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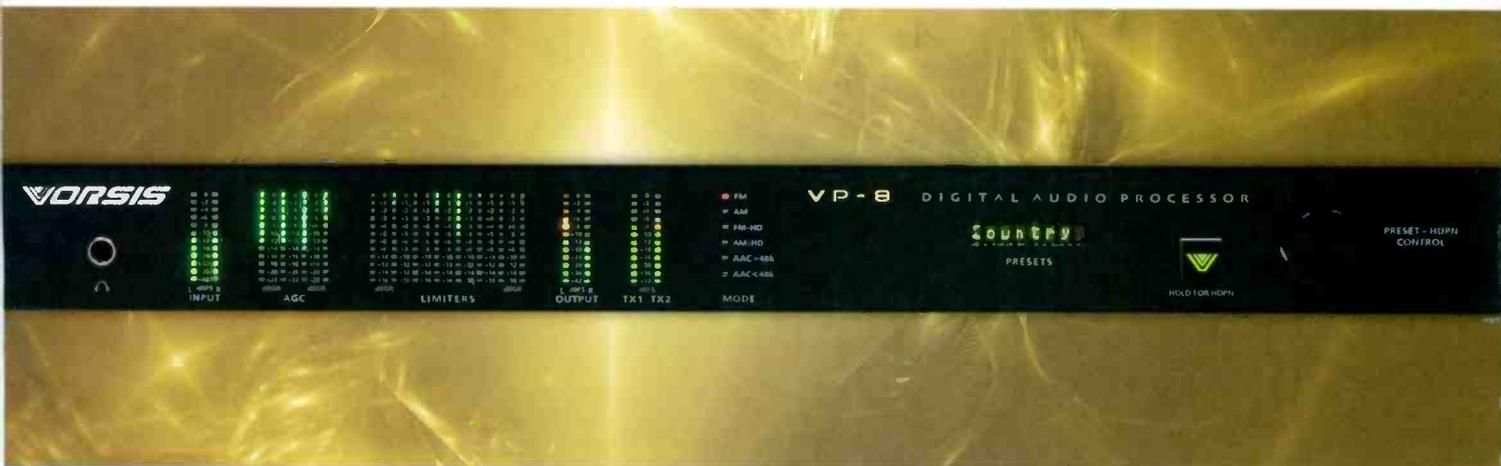
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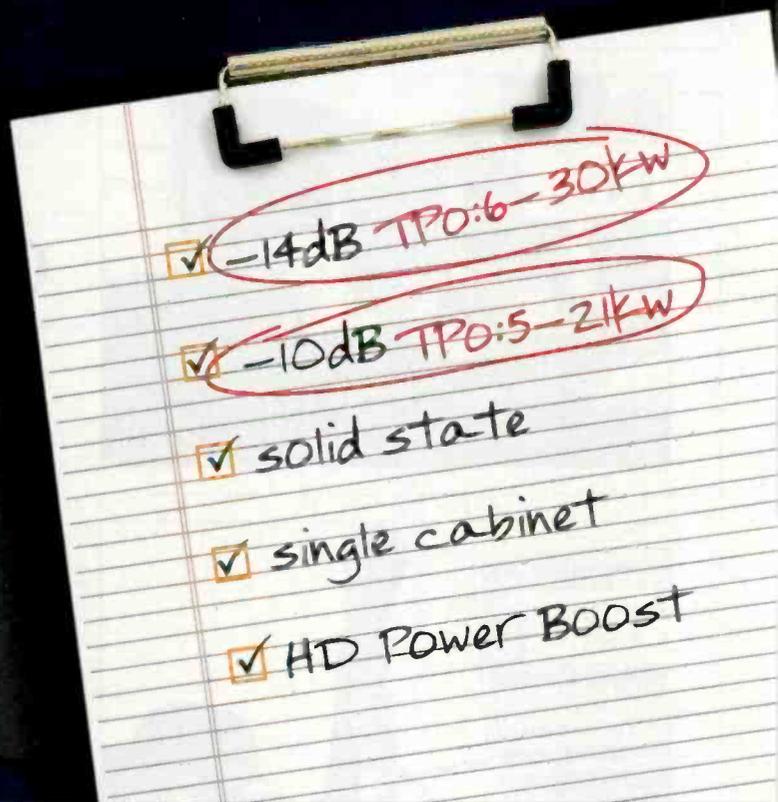
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Cover design by Michael J. Knust.



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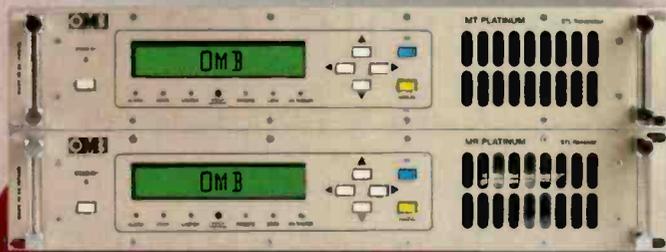
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FM TRANSMITTERS

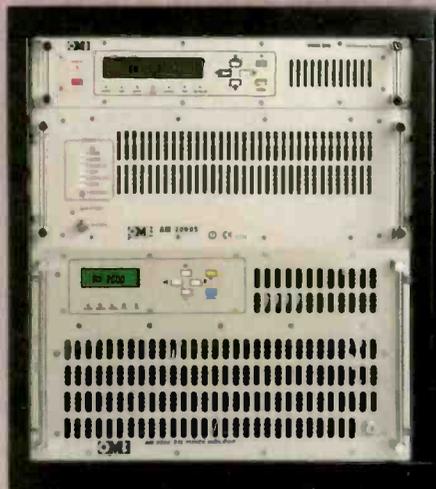
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> 1GHz is a high-performance Studio-to-Transmitter Link. It is made up of the 5W MT transmitter externally synthesized in 10MHz sub-bands with a step of 100KHz, and the MR double conversion receiver, that is externally synthesized, too. The MT is microprocessor controlled, and includes LCD display for the visualization of the most relevant transmission parameters (frequency (0-digit), forward and reflected power, modulation level), balanced Mono, Stereo (MPX). The MR receiver has the same visualization system as the transmitter. It includes balanced Mono and Stereo (MPX) outputs. Furthermore, the MT/MR Platinum STL includes a jumper in order to get a proper operation with digital signals.



EM 2000

is a 2000W FM transmitter made up of the EM 25 DIG exciter (or EM 20/30 exciter) and the AM 2000 FM amplifier. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules work independently thanks to a power combining structure that provides high isolation between them.

EM 10000

is a 10000W FM transmitter made up of the EM 250 COMPACT DIG exciter and three control units which combine the power of six AM 2000 FM amplifiers. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifying modules work independently thanks to a power combining structure that provides high isolation between them.

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Currents Online

Selected headlines from the past month.

FCC Issues Further NPRM to Nationally Test EAS

The FCC, FEMA, the NWS and the EOP have begun planning for a national EAS test, with subsequent tests to occur thereafter.

APRE Accepts Nominations for Fourth Engineering Achievement Award

Past honorees include Roger Karwoski, Chuck Leavens, Marty Bloss, Donald Creighton, Don Danko and John Kean.

Broadcast Electronics Gets New Majority Owner

Firstcity Crestone is now the majority owner of the broadcast manufacturer.

Telos Moves to New Facility

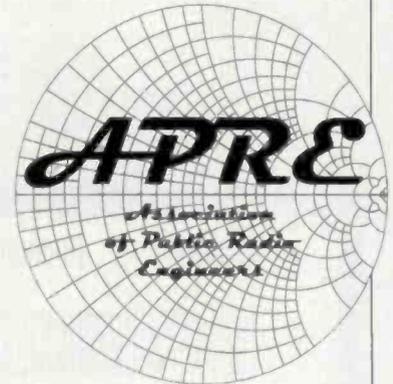
Despite expanding onto an additional floor several years ago, the equipment manufacturer still required more space.

GAO Report Notes Needed Improvements at FCC

A lack of written procedures to steer interbureau activity has created confusion in the FCC's actions.

AWRT Names Chickie Bucco as 2009 Achievement Award Winner

The award honors an AWRT member who has helped strengthen the role of AWRT within the industry and contributed to the betterment of the electronic media industry.



Find the mic and win!

Tell us where you think the mic icon is placed on this issue's cover and you could win a Samson Q2U recording pack courtesy of Samson.



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SBE Updates Leadership Course

The next course will be held Aug. 3-5, 2010, in Atlanta.

James Quello Dies

His FCC career spanned 23 years and included one year as interim chairman.

Site Features

NAB Insider Newsletter

Our pre-convention newsletter kicks off March 9. Be sure to get all your pre-show info on products and sessions each week leading up to the convention.

Digital Radio Update Newsletter

Stay up to date with the source of digital audio broadcasting news and information. The coverage extends to DRM, satellite radio and more. Subscribe today.

New Products Extra! Newsletter

Like new products? Subscribe to our twice-monthly e-mail newsletter and be the first to know about the latest technology.

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Web links to the advertisers in the February issue.

Industry Events

The *Radio* magazine Industry Events section lists upcoming conventions and conferences.

