connect ours to separate Internet circuits, one a cable provider and the other is a DSL.

## NO MORE MISSED PACKETS

SureStream allows two or more redundant streams to be sent over separate routes or networks. All streams and packets get special tagging for the decoder. At the far end the decoder inspects and synchronizes the multiple streams' latency. The decoder chooses and decodes the best packet from each stream to produce a seamless audio output. Packets may arrive out of order or be missing entirely, but as long as there is one good packet from at least one stream, all is good in the audio delivery. There are no audio drops from failover relays, glitches or other anomalies, as the SureStream decoder works its magic, choosing UDP packet by packet from the available streams.

In STL applications where long latency is tolerable, the NextGen supports up to five seconds of buffering to provide higher immunity to packet loss. For remote broadcasts, the user can greatly shorten the latency while still enjoying the superior dropout immunity of two streams.

In the event that all streams are lost as the result of network congestion or physical cable disconnections, the NextGen recovers very quickly, typically within a few seconds. We also found that the unit operates quite well over a unidirectional IP link, such as a one-way microwave link with UDP.

## ALGORITHMS

The unit ships with Enhanced apt-X linear PCM algorithms. Select audio bandwidths from 3.8 to 22.5kHz in stereo and 7.6 to 22.5kHz in mono. Choose 16- or 24-bit depth.

In our station's application, Enhanced apt-X provided a good combination of high audio quality and within the modest 1.5MB/s bandwidth provided by our cable and DSL Internet services. The NextGen SureStream technology allows freedom to choose a higher stream bandwidth, because occasional dropped packets from network congestion do not create audio dropouts. Transports can be Unicast, Multiple Unicast and Multicast. Multiple Unicast and Multicast can reduce cost for multiple destinations by requiring only one encoding unit. The Horizon NextGen is also available in the lower cost IP Decoder (only) model.



World Radio History

## SETUP AND MANAGEMENT

The codec comes with WorldCast's Network Management System (NMS) software, which is the Windows-platform proprietary GUI system present in many of WorldCast's products. The NextGen has the added convenience of an embedded Web GUI, giving the user two ways to access the unit. Either works well, with the NMS additionally displaying a one-screen family tree of all connected codecs and computers. Multiple configurations of streams, destinations and algorithms can be saved and recalled from a profile list. The Web GUI and the NMS software configure network addresses, audio codecs, stream destinations as well as the SureStream redundant stream setup.

The redundant Ethernet interfaces afford ultimate accessibility for troubleshooting or network maintenance. If a problem occurs on a redundant link, the user can access the unit via the one working link.

The NextGen includes alarm indicators and contact closures for audio silence detection, IP transmit and receive errors, and physical Ethernet disconnections. The audio silence detection alarm offers a user configurable level threshold from -3dBFS to -42dBFS and a timeout period of a few seconds to 2.5 hours. If a gap occurs in the audio stream due to dropped packets, a sync failure alarm displays. The alarms are available as relay contact outputs on the rear panel of the unit and viewable through the built-in Web GUI and NMS software.

The unit provides a basic wired GPIO remote control system. The Web GUI controls four relays at the far end unit. The user may configure four opto-coupler inputs to monitor status of external equipment. An AUX data RS-232 port is available to send and receive serial data, such as RBDS/RDS or HD Radio PAD/PSD text.

## CONNECTIONS

The front panel contains a headphone monitor jack with input/output selector switch, left and right bar graph LED audio level indicators, and Alarm, Connected and Power LED indicators. The rear panel hosts the RJ-45 Ethernet jacks, XLR AES3 digital audio input and output and AES3 reference clock input, XLR analog balanced left and right audio in and out, DB15 alarm relay outputs, and DB15 for status opto-coupler inputs. The DB9 AUX Data port may be used for transmitting RBDS/RDS, HD Radio PAD or other serial traffic.

The unit supports the Scripteasy control software, and can actually control and monitor other equipment using the SNMP protocol. Firmware may be updated via Ethernet and Internet. 0

*Holtz is vice president of technology for All Classical Public Media, Portland, OR.*


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World Radio History

SIDEBYSIDE

# Mic Processors

by Chriss Scherer, editor

The human voice is capable of a wide dynamic range. While a station's main processor can handle the task, it makes sense to apply processing to the voices separately since the music is already pre-processed. Some audio networking systems provide mic processing within the system. But if your need is something external or something different, here are a few popular options to take control of what those voices project.

## AirTools Voice Processor 2x

This microphone processor offers a comprehensive set of voice enhancement tools. The 2x's Windows software application enables total control of all essential parameters. Once a desired sound is dialed in, all settings are saved as named presets for later recall from the front panel or remotely. Any mic can be optimized for a diverse air staff. The device has two inputs selectable as line or mic level with phantom power and four outputs. All signal processing is controllable via software. Audio inputs and outputs are accessed via rear panel XLR connectors.

