



RADIO WORLD

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Radio Reading Services Face Obstacles

Challenged by budget pressures and technical evolution

BY RANDY J. STINE

Radio reading services, which often operate on the FM subcarriers of public radio stations, are facing tighter budgets and shrinking staff. That has led some audio information services to make cuts or discontinue operations.

Reading services, also referred to as audio information services, provide spoken word audio programming — books, magazines, newspapers — for visually impaired audiences, who typically receive programming on specialized SCA receivers via FM subcarrier channels. The audio programming also is often available via public television stations and cable TV systems.

Services have expanded their platforms by introducing podcasting, streaming and cellphone apps to their mix of over-the-air and dial-in services, observers said.

The number of services has gone down since the early 1990s, according to several sources, including the International Association of Audio Information Services, advocacy and education group. In 1992 there were 125 services in the U.S. as compared to 108 today, according to IAAIS data, while



a search for radio reading services on the American Federation for the Blind website lists 103.

Most RRSs still have a relationship

with their local public radio stations, paying for an SCA or bandwidth for a nominal fee, or else having that donated. (The FCC said it doesn't have data on the number of audio information services operating on FM subcarriers.)

Financial support for the non-profit services typically comes from listener contributions, state and municipal funding, endowments, grants, corporate gifts, community service organizations and fund-raising events, according to the IAAIS.

Notable radio reading services in Florida, Oregon and Utah have cut services or shut down in recent years. The most recent to do so, Reading and Radio Resource in Dallas, Texas, ceased

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Measure Diversity Delay and Correct for It

Equipment manufacturers are responding to this important issue with solutions

BY ALAN JURISON

This article appeared in the recent Radio World eBook "HD Radio Evolves," and is printed here due to interest in the topic. You can read the full eBook at radioworld.com/ebooks.

The hybrid digital and analog broadcasting solution deployed in the United States, FM and AM IBOC, more commonly known as HD Radio, allows

simultaneous transmission of broadcast radio signals in both the analog and digital domain. A key component is that receivers can immediately acquire the analog signal and then transition (or blend) into the digital signal after it has acquired and buffered. The transition process is called blending.

In order to have this blend be seamless and transparent to our listeners, we broadcasters have had to employ

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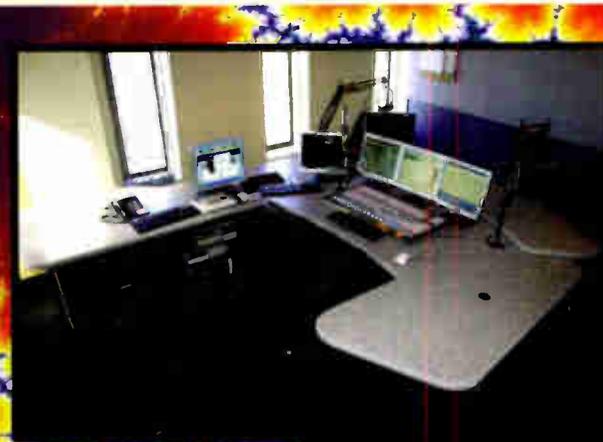
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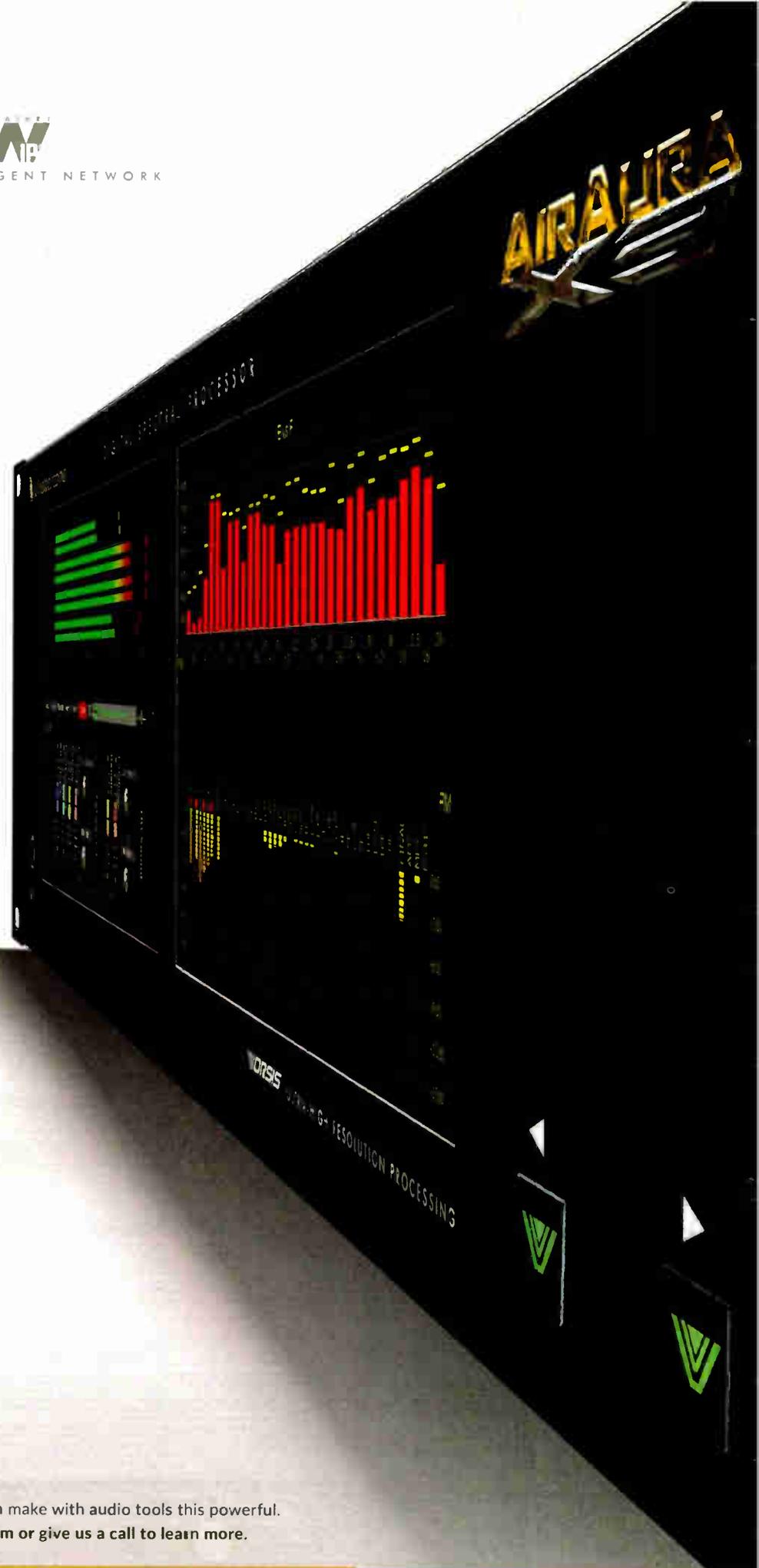
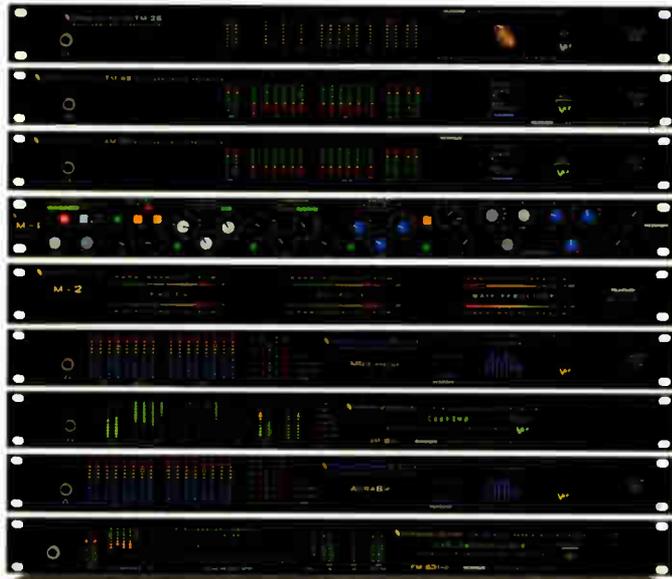
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AFCCE Works With Federal Government

Organization brings engineers and regulators closer together

BY BRETT MOSS

The Association of Federal Communications Consulting Engineers recently held its annual meeting in Annapolis, Md. Radio World spoke with new President Eric Wandel about the organization, where it's been and where it's going.



Radio World: What is the AFCCE?

Eric Wandel: The Association of Federal Communications Consulting Engineers was founded in 1948 as a professional association of communications engineers practicing before the Federal Communications Commission. Typical areas in which AFCCE members engage in practice include engineering consulting for broadcast stations in the AM, FM and TV services, for microwave, cellular radio, PCS, paging systems, cable systems and for satellite.

AFCCE has two main classes of membership. Full members are registered professional engineers engaged in the practice of consulting engineering before the FCC. Our associate members work in allied companies including consulting firms, equipment manufacturers, service providers, government agencies and communications law firms. We've recently begun growing our student membership.

RW: What is its mission?

Wandel: The purpose of the association is to aid and promote the proper federal administration and regulation of those engineering and technical phases of communications that are regulated by the Federal Communications Commission, to uphold the honor and dignity of engineers before the Federal Communications Commission and to provide for the mutual improvement and social intercourse of the members of the association.

In a primary function, AFCCE monitors the technical policy of the FCC to ensure that the agency's regulations coincide as closely as possible with sound engineering principles. When the FCC proposes technical rule changes, AFCCE participates in the rulemaking process, offering its comments and counterproposals for the public record. AFCCE stresses high standards of professional ethics among its members, providing for their mutual support and professional improvement. A scholar-

ship fund, supported by its members, permits the AFCCE to assist future communications engineers with college tuition.

RW: You recently had a convention. What came out of that?



AFCCE members and guests tour Dahlgren Hall at the U.S. Naval Academy.

Wandel: AFCCE recently held its annual meeting, which is open to all members to meet and to discuss the business of the association and to socialize and participate in cultural and technically-oriented tours and events. This year's meeting was held in historic Annapolis, Md., and included business meetings, a tour of the U.S. Naval Academy, a Saturday evening banquet held at the USNA Officer's Club, and free time for attendees to tour the historic city. Of special note, as the annual meeting coincided with the ARRL Field Day weekend, AFCCE deployed a Field Day station (FCC amateur call sign K3A) at the Historic Inns of Annapolis for members to operate.

Board members ending their terms of service this year included full members David Snively, who also served the past two years as AFCCE president, and Rich Biby, along with associate members Ron Chase, who has served as treasurer, and Gary Cavell.

Newly elected board members were announced at the annual meeting and included full members Bob Weller and Mark Fehlig, and associate members Ron Chase, reelected for another term, and John Lyons.

RW: Who are the new officers?

Wandel: The outgoing 2014–15 AFCCE officers were President David Snively, Vice President Eric Wandel, Secretary Steve Crowley and Treasurer Ron Chase.

Officers for the coming term — which runs to June 30, 2016 — are myself as

president [president and principal engineer, Wavepoint Research Inc.]; Bob Weller, vice president [VP spectrum policy with the National Association of Broadcasters]; David Layer, secretary [senior director, advanced engineering with the NAB]; and Ron Chase, trea-

surer [retired engineer, formerly with the FCC].

RW: How closely does the AFCCE work with the FCC and other interested agencies?

Wandel: AFCCE closely follows matters before the FCC and strives to provide thoughtful and technically significant comments in order to assist the FCC with their stewardship of spectrum use.

As an example, AFCCE was the first organization to express concern about an internal FCC proposal to close two-thirds of its field offices. We filed a letter with the FCC that, together with the support of other organizations and members of Congress, urged the commissioners to refrain from voting on that item until adequate opportunity for public comment was provided.

As a part of AFCCE efforts we also occasionally engage in meetings with FCC staff, such communications indeed being intended to ensure that the FCC is able to obtain information necessary for making expert decisions. AFCCE members also follow the activities of other agencies and organizations that may have an impact on the regulation of communications and broadcasting facilities, such as the Federal Aviation Administration as well as the U.S. Congress.

RW: What are the biggest issues facing the AFCCE?

Wandel: Some of the current issues AFCCE is addressing include reducing and mitigating all noise to AM and FM

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Sound Off, One Two Three Four

“The Internet will always find some version of bad manners”

I emailed a reader recently, out of courtesy, to explain why I'd blocked a nasty comment he had tried to post on our website. He ended his reply with a written shrug of the shoulders: “Your website, your rules.”

He's right about that; yet it was clear that he chose to believe I'd blocked his comment because I disagreed with his thinking about the story in question. That wasn't the case.

Trying to establish reasonable guidelines for discussion on a comment section or forum is like trying to get a haircut using a blender: You can do it, but the procedure is challenging and the results might be ugly. Nevertheless, I find it helpful to share my thinking, lest any reader assume I have malice to differing opinions. In fact, the opposite is true.

Not only is it my policy — and good journalistic practice — to seek out various viewpoints, it's actually in our interest to do so because it helps us drive site traffic. But putting such commercial considerations aside, I'm proud of how open Radio World is and has been during my tenure to publishing differing

viewpoints.

We approve the great majority of comments. Among the few we block, virtually all violated one of a few commonsense rules: No profanity. No spam or ads. And no personal attacks on identifiable people or allegations of illegal behavior.

“The person named in your article is a fraud and a charlatan.” Should we allow this comment? What's your ruling, Mr. or Ms. Editor?

If you posted a comment and it doesn't appear on our website within the next business day, feel free to email me to ask why. Note that comments may not appear until the next business day so wait a bit before emailing. It's also possible there was a technical problem.

Truly, though, my life is easier when I hit “approve” rather than “delete.” I often try to contact people whose

comments we block and invite them to post without the problematic wording. I do not attempt to edit or change posts myself, which would only muddy things.

(Interestingly, a high percentage of people who use abusive language do so under bogus email addresses.)

Even after I explain our few rules, someone on occasion will say I'm censoring them. Well, I'm not a government official, and freedom of the press belongs to the person who owns the press; so while you have a right to speak your mind in public, I'm not required to give you access to our platform.

However, as noted above, I pursue a relatively open, not closed, policy, with only a few pretty liberal ground rules.