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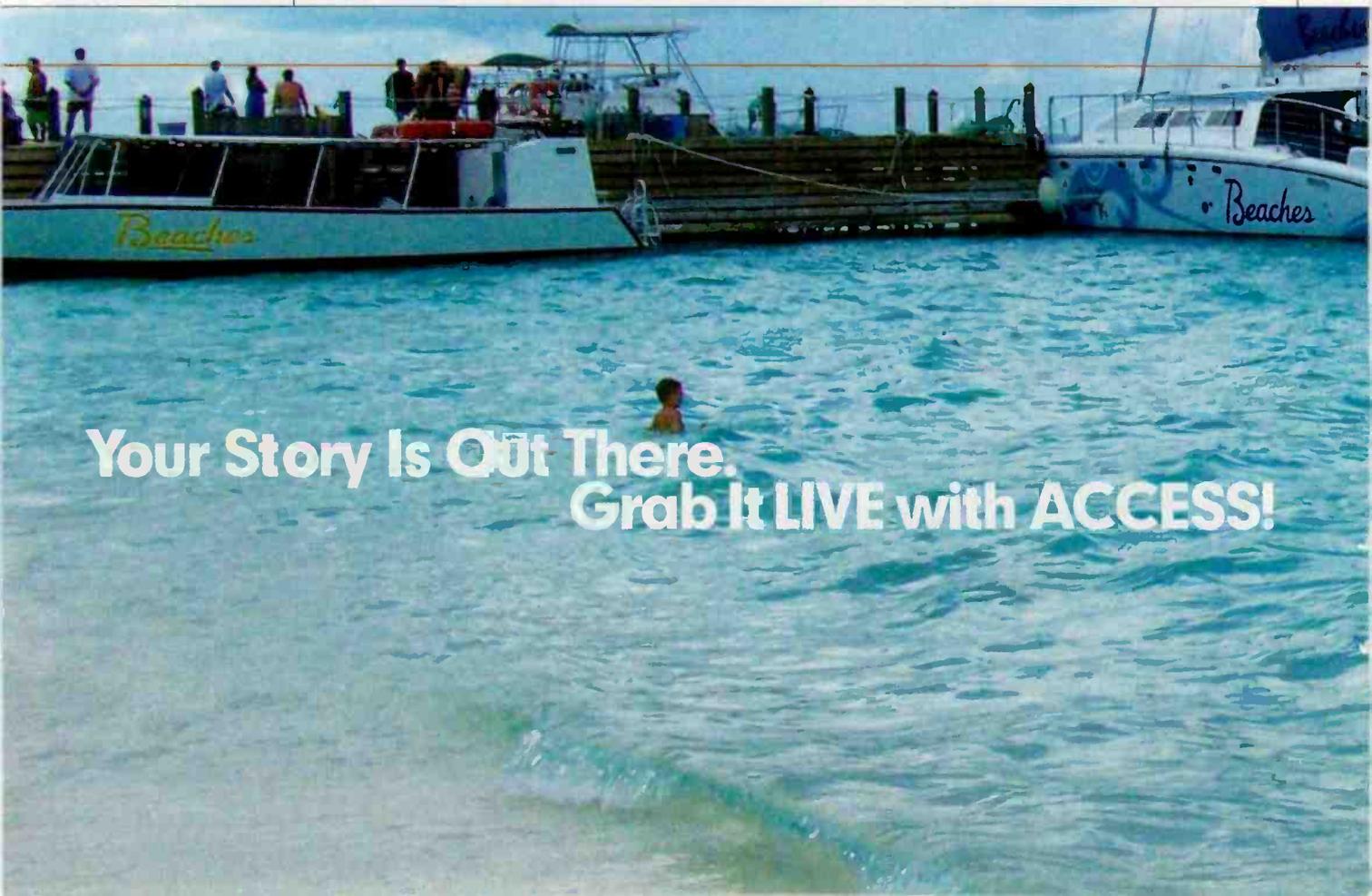
Being connected

How connected are you? Do you carry a cell phone? Maybe a Blackberry or Iphone? Perhaps an Ipod Touch or Zune with Wi-fi? The reality is we're almost always connected in some way. It's not always the most reliable connection, but there is usually a connection. With our increasing hunger for speed and data, we're not always satisfied with what's available, but it appears that is changing.

A recent report from ABI Research studied the proliferation of 802.11n Wi-fi in smartphones in 2009. The result? Less than 1 percent. That's

probably not a surprise. The report goes on to predict that smartphones with Wi-fi will increase to 84 percent by 2014. That's definitely an impressive number.

Some might wonder why you would need Wi-fi if you can connect through the wireless network. If you use a wireless carrier for data, you know that it has limitations. It's not always reliable mainly. Compared to an available



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Wi-fi hotspot, you will likely have better results from the Wi-fi.

What difference does this make? It's another delivery path.

How many ways can an audio signal reach a listener? Over the air is the method most familiar to us in radio. Some cell carriers offer a service to stream audio, such as Verizon Vcast. Then there's Internet streaming. I would consider those the main three methods.

Back to being connected: Everyone has a cell phone. Listeners might be willing to find a way to hear their favorite stations on the phone. (It's more likely that phone user has songs stored on the phone and is using it like a media player.) I don't see much acceptance of wireless-provided audio. Meanwhile, the NAB is pushing to have FM receivers built in to more phones. Also a good idea, especially if it doesn't take up more bandwidth on the wireless carrier. Progress on this is slow.

Then there's Wi-fi on a phone. For now, the idea of having to access multiple menus just to play a stream is cumbersome. But like every feature on a cell phone, popular functions become easier to use.

The real capability for the three data paths (and terrestrial radio is a data path in this instance)

with a phone is for them to work in unison. The listener should not have to decide how he wants to hear a stream, he should only have to decide the source of the stream. If I pick my favorite rock station in Cincinnati, the phone can decide to first look for the FM signal, then look for a Wi-fi connection or the wireless network to provide the stream.

As conditions and my location changes, the phone can switch to the most robust path.

In the meantime, wireless networks will move to 4G, perhaps HD Radio will again see an increase in installations, and the NAB will keep pushing for FM receivers in phones. My view of the integrated receiving device just might come sooner than I thought.

Chris Schen

Correction: The transmitter power chart in the January Trends in Technology feature had some errors in power levels. The online chart has been corrected.

What's your opinion? Send it to radio@RadioMagOnline.com

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Radio applications of fuel cells

By Kevin McNamara

Your choices for powering a transmitter or studio site now include the use of a technology invented in 1839: The fuel cell. Until recently, the costs to purchase and install fuel cells have been prohibitive; but, lower costs, more choices of fuel and federal tax incentives might make them a viable alternative for your facility.

In simple terms the fuel cell is a device that combines hydrogen and oxygen creating an electrochemical reaction that produces heat, water and electricity. The hydrogen is produced from common hydrocarbon-based fuels such as natural gas, gasoline, diesel or methanol. Oxygen is pulled from the air around it. The combination produces a chemical reaction, not completely unlike a standard battery. The fuel cell is essentially a battery with a system that constantly feeds the proper fuel into the cell. The process does not use combustion and as such produces no emission products.

carbon monoxide and heat.

- **Electrodes** – As in any battery, there is an anode (negative) and a cathode (positive). The anode has channels that disperse the hydrogen gas equally over the surface of the catalyst. The hydrogen molecules are split into positively charged ions, giving up one electron each. The positively charged ions then migrate through the electrolyte to the positive post (cathode). The negatively charged electrons travel through the external circuit to produce electric energy.

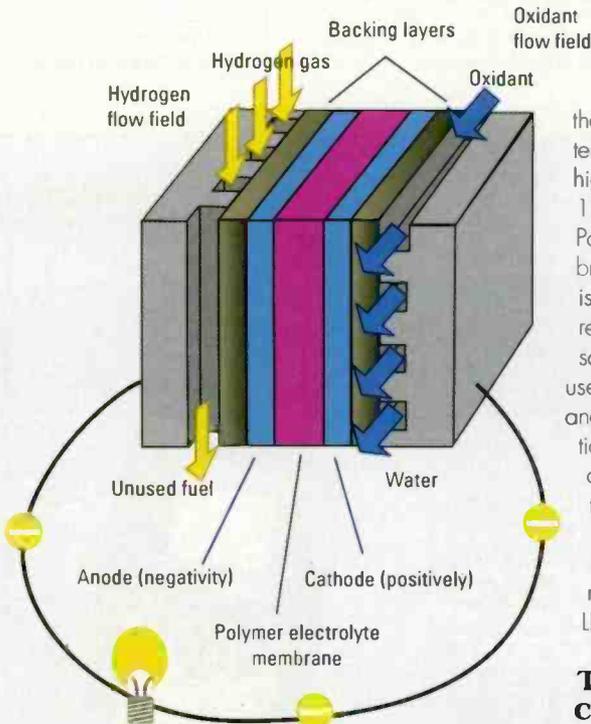
- **Electrolyte** – The electrolyte transports the positively charged hydrogen ions to the cathode in order to complete the electric circuit. In addition, it provides a physical barrier to prevent the fuel and oxidant gas streams from directly mixing.

- **Oxidant** – Typically oxygen that is pulled from the air surrounding the fuel cell. The oxidant is channeled through the cathode.

- **Fuel Cell Stack** – Each fuel cell produces 0.7V. Several fuel cells are connected together to produce the desired output, 12V or 24V are most common.

- **Power conditioning** – converts and/or conditions the dc power to ac (if desired). Fuel cells typically need some time to start producing power; many systems utilize capacitor banks to store power to ensure a constant power source in the event of transfer from grid power to fuel cell, this gives the fuel enough time to start while providing uninterrupted power.

There are several types of fuel cells, particularly for higher-power applications, but they are expensive and tend to operate at very high temperatures (up to 1,000 C). However, the Polymer Exchange Membrane Fuel Cell (PEMFC) is the technology currently used for the small-scale power generation used for transportation and other power applications. PEMFC systems operate at a lower temperature (less than 180 F) and have a higher efficiency. The most common fuels are LP or natural gas.



The components of a proton-exchange membrane fuel cell.

The system components

A fuel cell is created with six basic process components.

- **Fuel Processor/Reformer** – This system extracts the hydrogen from the hydrocarbon fuel. The generic term reforming is generally applied to the process of converting liquid or gaseous light hydrocarbon fuels to hydrogen and carbon monoxide. This process separates the fuel into hydrogen, water,

Applications and limitations

There are thousands of fuel cell power systems deployed in telecommunications applications in the U.S. Wireless telephone carriers are some of the biggest adopters of the technology since fuel cell systems provide much longer runtimes for backup power applications. There is also very little maintenance for fuel cells as compared with the need to replace batteries every two years or the costs to maintain thousands of backup generator systems. Perhaps the largest benefit is the ability of the fuel cell systems to operate continuously over long periods of time. Since Hurricane Katrina, the federal government has mandated that wireless carriers maintain 8 hours of backup power (at a minimum) at each site. When compared with the traditional battery-backup system, fuel cells provide longer runtimes for a given footprint. The runtime is only limited by the size of the fuel supply. The fuel cell also weighs much less than the amount of lead acid batteries required for

MANAGING TECHNOLOGY

the extended operation – this is a real consideration when located in the upper floor of a building.