**airtoolsaudio.com**

## Aphex Project Channel

Project Channel is a channel strip loaded with Aphex's patented audio processing technology. It is a streamlined version of the Channel processor and has an Aphex Class A microphone preamp, Aphex optical compressor, Aphex Aural Exciter processor and BigBottom low-frequency processor; analog and digital (SP/DIF) inputs and outputs; and LED metering. The rear panel includes an XLR mic input with 48V phantom power, XLR analog output, ¼" analog output, and S/PDIF RCA output. A front-panel sample rate selection chooses the range from 44.1kHz to 96kHz.

**aphex.com**

## DBX 286s

This 1RU channel strip processor provides a mic preamp and four processors that can be used independently or in any combination. Switchable 48V phantom power, an 80Hz high-pass filter, DBX OverEasy compressor, de-esser, low-frequency and high-frequency detail enhancement, and an expander/gate round out the processing features. LEDs and meters show how much processing is being applied. An additional ¼" TRS line input is provided. An insert allows external processing to be added, and detented controls simplify setup.

**dbxpro.com**

## Symetrix 528E

This 1RU analog channel strip has six processors in one unit: mic preamp, de-esser, downward expander, compressor, three-band EQ and voice symmetry. Rear panel patch points allow re-ordering of the processing elements or to insert external effects. 48V phantom power is supplied. The input is mic or line selectable with an XLR output. multi-segment LED bar graphs display level settings.

**symetrixaudio.com**

## Wheatstone M-1

The M1 microphone processor is equipped with a Super-Quiet (SQ) microphone preamplifier, very wide dynamic range, faithfully accurate transient response, and ruler flat frequency response. Operating in harmony with high quality 24-bit A/D converters and a 96kHz base sample rate, the M1 faithfully preserves the sound of any microphone and talent combination. Adjust settings with the front-panel controls or via the Vorsis remote control software, which can also recall presets. The unit provides 48V phantom power, and has a mic or line analog output and an AES3 output.

**wheatstone-processing.com**

## Yellowtec VIP/digital

This processor has two selectable mic inputs that feed a 24-bit digital converter. With 48V phantom power, the processor provides up to 54dB of gain. Processing functions include a compressor, expander, AGC, de-esser, four-band parametric EQ, a phase rotator, reverb (VIPverb), delay and a subsonic filter. The Sound Control software allows any processing module to be placed in any order in the chain. GPI/GPO allows for setting recall. Settings can be saved to a SmartCard that individual announcers can keep and load.

**yellowtec.com**



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# NEWPRODUCTS

**Direct box | Radial Engineering**

**StageBug SB-1:** Designed primarily for acoustic guitars, the StageBug SB-1 is a compact active direct box that measures less than 2" wide × 3.85" long x 1.3" high, and is powered using standard 48V phantom power. It features a standard 1/4" hi-Z instrument input, a low-Z balanced output to feed the PA system, plus a tuner output that works double duty as a thru connection to feed an on-stage amp. All connectors feature glass-filled nylon construction and nickel-silver contacts. Through-hole parts are employed throughout for optimal signal transfer. This is combined with a full ground plane to reduce noise. Flat response is20Hz to 20kHz. It is also equipped with a -15dB pad to handle high output active instruments and a 180-degree polarity reverse to help tame hot-spots on stage and eliminate resonant feedback.

**radialeng.com**

**Audio DSP | Symetrix**

**Jupiter:** The Jupiter platform consists of three models: The Jupiter 4, Jupiter 8 and Jupiter 12. Each unit is able to handle various DSP functions to multiple input sources, including EQ, audio delay and dynamics. The Jupiter 4 is a 4-in, 4-out device, the Jupiter 8 is an 8-in, 8-out device, and the Jupiter 12 is a 12-in, 4-out device. The units are designed to operator by loading apps for a desired use. The units are configured via the included Arc-Web software in a Web browser and an Ethernet port. The units can also be accessed remotely via iOs and Android devices. Possible uses include multiple mic processors, HD Radio analog/digital signal delay, and dynamics processing on multiple network feeds. 50 presets can be global and/or parameter specific, and presets store any type of available parameter.

**symetrixaudio.com**

**Label printers | K-Sun**

**PEARLabel 270, PEARLabel 360:** PEARLabel high-resolution label makers can label things such as racks and cabinets, circuit boards, outlets, wire-wrap, heat-shrink tubing, telecom cabling, computer cabling, installation equipment, connectors, wire cables, patch panels, sub panels, pathways, face plates, ANSI/TIA/EIA-606-A label standards, color coding, port identifiers, grounding/bonding locations prototypes, and supplier/service identification. The labelers use durable thermal transfer printing technology on K-Sun LABELShop heat shrink tube, wire wrap, cable flag, adhesive tape, iron-on fabric, magnetic, reflective, photoluminescent and many more specialty supplies. K-Sun LABELShop cartridges are universally compatible with K-Sun printers.