**FROM THE
EDITOR**



Paul McLane

You may enjoy reading a few examples of comments and my decision on whether I'd allow them on the website. These are either real or (because I don't want to embarrass anyone) paraphrased while demonstrating the point:

“LPFMs are not and will never be ‘farm teams’ for professional broadcasters. ... LPFMs are for broadcaster wannabees playing radio, retired radio engineers or religious broadcasters. Have you heard LPFM stations? LPFM equals jamming the FM band with useless noise.” Ruling: Yes. While this opinion is harshly stated, it's not attacking a specific person or alleging illegal activity.

“To the previous commenter: I don't know who you are and really don't care. My station and team that runs and produces the programming are not broadcaster wannabees. ... So please, take your comment and put it where the sun does not shine.” Ruling: No,

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AFCCE

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radio, television and other consumer devices and the impact in terms of interference resulting from rapidly changing communications technologies; and identifying and supporting young engineers with an interest in choosing the field of communications and broadcast engineering as a career.

RW: What's new with the organization?

Wandel: AFCCE is currently working with the IEEE Broadcast Technology Society on a joint scholarship project. AFCCE and IEEE BTS have enjoyed a close relationship for many years, but this current collaboration is shaping up to be something very significant. Stay tuned on this one for a more detailed announcement in the coming months.

We are always working to support our members in the area of professional development, and related activities include:

- Monthly technical luncheons featuring timely and relevant topics and presenters
- Working on better ways to support Professional Engineer attainment of current associate members who have an interest
- Promoting PE attainment as a goal to engineering students. Attaining a PE is a two-step process that first requires passing a Fundamentals of Engineering exam, which can be taken at around the time of graduation from an undergraduate program. Passing the FE at graduation leaves only the field-specific PE exam remaining.

Upcoming events include AFCCE Luncheons on Sept. 25, Oct. 30 and Nov. 19, at our traditional location, the Holiday Inn Rosslyn in Rosslyn, Va. For our Oct. 30 event we'll have an afternoon symposium along with our Fall Social Dinner. In November, we'll be at the National Press Club for our FCC Reception, Holeman & First Amendment Lounges.

For more information, visit www.afcce.org.

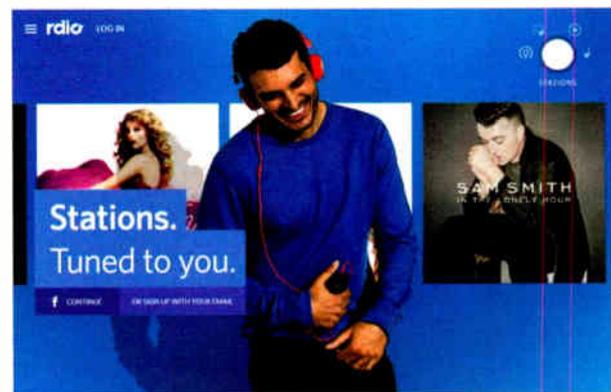
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VOLTAIR: The debate over radio audience measurement technology will be reflected in presentations at the fall Radio Show by 25-Seven Systems/Telos Alliance, manufacturer of the controversial Voltair, and by Nielsen Audio, regarding the technology behind its Critical Band Encoding Technology, CBET, used in its PPM system. There will be separate 30-minute presentations in a theater in the exhibit hall.

PODCASTING: The Interactive Advertising Bureau announced an "upfront" event for September in which advertisers and buyers get previews of podcast programming. Public radio entities NPR and WNYC will be among the presenters.

STREAMING: Rdio's interactive streaming service added audio from some 500 live broadcast stations including some in markets like Los Angeles, San Francisco and New York. The expanded services are a result of a partnership between Rdio and Cumulus Media, which took an ownership stake in Rdio in 2013.



The Rdio home page promotes four options via the dial at upper right: "stations, playlists, albums and songs." Local stations are now a part of its mix.

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READING SERVICES

(continued from page 1)

operations in late 2014, citing financial pressures and new technologies that have replaced the need for the service.

Some supporters of audio information services believe demand for their services is going up as the baby boom generation ages. However, others claim the Internet and other technologies can improve audio quality and provide more options for the visually impaired to receive helpful services.

Radio World asked IAAIS President Stuart Holland about the hardships of radio reading services and what his organization is doing to help. He is also manager of the Minnesota Radio Talking Book Network and has been an IAAIS board member since 2001.

RW: What is the job of IAAIS in 2015?

Holland: The IAAIS is the umbrella organization for audio information services around the world. We exist to share information with each other about technology, trends, best business practices and advocate for agencies with governments for funding and support.

For a couple of reasons, most of the member services are in the United States. First, the concept of audio information services for people who are blind or with visual disabilities began in the U.S.; and second, the U.S. is covered by a patchwork of services in most major population areas. Most other countries with audio information services have a more coordinated national system. In Canada, for instance, the government-run service AMI, which is a member service of the IAAIS, is carried on a national cable network. The number of member services varies slightly from year to year, losing a few, gaining a few, but remains around 85 member services.

RW: What trends are affecting your membership?

Holland: There are two major threats to audio information services: funding and technology.

The funding problem is obvious; since the U.S. is covered with a patchwork of services, each service is funded in slightly different ways. Some depend on government funds, some on local donations and some on grants — but in each case, the stations need to convince funders that the service is worth funding.

And that ties into the technology challenge. We have more and more access to information with some amazing technology, and much of that is actually accessible to blind people. So many funders believe that the access to technology counters the need for our audio information services. It does not.

FROM THE PAGE TO THE EAR

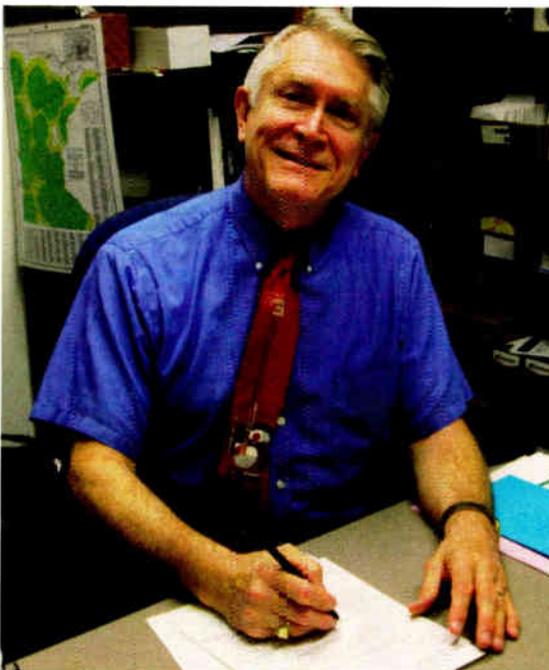
Audio information services began by being called radio reading services because using space on a FM subcarrier channel of a public radio station was the only broadcast option at the time, according to Stuart Holland, president of the IAAIS.

The first such service, Minnesota Radio Talking Book, was launched in 1969, the brainchild of Minnesota Public Radio's Bill Kling and State Services for the Blind Director C. Stanley Potter.

That service set a trend around the U.S. In some areas where radio signals were not as dependable as television signals, a similar arrangement was made with public TV stations; the audio was carried on the TV's second audio programming or SAP channel, Holland said.

In 1976, copyright exemption was clarified by the U.S. Congress (Public Law 94-553) allowing reading services to broadcast material to those "who are unable to read normal printed material as a result of their handicap" as long as the access was not also made available to the general public. Since the stations were on subcarriers, the rules of the FCC were not enforced, Holland said.

The group said an estimated 20 million Americans are living with a significant vision loss and suffer from print disability.



Stuart Holland

First, we do not only serve the blind and visually impaired communities. We serve anyone who cannot read the printed page — for any physical reason. That includes people with brain trauma, MS, dyslexia, quadriplegia and more. Plus, blindness in the west is usually an age-related issue.

Though the numbers of elders who are using new technology are increasing, there are still huge numbers of older people who will never use a computer or cellphone. The technology that some people tout as the solution to access is still unavailable to many. Plus, one of the advantages of having a local audio information service is that it can truly be local; people can have access to what is happening in their own communities, not just what would appear in national news publications. Not all the information in local publications is available in a digital format.

RW: Tell me more about the newer technology.

Holland: Technology is a great benefit to our services. When our service industry began, we recorded magazines and books on reel-to-reel tape, and broadcast on analog "side-channel" radios. That was our only option. The result was information with occasional crosstalk, fuzzy signals in places and frustration. New technology has allowed our signals to be broadcast on digital radios, Internet streams and archives, cable television, phone apps, podcasts and more. So we are really at a crossroads with technology. We need to continue the service in a format that works for people who do not, or cannot, use modern technology. But we also need to be expanding our options for those who do use and depend

on the technology now available.

RW: Why are RRS budgets so tight? Are public broadcasters spending that money elsewhere?

Holland: Not all money for operation of audio information services comes from public radio stations, though they are required to provide audio space for reading services on their signal if asked.

I think there is a myth that public radio and television stations are all run in the same way and walk in lockstep. There are connections, but each station makes its own decisions regarding how much national feed to use, whether or not to broadcast in HD, how to divide up the signal and what to use on it. And not all audio information services are carried on public radio. As I indicated above, some are on cable television, some are on college radio stations and a few are actually on mainstream radio channels.

RW: What kind of outreach or education does IAAIS offer to assist members to help with fundraising issues?

Holland: This last year, the IAAIS became more active in advocacy for their member stations that we have been in recent memory.

The IAAIS hosts national conferences at which there are always workshops on fundraising. But we also offer mentoring and our list server where member services can ask for advice from other stations. We also have a program in which member services can share items that they have recorded, making them available to any other service; and I know that there are materials there regarding fundraising.

But as an umbrella organization, we cannot do the work for individual member services. We can instruct and advise. We can advocate for them with funders. Ultimately, each service needs to do the work necessary to provide the money for their service.

RW: How is IAAIS dealing with challenges brought on by how pubcasters use their analog subcarriers?

Holland: Individual member services need to find their own solutions to the changes happening in technology. Public radio stations are shifting more and more to digital broadcasting, though there are still holdouts. There are still member services that use analog radios. The IAAIS cannot dictate to any member what they need to do. However, we continue to educate our member services through our conferences, information that we share on our list server, webcasts and mentoring.

RW: Do many pubcasters devote valuable HD Radio multicast channels for RRS programming?

Holland: When HD Radio hit the scene, there was a great deal of excitement about it. The IAAIS devoted a lot of energy and time to the issue and co-sponsored the development of an accessible HD Radio so that IAAIS member stations could get out of the business of supplying radios to our subscribers.

HD Radio did not take off among the general public or, as I understand it, with as many public radio stations as much as expected. Most IAAIS member stations have not added HD Radio to their distribution methods, though there are a few around the country that have. I think many public radio stations would actually be very willing to find room on their HD stream if asked, but most have not been asked. There is no groundswell demand for it.

RW: How many audio information services are currently streaming their broadcasts? Is Internet delivery

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DIGITAL DELAY

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delays on our analog AM and FM signals to match the digital. This delay is typically called "diversity delay" because the HD Radio transmission system uses a variety of techniques and buffering to add redundancy or diversity to the system for signal robustness.

This robustness and signal processing create significant delays compared to the near-instantaneous analog transmissions, typically anywhere from 6–10 seconds, depending on hardware, software and data links in use. At a properly configured AM or FM station broadcasting in HD, there is a device in the analog air chain providing this delay.

In the first and second generation of HD hardware, this delay often was in the same device producing the HD signal. Over time, engineers demanded flexibility in configuration, reduction of hardware costs and reducing points of failure (the first two generations of hardware weren't particularly reliable).

The most common deployment of HD systems came in third-generation and recently introduced fourth-generation hardware, and these systems broke out the functionality of that single device into two, the Exporter and the Exciter. These components communicate over common Ethernet using a system designed by iBiquity called the Exgine platform. The connection between the two is considered the Exporter to Exciter (E2X) link.

As a station-level engineer, ever since I got my hands on an Exgine system (now in its tenth year in production hardware), I was challenged to keep the analog diversity delay perfectly aligned with the digital; and I wasn't alone. But these were the early days; the system was still being worked out, and many many of the major drifting issues were resolved over several software updates.

But precision tools available in the last few years have told us that there is still a long list of items that can cause diversity delay drift on a radio station: Incompatible software/firmware loads, improper configuration of the hardware, poor isolation of network traffic and design of the E2X link, location of the Exporter and the Exciter and the latency or jitter on the data link it traverses, separate processors, component aging and

failures ... and did you know that if you reboot your Exporter or Exciter it often will come up with a slightly different delay than it had before the reboot?

A laundry list of items can cause a station's digital transmission timing to change. These, in turn, can cause diversity delay/ blend time alignment problems.

It's impossible to keep your station's diversity delay perfectly aligned through manual means. If you don't have a delay

might imagine, it takes a "golden ear" to get it perfect. I've determined with precision devices that I'm just awful at it. Or, if I get close, I've wasted half my day trying to get it right.

And let's say you do have that "golden ear" ... your UPS on the Exporter just failed, your Exporter rebooted, the delay just changed. Are you able to listen to each of your stations continuously to make that adjustment? The answer is

Imagine your station's most important client in a vehicle with HD Radio, hearing their commercial stutter.

measurement device, it's also nearly impossible to know the precise amount of delay needed on your station. You should seek a way to measure the delay accurately and correct it automatically.

SPEC

We as an industry really have not been looking at diversity delay measurement with the precision it has demanded. Part of the problem was that we did not have the tools when we launched our HD stations. The initial alignment procedure was to put on a set of headphones and put a receiver in split mode with the analog on the left and the digital on the right, and get them to match. As you

that nobody can do this job manually and stay up on it and provide the precision required to stay in spec.

The official specification is that the analog and digital signals should be at 0 samples, plus or minus 3 samples. So the range is -3 to +3, with the center of 0 being preferred. One sample refers to 1 out of 44,100 samples per second in the 44.1 kHz bit stream.

An extreme amount of precision is required to get this perfect. One sample is 22.7 μ sec. Three samples means within 68 μ sec. Many broadcast monitoring products show the measurement in seconds and samples. If you've been measuring your diversity delay in seconds

from any of these products and been saying things like "... the station is off -0.0001 seconds ... close enough," you have been doing it wrong.