In terms of broadcast applications, PEMFC systems would not be suitable to run full power transmitter sites. The largest PEMFC systems will provide up to 7kW of dc power. The systems can be ganged to increase the capacity, if necessary. In practical use, these systems are most suitable for applications where you now use large battery-based, uninterruptible backup power systems. These might include data centers, engineering rooms, small studios, remote trucks, remote microwave sites and low power backup transmitter sites. Fuel cells would also be the ideal power source for any emergency plans such as portable, trailer-mounted, low-power emergency transmitter systems and studios.

Cost

Cost for PEMFC systems are about \$3,000 per kilowatt, that would make the cost of a 5kW system approximately \$15,000. Installation might add another \$2,000. While \$17,000 is a little higher than the equivalent battery-based UPS or generator backup, tax credits could lower the purchase price of the PEMFC \$5,000 or more putting it well within range of the traditional methods. Also when you consider

the total cost of maintenance over 5, 10 or 15 years between a generator or battery UPS, the PEMFC becomes about 30 percent cheaper, since there are no expensive batteries to replace and dispose. Fuel cells have no moving parts, which eliminates the mechanical issues and repairs found in reciprocating, engine-driven generator systems. Perhaps the greatest benefit of PEMFC systems is that they are considered a green power alternative, which gives your company some bragging rights.

Other considerations

The installations of PEMFCs are specifically addressed in all national and most state and local building codes including NFPA and IBC. A lot of the differences between fuel cells and other power systems in the codes have to do with the handling of the fuel, fuel piping, ventilation and location of the system.

McNamara is president of Applied Wireless, Cape Coral, FL.



Want to know more about PEMFC and other fuel cell systems? The U.S. Department of Energy has a site dedicated to efficient and renewable energy sources including fuel cells. www.eere.energy.gov

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Back to the drawing board for Form 323

By Harry Martin

On Dec. 23, 2009, the FCC again postponed the filing deadline for commercial station biennial ownership reports, this time indefinitely. However, commercial stations are still required to file ownership reports, using the FCC's new Form 323, for new stations and to report consummations of station sales.

On Dec. 8 the FCC finally took the wraps off its new ownership reporting form – six months after first announcing in the Federal Register that the new form had been designed – and said that all commercial licensees would be required to file the new form as a new biennial ownership report by Jan. 11.

In response to this announcement, representatives from a number of law firms met with FCC staff members to show that the new Form 323 was, as a purely practical matter, unworkable. Based only on a week of experience with the new form the lawyers pointed out cumbersome online processes, system timeouts and slowdowns, and losses of "saved" data, all of which contributed to massive amounts of time being spent and wasted

owners without compromising the FCC's data collection goals.

The law firms followed up with a joint letter requesting an extension of the Jan. 11 deadline as well as various mechanical modifications to the form to alleviate the data loss and manual data collection problems that had been encountered. The letter focused exclusively on the mechanics of the form. In the meantime, one of the participating law firms, Fletcher, Heald & Hildreth, supported by 10 state broadcast associations, followed up at the U.S. Court of Appeals in D.C. on an earlier unaddressed challenge to more fundamental legal issues regarding the privacy problems raised by the requirement in new form that all individual stakeholders submit FRNs based on their social security numbers.

On Dec. 23, the FCC agreed to suspend the Jan. 11 deadline. The suspension is indefinite, and is intended to allow the staff to investigate what changes can be made to get the form to work more efficiently without compromising the completeness, quality, usefulness and aggregate ability of the data. The Order provides that, once problems with the revised form have been resolved, the FCC will announce a new deadline which will be at least 90 days from the date the revised version of the new form is made available. The court challenge by Fletcher Heald and the state broadcast associations remains pending.

When the biennial form is eventually required to be filed, it will still have to reflect ownership as of Nov. 1, 2009. That means if the new form were to become available on, for example, March 1, 2010, reports would be due 90 days later, i.e., by June 1 – seven months after Nov. 1, 2009. Thus, some licensees and individuals will be reporting outdated information likely relating to entities or individuals with which the reporting licensees may have no connection, or only a past connection. Thus, the data the FCC will be collecting once it restarts the biennial ownership reporting process will be both outdated and flawed. ♣

Dateline

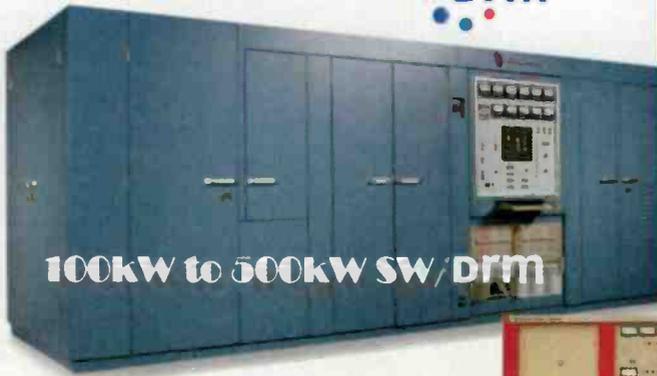
For noncommercial radio stations in Delaware, Indiana, Kentucky, Pennsylvania and Tennessee, their biennial ownership report deadline is April 1. As noted above the deadline for submission of biennial ownership reports for commercial radio stations has been suspended.

April 1 is the deadline for radio stations in Delaware and Pennsylvania to electronically file their Broadcast EEO Mid-Term Reports (Form 397) with the FCC.

April 1 is the deadline for radio stations licensed in the following states to place their annual EEO Reports in their public files: Delaware, Indiana, Kentucky, Pennsylvania, Tennessee and Texas.

in completing the form. Indeed, the group told of cases involving moderately complex ownership structures where the completion of a single form had taken hundreds of work hours. One suggestion for improvement was to allow the submission of other media interests' information, which now must be entered manually for each attributable owner for each station, in the form of a machine-readable spreadsheet. This modification, it was pointed out, would substantially reduce the time required to prepare reports by multiple station

Martin is a member of Fletcher, Heald & Hildreth, PLC, Arlington, Virginia. E-mail: martin@fhhlaw.com



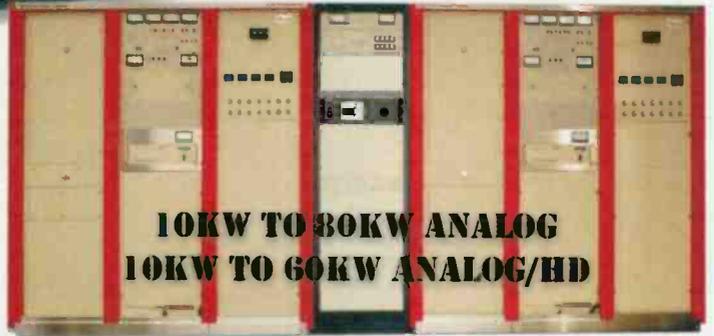
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There are many forms of portable recording options, and they range from a device the size of a cell phone to a laptop to racks of equipment. In most cases, radio usually requires the smaller form factor to capture an interview, sound byte or impromptu performance. With this more common use in mind, we'll focus on the smaller options.

One attribute of portable recorders that continues to change rapidly is the amount of storage space. The cost of solid-state storage has continued to drop to the point that 32GB of memory can be bought for less than \$5/GB. Because of the low cost of storage, many recorders that are only a few years old may be at a disadvantage with limited storage capacity.

All recorders now include USB connectivity as well. Some can function as audio interfaces (sound cards), too. This simple interface makes it easy to access the captured audio events.

Other common features of many recorders include automatic record levels, multiple file formats (WAV and MP3 being the most common), mic and line inputs, and clear metering. Some recorders provide basic editing functions for field editing. Many have some type of built-in microphone.

Form factors

Portable recorders take several shapes, but the dedicated recording device is the most common. Handheld and compact, these small boxes place a great number

of features in a tiny package. Their bright displays and simple transport functions allow even the most inexperienced user to record quality audio.

The squarish devices typically have some type of mounting option available, whether it's a camera tripod thread or a custom clip. This makes it easy to place the recorder on a desk or podium during an event.

Some recorders have features that musicians will value, such as a metronome and tuner. Some offer 4-track recording, which may be suitable for live music. Many have some option to remotely control the device. There are cases where a wired remote could be handy, although some models offer a wireless remote, which would be useful if the recorder is placed in an inaccessible spot. One example would be on a podium at a news conference.

There are two models that have packaged the recorder into a microphone handle. For interviews, this can look more natural than holding a little box, but it has the advantage that it can hold a mic flag to make the station's call letters visible. The mic-style recorders have simplified transport buttons and minimal displays. For a user, knowing the sequences is not as simple as reading a display, but they are still easy to use.

The internal mics on most recorders will provide audio quality ranging from good to great. Except for the stick-mic recorders, all recorders provide at least mic inputs. Personally, I like the robustness of an XLR connector for a mic. Many inputs use 3.5mm connectors.