**ksun.com**

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### Emergency alert notification | Global Security Systems

**Alert FM App:** Alert FM App, an emergency notification smartphone application, is available for both Apple iOS and Google Android devices. The app provides users with federal, state, or local emergency information via GSS's Alert FM plus award-winning weather information via the iMap weather radio. A free version of the App will allow users to receive Alert FM messages for their home Zip Code as well as current/extended forecasts, radar, and watches/warnings for their current location plus one saved location. Push notifications, audio, map-overlay, and additional locations are available to users through in-app purchases.

**gssnet.us**

### Streaming player | Securenet Systems

**Version 5 Cirrus Player:** This player incorporates new features and enhancements designed to better interact with the listener, and to maximize online ad revenue streams. Some of the newest features include built-in apps that a station can activate or deactivate from a control panel. The player also provides the latest social media interactions. It can also double as the website for any radio station. This is especially useful to small stations with a limited budget. Up to five buttons at the top of the player can be customized to open content within the player controls frame; home page, about us, schedule, events, contact.

**securenetsystems.net**

### Portable mixer | Allen & Heath

**Qu-16:** Qu-16 features total recall of settings (including 17 motorized faders and digitally controlled preamps), an intuitive touchscreen, Qu-Drive integrated multi-track recorder, dSNAKE for remote I/O and personal monitoring, multi-channel USB streaming to Mac, Qu-Pad control app, and iLive's renowned FX library to deliver class-leading audio quality. It also features 16 mic/line inputs, three stereo inputs, four FX engines with dedicated stereo returns, 14 mixes (including LR, 10 aux mixes, plus two dedicated FX busses), 12 mix processing channels, patchable AES digital output with a further two-channel ALT output, dedicated talkback mic pre input, and two-track output. Five high-speed dual core DSPs provide comprehensive channel and FX processing, with ample room for future processing updates and functionality. Five latest-generation 200MHz ARM core processors run in parallel, one to drive each of the touchscreen and surface, the Qu Drive USB interface, USB streaming, Ethernet port, and the moving faders.

**allen-heath.com/US**

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- BER (bit error rate) Measurements
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- Frequency Agile on both Antenna & High Level RF Inputs
- AM & Sync AM Noise Measurements
- Variable BW Digital IF Filtering
- Digital FM Demodulation with 100dB 75μs SNR
- Variable BW Composite Filtering
- Digital Stereo Demodulation with 100dB L/R Separations
- Full Metering of Analog Peak and RMS Values
- RDS Injection and Full Data Decoding
- Two Digital SCA Decoders
- RF, Composite and Audio FFT Spectrum Analysis
- User Assignable Email, Relay & Display Alarms
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### HD Radio interface | Comlabs

**Active Alerts:** This free upgrade allows Emergency Management Networks (EMnet) equipped radio stations to send Emergency Alert System (EAS) notifications directly to radios via their HD Radio digital broadcast systems. When activated, HD Radio receivers will automatically display emergency information and trigger wake-up/snooze capabilities on supported receivers. The HD Radio Active Alerts interface and several other new features are included in Comlabs' EMnet v4.1 release. No additional hardware is required for the upgrade, and v4.1 is a free update for all existing EMnet customers.

**comlabs.com**

### Stereo mic for iPhone/iPad | Rode

**iXY:** At the heart of the iXY is a matched pair of ½" cardioid condenser capsules, fixed in a perfect 90-degree "near-coincident" alignment, resulting in true-to-life stereo recordings. It features a 30-pin connector that allows high quality recording at sampling rates up to 24-bit/96kHz. The iXY uses its own high-fidelity analog-to-digital conversion. A foam windshield is provided for outdoor recordings, as well as a rugged zip pocket.

**rodemic.com**


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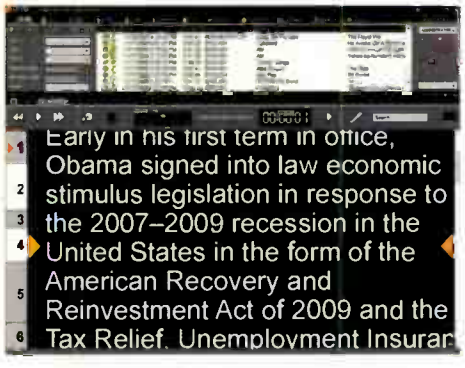


### Automation | Netia Digital Audio

**Radio-Assist 8.2:** Version 8.2 of Radio-Assist features the introduction of cloud-based management giving users the ability to access the system database from any network-connected workstation. In addition to enabling faster, more productive operations through shared media access, cloud-based management enables broadcasters to reduce reliance on server infrastructure and, in turn, lower the total cost of ownership. By storing content in the cloud, Radio-Assist can serve as an online production database or as online content archive. Radio-Assist archiving tools enable seamless management of the archive/restoration process in the cloud. Users can simply trigger the archiving process as a background task and subsequently use simple search requests to retrieve content. The Snippet range of editing tools available within the Radio-Assist automation products is now available for iOS devices. Sharing the same look and ergonomic principles as the Snippet desktop interface, the new iPhone- and iPad-compatible iSnippet tool allows field reporters and other remote users to enjoy Radio-Assist audio editing capabilities on their portable devices. A new teleprompter module gives convenient visual access to news scripts, which scroll continuously across the presenter's screen, linked with the playout system in the studio.