I must admit, I was doing it that way for a long time as well. At four digits beyond the decimal point, that is a resolution of 100 μ sec. Any reading that is not zero essentially is out of spec. If the station is off by 3 samples, that equates to 68 μ sec, rounded to the nearest 100 μ sec, you would get 100 μ sec or 0.0001 seconds. Four samples is 91 μ sec and would round to 0.001. So, you could be in spec or out of spec with that number: there isn't enough resolution. At 2 samples, that will round to 0.000 sec.

Looking at it another way, 0.0001 sec is very close to 4 samples off, but anything between 3 and 6 samples off will round to .0001 seconds.

The best way to avoid these issues is to just focus on the number of samples and stop looking at the time. We need to be focused on samples, not seconds. And when you look at it that way, that level of precision is only available consistently if we automate the process.

WHY DOES IT MATTER?

HD Radio is here to stay and growing rapidly in the only area where volumes of radio receivers are still manufactured: factory installed radios in new automobiles. Ten years ago the industry wondered when these digital radios would show up. They are here now; your

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READING SERVICES

(continued from page 6)

of RRS programming the future?

Holland: I wish I knew what the future really holds. I don't have statistics, but I believe the percentage of stations that stream is probably around half, and increasing. What we realize is that we need to continue looking at additional ways that we can get our information distributed because people are accessing information in newer ways every day. We are looking at an IAAIS app for phones.

But as I said earlier, we cannot forget the people who cannot access the technology for various reasons other than just blindness. The simplest technology is sometimes the best — we will always need to have some form of access that a person with severe disabilities can turn on with a button or lever.

RW: Technology has made reading services available on many platforms. Which technologies are growing the fastest, and could they eventually eclipse the need traditional subcarrier broadcasts?

Holland: Member services are excited about the potential that Internet streaming brings. By simply providing a stream and hooking up with a few apps, an RRS can be on several different devices at the same time. One of our members counts 28 different ways they are delivering their broadcast. I think that the exciting shift in the industry is a move away from worrying about how a listener is consuming the content and a greater emphasis on the quality and diversity of what they are consuming. It will be a long time before RRSs will completely move



Members of the IAAIS board include Amy Hatter and Lori Kesinger (seated) and, from left, Mark DeWitt, Jane Carlson, Melanie Brunson, Stuart Holland, Andrea Pasquale, Marjorie Williams, Brad Walker, Mary Frances Evans, Neely Oplinger and Jennifer Nigro.

away from SCA broadcasts, but our member services are working hard to be on the devices our listeners are using.

RW: What is the "silver tsunami" that some RRS professionals describe? Is demand for their services growing?

Holland: The "silver tsunami" refers to the fact that baby boomers are reaching that age when they will no longer be the working population. In the west, the majority of eye conditions happen to older people — macular degeneration and retinopathy. The assumption is that more and more cases of blindness and limited vision will occur.



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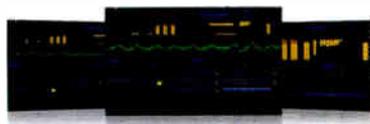


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Omnia®
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DIGITAL DELAY

(continued from page 8)

listeners already have them. In 2014, iBiquity reported that 43 percent of new automobiles came with HD Radio, standard. In 2013, that number was 33 percent. This equates to millions of HD radios being sold and used.

Each day, more and more of your listeners have HD Radio receivers. Should trends continue for the rest of the decade, it's going to be hard to buy a vehicle without HD Radio in a few years. The digital experience of your radio station is something we should be paying attention to today. Within a few years, an HD Radio will become the primary radio your listeners will use.

If your station is not precisely aligned, all of the time, it makes that transition from analog to digital, or back from digital to analog when the HD fails, sound bad. How bad depends on how far off you are and what type of programming you have.

Stations that are lightly processed or air talk programming seem to be more susceptible to audible problems even with a small offset in samples. Loud, densely processed music stations the effects of being out of spec slightly can get buried in the program density to a point. But keep in mind, even these stations have periods of less density that are important, such as talk-intensive morning shows and commercials.

Imagine your station's most important client in a vehicle with HD Radio, hearing their commercial stutter. So every station ultimately is affected by not being "in spec."

iBiquity has done research, demonstrating how you can get various audible blending effects depending on how many samples you are off. Fig. 1 shows the effect of different sample offsets and the impact on the audio. During a blend, any misalignment >5 ms (approx. 200–300 audio samples) will be perceptible to a listener as an echo or skipping effect. The two audio sources will sound distinct. Even small misalignments (<200 samples) will produce a filtering effect during a blend. It will sound like one audio source but will have a "hollow" sound due to a comb filtering effect. The effect is not noticeable if the misalignment is less than 3 samples.

Some people may think, "Well, the radio blends once 8 seconds after it tunes to the station, so it skips once; why does it matter that much?" Perhaps they think of the blend as an initial acquisition; then you keep digital forever. But that isn't always the case. Receivers of all types lose digital lock at some point. We could go into an exhaustive investigation of those situations, but that's a topic in itself.

The easiest way to think about this

Diversity Delay

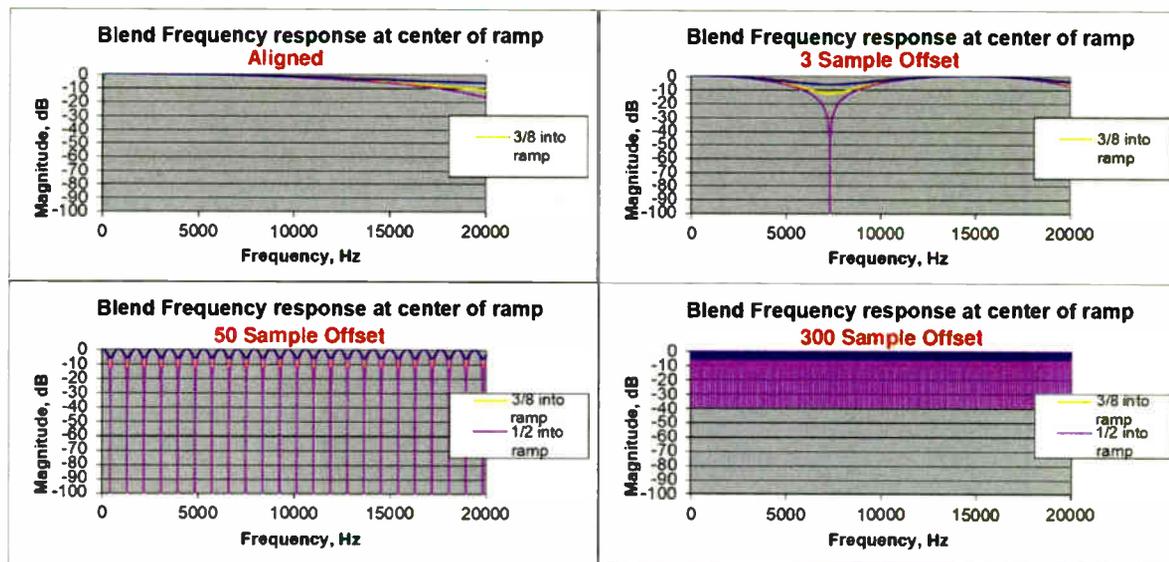


Fig. 1: Audible effects on blending at various sample offsets.

is in the car. Perhaps you think of the blend as if someone is driving out of your market. They have coverage, and at some point on the highway, they lose digital lock, it blends to analog, and eventually as you go out further and further, the signal is gone. But that's not the typical experience of your listeners. Most of your listeners do not leave the market and stations' signal coverage each day.

Think about your station's 60 dBu contour, which is where most -20 dBc stations tend to start to lose digital lock. If you live and work in that area, you can experience constant drifting in and out of digital. You can run into situations where the radio is blending quite a bit.

CAR COMPANIES CARE

Diversity delay blending issues are the top complaint from auto manufacturers. iBiquity has told the industry that for years, their number one complaint about HD Radio is time alignment. I can independently vouch for this. I work closely with many automotive companies, and I've had emails, phone calls and idle conversations at lunch about this problem with their engineers. I have been in vehicles with these engineers where they hear stations skip and ask me to help fix it. The problem is, those stations typically belong to other companies, so it takes time to research who owns that station and to contact their engineering staff to have them make a manual adjustment.

GM temporarily removed HD in some vehicle models to help fine-tune their implementation to address consumer feedback about HD Radio blending. It turns out that their customers (and our listeners) have been complaining to them about this for a long time. But instead of calling up the radio sta-

tion to complain about it, the customer takes the car back to the dealer and thinks there is a problem with the radio. Listeners are not (and should not be) educated enough on this issue to think to contact the radio station about this annoyance. This customer feedback is not unique to GM vehicles.

Automotive designers are sensitive to this problem, and it is my experience that 99 percent of the problems come back to issues on the broadcast side. We need to fix this with automated monitoring and correction.

WHAT CAN YOU DO ABOUT IT?

For years, broadcast engineers have been working with iBiquity and transmitter hardware manufacturers to resolve this problem. We have made progress and addressed some of the most common problems that cause drift. But as I transitioned from a traditional broadcast engineer to an HD Radio implementation specialist, I have discovered there are just too many variables beyond the control of all parties involved; there really needed to be a push for automated diversity delay measurement and corrective systems. I and other colleagues have been asking for products and solutions in this area, and we've seen the industry respond in the last few years. This year at April's NAB Show in Las Vegas, we saw a large collection of solutions being introduced to the marketplace.

Below, we've created a roundup of products that can help you monitor and manage diversity delay. Note that I have not personally tested each solution, and the list should not be construed as a product review or endorsement. Also, this is an evolving space. Some vendors are working on integration efforts with other products; and there may be

other offerings available. Check with each vendor about pricing and delivery schedules for products or software you are considering.

TWO STRATEGIES TO CONSIDER

Create a two-piece system. Consider pairing a monitoring receiver that can measure the diversity delay offset and send a correction offset to a device that is active in the analog air chain (an audio processor, delay unit or exporter). If you have some of these products already, this could make a lot of sense for your station. By upgrading firmware on your devices, you can possibly put together two pieces of hardware to come up with an automated hardware solution.

Single-box solution. Some stations may choose to implement devices that measure and correct the diversity delay in a single device. This is especially handy for stations that do not have the products listed on the following pages already in their air chain, or for companies looking for standardization of delay solutions from station to station. These devices can be inserted into either your analog or digital air chain to make delay adjustments and have an integrated receiver to make the measurements of delay offset. You can use a simple antenna on these units, or wire off an RF sample (in FM+HD installations) with the appropriate amount of attenuation and the device. Many engineers I have spoken with are most comfortable about having these right before the HD Exporter, so that any adjustments the Exporter is making to delay are contained to just the HD broadcasts and the analog plant remains exactly the same as it does today. In that use case, you increase the existing diversity delay in your analog chain to a larger

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THE IP GATEWAY

— The VMXpress IP —

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DIGITAL DELAY

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number than you need today; then these devices will make up the difference on the digital chain. The advantage of going in this direction is that the devices can then correct digital audio level and give you level alignment between analog FM and HD. The disadvantage to it being in the digital chain is that it would not work for any station that has to eliminate all delay for live programming and enter what is commonly referred to as "ball-game mode." Luckily, the products are easily configured to work in either chain.

SOLUTIONS

Some solutions may be a better fit for your station than others. There are many factors to evaluate, including repurposing equipment you already have, overall system costs and your level of comfort with the devices. As mentioned, this is a rapidly developing space. If you adopt now — and I suggest that you do — you might need to provide feedback and observations to the manufacturers to refine the code and products. The industry is going to learn a lot about this issue in the next few years

SOUND OFF

(continued from page 4)

but only because of the last phrase. Admittedly this is a tougher call, but readers have told me they don't want personal attacks on our website. Here I emailed the person who posted and said I hoped he'd repost without the last phrase.

"The person named in your news article is a fraud, and I encourage anyone ... to oppose his effort at the first possible opportunity." Ruling: No. If you want to label someone publicly as a fraud, do it on your own website. And get a good lawyer.

"Joe Smith is a charlatan, and a man whom RIAA should seriously look into." Ruling: No. See above.

"Help wanted! We're looking for a good engineer. Send your email to humanresources@rca.com." Ruling: No. Radio World offers a very affordable classified ad service for your Help Wanted or Gear for Sale ads.

"I saw your story about a filing with the FCC spelling out changes to AM rules. I can't believe what this group is asking for. This would be terrible, terrible for the AM band. How can they think this cockamamie idea would work?" Ruling: Yes. The reader disagrees with an idea that had been put forth in a public forum; further, this comment attacks the idea, not the person. Whether Radio World agrees with either side, the subject matter is a legitimate topic for industry discussion.

"To the reader who asked about an RF solution: We sell FM transmitters and have realized a good number of projects all around the world for the entire

now that we have tools to measure and correct for this delay automatically.

Belar

The *FMHD-1* broadcast monitor receiver makes a variety of HD Radio-related measurements, and it can measure diversity delay continuously. Not only is this helpful when trying to manually align a station, the correction offset can be sent to a variety of devices in this list, such as products from GatesAir, Nautel, Omnia, Orban, 25-Seven and Wheatstone below. Currently, the *FMHD-1* works on a single-station basis; however a future software update is being considered to have the device scan multiple station presents and send correction codes to multiple stations devices.

Broadcast Electronics

The *XPi10 esp Exporter* is an HD Radio Exporter with a built-in diversity delay alignment feature. If you provide the Exporter with audio of the analog and digital from a receiver running in split mode through the unbalanced audio inputs, when configured, it will measure and maintain diversity delay. Note that the station must be configured to have the

analog diversity delay fully provided by the exporter for this feature to be useful.

DaySequerra

The *M4DDC* is a single-box solution that can do the measurement and delay adjustment in a single box. It inserts in your AES stream of either the analog or digital air chain and can make the corrections necessary for time alignment, level alignment and phase reversal correction. It has a Web GUI and can alarm via GPIO and SMTP (email alarms) and also has an SNMP interface. The GUI also does data collection and can show you how the device is working overtime. This is an FM-only device; an AM version with slight hardware variations is expected later this year.

DaySequerra's *M4.2 TimeLock* is a broadcast monitor receiver that makes a variety of HD Radio-related measurements, one of which is that this product can measure diversity delay continuously, helpful for aligning stations manually. In addition, this product supports automatic diversity delay correction with the GatesAir *HDE-200 Exporter* and the Orban processors mentioned

below. Future support for Nautel, Omnia and Wheatstone products below is planned but not yet available.