LINEUP

By Chriss Scherer, editor



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RECORDER LINEUP

Recorder	Dimensions	Weight*	Inputs	Connectors	Outputs	Connectors	Speaker?
 AEQ PAW-120 www.aeqbroadcast.com	121mm x 51.5mm x 23mm	110g	mic, line	3.5mm	line, headphone	3.5mm	1
 American Audio/ Musician's Gear Pocket Record www.adjaudio.com	155mm x 84mm x 30.5mm	247g	mic, line, guitar	2 x 1/4"	line, headphone	3.5mm	1
 Korg MR1 www.korg.com	120mm x 64mm x 24mm	182g	mic, line	3.5mm	line, headphone	3.5mm	none
 Marantz PMD620 www.d-mpro.com	102mm x 62mm x 25mm	110g	mic, line	3.5mm	line, headphone	3.5mm	1
 M-Audio Microtrack II www.m-audio.com	105mm x 60mm x 28mm	130g	mic, line	mic: 3.5mm, mic/line: TRS	line, S/PDIF, headphone	line/S/PDIF: RCA, h.p.: 3.5mm	none
 Olympus LS-11 www.olympusamerica.com	131.5mm x 48mm x 22.4mm	165g	mic, line	3.5mm	headphone	3.5mm	2
 Sony PCM-D50 www.sony.com/proaudio	156mm x 73mm x 35mm	370g	mic, line	3.5mm, optical	line, headphone	3.5mm, optical	none
 Sony PCM-M10 www.sony.com/proaudio	115mm x 64mm x 23mm	188g	mic, line	3.5mm	line, headphone	3.5mm	1
 Tascam DR-07 www.tascam.com	137mm x 55mm x 27mm	178g	mic, line	3.5mm	line, headphone	3.5mm	none
 Tascam DR-100 www.tascam.com	151mm x 80.5mm x 35mm	238g	mic, line	XLR, 3.5mm	line	3.5mm	2
 Yamaha Pocketrak CX www.yamaha.com/proaudio	129.5mm x 46.5mm x 17.5mm	92g	mic, line	3.5mm	headphone	3.5mm	1
 Zoom H2 www.samsontech.com	110mm x 63.5mm x 32mm	110g	mic, line	3.5mm	line, headphone	3.5mm	none
 Zoom H4n www.samsontech.com	156.3mm x 73mm x 35mm	280g	mic	XLR/TRS	line, headphone	3.5mm	1
 HHB DRM-85 Flashmic www.hhbusa.com	244mm	414g	on ll version		headphone	3.5mm	none
 Yellowtec IXM www.yellowtec.com	255mm	400g	line	3.5mm	headphone	3.5mm	none

Add-on	Dimensions	Weight*	Inputs	Connectors	Outputs	Connectors	Speaker?
 Alesis Protrack www.alesis.com	185mm x 75mm x 30mm	310g	mic/line	XLR/TRS	headphone	3.5mm	none
 Belkin Go Studio www.belkin.com	250mm x 100mm x 136mm	421g	mic/line	XLR/TRS, 3.5mm	headphone	3.5mm	1

* With Batteries

Software	Host	File Formats	Price
Audiophile Engineering Fire www.audiophile-engineering.com	Iphone/Ipod Touch	WAV, AIFF, CAF, AAC, ALAC, FLAC, Ogg Vorbis	\$6
Bias Iprorecorder www.iprorecorder.com	Iphone/Ipod Touch	16/44WAV	\$5
Enco Idad www.enco.com	Iphone/Ipod Touch/Ipad	WAV	free
RCS Ipush www.rcsworks.com	Iphone/Ipod Touch		free

Both styles of recorders may offer fixed (internal) or removable storage. Some have both. There are pros and cons to either. Fixed storage has the advantage of never being lost or the recorder not be loaded when it's used. With internal storage, power on and record. One drawback to internal storage is filling the capacity. If the recorder is used for long interviews or periods where it is not possible to offload material, the recorder can't record any more. With removable storage, a new card can be plugged in and recording can go on.

Many recorders with removable storage accept cards nearing 32GB. This allows for recording times that

On-board Mics?	Internal Storage	Removable Storage	Power	Battery Life	Recording Formats	Price	Notes
1	2GB	none	2 x AA, USB		WAV, BWF, MP2, MP3, aLaw, uLaw, G.729	\$645	
2 x cardioid	128MB	SD 4GB	2 x AA, 5Vdc	5 hours	16/44WAV, MP3	\$100	includes two lavalier mics
none	20GB	none	internal rechargeable, 5Vdc	2.5 hours	24/192WAV, BWF, DSDIFF, DSF, WSD	\$899	mic included
2 x cardioid	none	SD/SDHC	2 x AA, 5Vdc	4 hours	24/48WAV, MP3	\$350	wired remote control jack, 5V phantom power
none, includes T mic	none	CF Type I and II	internal rechargeable USB	5 hours	24/96WAV, MP3	\$200	phantom power
2 x cardioid, X-Y	8GB	SD/SDHC 32GB	2 x AA, 5Vdc	23 hours	24/96 WAV, MP3, WMA	\$399	remote control jack
2 x cardioid	4GB	Memory Stick 4GB	4 x AA, 6Vdc	14 hours	24/96WAV	\$450	wired remote control jack
2 x cardioid	4GB	Micro SD/ Memory Stick	2 x AA, 3Vdc	19 hours	24/96WAV, MP3	\$400	prerecord buffer, wired remote
2 x cardioid	none	SD/SDHC 32GB	2 x AA, 5Vdc	7.5 hours	24/48WAV, MP3	\$170	
2 x cardioid, 2 x omni	none	SD/SDHC 32GB	2 x AA, 5Vdc	5 hours	24/48WAV, MP3	\$429	remote control jack, wireless remote
2 x cardioid, X-Y	none	Micro SD	1 x AA	54 hours	16/48WAV, MP3	\$250	
4 x cardioid	none	SD 16GB	2 x AA, 9Vdc	4 hours	24/96WAV, MP3	\$150	4-channel recording
2 x cardioid, 90°/120°	none	SD/SDHC 32GB	2 x AA, 5Vdc	11 hours	24/96 WAV, MP3	\$299	wired remote jack, M-S mode, 4-channel recording
omni, cardioid	1GB	none	2 x AA	6 hours	WAV, BWF, MP2	\$1,000	line-input model also available
omni, cardioid	none	SD	3 x AAA & rechargeable LiON	15 hours	WAV, BWF, MP2	\$1,000	Beyer Dynamic or Yellowtec capsule

On-board mics?	Models	Power	Battery Life	File Formats	Price	Notes
2 x cardioid	Classic 6 & 7; Nano 2, 3, Chromatic; Touch 2	4 x AAA, ac adapter	3 hours	16/44WAV	\$150	provides phantom power
2 x cardioid	Classic; Nano 2, 3; Video	4 x AAA, 5Vdc	4 hours	16/44WAV	\$100	

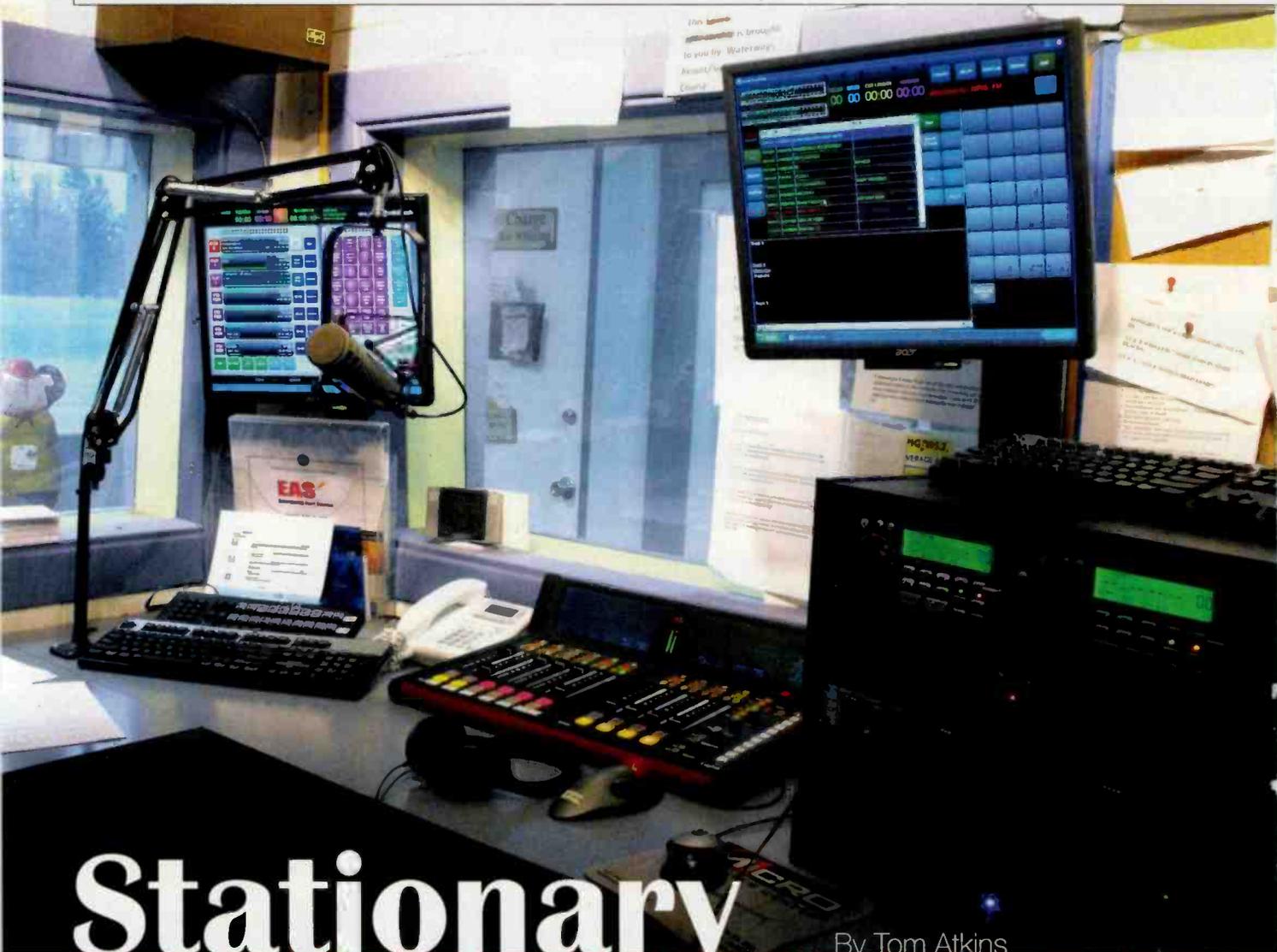
can approach days in length when a compressed audio format is used.

Power is another important consideration. Standard batteries and internal rechargeables have considerations similar to storage. Non-removable batteries typically charge when the recorder is plugged in to a USB port. This makes it easy to keep the recorder charged, but limits the time the recorder can be used in the field without being returned to a USB port. With common batteries, fresh cells can be installed on the fly. The Yellowtec IXM has fixed and removable batteries.

Since the first handheld personal devices (PDAs) were introduced in the late 1990s, there have been efforts to

turn them into professional field recorders. The first attempts usually required add-on hardware making them awkward and bulky. Now that iPods have become so ubiquitous, using them to record is natural. There are several software programs available for the iPod Touch and iPhone. Adding a mic, such as the Blue Mikey, creates a practical option for field recording.