**netia.com**

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## NEWPRODUCTS

**Loudspeakers | Line 6**

**Stagesource L2m and L2t:** StageSource L2m is an 800W, two-way, bi-amped speaker system that delivers power, sound quality and dependability. StageSource L2t adds an onboard mixer that provides effects, acoustic guitar modeling and feedback suppression, making it a self-contained live sound solution. StageSource L2m and L2t are designed for seamless integration with other Line 6 live sound products, so users can use them to extend the capabilities of a StageSource L3m- or L3t-based system, pair them with the 1,200W L3s subwoofer, and more. Both L2-series speakers feature six DSP-based Smart Speaker modes, which enable users to optimize the loudspeakers' output for a variety of performance scenarios. Onboard accelerometers and pole-mount sensors automatically detect the speakers' orientation and set their Smart Speaker modes accordingly.

**line6.com**

## FIND THE MIC WINNER
## MARCH ISSUE

Congratulations to

**Tom Holmes**
of
Cumulus Media
Columbia, MO

He won a three-pack of HMIC-025 Mic cables.

**www.hosatech.com**

The mic icon was on the Audio-Technica microphone next to the level control.

*The winner is drawn from the correct entries for the issue two months prior. No purchase necessary. For complete rules, go to RadioMagOnline.com.*

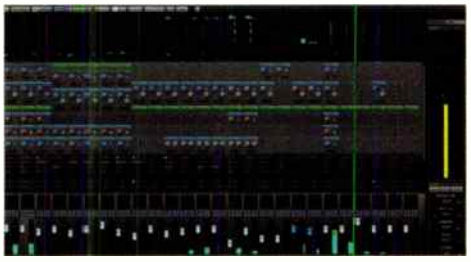


World Radio History

### CD player | Tascam

**CD-200SB:** The CD-200SB offers SD/SDHC, USB flash storage and CD-R/RW (WAV and MP3 disc) playback along with CD dubbing to the SD and USB channels. It features easy access function controls to maneuver through files and folders on solid-state media directly from the front panel. The unit is equipped with controls for fast track/file selection, multiple playback modes, ±14 percent pitch control and also includes a wireless remote control. It provides quiet playback, smooth loading and longevity while being outfitted with shockproof memory.

**tascam.com**



### Audio editor | Steinberg

**Nuendo 6:** Nuendo 6 provides new mixing facilities featuring full-screen mode and scalability, Insert View for displaying activated insert slots, plug-in and channel search and integrated Control Room. The brand-new channel strip comprises high- and low-pass filters, a noise gate with sidechain support, various compressors and a brickwall limiter. The overhauled Channel Settings window provides immediate access to channel parameters. It also features EBU R128 standard compliant loudness metering with RMS metering scales, the Loudness Lane for tracking and editing loudness efficiently and the new ADR taker system including on-screen dialog for dialog recording and language dubbing.

**steinberg.net**

### Mobile app | Live365.com

**Studio365:** The Studio365 mobile app allows online broadcasters to further interact, and engage their listeners. It features a mobile Shout Out feature, which lets broadcasters interact with their listeners wherever, and whenever they choose. Broadcasters can record multiple Shout Outs directly from their phone, and set them to play in their station with a couple of taps of a mobile screen. This gives archived and pre-recorded broadcasters the ability to dynamically engage their listeners, without having to update their tracks or playlists. Furthermore, the Studio365 app provides broadcasters with both the ability to have their audio hosted on Live365's platform, along with the capability to go "live" on the microphone whenever and wherever.

**live365.com**

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# NEWPRODUCTS

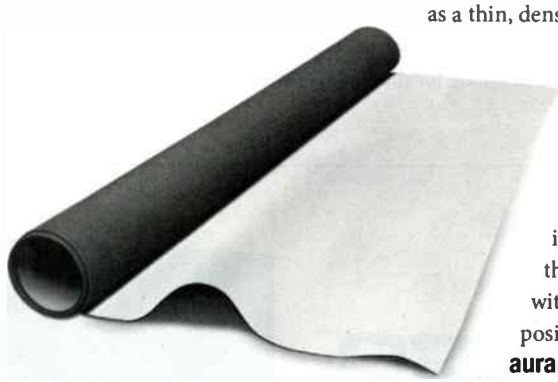
## Recording software | Presonus Audio Electronics

**Capture 2.0:** Designed specifically for live recording, Capture is bundled with all PreSonus StudioLive-series digital recording and performance mixers and is preconfigured for instant use. Version 2 further streamlines workflow and adds significant new safety features. A new start page lets the user instantly create new sessions and access previous sessions. A new big meter mode turns a computer monitor into a gigantic meter bridge that is clearly visible from a considerable distance. Clicking the record now button creates a new session and immediately starts recording. A new pre-record feature captures audio on all tracks, starting up to a minute before record is pressed. Even saving a session can be automated, with user-definable auto-save intervals. Capture also stores the active session automatically whenever the transport is stopped and the session is changed.