GatesAir

HDE-200 Exporter can receive correction outputs from both the Belar *FMHD-1* and the DaySequerra *M4.2 TimeLock*. Note that the station must be configured to have the analog diversity delay fully provided by the exporter for this feature to be useful.

Inovonics

JUSTIN 808 is a single-box solution that can do the measurement and delay adjustment in a single box. It inserts in your AES stream of either the analog or digital air chain and can make the corrections necessary for time alignment, level alignment and phase reversal correction. It has a Web GUI and can alarm via GPIO and SMTP (email alarms) and also has an SNMP interface. The GUI also does data collection and can show you how the device is working overtime. This is an FM-only device.

Nautel

Exporter Plus can receive correction

satisfaction of our customers. Contact me at this email ..." Ruling: No. Buy an ad.

"HotFlash renewable hand warmers are available on the Internet at the following URL ..." Spam alert!

"Good tip in Workbench about HotFlash renewable hand warmers. I use them at a lot of my transmitter sites." Yes.

"Most of my 35-year career at the FCC I worked as an enforcement attorney ... Unless this 'tiger team' is composed of Batman or a Superman, there's no way it can accomplish anything but staying several steps behind whatever problem it is working on." Ruling: Yes, the comment is about a matter of public policy.

"Thanks for the story about pirate radio. Someone should tell the FCC to check out the guy who runs the LPFM in Winslow, Ariz. He's a former radio pirate." Ruling: No. The statement alleges illegal activity by a person who may be identifiable. (Whether RW might pursue this as a story is a different question.)

"Thanks for the story about pirate radio. Someone should tell the FCC to pay more attention. I know of at least one LPFM that is run by a former radio pirate." Ruling: Yes. No specific person is attacked or made subject to unverified allegations of illegal behavior.

"Good luck collecting that fine! There is an attorney in southern California who has falsified station renewals and construction permits over and over again. Well beyond five years and he is still running the FCC in circles." Ruling: Yes, for the same reason as the previous entry.

"Radio World has its head up its ass on IBOC." Ruling: No. Readers have told us clearly they don't

want sexual or explicit offensive language.

"Radio World has no clue what it's talking about on IBOC." Ruling: Yes. We don't block comments on grounds that a person disagrees strongly with RW or a person quoted.

"The previous comment is exactly the kind of idea I'd expect from a Republican (or Democrat, Muslim, Christian, Jew, Obamafan, neo-conservative, tea partier, blah blah blah)." Ruling: No. (In rare cases, policies expounded by political parties are central to a story, and therefore subject to fair comment, but most comments along these lines are gratuitous.)

A corollary situation arises sometimes when we cover a public person who has spoken out on an issue, and readers post the strong reactions to the quoted opinions. The person in our news story may then complain to me that Radio World is too liberal in allowing critical comments about his or her quoted comments.

I take such feedback seriously; but again, the distinction is whether a comment is a *personal* attack.

Let's say you file a public letter with the FCC proposing a dramatic rule change. Don't expect me to block strong disagreements about your *issue*. I will not allow readers to post ad hominem, *personal* attacks.

All of the above being said: An occasional reader will insist that he (it's always a he) can see into my heart and knows my motivation for disqualifying a comment, even after I took the time to send a courtesy note explaining our rules. The vitriol I usually get back in reply only convinces me I was right in the first place.

As our Emily Reigart puts it: "Paul, you are fighting the good fight against trolls, but the Internet will always find some new version of bad manners."

outputs from both the Belar FMHD-1 and the DaySequerra M4.2 TimeLock. Note that the station must be configured to have the analog diversity delay fully provided by the exporter for this feature to be useful.

Omnia

Omnia.7, *Omnia.9* audio processors can work in conjunction with the Belar FMHD-1 to automatically adjust the analog diversity delay, with future support for the DaySequerra M4.2 TimeLock planned.

Orban

The Orban 8600, 8600S, 8500, 8500S, 5700 and 5500 audio processors can work in conjunction with both the Belar FMHD-1 and the DaySequerra M4.2. Orban notes that even the non-HD versions of these processors make diversity delay available for stations running separate analog FM and HD processors.

25-Seven

Precision Delay can be inserted in the analog air chain to achieve diversity delay and supports automatic correction adjustments from both the Belar FMHD-1 and the Worldcast/Audemat Golden Eagle HD.

Wheatstone

AirAuraX3, *FM531HD*, *FM-55* and *AM-55* audio processors can work in conjunction with the Belar FMHD-1 with future support for the DaySequerra M4.2 TimeLock expected but not available yet at time of publication.

Worldcast/Audemat

Golden Eagle HD is a broadcast monitor receiver makes a variety of FM and HD Radio related measurements, one of which is that this product can measure diversity delay. It can work with the 25-Seven Precision Delay for automatic diversity delay correction. Also, it can be configured to monitor diversity delay alignment and send alerts if alignment (or other parameters) are out of specification. All alignment measurements are available via SNMP for use by third party equipment.

Thanks to Harvey Chalmers and Jeff Detweiler of iBiquity for providing insights, facts and figures on their research on time alignment offset and its audible impact on the blending process.

Alan Jurison is a senior operations engineer for iHeartMedia's Engineering and Systems Integration Group. He also chairs the NRSC RDS Usage Working Group (RUWG). He holds several SBE certifications including CPBE, CBNE, AMD and DRB. His opinions are not necessarily those of iHeartMedia, the NRSC or Radio World.

NEWSROUNDUP

RETIRING: One of U.S. commercial radio's most well-known engineers left full-time employment at CBS. Glynn Walden, 71, was senior vice president of engineering and was on his second stint at the company. In addition to having been chief engineer of Philadelphia's KYW(AM) and having managed numerous corporate projects for CBS, Walden is considered one of the "godfathers" of in-band, on-channel digital radio. He will be doing consulting work for CBS on a contract basis and voiced an interest in industry projects.



Glynn Walden, center, is shown at a panel at last year's Radio Show. He's flanked by Greg Borgen and Andy Skotdal.

ALSO: Beasley told the FCC the license of WVVV(LP) near Tampa should be suspended because the new LPFM had "positioned itself as a competitor" and had not operated in a manner that advanced an educational program or complied with its application. The station told RW it is acting legally. ... Broadcasters are seeking protection from paying "court-imposed" performance fees for pre-1972 recordings, the latest turn in the "Flo & Eddie" case against Sirius XM.

In a "friend of the court" brief, NAB wrote that although a district court had "stopped short" of a ruling that would encompass over-the-air broadcasting, the appeals court should "reject the ruling ... and eliminate any doubt."

NEW...
DIGITAL

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WORKBENCH

by John Bisset

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Here's a simple idea to solve a newsroom problem. Cumulus New Mexico Assistant Chief Engineer Evan Baker responded to his news staff's need for multiple scanners in the newsroom by running the scanner outputs to independent speakers, seen in Fig. 1.

Although the scanners add excitement and realism to newscasts, the studio is also used for recording public affairs programs. Rather than turning each scanner or speaker off, Evan ran the audio through a Henry Engineering Superelay, which is tied to an activation switch that he mounted on the side of the mixer, shown in Fig. 2. When the scanners

must be muted, one switch does the job.

In planning the studio/newsroom layout, he also placed the "green room" so that guests would pass by the newsroom on their way to the air studio. Newsworthy guests could then be led easily to the newsroom to record a brief interview after their on-air appearance.



Fig. 1: Newsroom scanners run to individual speakers.



Fig. 2: A switch, tied to a multiple-pole relay like Henry's Superelay, can mute the speakers simultaneously.

Fig. 3 shows a common problem for stations that line their studio walls with foam sound deadening material: It eventually starts to disintegrate. This is particularly true in high-traffic areas such as light switches or door handles.

Perhaps you have encountered this problem. If so, what did you do to cor-

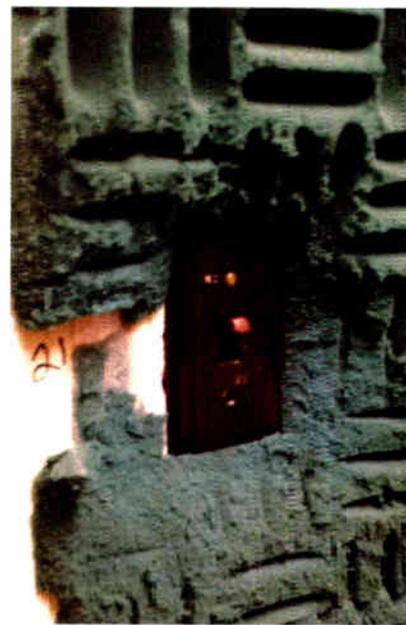


Fig. 3: How would you handle this problem of deteriorating foam sound-proofing?

rect or prevent it? Email your suggestions to me at johnpbisset@gmail.com and include a high-resolution photo to demonstrate your solution.

Frequent Workbench contributor Marc Mann writes that Terry Skelton's idea to place a white dot on the "up" side of his USB connectors is a good one. But Marc cautions engineers to pause before applying white dots en masse. An "up" dot is fine, but not in all cases.

Marc has found that some clever equipment design engineers mount the USB "female" not to the topside of a PC board, but to the underside, to conserve space. This changes the orientation and one now must insert the plug upside down (now with the white dot facing down).

Of course, one would never force a USB plug into place; but the concern is if we tell staff the dot is *always* up, they may try to force it when the jack is actually upside down.

Good practice is to test the USB receptacles first, to ensure they are oriented correctly.

Marc adds that the same applies to vertically oriented USB receptacles. A white dot is fine on the narrow side, too — but which side is truly "up"?

We live in a monitor world these days, and proliferating screens can interrupt sight lines in the studio. This can be especially annoying in facilities with multi-talent morning shows.

Beasley Las Vegas Engineering Manager Lamar Smith demonstrates a workable alternative to the issue of monitor crowding in the control room.



Fig. 4: Recess your control room monitors on a shelf like this one at the Beasley Las Vegas cluster.

Fig. 4 shows how the tabletop surface behind the console is cut and a recessed shelf placed in the cutout. The monitors sit on the shelf and can still be seen by the board operator/talent, but the recession lowers the height of the monitors so they no longer block the field of vision of the air staff.

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.

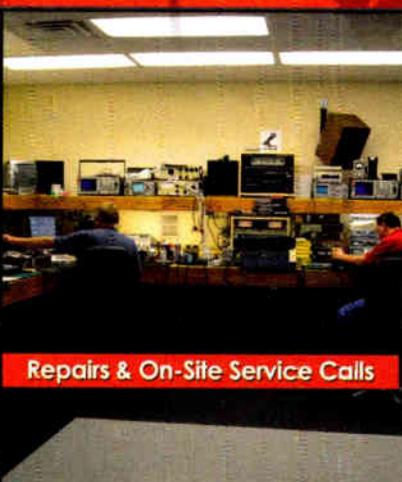
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- Insert in either the FM or HD Radio AES digital feed
- Full Web interface for remote control, metering, etc.
- SMS/email alarms for loss of signal and loss of audio
- Extensive data logging with graphic display
- Auto failover with relay bypass

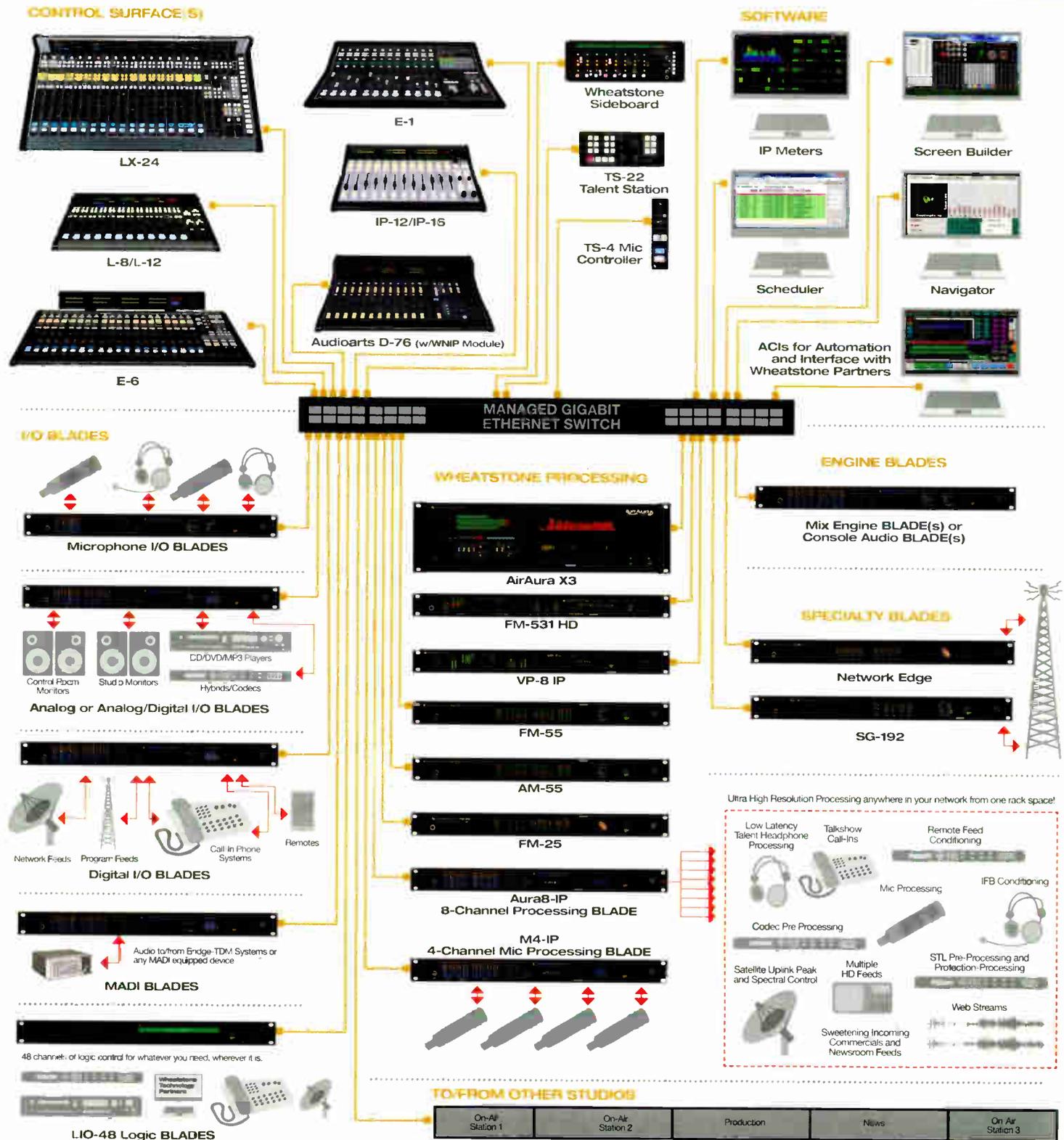
What are users saying about the JUSTIN 808?