Going one step further with an iPod, there are options to add metering and enhanced connectors to the iPod. These docking adapters are bulkier than dedicated recorders, but if you're set on using an iPod, there are choices. The two noted on our list are still compact.



Stationary

By Tom Atkins

MODERNIZATION

A huge leap in technology eases WPIG's upgrade burden.

Re-building a radio studio is a pretty straightforward task. Though there are different levels of intricacies, you would usually move the studio operation into a temporary room, rebuild the old studio, then move the operation back into the newly outfitted room. The time involved would, of course, depend on the level of the rebuild, but moving the operation into another room temporarily makes the job go much easier. What if you were given the task of rebuilding radio studios while keeping the operation running from the same studios you were tasked to rebuild? This was the job at hand at our FM/AM combo in Olean, NY.

WPIG and WHDL badly needed a rebuild. The automation was still the DOS-based DCS system from Computer

Concepts and most of the audio consoles were even older. The operation, though at once state of the art had over a 20-plus year time span, become unreliable and the sound quality had deteriorated. The studios, originally built in the 1930s, are nestled in the Southern tier of Western New York near the New York/Pennsylvania border an hour and a half drive south of Buffalo. Originally, the building was home only to WHDL-AM until The FM (WHDL-FM) came along in 1947. It is now the heritage super power class B FM country station WPIG. There are three studios, two air, one production room and a combined rack and engineering room involved in this job. The AM transmitter is co-located here as well. Needless to say, space was limited, thus the need to rebuild around the present operation.

WPIG's on-air studio features a Logitek Remora-10 console.

Where to begin

The first need was to select a state-of-the-art automation system that would give a good amount of flexibility to the operation. Backup was also an important aspect. The automation system needed to have the ability to keep the stations on the air if a central server failed or one of the main on-air work stations failed. Ease of setup was a must and we wanted to be able to stream WAV files from a central server over Ethernet. Another primary focus in the automation decision was its ability to run with off-the-shelf hardware if need be, in case of failure. This was very important. Being located in a smaller town, a hardware failure could mean those dreaded three words: Off the air.

In the early days of automation, hardware specifications were finite, but I am sure that having the ability to put an off-the-shelf sound card, or for that matter, an off-the-shelf work station to use would be a distinct advantage, at least for the short term. You know the scenario, a major failure happens on a holiday weekend and you cannot get parts. Given all these requirements, Media Touch from OMT was selected as the automation system of choice. The hardware purchased included five workstations, two for each on-air studio and one for production, a central server with a RAID five hard drive array, a gateway workstation, and an additional workstation to run the Media Touch logger software to record network feeds and air checks.

All workstations except for the gateway were outfitted with M-Audio Delta audio cards affording the station balanced inputs and outputs. The gateway workstation's mission in life is to be the location audio files, log files and any other files that need to be put into the automation system from outside the system, are deposited, scanned for any infections, and then copied to the appropriate destination in the automation. As a company, we do not allow the automation system to be directly connected to the Internet. The reasons are many but the most important is that we do not want to render the on-air product useless due to an infection being passed along to it. So, we take extra precautions in this area. I mentioned previously that one of the requirements of the automation system was to stream WAV files on the automation network. Backyard Broadcasting does not condone



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Stationary MODERNIZATION



WHDL's on-air studio



WPIG/WHDL production room

the use of compressed audio formats, especially for the music. A new music library was purchased for WPIG to use when the new automation system was installed. We have changed music libraries in many of our markets and the difference between compressed and linear non-compressed is dramatic. With hard drive space so cheap, there is absolutely no reason to have a compressed library, unless you are working with legacy equipment and it would not support the larger files. WHDL did not

have to go this route as it runs a 24-hour satellite delivered format called Kool Gold from Dial-Global.

In-place progress

Rebuilding studios around the existing operation has many challenges. Given its number of years, there was existing wiring. Not just a little. A lot. Actually more than a lot. Just like any other broadcast facility, the original wiring was added to, and added to, and added to over

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[in-ti-grey'-shuhn] – noun

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photo by Chriss Scherer

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the years for modifications and new equipment. This left the original wiring path to the studios looking like 20 pounds of bologna in a 5-pound bag. New wiring had to run overhead in a new path and be kept to a minimum as space was limited. Also, remember that the current operation had to continue. In order to accomplish this task, traditional audio consoles with all the ins and outs in the actual console had to be ruled out. The decision was made to go with an audio router-based console system. This way we can keep most of the audio sources and destinations wired in the rack room. Sources such as microphones and CD players along with destinations like headphone and studio monitor amps would be part of the new cabling to and from the studios thus minimizing the actual audio runs to and from the studios. Logitek Remora consoles and audio engine were chosen as they fit all the requirements and cost guidelines for the project, not to mention that this system will afford us the ability to have virtually every source in the building available for selection on the three Remora consoles.

With the two main components ordered, it was time to create room in the existing racks for the new Media Touch automation and Logitek Audio Engine. The existing racks housed many gems not being used anymore including an old cart carousel once used for automation. Audio still being used in the existing operation was still



running through the old patch bays so care had to be taken in removing some of the items. In some instances, temporary wiring had to be put in place to bypass these relics. Keep in mind that with this type of rebuild, and the lack of available space, you wind up moving items in the racks two or three times before they find their final physical location. Does this add time to the project? You betcha!

Equipment List

Acer LCD monitors
 ART Clean Boxes, SLA-2
 Avocent KVM extenders
 Behringer Power Play Pro XL
 Broadcast Tools 16.4
 DBX 286
 Furman power distribution panels
 HP desktop workstation computers
 Logitek Audio Engine, Remora, X-Y
 Select Panel
 Media Touch
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Jessie Walker, Program Director

DMS Broadcasting, San Francisco, CA

"When we started, we were jumping into something we knew nothing about! We called your tech support & within a day they had a solution. It was miraculous. They helped us get wired up & set up. (Tech Support) had a positive & upbeat attitude. They went above & beyond!"

David Trudrung, General Manager & Co-owner

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"We are absolutely pleased. I especially like the game scheduling feature, it works great for Mountaineer West Virginia University games. I rate it a 9 ½ because we can schedule 2 games simultaneously & flip flop when there are rain delays. It works great for sports talk!"

Mike Hurst, Engineer

KSVL, Yerington, NV

"I love (Xtreme)! We've been running (Xtreme) for a year & a half every single day & we give it a 10! It's easy to learn & use. Good support & it's dependable!"

George Lemait, Station Manager

KSMZ, Alexander, AR

"Xtreme has more flexibility, sounds better & has fewer problems than our stations running (other automation systems). It's easier to program & a 9 compared to other programs out there."

Scott Gray

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Stationary MODERNIZATION



Relics in the rack: WPIG's carousel.

The good folks at Logitek provide pre-wired cables to most flavors of termination blocks at different lengths. The option here was to terminate all the analog audio ins and outs into 66 blocks from the Logitek audio engine. The Logitek Audio Engine has the option for AES/EBU in and out. However, in this particular installation, the majority of our sources and destinations in the market were analog and the need for AES/EBU was small to none. Thus the Audio Engine was purchased without any AES/EBU cards in it. Though if need be, we can add AES/EBU functionality by the addition of an audio card in the Audio Engine.

Also added were 66 block terminations to the newly run cables to and from the three studios. While on the subject of the studio cable runs, traditional multi-pair shielded cables were used for the analog audio runs. Also included were CAT-5e 25-pair cables for computer network connectivity to the rooms and the RS-422 communication lines necessary for the Remora Consoles to communicate with the

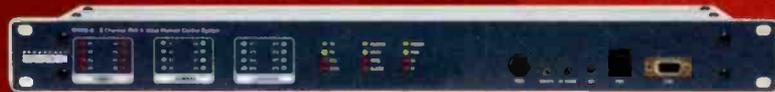


audio engine. These 25-pair cables were also terminated in 66 blocks that are CAT-5e compliant. The only computer network connectivity that did not take advantage of the cables was the automation network, which was set up for gigabit speed. Most of the automation network connections to the switch were kept in the rack room since many of the automation workstations were physically installed there. So the CAT-6 cables were kept short. For the workstations located in the studios for production, a commercially made CAT-6 cable was purchased and run into the rooms directly from the automation switch.

Punchin' and grinnin'

As a very good friend once said, "If you have all your terminations, it is time to be punchin' and a grinnin'."

Site Control



WVRC-8 Web-enabled and Voice Dial-up Eight Channel Remote Control



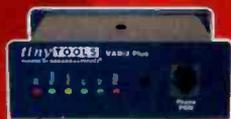
Site Sentinel™ 16 Web-enabled Sixteen Channel Site Remote Control System



WVRC-4 Web-enabled and Voice Dial-up Four Channel Remote Control



Site Sentinel™ 4 Web-enabled Four Channel Site Remote Control System



VAD-2 Plus Dual channel Voice alarm Dialer

USA Proud



AUDIO Sentinel™ Web-enabled dual channel stereo silence monitor



I/O Sentinel™ 4 Web-enabled four logic/status input, four relay output module

Relay Sentinel™ Web-enabled three relay module

Relay Sentinel™ 16 Web-enabled sixteen open collector/SS relay module

Schedule Sentinel™ Web-enabled Event Scheduler

Status Sentinel™ Web-enabled three input status/logic module

Status Sentinel™ 16 Web-enabled Sixteen-input status/logic module

WebSwitch™ (not shown) Web Remote Power Switch

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Ripping out legacy wires proved to be a heroic effort.



Yes, cross connecting was next on the agenda. Since most of the audio sources and destinations would remain in the rack room, cross connecting was short and to the point. On the automation side, the keyboards, video for the monitors, and the mice connections were removed to the air studios with Avocent KVM extenders. Connectivity from the local to the remote KVM was accomplished through CAT-5e cables. In this instance, we utilized the 25-pair runs into the rooms. The only workstations that

did not have KVM extenders on them were workstations designated for production. Here it was deemed better to have the workstations in the rooms so access to CD/DVD drives were available.