**presonus.com**

## Sound isolation barrier material | Auralex Acoustics

**SheetBlok-AF:** SheetBlok-AF is a thin, dense isolator with a Class A fire-rated PVC laminate on its surface for a finished aesthetic. Intended as a solution for improved sound isolation between adjacent spaces, SheetBlok-AF is at least 6dB more effective than solid lead at stopping the transmission of sound. It acts as a thin, dense sound barrier layer in wall, ceiling and floor systems and is most effective when used as one component of a multi-layered construction scheme. However, SheetBlok-AF can be applied directly over the existing wall, and using Auralex's base-coat paint, it is fully paintable using any latex paint, coordinating it with any decor. It is supplied in 4'x10' sheets that can be trimmed for custom fit. It is affixed with trowel-applied adhesive, which allows proper positioning and alignment during installation.



**auralex.com**

## UPGRADES AND UPDATES

**Logitek Electronic Systems** and **Enco** have added Enco Inside within the JetStream AoIP platform. The Enco DAD audio playout and automation platform incorporated within the JetStream router gives users full operational Enco capabilities married with the AoIP routing and mixing capabilities of the JetStream platform. (logitekaudio.com, enco.com) ... The **Digital Alert Systems** DASDEC emergency messaging platform has added support for Canada's National Alert Aggregation and Dissemination (NAAD) system requirements, which incorporates multilingual messaging with English and French-Canadian text-to-speech capabilities. (digitalalertsystems.com) ... **Telos Systems** has teamed with the Luci Live wideband audio app to enable broadcast-quality IP remote broadcasts from popular smartphones. Luci Live is a mobile remote app to provide live, low latency remotes to a Z/IP One at thestudio. (telos-systems.com, www.luci.eu) ... **Nautel** has expanded its NVLT line of FM transmitters by adding four additional power levels: 15kW, 20kW, 30kW and 40kW. (nautel.com) ... The **25-Seven** Precision Delay, which made its award-winning debut at the 2012 NAB Show, now boasts up to four hours of sample-accurate delay. Precision Delay provides a flexible system to delay programs across time zones, with no spinning hard drives. (25-seven.com) ... **VocalBooth.com** has expanded the exteriorheight options of its isolation booths. Custom heights up to 9 feet 6 inches are now available in both the Gold Series and the Platinum (double wall) Series VocalBooths. (vocalbooth.com) ... **Barix** enhances its Exstreamer 500 bi-directional audio device to support both constant and variable bit-rates, with the former added to simplify streaming to Shoutcast and Icecast servers. (barix.com) ... **Silicon Lab** has introduced a single-die, all-in-one digital radio IC. The Si468x receiver IC brings FM, HD Radio and DAB/DAB+ broadcast capabilities to a wide range of consumer devices. (www.silabs.com) ■



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### Computer audio interface | Aphex

**IN2:** The IN2 is a single desktop-unit interface with two analog inputs and outputs, two S/PDIF digital inputs and outputs, two high-quality Class A microphone pre-amps, volume, mono/stereo dim controls, Aphex's optical compression and the HeadPod 4 technology. Other desktop computer audio interfaces are merely basic input/output devices that still require the discriminating user to incorporate external preamps, compressors and headphone amplifiers. The IN2 brings high-quality mic pres, transparent optical compression, and Aphex's HeadPod 4 headphone amplification system. By allowing compression to take place in the analog domain, before going through the A-to-D conversion process, before going through the USB-to-DAW transfer, the best possible recordings can be achieved.

**aphex.com**

### Amp racks | Grundorf

**ABS Series:** Designed to house everything from amps, processors, patchbays and more, these versatile, lightweight, rugged transport cases provide robust protection for valuable electronics. Available in 2-, 4-, 6-, 8-, 10-, and 12-space configurations, the amp racks are manufactured from ultra-high molecular weight ABS material and utilize a 3mm-thick, high-density ABS shell with a heavy duty aluminum extrusion to ensure robust protection for years of use. All models feature a contemporary, professional black textured finish that is easy to clean and maintain. These cases have gasket-fitted front and rear lids—each with a 2.25" inside depth—to protect equipment from moisture and dirt.