"I found it (JUSTIN 808) to be very easy to set up and install, but most importantly, it gets the job of time and amplitude alignment done perfectly, so the blend is virtually undetectable."
 - Paul Shulins, Greater Media Boston.

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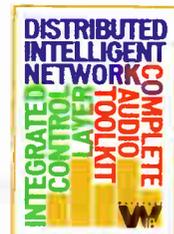


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No BS Guide to Radio Podcasting

Amateur podcasters can call them what they want, but between us broadcasters, we know those so-called subscribers are really listeners with earbuds and a cellphone.



No one knows those ears better than broadcasters. We know about good content and good sound. What's new to us are the codecs and the listening environments and devices used for podcasts. To explain what it all means, we asked our audio pros Jeff Keith and Mike Erickson to give us a quick sound check on podcasting.

For the entire story... INN26.wheatstone.com



Part 101 Wireless IP STLs Cheat Sheet

Part 101 frequencies have been used by businesses and others for some time. But not until 2011, when the FCC abolished the so-called "last link rule" precluding broadcasters from using these bands, did broadcasters have access to these frequencies for wireless IP STLs.

Licensed IP wireless systems (Part 101 6 GHz or 11 GHz) are useful as a main STL, such as when a station is moving and re-upping their STL in a market where 950 MHz frequencies are hard to get.

By putting up an IP link from the studio to the transmitter, your transmitter site immediately becomes part of your Ethernet network. "It's almost like from an IP standpoint, that tower is sitting as part of your building now," said Jeff Holdenrid, who specializes in wireless IP for broadcast and other emerging markets for DoubleRadius engineering firm. Jeff has installed dozens of wireless IP microwave systems with our WheatNet-IP audio network in the past five years, most averaging in the 20 to 25 mile range.

A WheatNet-IP IP88D BLADE into an IP wireless radio can run 8 stereo channels across a wireless IP link and still have enough bandwidth left over for video surveillance, VoIP, remote control and other periphery functions.

For the entire story... INN26.wheatstone.com



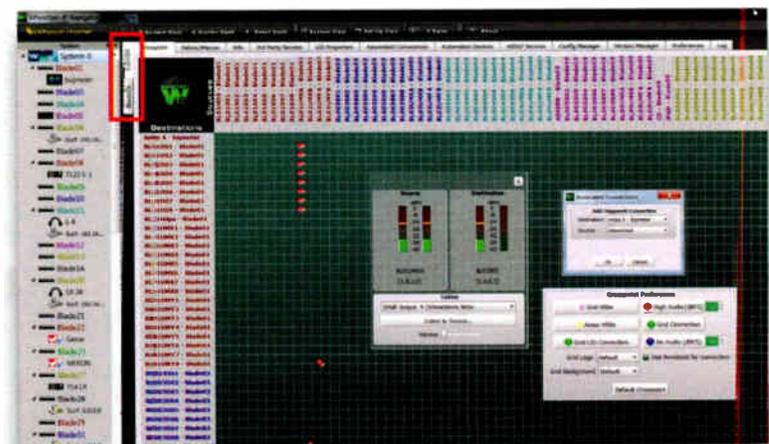
Not Just Any On Screen Clock...

Our Kelly Parker ran across VClock made by Voceware recently, and thought it was pure genius.

There are plenty of virtual clocks that are merely numbers on a wall, or virtual clocks that are designed specifically for one broadcast group only. This virtual clock is different. VClock is flexible like a certain audio network we know, so it can transform from just a single clock to a network of clocks taking in information from different sites. Everything on it is configurable, complete with up to 32 lamps that are changeable and can be turned on / off or made to flash with external triggers (such as a "mic live" signal from a mixing console or a phone call). This clock also has an embedded web browser, which allows you to show any content that you like on VClock, simply by creating a web page.



For the entire story... INN26.wheatstone.com



Navigator: Manipulate WheatNet-IP's Very DNA

NAVIGATOR comes as a part of WheatNet-IP, so we don't always point out the kind of power it gives you. But wow is it powerful.

We've added some great how-to videos to shortcut your Navigator experiences. Check them out and start getting more out of your system.

Learn all about Navigator at... INN26.wheatstone.com

GOING TO THE NAB RADIO SHOW? SEE WHEATSTONE AT BOOTH 18!



The Ocean Is Cruel to Broadcasters

One businessman recounts his experiences working with Radio Nord and Radio Caroline

ROOTS OF RADIO

BY MARK PERSONS

In an earlier issue we related a story about the career of Dick Witkovski, who has been in the business for 58 years as on-air talent, salesman, station owner and consultant (radioworld.com, keyword Witkovski). Here we look at another colorful part of his history.

Offshore broadcasting is not in Dick's Witkovski's blood, but he did have an excuse when he became involved. Witkovski lived two streets over from radio engineer Glen Callison in Dallas, Texas. They were friends when Callison hired on with an offshore broadcaster. One thing led to another, ultimately resulting in the sale of some broadcast equipment.



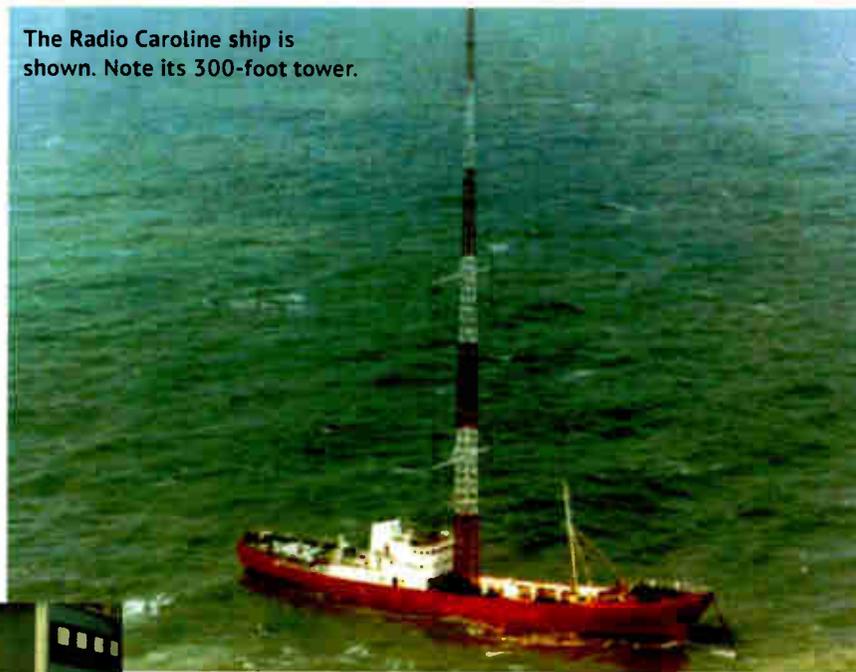
Salesman Dick Witkovski

Witkovski sent a 10 kW AM transmitter to an offshore station that "almost" made it to the air. It was intended to broadcast music commercially to England and Ireland in about 1960, located in the Irish Sea, offshore near the Isle of Man. The process had several hiccups — the first transmitter was dropped accidentally and sank in the ocean. This occurred as it was being

hoisted onto an abandoned World War II gun platform.

Naturally, Witkovski had to find yet another transmitter for them. Even with

The Radio Caroline ship is shown. Note its 300-foot tower.



50 kW RCA Ampliphase transmitter on Caroline

the replacement, the station never successfully broadcast because it was discovered that the gun platform was not actually in international waters. British authorities, using legal proceedings, reportedly demolished the equipment.

Witkovski also went on to supply another group of offshore broadcasters with a new Continental 316B 10 kW AM transmitter. The result was Radio Nord, owned by Gordon MacLendon and Clint Murchison Jr. The station was hosted aboard a ship anchored near

Stockholm, Sweden, in the Baltic Sea. It took to the air in 1961 after several incidents of storm damage at sea. In 1962, only 14 months after first signing on, the ship lost its anchor in a storm and had put to port for more repairs, and at that time, a new Swedish law required a final shutdown.

MORE OFFSHORE AAAARGH

Find further information at www.radiocaroline.co.uk. RW has also reported on an interesting Radio Caroline smartphone app (see radioworld.com, keyword Shiver).



ity of seawater is about 5,000, compared to 1 to 40 on land, which meant they had no problem getting a signal to land.

One challenge of this work, Witkovski says, was that O'Rahilly was concerned their telephone conversations might be overheard by authorities. To confuse potential eavesdroppers, O'Rahilly referred to transmitters as "trucks." For example, he wanted a truck that would "go 50 miles per hour," translating to 50 kW. Witkovski complied with this request, and the station's power was increased to 50 kW, serving 20 million people. Radio Caroline had more listeners in 1964 than the three British Broadcasting Corp. networks combined, Witkovski remembers.

ROUND TWO

Caroline's anchor chain broke in 1980, and the ship sank, ruining all the equipment aboard. Radio engineer and part time announcer Peter "Chicago" Murtha was sent to the United States to pick up a replacement transmitter, again supplied by Witkovski.

It was a 50 kW RCA Ampliphase, which could modulate to 150 percent positive. This was a real plus to get a loud sound on the dial, Witkovski notes. The new Radio Caroline ship was equipped with a 300-foot tower, taller than the ship was long. Tons of ballast were used near the ship's keel to counterbalance and stabilize the pendulum effect of the tower. Radio Caroline was back on the air in 1983 at 963 kHz, later heard on 558 kHz.

Then another disaster struck. In 1991, the ship's anchor chain broke again and she drifted near shore, grounding, and this time *almost* sank.

This chapter of the station's history ended, though today you find Radio Caroline on the Web at <http://carolinestreams.weebly.com>.

OFFSHORE VS. PIRATES

Witkovski takes pains to differentiate offshore vs. pirate broadcasting.

Offshore broadcasters operate in international waters. In the early 1960s,

(continued on page 20)

HD Radio Ahead
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Bradley Digs Deep Into FCC Records

Michi Bradley is filling in the station history gaps

ARCHIVES

BY TOM VERNON

There's a lot of fascinating broadcast history in the FCC's files. However, knowing where and how to find it can be a bit challenging. Michi "Michi" Bradley has a mission to change that.

She's president of REC Networks and REC Broadcast Services LLC, which provide advocacy and professional filing services, mainly to LPFM stations. Bradley's goal is to compile information kept by the FCC on three generations of record-keeping into a searchable, Web-based system. It's a huge project, but plugging away every day is beginning to yield results.

"In the beginning, all the records were kept by the FCC on typed 3-by-5 index cards kept in file cabinets," Bradley said. "These cards maintained a basic history of the station including every application that was placed and their outcome." When the FCC moved its offices to the Portals in 1999, the index cards were transferred to micro-

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AM BROADCAST
930 kHz
Facility ID: 37224
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BML-20140731AS GRANTED 12/03/2014
Frequency: 930 kHz
FCC Station Class: B
IFB Region 2 Class: B
Time Zone: Pacific
Antenna Monitor: POTOMAC INSTRUMENTS AM-1901
Daytime | [View Towers](#)
Primary Tower Coordinates:
NAD27: 34 5 9 60" 118 15 25 20"
NAD83: 34 5 9 65" 118 15 28 46"
Power: 5 kW
Directional Antenna Nighttime only
Domestic Pattern: T
RMS Theoretical: 294.9 mV/m at 1km
Towers: 1

Tower	Field	Elev.	Phase	Spec.	Orien-	Tower	Top	Switch	Switch	Switch	Switch
	Ratio	Height	ing	ing	tation	Ref	Load	A	B	C	D
A	1	98	0	0	0	19	N	0	0	0	0

IMML-20130719CZ GRANTED 10/31/2013
IMML-20130719CZ Application Superseded 09/12/2013
BP-20120504AAE GRANTED 08/02/2012
BP-20120504AAE Application Superseded 07/17/2012
BL-20041018AE GRANTED 01/12/2005
BP-20010808AAH GRANTED 11/16/2001
BL-18890112AB GRANTED 05/18/1989
BL-12461 GRANTED 02/06/1970
BP-18560 GRANTED 05/27/1969
BRC-2436 GRANTED 05/12/1964
BRC-2434 GRANTED 05/12/1964

APPLICATION HISTORY

File No.	Description	Status	Date
88-22	New Station	Granted	03/18/1922
3-S-P-22	Special Temporary Authority	Granted	04/23/1927
3-A-B-0	Minor Modification	Granted	11/11/1927
3-P-B-0	CP Extension	Granted	02/29/1928
3-L-B-0	License to Construct	Granted	04/01/1928
3-P-B-438	Minor Modification	Discontinued	09/03/1928
3-P-B-1492	Minor Modification	Discontinued	04/15/1933
3-P-B-1539	Minor Modification	Returned	09/19/1930
3-S-B-39	Direct Measurement	Granted	10/13/1931

The FCCdata.org page is enhanced with History Card data.



Michi Bradley

film and eventually destroyed. The commission has made the data from the "History Cards" accessible to the general public.

The index card system was replaced by the Broadcast Application Processing System in 1978. BAPS in turn was replaced in 1999 by the Consolidated Data Base System. One of the problems facing the REC history project is that when new systems were implemented, not all of the old data was transferred on to them.

"This means that CDBS is a fantastic source for tracing a station's history back to 1999," says Bradley, "but data prior to that was incomplete, and history data

(continued on page 20)

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Photo: Ian Flannery/ Impact Partnership - Kennesaw, GA

HISTORY

(continued from page 19)

prior to 1978 was almost nonexistent.”

The REC Radio History Project comprises several initiatives, with a goal of populating REC's broadcast query tool (fccdata.org) with as much historical engineering information as possible. The ultimate aim is to give the full history of a broadcast facility from the time that it was licensed. This effort has become much easier with the recent availability of scanned data from the FCC's pre-1980 broadcast History Cards, which have data from as early as 1927, when the commission's predecessor, the Federal Radio Commission, was created.

HISTORY CARD PRESERVATION

One of Bradley's initiatives is the History Card Preservation Project.