With everything in place, and all the cross connections made, it was time to cut over to the new systems. To accomplish this task without losing any air time, we had to run the on-air for each studio out of the production room one at a time for an evening each. The old equipment of each room was removed along with the old wiring. As I mentioned earlier, there was a heroic amount of legacy cables in the studios. They were all cut and pulled out to make room under the counter tops. Once the room was cleared, the new equipment was brought in and connected. Each room took approximately six to eight hours to strip down and then re-populate with the new equipment. Having everything pre-wired ahead of time also helped in this venture. For those of you keeping count, the production room was last in the upgrade scheme.

With WPIG and WHDL comfortably using the new consoles and automation system, the decision to go with an audio router-based console system definitely made the job go easier considering everything that had to be danced around. It gave us the ability to pre-wire 80 percent of the connections without affecting the legacy operation as most were kept localized to the rack room. The hard part was doing a dance with legacy equipment that had their dance cards all filled over the 20-plus years of operation.



Mediatouch workstation computers and Broadcast Tools switcher in the rack room.

Atkins is VP, director of engineering of Backyard Broadcasting, Buffalo, NY.

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Part of the *Radio* magazine DAB Answer Series

HD Radio's Electronic Program Guide

What's on the radio?

By Rick Ducey, with David Maxson, Skip Pizzi, Adrian Cross

With nearly 2,000 HD Radio broadcast services now operating in the United States, we're certainly approaching a critical mass on the delivery side of digital radio. What will attract the critical mass on the consumer side? Consumers have recently become accustomed to the availability of program service information (metadata) along with their digital media experiences. HD Radio offers program-associated data (PAD) for this purpose via the

stickiness of listenership by keeping audiences aware of what's next.

The NAB Fastroad EPG Project

To bring Radio EPG services closer to fruition, the NAB Fastroad program funded an EPG development project. BIA/Kelsey and Broadcast Signal Lab combined forces and won the original contract to explore the business and technical requirements of EPG using the HD Radio platform. Unique Interactive of London joined the project team, bringing its vast experience as an EPG and digital services developer. The project team worked closely with Ibiquity Digital, the inventor and licensor of HD Radio technology, and with representatives of the radio broadcast industry, the consumer electronics industry and the broadcast equipment manufacturing industry.

Phase 1 of the EPG project produced a report (www.nabfastroad.org/NAB_FASTROAD_EPG_Final.pdf) in 2008 describing the business and system requirements for an effective HD Radio EPG service, and presenting an EPG ecosystem as a model for the development of sustainable EPG service delivery.

It also pointed out the challenges to terrestrial radio EPG, since it had never been attempted before. Unlike the well-established EPGs in DTV, there is no print-media predecessor or existing database from which to build an electronic guide for radio. Add to this the considerations that there are many more radio stations than TV stations, radio coverage is less uniform than most local TV signals, and there's no telling what the EPG display will actually look like on the many radio form factors, and you get a sense of the magnitude of the effort.

To help sort these issues and test the feasibility of a radio EPG ecosystem, lab testing of various EPG modes and a subsequent field trial were proposed and subsequently received a second round of funding by NAB Fastroad.

The culmination of this second phase of the EPG project was a field trial of the HD Radio EPG service conducted

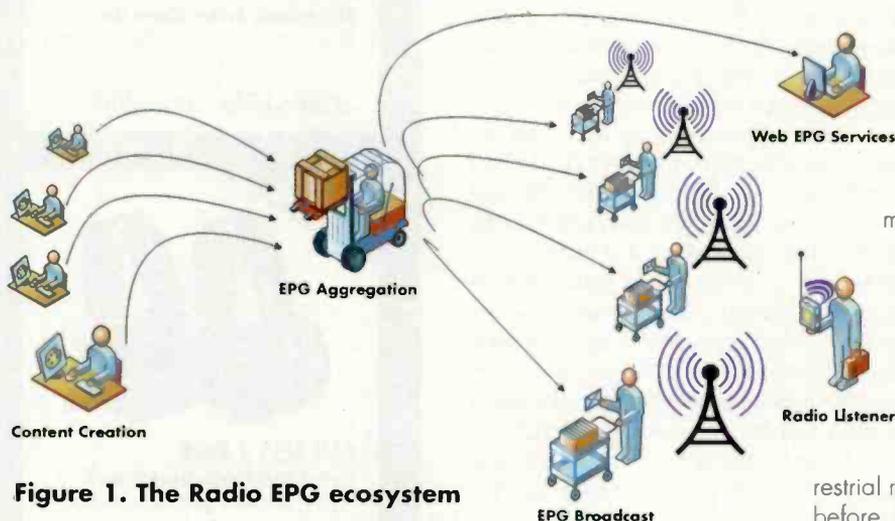


Figure 1. The Radio EPG ecosystem

HD Radio Program Service Data (PSD) service. PSD can be used to label the artist and title of a song, or the host and topic of a program. Or it can provide a link for more information about the current content. HD Radio broadcasting has been delivering PSD to HD Radio receivers since its inception.

Electronic Program Guide (EPG) services are the next frontier in program data for radio broadcasting. While PAD is about what's playing now, EPG is about what's coming up – a metadata method of forward promotion for radio stations that can be displayed full time on a user's screen. Besides making radio seem more hip and up to date, EPG can increase listenership (as all good forward promotion does) and add to the



Figure 2. Various views of Radio EPG data in online presentation during field trials.

in the Boston/Providence/Worcester markets during the summer of 2009. A remote real-time demonstration of the Boston-area EPG system was presented on the exhibit floor of the NAB Radio show in Philadelphia in September 2009.

Enhancing localism via EPG

These three adjacent Arbitron markets were selected as the field trial location for several reasons. An analysis done during the first phase of the EPG project showed that one of the challenges to the delivery of EPG services was in the geographic diversity of radio broadcast coverage areas. An effective EPG service would provide the listener with an accurate listing of the programs available to the listener at his location. EPG services should filter out false positives, which are program listings of stations that are not receivable at the listener's location, and false negatives, which are missing listings for stations that are receivable at the listener's location. The triple-market area provided a geographically compact example of the overlapping

WFMT Chicago Commences HD Radio

By Hal Kneller, CPBE CBNT

A fine-arts station since its debut, WFMT-FM Chicago has always had a reputation for classical music and utmost audio quality. Station engineers once designed their own audio processors because nothing on the commercial market was acceptable to them, nor did they air commercials on tape cartridges.

Launched in 1951 by classical music lovers Bernard and Rita Jacobs who guided the station its first 15 years, Chicago Educational Television Association/WTTW has operated WFMT since 1970. Over the years, the station has grown to offer some of its programming nationally, such as Jazz with Bob Parlocha, The Beethoven Network, and syndicates many other short-form products such as symphony orchestras and operas.

Today, WFMT is equally concerned with audio quality and has chosen the Nautel NV-40 to upgrade and initiate HD Radio transmission. Chief Engineer Gordon Carter, who celebrated his 40th anniversary with the station this



year, has an industry-wide reputation as an expert on audio and processing, and has made numerous industry presentations on the subject.

Why did WFMT choose a Nautel NV-40 transmitter? Carter says the reasons were reliability, sound quality and a general preference for solid-state. He says, "With tubes, pretty much if anything goes wrong, you're off the air. With solid-state a lot of things can go wrong and you're still putting out some signal. You can lose a module or power supply and still not be off the air." Reduced long-term maintenance costs and the headroom to increase HD Radio power to -10dBc, if approved, are additional reasons for Carter's choice of Nautel.

Carter had been looking for some time but culminated

The *DAB Answer Series* is an ongoing series of articles that cover the technology of digital audio broadcasting.

Drop-down box offers five choices for geo-filtering of stations displayed

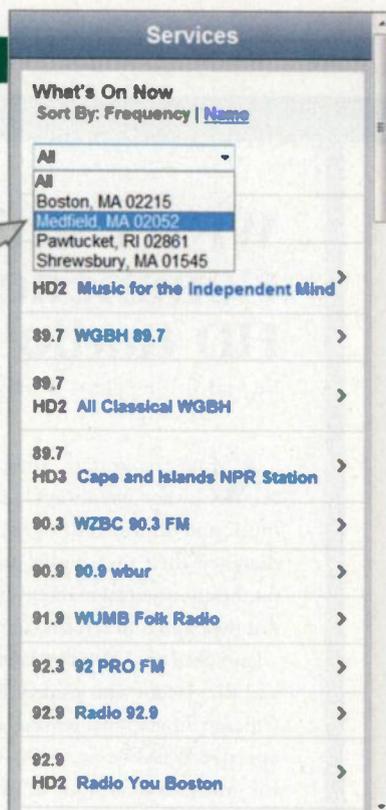


Figure 3. EPG with geo-filtering

service areas of stations in adjacent markets. These markets also represent the scope of market sizes in the nation – large, medium and small. In addition, several major radio groups that are supportive of the EPG trial own stations in these markets. Broadcast Signal Lab was able to leverage its long-standing relationships with commercial and non-commercial stations in these markets to obtain participation in the field trial.

As Figure 1 indicates, a key component of the EPG ecosystem (and thus the field trial, as well) was the multiplatform delivery of EPG service. So in addition to presenting the EPG as a 1.7kb/s HD Radio datacast, the same data was provided on a Web service (optimized for handheld device browser display), and viewed on a PC and an iPhone at the NAB Radio Show demonstration (see Figure 2). Because the Web service is available ubiquitously, it included the ability to manually filter the display of available stations by ZIP code, as shown in Figure 3. Ultimately this could be done automatically by a location-aware browser/device, on a national or even international scale.

The First EPG-capable receiver

The EPG team was especially pleased by the support of Ibiqity and Korean consumer electronics manufacturer Cydle who collaborated to provide a functional prototype HD Radio EPG receiver on hand for demonstration at the

NAB Fastroad EPG booth during the 2009 NAB Radio Show (see Figure 4).

The EPG functions supported by Cydle's touch screen implementation (shown in Figure 5) included:

1. Select station from list
2. Load and display EPG of selected station
3. Refresh EPG data
4. Display previous day's schedule
5. Display next day's schedule
6. Close EPG

Project results

Some preliminary conclusions from this field work were drawn.

1. EPG services, delivered over the air and (more immediately) via networked devices, hold the promise of engaging more listeners more often, in the face of competitive media choices, by presenting the listener's local radio dial as a single service with many choices. In addition, EPG services provide an opportunity to supply continuous forward promotion to the current listener, in parallel to whatever is on the air at the moment.