**grundorf.com**

### File backup system | Radio Backup

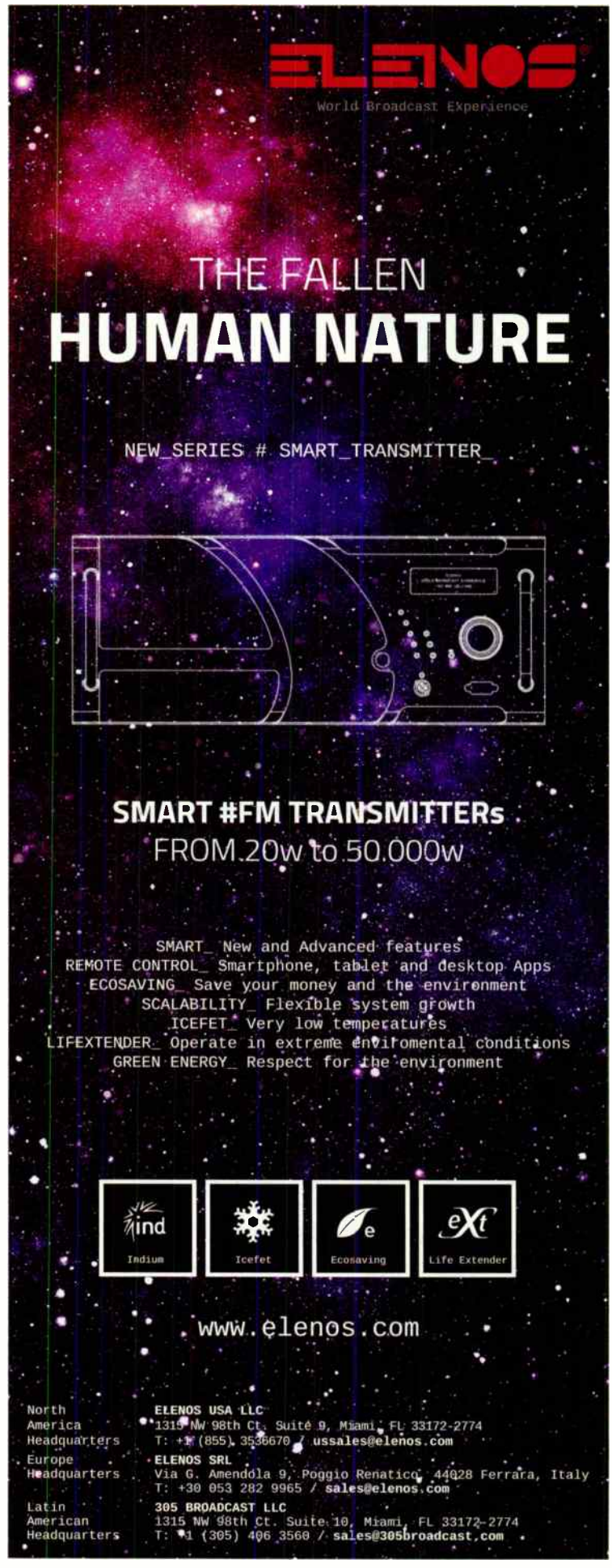
**Radio Backup:** A cloud-based file backup system, Radio Backup allows users to sync files between multiple computers automatically. Backups can be created automatically in the background on any desired schedule. All files are encrypted for security through a small desktop application. Once the initial backup is complete, Radio Backup will automatically save any changes to the files or any new files added. It runs on Windows and Mac.

**radiobackup.com**

### Headphones | AKG

**K702 65th Anniversary Edition:** The K702 Anniversary Edition headphones feature genuine leather headband and soft velour ear pads for maximum comfort during long recording or listening sessions. With its patented Varimotion two-layer diaphragm and flat-wire voice coil, K702 delivers pristine sound. The headphones boast an over-ear, open-back design, with extremely accurate response.

**akg.com**

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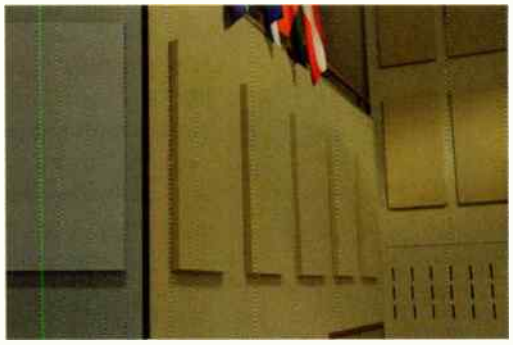
### Power extension cords | Hosa Technology

**PWL-400:** Equipped with IEC C14 to IEC C13 connectors, the PWL-400 can daisy-chain multiple units off a single power receptacle or extend the reach of a power cord. Many types of equipment are outfitted with both IEC in and out jacks for the purpose of daisy-chaining these devices off a single power outlet. Long length cables on stage frequently create an unsightly mess, but the PWL-400 extension cord eliminates this situation. This cable is designed to connect an electrical device equipped with a C13 outlet to one with a C14 inlet. With extension cord lengths as short as 1.5' multiple devices can be daisy-chained together, with all cables safely out of view.