“This is a very time-consuming part of the project,” Bradley says. “It can take anywhere from a half hour to over three hours per station, based on when it was started. For example, a 1920s-era station may take up to four times as long compared to a 1950s-era station, especially if the station started as a daytime-only operation.”

Data from the FCC History Cards must be entered manually into four different Excel spreadsheets that are then converted to comma delimited files and uploaded into four dedicated tables in the REC database. Bradley is usually able to enter data for about three stations per day. A few of the cards go back to the days when stations were licensed by the Department of Commerce.

These cards are usually where the most interesting historical information turns up, especially if the stations were daytimers or time-shared operations. “Often there were requests to stay on the air beyond licensed hours. The reasons given were things like covering football games, election returns and even one request to broadcast a banquet dinner. Those cards show how radio in the 1930s was truly a local phenomenon.”

Another bit of history that Bradley discovered is that in the earliest days of radio, only two frequencies were used, one for entertainment, the other for news programming. “There are records of one station switching frequencies during the day as the programming changed.”

BAPS FILE RECOVERY

As part of the BAPS File Recovery Project, REC can extract data from public data files that were provided through the FCC's FTP site from 1985 through 1999. REC's system then adds this data into the existing CDBS files. The program will first run the youngest database file that is available to fill in the missing engineering records; then if there is an older file, it will use that data to fill in the blanks.

“We're actively seeking older copies of FCC public data that was downloaded from the Internet. If anyone has such files, especially from the 1980s, please

contact REC so we can arrange to have a copy made. This data can help fill in more of the blanks in the FCC data.”

Recently a 1995 file was found that led to the recovery of about 1,100 AM and FM engineering records.

PUBLIC NOTICE COMMENT RECOVERY

The Public Notice Comment Recovery Project is also a part of this effort.

“During the BAPS era, the FCC kept narratives about many engineering-related applications, similar to the notes they made during the History Card era,” said Bradley. “While the engineering specifics were not carried over from BAPS to CDBS, the public notice comments do offer some level of research data.”

The REC Public Notice Recovery Project queried the FCC database during off-peak overnight and weekend hours to slowly obtain these public notice comments. It automatically

added them to the database for display on fccdata.org. This part of the project is now complete for radio (except boosters). Plans are under way to add data from television station at a later time.

Bradley began the overall project in March and is working alone in her spare time. It is slow going.

“We would like to find people who have an interest in adopting a particular radio market, and working on the local AM stations. Not only would this help others who wish to research these stations but it is an excellent way to learn about the history of radio in your area.” She adds that it takes about two hours per station to complete the data.

“We're approaching the 100th anniversary of radio,” she said, referring to the launch of commercial station KDKA in 1920, “and it would be great if all the work could be done by then.”

Tom Vernon is a longtime contributor to Radio World.

Date Filed	File Number	Assignor	Assignee	Application Status	Status Date
03/02/1948	BL-2645	Direct Measurement	Granted	03/29/1948	640 50000 50000 Unlimited NonDirectional Main
05/04/1948	BL-2876	Direct Measurement	Granted	05/21/1948	640 50000 50000 Unlimited NonDirectional Main
05/02/1959	BP-13173	Minor Modification	Granted	06/18/1959 02/18/1960	640 50000 50000 Unlimited NonDirectional Main
CP to install a new transmitter (CONTINENTAL ELECTRONICS 317-B)					
05/02/1959	BP-13174	Auxiliary Permit	Granted	06/18/1959 02/18/1960	640 10000 10000 Unlimited NonDirectional Auxiliary
05/02/1959	BRC-1462	Chg Remote Control Point	Granted	08/17/1959	640 50000 50000 Unlimited NonDirectional Main
141 N VERMONT AV. LOS ANGELES					
05/02/1959	BRC-1463	Chg Remote Control Point	Granted	08/17/1959	640 10000 10000 Unlimited NonDirectional Auxiliary
141 N VERMONT AV. LOS ANGELES (AUX)					
09/30/1959	BL-7643	License to Cover	Granted	04/14/1960	640 50000 50000 Unlimited NonDirectional Main
Lic. To cover CP (BP13,173) which auth. Installation of new transmitter (Main)					
08/27/1959	BL-7644	License to Cover Aux	Granted	04/14/1960	640 10000 10000 Unlimited NonDirectional Auxiliary
03/03/1970	BP-18728	Auxiliary Permit	Superscoped	04/13/1970	640 10000 10000 Unlimited NonDirectional Auxiliary
INSTALL 200 FT AUX ANTENNA					
04/13/1970	BP-18728	Minor Modify CP	Granted	04/29/1970	640 10000 10000 Unlimited NonDirectional Auxiliary
ADD ENGINEERING					
12/18/1970	BMP-13154	CP Extension	Granted	01/11/1971 06/29/1971	640 10000 10000 Unlimited NonDirectional Auxiliary
06/08/1971	BMP-13249	CP Extension	Granted	06/25/1971 09/30/1971	640 10000 10000 Unlimited NonDirectional Auxiliary
07/20/1971	BL-13013	License to Cover Aux	Granted	08/24/1971	640 10000 10000 Unlimited NonDirectional Auxiliary
Assignment of Licenses and Permits					
Date Filed	File Number	Assignor	Assignee	Application Status	Status Date
11/28/1972	BAL-7765	EARLE C ANTHONY	DONALD H FORD, TRUSTEE	Granted	04/18/1973
11/30/1972	BAL-7766	DONALD H FORD TRUSTEE	KFI INC	Granted	04/18/1973
Transfer of Control					
Date Filed	File Number	Transferor	Transferee	Application Status	Status Date
09/26/1956	BTC-2335	EARLE C ANTHONY	EARLE C ANTHONY SECURITY-FIRST NATIONAL BANK OF LOS ANGELES AND EUGENE OVERTON, TRUSTEES	Granted	10/31/1956
08/28/1961	BTC-9437	EARLE C ANTHONY DECEASED	EUGENE OVERTON, TRUSTEE	Granted	08/26/1961
03/19/1970	BTC-6238	EUGENE OVERTON, TRUSTEE (DECEASED)	DONALD H FORD, TRUSTEE	Granted	04/29/1970
05/31/1979	BTC-790531GJ	COX BROADCASTING CORPORATION	COX BROADCASTING CORPORATION (AS A WHOLLY OWNED SUBSIDIARY OF GENERAL ELECTRIC COMPANY)	Granted	04/28/1980
Special Temporary Authority (STA) and Experimental and other miscellaneous authorizations					
Type	Date	File Number	Remarks	Outcome	
	04/26/1927	S-S-B-13	REQ 642 KC 5000 W	Granted	
	01/10/1935	BS-S-13	To rebroadcast transmissions emanating from aircraft (NR-965-V) of Amelia Earhart during flight from Hawaii to Los Angeles sometime after Jan. 10, 1935. For period ending no later than 2-1-35.	Granted	
NARBA Allocation	03/24/1941	NARBA-940		Granted	
	11/23/1955	BS-13	Mod of lic to modulate KFI transmitter with audio tones not in excess of 40 cycles per section & with modulation of carrier not in excess of 20% for the specific & sole purpose of activating air-raid sirens in County of Los Angeles	Granted	
	02/14/1957	WRE.	Ext authority to modulate KFI transmitter with subaudible tones below 40 cycles with approx. 20% modulation to test Civil Defense electronic unit for city of Los Angeles for remainder of lic term.	Granted	

This page displays the history of a station and offers a trove of info including dates, application number and type, frequency, day and night power, operating schedule, STAs and a history of assignments and transfers.

PRODUCT SPOTLIGHT

ADVERTISEMENT

Audio-Technica BP40 Large-Diaphragm Dynamic Broadcast Microphone

Audio-Technica's new BP40 broadcast vocal microphone offers a rich, natural, condenser-like sound from a large-diaphragm dynamic design. The 40 mm diaphragm features patented floating-edge construction that maximizes diaphragm surface area and optimizes overall diaphragm performance, while the humbucking voice coil prevents electromagnetic interference (EMI).

With rugged construction and stylish, waveform-inspired design, the BP40 delivers clear and articulate reproduction. Optimized capsule placement helps maintain a commanding vocal presence even at a distance, while the multistage windscreen provides superior internal pop filtering. Mic also includes a switchable 100 Hz high-pass filter to provide additional pop protection. U.S. estimated street price \$349.

www.audio-technica.com
pro@atus.com • 330-686-2600



WITKOVSKI

(continued from page 18)

he said, offshore broadcasting became a method for commercial radio to make a breakthrough into Europe and Scandinavia, where no commercial frequencies were available and there were no country licenses to apply in international waters; the law did not prohibit broadcasting from international waters. Pirates, on the other hand, operate illegally from within the countries to which they broadcast.

AM was the logical choice as broadcast medium because the coverage was better, and there were more AM radios in the hands of potential

listeners. FM, back then, meant “Free Music.”

Witkovski says this type of broadcast was experimental, and he found it to be an adventure, an opportunity to expand commercial radio to countries where that kind of broadcasting was not available. The experience was grounded in the hope that all governments would someday issue commercial licenses because there was—and is — a need for it.

Mark Persons, CPBE, has more than 30 years' experience and has written numerous articles for radio publications. He uses amateur call sign W0MH; his website is www.mwpersons.com.

INOVONICS PRESENTS HD RADIO FIX

HD Radio receivers are hybrid-mode radios. They grab and play the analog channel, then cross-fade to digital reception once that signal has been locked in. HD Radio encoding and decoding takes about 8 seconds. This means that the analog channel must be delayed by a corresponding time interval to be in sync with the digital program signal at the receiver output.



Inovonics says that from the inception of HD Radio, keeping the analog and digital programs synchronized has been a major problem. Responsibility for correcting timing errors falls on the broadcaster.

The Justin 808 from Inovonics serves this need; it picks up the FM hybrid broadcast off air, as it's received by listeners. A correlation algorithm constantly checks for timing differences between the analog and digital program channels, and an additional program buffer adds to or subtracts from the primary diversity delay timing to maintain sync within one 44.1 kHz sampling period, or 22.6 microseconds.

The Justin 808 normally is placed directly ahead of the HD exciter, following audio processing for the HD channel. But it could be placed in the AES digital audio path to the FM stereo generator/exciter if a particular installation dictates. Since time can't be made to run backward, the fixed primary diversity delay is offset by a small amount so that its audio buffer can make up any difference, plus or minus.

The box also monitors the phase and the level of the audio programs. It can reverse an out-of-phase condition and match RMS, loudness. Its Web interface has SMTP support and enables remote control with level metering. Alarms for carrier and audio loss are dispatched by SMS text or email messaging, and the unit offers time-correction logging presented by graphic display.

Info: www.inovonicsbroadcast.com

NEW HEADPHONES FROM AUDIO-TECHNICA

A year ago Audio-Technica released the ATH-M50x headphones. The next member of the M Series family is available, ATH-M70x.

The 70Mx is similar in design to the ATH-M50x, using 45 mm drivers with copper-clad aluminum wire voice coils with neodymium magnets but it has higher performance specs of 5 Hz–40 kHz and an increase in input power.

The earcups swivel, allowing for single-ear use. They are of a collapsible, closed-back circumaural design.

Three detachable cables are provided: 1.2-meter straight, 3-meter straight and 1.2–3-meter coiled. The ATH-M70x ships with a carrying case.

Price: \$419.

Info: www.audio-technica.com



DAYSEQUERRA RELEASES SECOND GEN OF MAM

DaySequerra says that its second-generation Market-Area Monitor, MAM2, is designed to capture, log and report the entire HD Radio data payload for the main and all multicast programs including PAD, SIS, RBDS and any weather and traffic data, and make accurate measurements of various HD Radio parameters such as time/level alignment, power levels and signal quality.

The company said that MAM2 essentially is a sophisticated software-defined HD Radio receiver built on a customized Linux kernel. It is powered by a dual ARM Cortex CPU while data is processed by two separate floating point DSPs each running at 300 MHz.

This MAM2 data collection system offers HD Radio broadcasters a set of resources for local, regional and national quality assurance and confidence monitoring as well as market competitive analysis. The MAM2 system provides complete diagnostic measurements for any HD Radio AM/FM station, whether an independent operation or part of a national multi-station group.

Info: www.daysequerra.com



GATESAIR ENHANCES VISTAMAX IP NETWORK

GatesAir has extended networking capabilities of its VistaMax portfolio with VMXpress IP, an AES67-compliant audio and logic device that establishes an audio over IP gateway for radio studios.

VMXpress IP provides interoperability across the studio and signal transport architecture through an open, standards-based foundation, GatesAir says, taking advantage of the non-proprietary nature of ALC NetworX's Ravenna networking. It simplifies connectivity with audio processors, satellite receivers, phone systems and studio support equipment including program delays. With GatesAir's network-based studio networking architecture at the core, it says, Ravenna's networking provides low-latency distribution and signal transparency.

Beyond the studio, VMXpress IP extends networking to other IP transport equipment, including GatesAir Intraplex IP Link codecs, for low-latency audio contribution and distribution. This expands connectivity to transmitter facilities (STL), live remote broadcast sites and the Internet for streaming content to other studios and the Web. The company says limitations of AES and analog connectivity are eliminated, leveraging intelligent networking with IP transport systems by using AES67 over the local Ethernet.

GatesAir says this offering continues its strategy of using single network-based connections (Cat-5/6) to move hundreds of audio and data signals across a multipoint network, ensuring a clean studio design that is easy to deploy, operate and scale as requirements evolve.

Info: www.gatesair.com



IZT EXPANDS DIGITAL RADIO SUPPORT

Germany-based IZT has expanded its support of digital radio, adding new DAB features to its S1000 signal generator family. IZT's DAB ContentServer Embedded Edition (shown) integrates DAB, DAB+ and DMB multiplexing and makes the functionality of the DAB ContentServer directly available on the S1000.

The new software option encodes and multiplexes audio and data services and features a Web interface that provides access to needed parameters, the firm said.

The Embedded Edition of the DAB ContentServer includes basic functionality, while an upgrade to the full DAB ContentServer Developer Edition is available.

In addition, the S1000 can now also come with a real-time DAB/DAB+/DMB modulator. According to IZT, the modulator supports simultaneous streaming of multiple ensembles, creating a direct link between the DAB ContentServer and S1000 with EDI protocol.

DAB ETI files can be used as an input source without conversion; the real-time DAB modulator is capable of dynamic reconfigurations; and S1000 impairment features can be applied to the DAB modulator, said the company.