2. The highest and best use of EPG is to present all stations' listings as if the local radio dial were a single service. The listener would see listings for all stations available at the listener's location, similar to listings for a satellite radio or satellite/cable TV service.

3. The service bureau has been shown to be an effective model for generating and delivering EPG services. The service bureau is responsible for aggregating EPG data from numerous stations for presentation in a unified user interface and publishing it over multiple distribution platforms.

4. The classic chicken-and-egg problem is resolved by immediately delivering EPG services via the Internet, while waiting for growth in the market adoption of EPG-capable radio receivers.

Chicken-and-egg problem

The chicken-and-egg problem is the situation where broadcasters are reluctant to launch a new service if there are no receivers to receive it, while CE manufacturers are reluctant to develop devices to receive a service that broadcasters are not yet broadcasting. The slow adoption of FM stereo, RBDS and color TV are examples of this challenge.

Reaction to the research gathered from these Radio EPG trials has been cautiously positive. Broadcasters have confirmed by the manner in which they participated in the trial that radio station programming, operations, engineering and IT time is precious. The trial worked out the kinks on how to set up EPG on an HD Radio transmission system so it can be executed efficiently. Once EPG transmission is established, stations would be well



Figure 4. Cydle HD Radio tuner display with EPG feature



Figure 5. Cydle HD Radio EPG display

served by their software vendors (e.g. automation and/or traffic) if the vendors develop easy-to-use interfaces that incorporate EPG activity into the existing workflow.

What's next?

What remains is more research and development to define and test the business and operational models that make sense for U.S. radio broadcasters. We see the radio broadcast industry making strong moves toward serving its audiences not only over the air using its traditional broadcast infrastructure but also to devices connected to the wired and wireless Internet. Connected devices typically offer a rich user experience, including a lot of program information. It may pose a competitive risk to radio broadcasters if a similar user experience is not provided over the air.

Rick Ducey is the chief strategy officer for BIA Advisory Services, BIA/Kelsey; David Maxson is the owner of Broadcast Signal Lab; Skip Pizzi is a media technology consultant; Adrian Cross is the software development team leader at Unique Interactive.

his transmitter search at the 2008 NAB Show. He and his boss, Window to the World Communications' President and CEO Dan Schmidt, went to the show to take a final look and move forward with the purchase. Appointments were made with the major HD Radio transmitter manufacturers. Schmidt told Carter that the major focus should be on redundancy, reliability and solid-state, and after seeing Nautel's NV-40, he told Gordon to make it work within the budget.

WFMT had some other important criteria. The Sears Tower is a busy and expensive location – rent is by the square foot, so transmitter size is important. The compact design of the NV-40 along with its relatively light weight compared to some other models fit the profile for floor loading requirements. Additional space is saved due to the NV-40's built-in redundancy – WFMT presently operates with no auxiliary transmitter since installing the NV-40 in April 2009.

As an early adopter of the NV-40, Carter suggested some engineering improvements that have now been incorporated into the NV Series. One is an option to place the circuits powering the controller and exciters under a UPS for both stability and more rapid re-starts after power bumps. Carter says, "We have serial number 4, this is a new product; it was a lot less troublesome than it could have been, and has fully met my expectations for both quality manufacturing and sonic excellence." He says he's been complimented by both listeners and competing market engineers on the HD Radio sound quality. With the Nautel NV-40, WFMT's reputation for excellence remains at an industry pinnacle.

Kneller is market development manager for Nautel.



The NV40 in operation at WFMT

TECHtips

Tips, tricks, hints and more

By Chriss Scherer, editor

Cover the gap

Robert Dominguez, general manager of the Guadalupe Radio Network of West Texas, shared his solution for some weather protection. He explains that some work had been done to a station's AM transmission lines, including new spark gaps. Just as the finishing touches were put on the gaps, he noticed that storm clouds were moving in. The station engineer suggested covering the spark gap clouds in some way to protect it from being shorted by the heavy rain.

Time was short, and ideas were few, but Dominguez visited a few hardware stores for ideas. He wanted something inexpensive, but it had to stand up to the rain without presenting any electronic influence to the transmission system. He looked in several places but found nothing until he was about to leave the store. That's when he noticed some small accessory bins on sale for 99 cents. Dominguez bought two and returned to the transmitter site.

He cut holes for the wires to pass through and mounted the bin to the wall. Dominguez notes that even during the recent highest wind day on record the cover stayed in place. Seems like a good investment for 99 cents.



Online resources

We have compiled quite a collection of tips and ideas as well as resource lists. These are all posted at RadioMagOnline.com in the Tech Tips and Engineer's Notebook sections. While we add to and update ours all the time, there are some online references that are quite complete on their own and are worth bookmarking.

There are several online glossaries available, and we'll start with our own. The Radio magazine Glossary primarily covers terms specific to radio broadcasting. Like any resource, this is an ongoing work in progress and is updated regularly. If there's a term you think we should add, let us know.

One that you could access quite often is the Radio Pro Audio Reference. This dictionary is updated regularly and contains an enormous range of terms and ideas. The online resource can also be purchased in hard copy from Rane.

Equipment dealer Sweetwater also has a glossary of terms. Its focus leans on music production and performance, but it's still a broad reference of terms and ideas.

If mics fit your fancy, you will probably like Stan Coutant's Microphone Site. It's loaded with images, specifications and literature of many mics, from vintage to modern. It's a good way to

kill some time, but it's also a good reference for the inquisitive.

If you just want to see vintage broadcast mics, turn to James Steele's mic page. There are lots of photos of mics organized by manufacturer. It's a gallery rather than a resource, but who doesn't like to look back and reminisce once in a while?

Do you have some favorite online references? Tell us about them.

Radio magazine Glossary
radiomagonline.com/mag/glossary

Rane Pro Audio Reference
rane.com/digi-dic.html

Sweetwater Glossary
www.sweetwater.com/expert-center/glossary

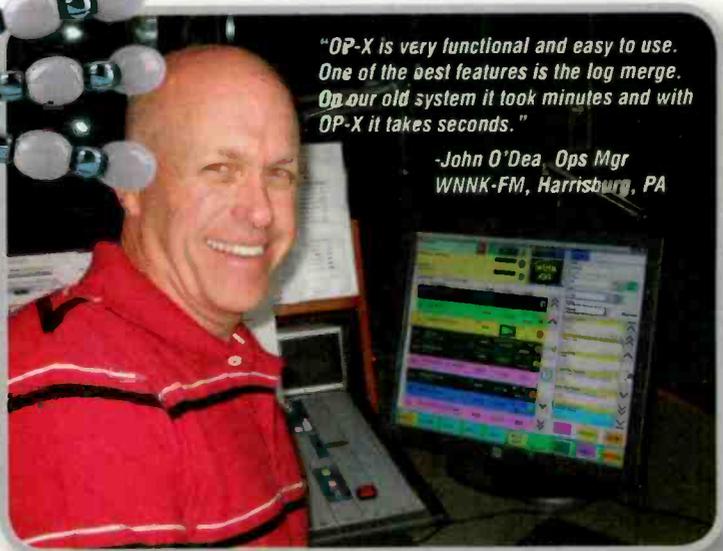
Stan Coutant's Microphone Site
www.coutant.org

James Steele Mic Page
www.k-bay106.com/photos.htm

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-John O'Dea, Ops Mgr
WNNK-FM, Harrisburg, PA

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Samson Q2U

By Chris Wygal, CBRE

Nick is a sports reporter on the run. He faces stiff deadlines. Typically, he is required to upload one-minute sports roundups to several stations that use his reports on the next day's morning show. Nick only carries a laptop with Wifi connectivity and his favorite recording software. Luckily for Nick, it's all he needs. He no longer carries an extra sound mixer case, audio cables and power supplies. Nick uses the Q2U USB microphone package from Samson. Complete with a dynamic handheld microphone and headphones, he'll have his reports completed and uploaded long before the lights go out at the arena.

At a glance, the Q2U looks like a regular

Real use

The story about Nick is true. He's a colleague who took great interest in the Q2U, so I let him take it for a week to try. Upon connecting the USB cable to his laptop and the HP20 headphones to the bottom of the actual microphone, he was able to instantly record his voice-over material. In addition, he could monitor himself using the headphone output on the microphone, plus he could hear the multitrack editing playback on his software. The unit effectively becomes a handheld external soundcard. I too gave the Q2U a whirl in the radio studio, on a laptop in the field and at my personal studio. Each computer recognized the device and loaded the drivers immediately without having to load any software or firmware. The only adjustments we had to make involved telling the editing software to use the Q2U as the primary I/O device. This did not require a reboot. The Q2U is the epitome of plug and play.

In addition to its ease-of-use, the Q2U boasts a strikingly noticeable dynamic cardioid microphone element that is noise free and capable of handling high SPLs. Voice-over reproduction during our testing was stellar. With a frequency response between 50Hz and 15kHz, the Q2U performed superbly. Samson also specifies the unit for use in miking drums, guitar and piano. Based on the true reproduction during our voice tests, putting the Q2U in front of most instruments or any voice type would be well warranted. Of course as is the case with many dynamic handheld microphones, P-popping can be considerable. In the Q2U users manual, Samson prescribes the PS-01 pop filter to help eliminate plosives.

Performance at a glance

Dynamic cardioid pickup pattern

16-bit/48kHz A/D converter

Works with any editing software

USB connectivity

3.5mm headphone jack

No software or drivers to install

XLR output and USB I/O can be used simultaneously

Sturdy diecast steel construction

HP-20 headphones offer quality monitoring

handheld dynamic microphone. It has an on/off switch, dual-stage silver grille, cardioid pickup pattern, an XLR output and a gray body. What's unique though, is the USB I/O jack, the 3.5mm headphone jack, the green USB LED indicator and the headphone volume control. Inside the microphone is a 16-bit/48kHz A/D converter that allows the unit to become an external I/O audio device for a PC or Mac. The XLR and USB can be used simultaneously for connection to a live sound console and computer for recording. The no-latency 3.5mm headphone jack makes monitoring during recording a snap. The Q2U package ships with Samson HP20 studio headphones, which deliver accurate audio and are very comfortable. Also in the package are a standard microphone stand clip, tripod-style desk stand, USB cable, 10' XLR to 1/4" cable and Cakewalk audio editing software.