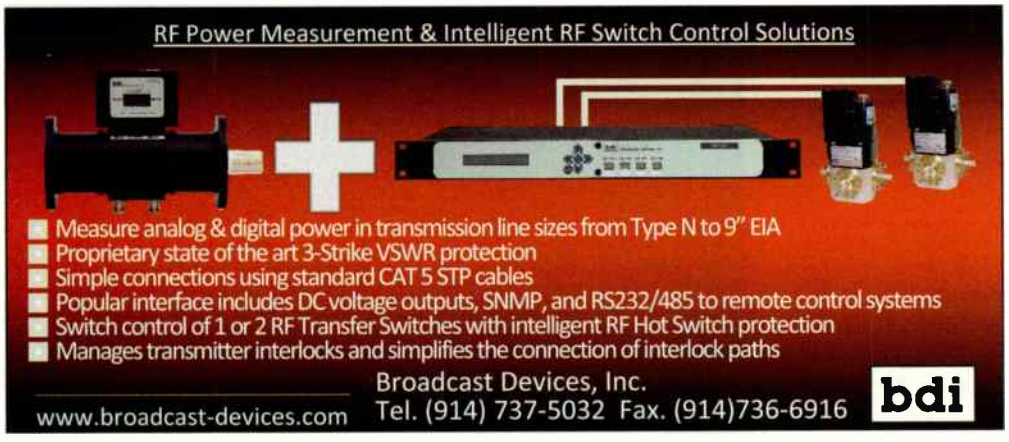
**hosatech.com**



### Acoustic panels | Primacoustic

**Paintables:** Available in two sizes: 2' × 2' and 2' × 4', these customizable panels are made from 2" thick high-density 6lb glass wool for even absorption across the audio listening range. The front face and edges are encapsulated in a fiberglass mesh and the panel is then finished in a white, paintable latex. The panels are tested to meet stringent class-1/A requirements for safe use in commercial buildings.

**primacoustic.com**



### Professional cables | Vu

**CableUp:** The Cable Up Premium line of microphone cables has been rebuilt to improve overall performance and durability. These low-capacitance, high-bandwidth cables feature neoprene jackets with a high strand count of oxygen-free copper and a 22 AWG braided shield. This combination gives these cables analog audio capabilities while allowing them to withstand harsh environments. XLR cables are now terminated with Amphenol AX Series connectors. The cables are RoHS compliant and can be purchased in 1' - 200' lengths, as well as in 500' bulk spools. Cable Up Industrial line microphone cables feature PVC jackets and are manufactured with a high-performance, 22 AWG braided shield and soldered XLR connectors fitted with gold-plated contacts for reliable professional use. These cables provide high bandwidth and low capacitance. They are available in 12 sizes from 1' to 100'.

**cableup.com**

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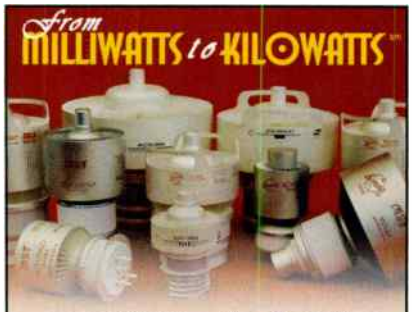


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| 500 W | 2000 | BE FM 500C |
| 5 KW | 1998 | Harris Z5CD |
| 5 KW | 2006 | Harris Z5CO, solid-state, unused |
| 10 KW | 1991 | Harris HT10 |
| 20 KW | 2000 | Harris HT20CD |
| 25 KW | 1998 | Harris HT25CD |
| 27.5KW | | Continental 816R4, SS IPA & all factory upgrades |
| 27.5KW | 1988 | Continental 816R4B, SS IPA & LP filter cooling option |
| 30 KW | 1988 | Harris FM30K |
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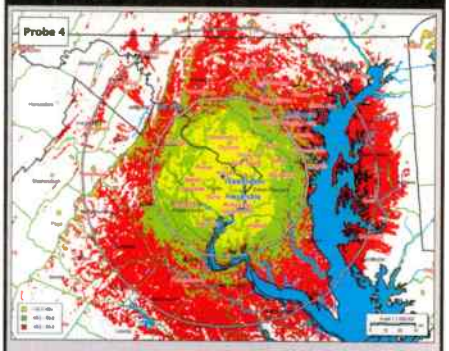


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World Radio History

# 20 years of *Radio* magazine

by Chriss Scherer, editor

The first issue of *Radio* magazine (originally titled *BE Radio*) was published in January 1994, but its roots go back much farther. In 1959, *Broadcast Engineering* magazine was launched to cover the technology of radio and television. By 1994, it was realized that while the two services are related broadcast efforts, the needs of their specific audiences warranted splitting the content into two publications.

*Radio* magazine, now part of the NewBay Media group of publications, continues to cover the technology of radio broadcasting. Now in our 20th year, we'll look back at the first year of publication, which had six issues.

Features of the May 1994 issue:

> The 1994 NAB Convention wrap-up was written by Kevin McNamara, who at the time was the chief engineer of WGAY-FM/WRC-AM in Washington. His review noted that digital storage prices were falling: disk storage was less than $1/megabyte and RAM cost less than $20/megabyte. Yes, we were talking megabytes at the time.

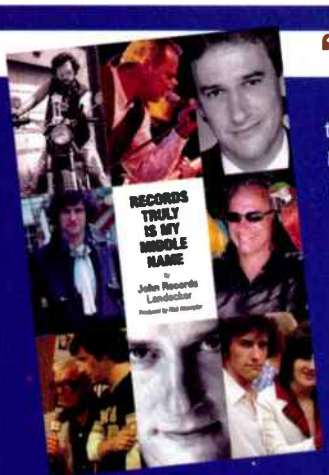
> The talk of the convention was digital everything. A completely digital on-air chain was the buzz. Cascading encoding algorithms was a significant topic. Various uses of RBDS were proposed. And something called ISDN was still a new idea in many areas.