Info: www.izt-labs.de



NAUTEL GV30 INCREASES DIGITAL POWER

There's a new member of the Nautel GV family of digital FM transmitters.

The GV30 provides up to 33 kW of analog power, or 27 kW of analog power in -14 dB hybrid mode. It is 20 percent smaller and is more efficient than its predecessor.

The company says this model offers advancements in transmission and audio management and processing tools unavailable in other high-power transmitters. Features such as MER instrumentation, HD PowerBoost, SNMP support, Shoutcast and Icecast streaming input, PushRadio with scheduler and play lists, Axia Livewire IP audio support, MPX over AES functionality, and optional Orban Inside onboard audio processing are available.

The GV30 has automatic audio loss switchover, allowing automatic return to the desired audio source once it recovers. Nautel highlights robust cabinet and module design, easy installation, hot-swappable power modules, extensive redundancy and field-repairable amplifier pallets. The 90-265 V power supplies help keep transmitters on the air even in brown-out conditions.

The transmitter can be operated locally or remotely via IP network through Nautel's Advanced User Interface. Site control functions have been added for monitoring and control of items external to the transmitter, such as doors or generators.

Info: www.nautel.com



AXIA FUSES CONSOLE EXPERIENCE

Axia highlights the Fusion AoIP console. It features anodized extruded aluminum construction and frame sizes from 8 to 40 channels.

Laser-etched panel markings are used on modules; Axia says they won't rub, chip or fade. Side-loading faders protect against internal grime buildup, and avionics-grade LED backlit switches rated to 5 million operations are used.

Each fader features an OLED display at the top of the console to provide source, confidence metering and other critical information. Rotary encoders below each display allow rapid source selection and parameter adjustment, including internal Omnia microphone processing with compression, de-essing, expansion, EQ and other functions.

Optional call handling modules and an integrated dialing keypad put control of codecs and phone lines at the user's fingertips. Controls for external profanity delays (such as the 25-Seven Program Delay Manager) are standard.

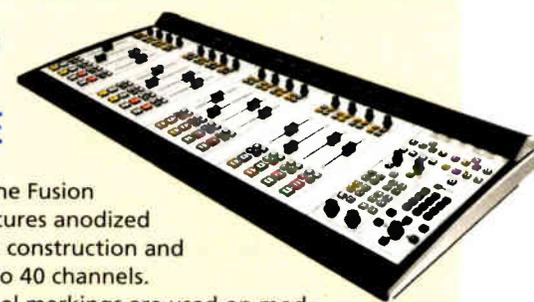
Fusion automatically configures mix-minus on the fly, with dedicated talkback buttons on each fader for sources like codecs and telephone hybrids. Integrated IFB capabilities allow users to talk down phone or codec lines, to host and guest headphone feeds or add intercom panels to form a facility-wide intercom system.

In addition to the phone bus, Fusion provides added mixing capacity with four main stereo program outputs, plus four stereo aux sends, two aux returns and a dedicated Record bus for off-air recording. Fusion supports mixing in 5.1 Surround, with synchronized stereo upmix/downmix capabilities.

There's a dedicated "record mode" key that assigns mics, phones, or any other sources to a utility bus and can start the recording device automatically.

A Web interface allows remote configuration, management and diagnostics. The console can also be controlled using Axia SoftSurface for Windows.

Info: www.telosalliance.com



BW'S TR300 V2 IS A MULTI-FEATURED TRANSLATOR

BW Broadcast says that its TR300 V2 is the only single-box FM translator.

The TR300 V2 is a versatile box since it can be used as a standalone transmitter complete with analog, digital and MPX inputs. Its built-in four-band DSP audio processor and stereo generator will ensure a competitive signal.

Using a built-in BW Broadcast receiver the TR300 V2 can pull in weak signals. Combined with a low-distortion modulator, difficult translator sites should broadcast a clear signal.

Intelligent email alarms, SNMP, Telnet, UDP and local SD card logging keep users updated with how the translator is doing and will let them know if it needs attention. A front-panel LED screen provides local control while a remote control app allows users access and control from wherever they are, even if using a smartphone.

Tool-free dual slide-in hot-swappable power supplies will keep the TR300 V2 on air if one of the power supplies falls foul of a lightning strike or power supply failure.

Info: www.bwbroadcast.com



WHEATSTONE UNVEILS PROCESSORS

Wheatstone has the AM and FM bands covered with the recent delivery of two new processors, the AM-55 (shown) and FM-25.

A multiband audio processor for AM broadcast, the AM-55 is based on Wheatstone's iAGC technology. The design provides automatic, real-time program density control for a consistent, spectrally-balance sound regardless of density variations from incoming source material, the company says. It has a bass management system optimized for AM signal usage along with four-band parametric equalizer, variable high-pass filter and voice phase rotator.

It includes an interface to the Wheatstone WheatNet-IP network, a front-panel OLED display and Guru GUI navigation. Factory format-specific processing presets are included.

The FM-25 is a multiband audio processor for FM stations requiring basic spectral audio shaping and peak limiting control and LPFM. It includes two-band iAGC technology coupled to a multiband limiter and stereo generator. Other features include four-band parametric EQ, stereo enhancement, program adaptive L-R control, variable high-pass filter, voice phase rotator and MPX generator; it fully supports the WheatNet-IP Intelligent Network. It has Wheatstone's baseband192 composite digital link. The FM-25 interfaces with the Wheatstone WheatNet-IP network and offers a front-panel OLED display and Guru GUI navigation. Factory format-specific processing presets are included.

Info: www.wheatstone.com



IK MULTIMEDIA SHIPS IRIG MIC STUDIO

There's no shortage of microphones aimed at the digital project studio market. One item that could be of interest to radio broadcasters is IK Multimedia's iRig Mic Studio.

The iRig Mic Studio is a petite microphone that looks bigger than it really is. It is designed for PC and mobile device use so it comes with a number of cables featuring micro-USB on one end and the connector to accommodate a tablet, smartphone or PC.

Inside there is a 1-inch diaphragm condenser capsule. It offers gain and headphone volume controls along with a 44.1/48 kHz A/D converter. It also ships with a variety of recording and processing software for the various platforms. The iRig Mic Studio is compatible with most DAWs.

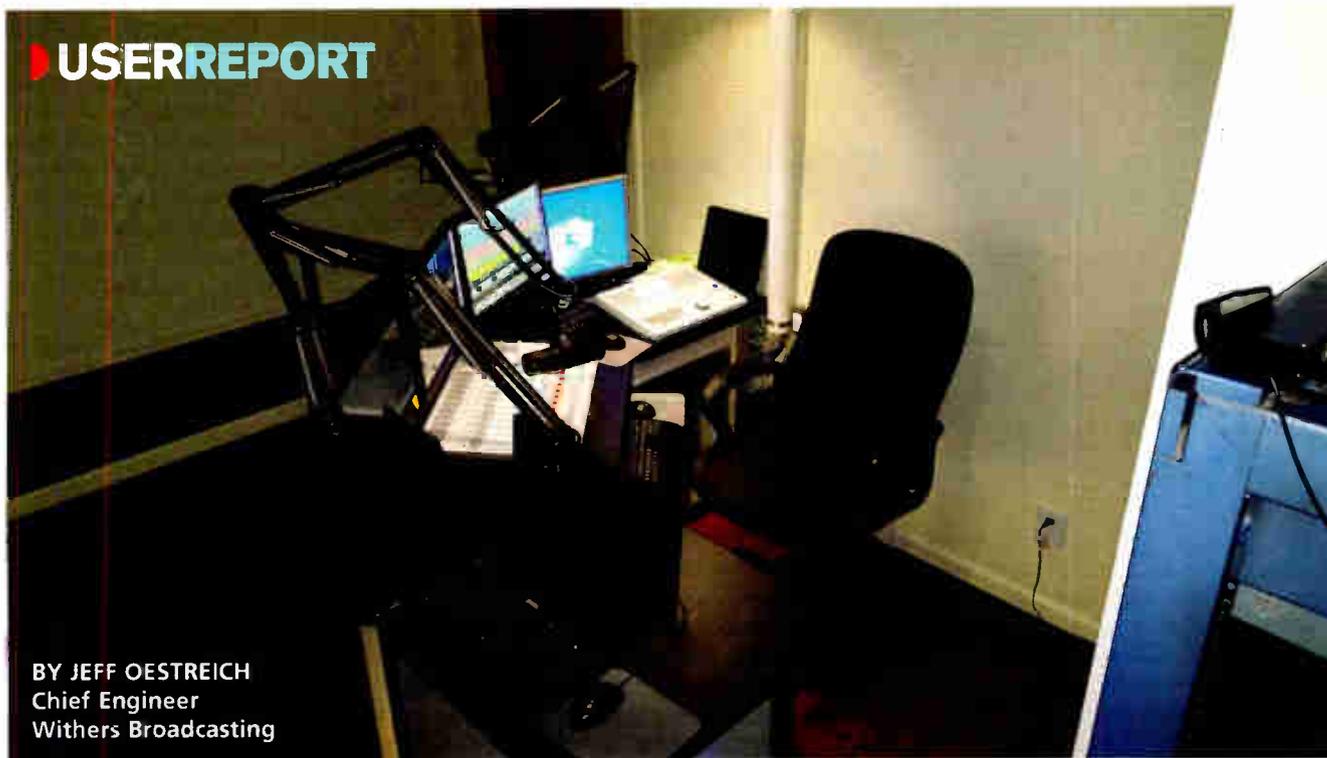
Info: www.ikmultimedia.com



Arrakis Gets a Whistle From WETT

Custom furniture meets deadline, fits space and promises a long life

USERREPORT



BY JEFF OESTREICH
Chief Engineer
Withers Broadcasting

BRIDGEPORT, W.VA. — In the spring of 2015 Withers Broadcasting President Dana Withers and WETT(FM) General Manager Tim Defazio came to me with a request to design and equip a state-of-the-art studio for a new morning show on Withers' West Virginia radio station WETT in Clarksburg/Bridgeport, W.Va.

With a tight deadline of July for the launch of the "Jack Logar Show," I visited with Ben Palmer of Arrakis Systems at the NAB Show with a request for a custom-built desk. Withers Broadcasting has had a 20+-year relationship with Arrakis custom-built studio furnishings, including countertops and cabinetry built for Founder Russ Withers for flagship stations WMIX(AM/FM) in Mount Vernon, Ill. With this relationship, I knew we wouldn't be disappointed. Seeing their Accent furniture line at NAB, I was also excited to see how the custom furniture would turn out. The durability, ease of maintenance and competitive pricing were also major factors in selecting Arrakis studio furniture.

Before even leaving the show in Vegas, I emailed Ben a basic layout of the room, along with dimensions that were provided by the WETT staff.

(continued on page 25)

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GatesAir Studio Design Pays Dividends

Furniture, racks turn empty space into a studio

USERREPORT

BY DARRYL PARKS
Senior Vice President
Simply Money Media

CINCINNATI — As a personal wealth management firm, Simply Money provides insightful financial advice and creates strategic plans that help people reach their savings, retirement and life goals. Our CEO, Nathan Bachrach, is often featured on TV shows like CNBC's "Closing Bell," on Cincinnati, Ohio's local Fox TV affiliate and on local and national radio.

Recognizing that traditional media and new digital channels are an effective way to reach people and engage them in personal money management, we recently completed our own in-house television and radio production studios.

TRANSFORMATION

From our radio studios, we produce "Simply Money," which airs weekday evenings 6–7 p.m. on WKRC(AM) in Cincinnati and iHeartRadio. This one-hour personal money advice show is co-hosted by "Simply Money" co-founders Nathan Bachrach and Ed Finke, both of whom envisioned building these new on-site studios to produce and distribute our own broadcast-quality content locally and with the goal of expanding to national syndication, social media

distribution and Web streaming.

Having been an executive with Clear Channel Media + Entertainment, now iHeartMedia, I had the opportunity to work with GatesAir (then Harris Broadcast) on the build-out of that company's Cincinnati radio station

facilities. During that time, I was greatly impressed with the innovation, technology and craftsmanship that GatesAir and its engineering team, led by Paul Barzizza, brought to that project. When it came time to build our radio facilities here — including a control room, talk studio and technical operations center — naturally I turned to GatesAir

accessories.

Both Smoothline and Quickline offer sturdy, ergonomically designs to house furniture and manage cable runs through strategically-placed punch holes and trays. We were pleased with the look and value of the furniture and its décor, which matches the colors of our "Simply Money" branding. The attention to detail was impressive, with cables and wiring cleanly managed, bundled and positioned out of sight.



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GatesAir delivered the studio design, planning, custom furnishings, audio console, processing equipment, studio networking and completed the systems integration within our tight timeframe. The project's first phase transformed empty office space into professional radio studios by installing conduit, insulation, sound panels and sonic wall coverings and cutting a large window between the talk studio and control room.

ECONOMICAL

The talk studio is furnished with GatesAir Smoothline custom furniture and cabinetry, including a table and chairs that are aesthetic and comfortable for three. The control room is furnished with more economical GatesAir Quickline furniture, which is modular furniture that is quick to configure. Each provides comfortable host and guest positions with easy access to production equipment, microphones, built-in headphone controls and other

Our audio control room is equipped with a GatesAir NetWave 16 digital audio console and a World Feed Panel to facilitate the input and output of audio from digital recorders and other XLR or USB devices. GatesAir racks in the technical operations center house servers, automation and an array of processing gear, as well as an Intraplex IP Link STL codec to transport live feeds from studio to station and to broadcast networks. Additional IP Links will be added to distribute live audio to other radio stations and networks that carry "Simply Money" shows and content.

GatesAir really understood the "Simply Money" vision. Our radio studios — which went online in June 2015 — are now a showplace featuring a fantastic and functional platform for producing high-quality radio shows and audio content for the digital space. And we're in a great place to adapt to whatever technological changes come along.

For information, contact Keith Adams at GatesAir in Ohio at (513) 459-3447 or visit www.gatesair.com.

ARRAKIS

(continued from page 23)

Palmer was able to create a custom design and send dimensional drawings for approval. The dimensions of the furniture were a consideration, since we wanted to have guests on the opposite side of the table, and we didn't want to block the main entrance. We also wanted to make sure that the current console would fit comfortably on the main table.

From the drawings Ben sent, we felt comfortable with moving forward on the purchase. We also specified that we wanted a keyboard drawer added to the main table, and standard 13RU racks for the two pedestal tables.

The furniture was assembled in one afternoon by Chief Engineer Dave Compton, Esker Davis and me. Step-by-step instruction made assembly quick and simple. The solid construction and materials used make the furniture something that will endure for a long time.

We are happy with how it all turned out. It fits wonderfully in the room and complements the rest of the studio. We are pleased with the flow, functionality and how beautiful it all looks together. The studio turned out to be a great success.

For information, contact Ben Palmer at Arrakis Systems at (970) 461-0730 or visit www.arrakis-systems.com.

TECHUPDATE

PRIMACOUSTIC PROVIDES PORTABLE PANELS

Primacoustic, a division of Radial Engineering Ltd., several years ago developed London Room Kits to fulfill the do-it-yourself acoustical control requirements of small home-based recording and broadcast studios.

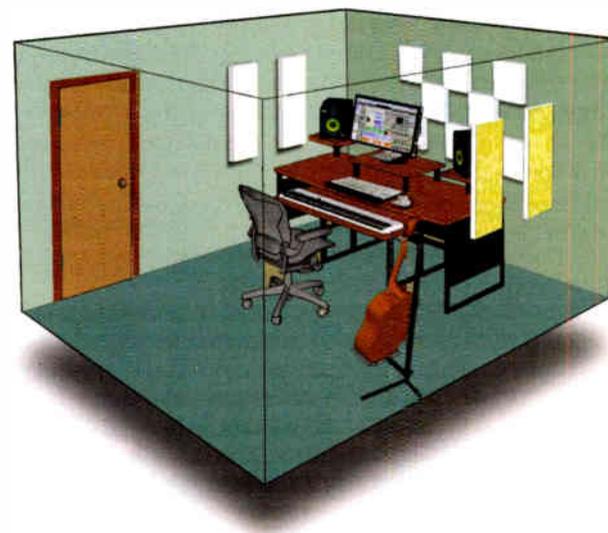
The company says the performance and value of these turnkey solutions have been seen by users of podcasting rooms, teleconference rooms, boardrooms and home theatre/media rooms.

Primacoustic has, during that time period, also developed a series of paintable acoustic panels that provide the same absorptive properties while offering the user many possibilities for color and design.

As of August 2015, Primacoustic is offering the London 8 and 10 room kits in the paintable option providing a complete acoustical absorption solution with the color options designers need. These room kits are designed for rooms between 80 and 120 square feet. Should a bass trap be required, the London Bass trap is also available in the paintable option. The room kits come with panels and mounting hardware including screws and dry-wall anchors to make installation simple. For larger spaces the end user could either add another London kit or expand using the paintable series of panels to create the desired acoustic and aesthetic environment.

Primacoustic offers a variety of wall- and ceiling-mounted acoustical solutions.

For information, contact Radial Engineering in British Columbia at (604) 942-1001 or visit www.primacoustic.com.



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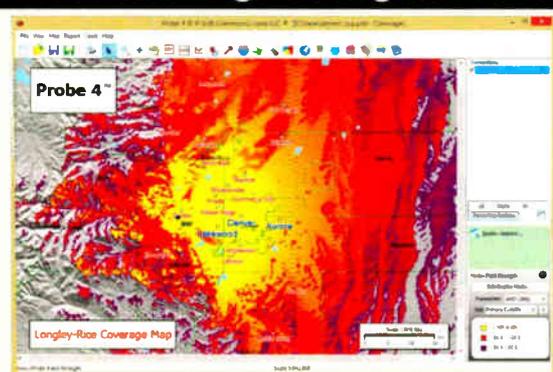
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Looking for a broadcast excerpt of a San Francisco Giant's taped off of KSFO radio from 1959, interviews with Willie Mays, Dusty Rhodes & some play by play excerpts, also features a homerun by Willie Mays and Felipe Alou stealing second base, running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

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

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7.5 kW	2002	Harris Z7.5CD, solid-state, S PH
8 kW	1997	CCA FM#000G, single phase
10 kW	1989	Harris H110
10 kW	1998	Harris Z10CD, solid state
27.5kW	1988	Continental 816R-4B, New CE SS IPA
30 kW	1988	Harris FM30K
35 kW	1991	BE FM35B

Used AM Transmitters

10 kW	1991	Nautel ND10, solid-state
12 kW	2001	Nautel XL12, solid-state

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We Remember Skip Tash

BY PAUL MCLANE

The author is editor in chief of Radio World. This is adapted from RW's blog.

Long-time Radio World family members are remembering Skip Tash.

Skip was one of the first people to welcome me when I joined Radio World and its then-parent IMAS Publishing 19 years ago. As a member of RW's sales team in the 1990s, he was one of the hard-working professionals who made Radio World what it was and is, and who yet who remain in the background for most readers.

Trust me though when I tell you that Skip's clients and friends will never forget him.

He attended Perkiomen School in Pennsburg, Pa., and the University of Miami before completing his bachelor's degree at the University of Maryland and launching a career in media advertising. "One of his proudest moments was helping in the late 1970s to get 'Staying Alive' by the Bee Gees into rotation at many different radio stations," the family wrote in a program at this weekend's funeral service.

After selling time, Skip moved over to selling space. He worked for six years as vice president of ad sales for Broadcasting & Cable, then took a similar position at the National Association of Broadcasters before coming to Radio World and IMAS. The latter part of his tenure overlapped with the earliest part of mine.

He would become our associate publisher, managing millions of dollars in ad revenue for three international trade publications with a combined circulation of 60,000, in addition to launching and managing numerous special projects.

But as hard as he worked, and as proud as he was of what we did here, it's not those things that we remem-



ber as our friend departs.

I recall Skip's love of golf. I remember his expressions of love for his wife Krystina, his quick energy, his ready expressions of concern for me. Personal warmth and good cheer are what others remember too. Radio World Advertising Coordinator Caroline Freeland talks about Skip's stutter when he got excited as well as his enormous laugh. She met her husband through Skip: "I will always be thankful for him as he introduced

Craig and I and the rest is as they say 'history'!"

"Skip was funny, caring and full of life," recalls Rogelio Ocampo, editor in chief of Radio World América Latina. "Always with a big smile. He made you feel like you were the only person in the room when he was talking to you."

Skip later would work as executive VP of BuyBidSell.com. He eventually became EVP of FMI-TV Networks, national interactive sales manager at Comcast Spotlight and, most recently, president of interactive media sales for Norstar Media Networks.

He also was involved with the Washington DC Police Foundation, WPO at Sibley Hospital, Seed a Need Organization and the Greater Bethesda-Chevy Chase Chamber of Commerce. And for 37 years he was a member of the journalism honor fraternity Kappa Tau Alpha.

Our friend and colleague died after keeping pancreatic cancer at bay for almost three years, always while showing his trademark humor and grace. In lieu of flowers, memorial contributions may be made to Montgomery Hospice, www.montgomeryhospice.org/donate.

It makes me happy to know that even in his illness — as recently as a couple of weeks before his death — Skip was still socializing, having lunch with the friends

he enjoyed so much.

Carmel King, today the executive vice president of our Broadcast & Video Group, told me, "I can't think about Skip without laughing, because everything about him was funny. Working with him for almost 10 years, there were a million moments — it's hard to single any one out. He was smart and funny and caring and warm and friendly and loyal — a good man and a good friend. I'm so glad I had the chance to know him, and to learn from him about radio, sales and life in general. He was uniquely Skip — a true treasure."

READER'S FORUM

GOOD REVIEW

I really like seeing reviews like Amanda Hopp's review of the Inmarsat satphone (July 15 issue), namely tools that aren't necessarily intended for the broadcaster but can be very useful.

However, she misses one important part here: the operating cost. For those of us who remember the Inmarsat suitcase terminals that were like payphones that took \$50 bills, it might be important to point out that costs have gone way down.

Scott Dorsey
Engineer
Kludge Audio
Williamsburg, Va.




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Bill Pietschman
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4	Burk Technology	www.burk.com
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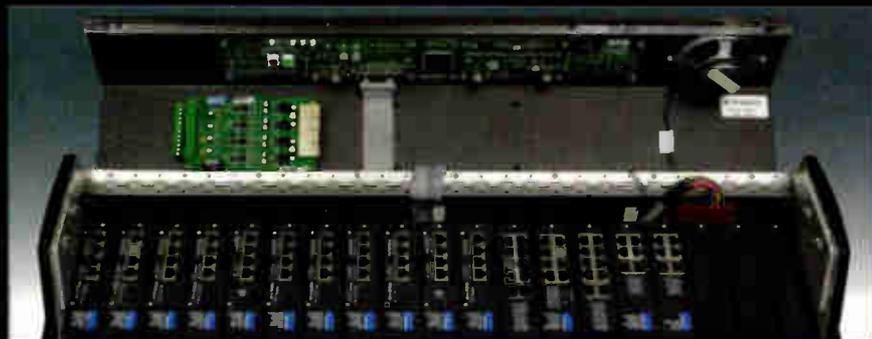
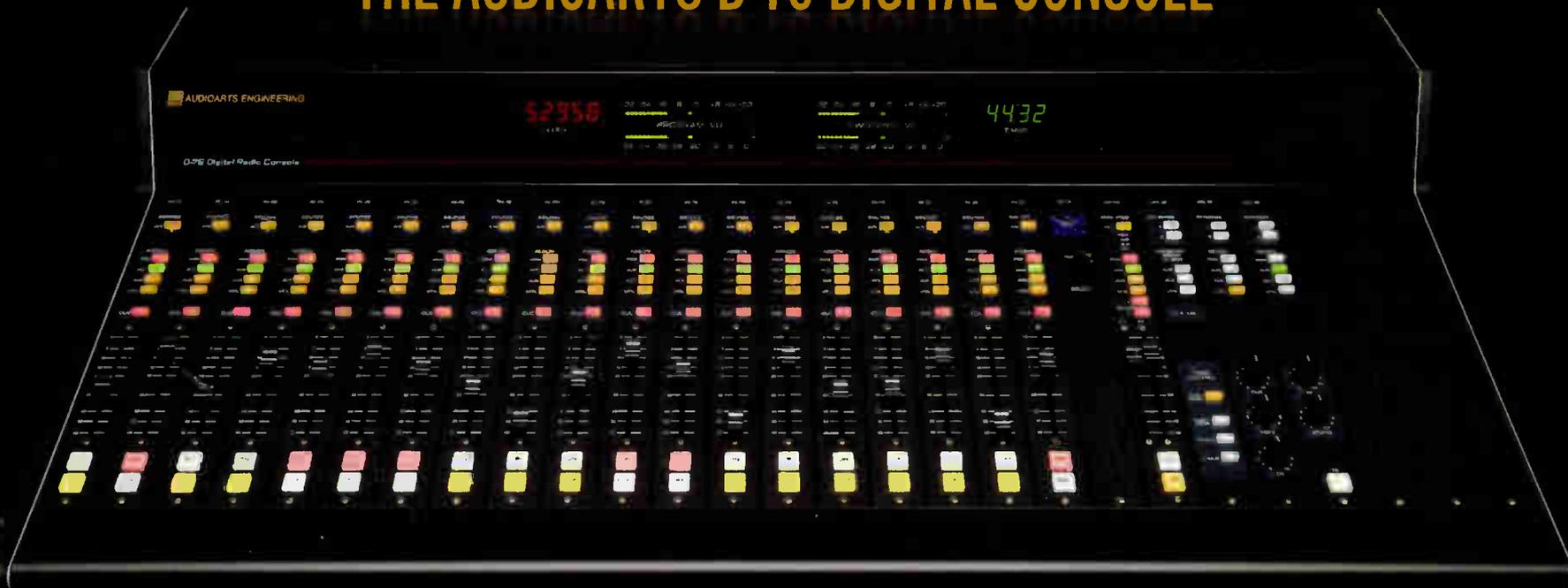
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World Radio History

AIN'T NOTHIN' LIKE THE REAL THING.... THE AUDIOARTS D-76 DIGITAL CONSOLE



The Audioarts D-76 console has all the practical style and rugged functionality of the beloved D-75 standalone console, a staple in radio studios for the past 15 years, but with modern necessities such as an RJ connector system for all your I/O.

The D-76 is a tabletop, modular console available in a 12-channel or 20-channel frame, and includes StudioHub+ RJ45 connectivity.

Sporting a sleek new profile, the D-76 comes standard with ample mic preamps, plenty of stereo busses, and a comprehensive monitor section that provides separate feeds to control room/headphone and studio monitor outputs -- plus headphone jack and built-in cue speaker.

It has four stereo busses, dual-domain outputs, sample rate conversion on all digital inputs, and interchangeable input module daughter cards for easy analog-to-digital conversion in the field. Its modern design features backlit controls and meter

bridge with full-scale, bargraph digital peak plus VU metering and automatic timer and clock.

Individual plug-in modules make installation and service a breeze. The D-76 can be ordered with an optional SUPERPHONE module, which supports two callers. It can also be ordered with the optional IP-76 plug-in module for interfacing to the WheatNet-IP Intelligent Network.

This new console has everything you have come to expect of an Audioarts console -- like ease of use and rock-solid reliability (including a KILLER power supply, built by Audioarts).

It is laid out in a sleek new design that is both affordable and practical for modern radio stations of all sizes.

Contact Audioarts Engineering for more info on the D-76 Digital Audio Console.



- Modular hot-swap plug-in design
- Optional IP-76 module provides connectivity and additional I/O through WheatNet-IP network
- Optional SUPERPHONE module with dual caller support
- StudioHub+ RJ45 connectivity
- Inputs can be analog or digital, depending on daughter card installed
- Any combination of analog and digital line inputs
- Input channel A/B source select
- External rackmount power supply
- Universal opto-isolated mic and line control ports on all input modules
- Sample rate conversion on all digital inputs
- Optional dual failsafe power supply
- Digital clock (can be slaved to ESE time code)
- Cue function and auto dropout
- Connectorized faders and monitor pots
- Connectorized channel ON/OFF switches
- CR and Studio Monitor outputs with separate four-buss source selection plus independent external 1 & 2
- Both Program and Switched VU meter pairs
- Four microphone preamps standard, with option for four additional
- Digital timer with autostart and manual control
- Two on-air tally relays
- Built-in headphone amp with concealed output jack
- Built-in cue speaker with amplifier and external cue output
- Direct digital VU-plus-peak LED metering displays

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