> The Pick Hit Awards recognized the top 10 new products of the convention as selected by our panel of engineers (which included a young chief engineer in Cleveland named Chriss Scherer). A few of the winners: Gentner TS612, Moseley Starlink 9000, QEI Quick-Link, Henry Engineering StereoSwitch, Innovative Quality Software SAW Digital, and the Wheatstone A-6000.

> In June 1994, all AM stations were required to comply with the NRSC-2 regulations. We outlined what the rules required and how a station could conform to them.

> Digital cart machines—those using floppy disks or Mini-discs as the media—were starting to appear.

> New products in the issue: Pacific Recorders and Engineering ADX DAW, AEV Exclusive FM on-air processor, Cutting Edge Unity AM on-air processor and Nautel NE50 digital FM exciter.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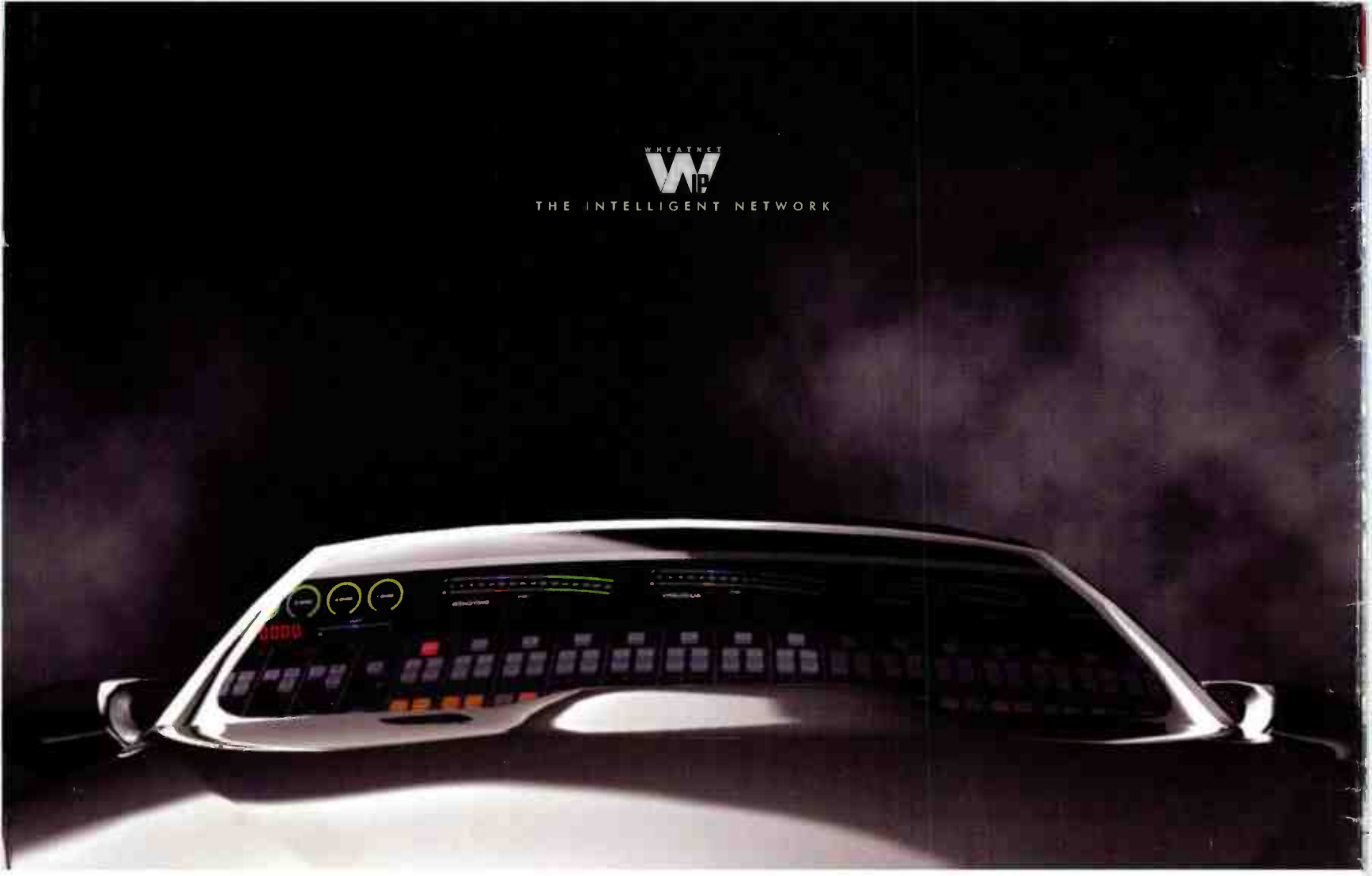


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