FIELD REPORT

The only variable concerning the Q2U was its usage with the audio editing software. Every software brand is different and may require some trickery when assigning I/O devices. The user's manual takes great care to help the user understand the many possible settings when installing on a PC or Mac. However, in less than a minute the Q2U was working perfectly

with no hiccups. All in all, connectivity is a breeze and quality is excellent. The Q2U greatly simplifies the non-linear audio recording process.

Wygat is the programmer, engineer and Web designer for Liberty University in Lynchburg, VA.

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

It is the responsibility of *Radio* magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by *Radio* magazine.



The Q2U package comes with a handheld mic and headphones.

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Find the mic on this issue's cover and be part a drawing to win a Samson Q2U recording pack.



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by Erin Shipp, associate editor

Linear PCM recorder Sony



PCM-M10: The PCM-M10/B is a 96kHz/24-bit capable recorder with electret condenser stereo microphones, 4GB of internal flash memory and a microSD/Memory Stick Micro (M2) slot for expanded memory. Key features include a built-in speaker, cross-memory recording, digital pitch and key control, digital limiter, low-cut filter, track mark functions, a 5-second pre-recording buffer and A-B repeat capability. The recorder includes a USB high-speed port for simple uploading and downloading of native WAV or MP3 format recorded files, to and from Windows PC or Mac computers. The M10 offers durable construction and long battery life using conventional AA alkaline batteries.

800-686-SONY; www.sony.com/proaudio

Acoustics analyzer Auralex Acoustics

Room Analysis Kit: Auralex Acoustics is now offering a kit that complements the company's Room Analysis Plus program for off-site analysis. The Room Analysis Kit provides all the tools needed to acoustically analyze any room. It includes an omni-directional measurement microphone, a USB drive featuring swept sine signals and a complete instructional guide. Users can record a sweep with the omni-directional measurement microphone in the location of the room in question. All files can be sent via e-mail, along with the included Room Analysis Plus Form, directly to Auralex for examination by its acoustical engineering staff. Frequency response, impulse response, waterfall plots and reverberation time values can be generated from this service. A written report will be presented back to the user within five to seven business days outlining the acoustical issues and how to solve them.



317-842-2600; www.auralex.com
auralexinfo@auralex.com

Solid-state recorder Tascam

SS-R05: Like Tascam's SS-R1 and SS-CDR 1, the SS-R05 rackmount recorder captures to compact flash media with no moving parts. The entry-level recorder removes features from the SS-R1, like balanced audio and RS-232C control, to create a new low-price model.

323-726-0303; www.tascam.com; tascamlit@tascam.com

Audio plug-in Izotope



Alloy: Alloy is an audio plug-in that combines six essential sound shaping tools into one integrated interface. It is designed for any audio mixing application from professional recording and post-production studios to the home studio, and its uniquely configurable interface helps pros work faster while giving less-experienced users simple starting points for mixing. Alloy includes six modules: equalizer, exciter, transient, dynamics, de-esser, exciter and limiter.

www.izotope.com; izotope@izotope.com

Interactive content Stratos Audio

Stratos Media: Stratos Media is a nationwide interactive radio service covering all major radio stations and markets, operable on iPhone, Blackberry and Stratos-compliant devices with resident FM radios. It utilizes Mediaguide's real-time airplay and monitoring network, covering more than 2,500 stations in 150 markets and Stratos' interactive ad creation, distribution and targeting tools. Mediaguide's data currently fuels numerous "now playing" applications on popular smartphones, and Stratos has similar applications for mobile phones including those with FM receiving capabilities. Stratos Media features include the immediate ability for listeners to obtain more information about advertisements and songs, download bar coded coupons to their handsets, vote, purchase content, watch live video and more.

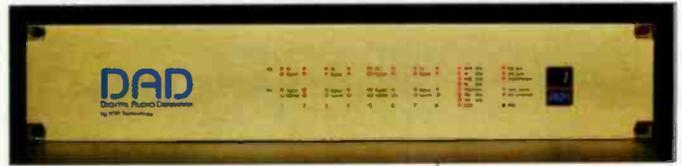
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Audio converter NTP Technology

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The receiver modules then convert that twisted pair signal back into the DVI with stereo audio and RS-232 data signal. The AT-DVI100SR is capable of extending signal up to 330' while the AT-DVI250SR extends signal up to 825'. In these lengths, each of the DVI extenders is still capable of maintaining high video resolutions up to 1920x1200 or 1080p, and they are entirely HDTV compatible.

1-877-536-3976; www.atlona.com

UPGRADES and UPDATES

RCS has released Gselector 3.13 with enhancements that include a multi-link changer, additional drag-and-drop functionality and Linker attributes.

(www.rcsworks.com)...Symetrix is now shipping the Airtools Multiband Processor 2m, a 1RU processor that provides broadband AGC, eight-band parametric equalizer, four-way programmable crossover, four-band multiband compressor and limiter, alignment delay and many other features. (www.airtoolsaudio.com)...

Audio Science has released the Windows 7 driver, v4.02.02, for 32-bit and 64-bit Windows 7 operating systems. The new driver replaces the older WAVE, WDM and Combo drivers. (www.audioscience.com)...Omnia Audio has added a new section to its website to post free processing presets. The presets are created by Omnia users and the Omnia support team. (www.omniaaudio.com/support/presets.html) ■



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USED FM TRANSMITTERS

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2 KW	2001	BE FM2-C, solid state
2 KW	2005	Harris Z2, solid-state
5 KW	1989	Harris FM5K1
5 KW	1991	Harris HT5
7+3.5 KW	2004	BE FM1703, FM & HD, solid-state
10 KW	2004	BE FM10S, solid state
10 KW	1995	Harris HT10
14+5 KW	2005	BE Fm1405 (IBOC) HD, solid state
20 KW	2005	BE FM20S, solid state
27.5 KW	1984	Continental 816R-4B, solid state IPA
27.5 KW	1999	Continental 816R-4C, solid state IPA
35 KW	1986	BE FM35A

USED AM TRANSMITTERS

5 KW	1982	Harris MW5A
5 KW	1987	Harris MW5B
5 KW	2002	Nautel ND5, solid state
50 KW	1986	Nautel Ampfet 50, solid state

EXCITERS

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Used Nautel NE-50 exciter
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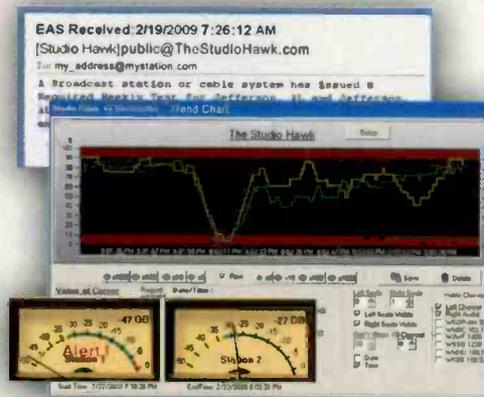
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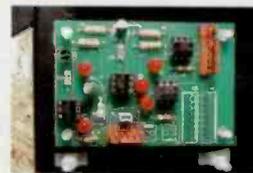
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Silence Sentinel - Silence Monitor w/Web

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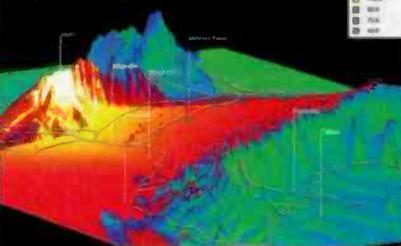
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Contributor Pro-file

Meet the professionals who write
for *Radio* magazine.
This month:
Facility Showcase, page 18



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Atkins has been in broadcasting for more than 35 years working for broadcasting

companies including Capital Cities, Taft, Keymarket, Sinclair and Entercom. He started as a disc jockey on WUSJ Lockport, NY, while attending college for engineering science. In later years he worked as an on-air personality and chief engineer for the legendary WKWB Buffalo, NY. He is also experienced in voice-over production and radio programming.



Written by radio professionals
Written for radio professionals

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by Erin Shipps, associate editor

Do you remember?



Announcer Milton Cross broadcasting from the anteroom of a box at the old Metropolitan Opera House in the 1930s.

Jan. 12, 2010, was the 100th anniversary of the first live transmission of opera via radio. On that date, Acts II and III of "Tosca" were sent by a transmitter at the Met, via an antenna strung between two masts on the roof, to a handful of receiving stations in the New York area. The *New York Times* accurately reported, "This will only be an experiment and perfect results are not expected immediately." Those singing or talking into a microphone offstage were heard much better than those singing on the stage. There was even shipboard reception, on a vessel docked at a Manhattan pier. As for the peaks and valleys, The *Times* had estimated a radius of perhaps 50 miles, given the low height of the opera-house roof.

Oscar Hammerstein, whose Manhattan Opera House competed with the Met, installed a wireless station in his new London Opera House the next year. But it wasn't for broadcasting; it was for selling tickets to "passengers in the great liners 500 miles out at sea," according to The *Times*.

Although we don't have a photo of this momentous first broadcast of live opera, we did acquire one from the 1930s. In 1931, the Met began its live network opera broadcasts, which continue to this day, said to be the longest-running series of live broadcasts.

Information courtesy of the Metropolitan Opera.

Sample and Hold

Interest in Features of iPod Nano's FM Tuner

Is radio getting a second chance in the new Nano's FM tuner? According to Vision Critical Communications, who surveyed 18-34-year-olds in the United States (with parallel studies in Britain and Canada), it is. The company found that the interactive features of the Nano's FM tuner show potential to reinvigorate interest among younger demographics, those most using MP3 players. The survey showed that 66 percent of Americans aged 18-34 show an active interest in the pause-and-rewind feature of the new FM tuner. Of the five features from the new iPod Nano that were presented in the survey, American adults rank an FM tuner number three in terms of overall interest. To read the full report, visit www.vcdocs.com/iPod_survey_US.pdf.

Percent "very interested"



Source: Vision Critical Communications

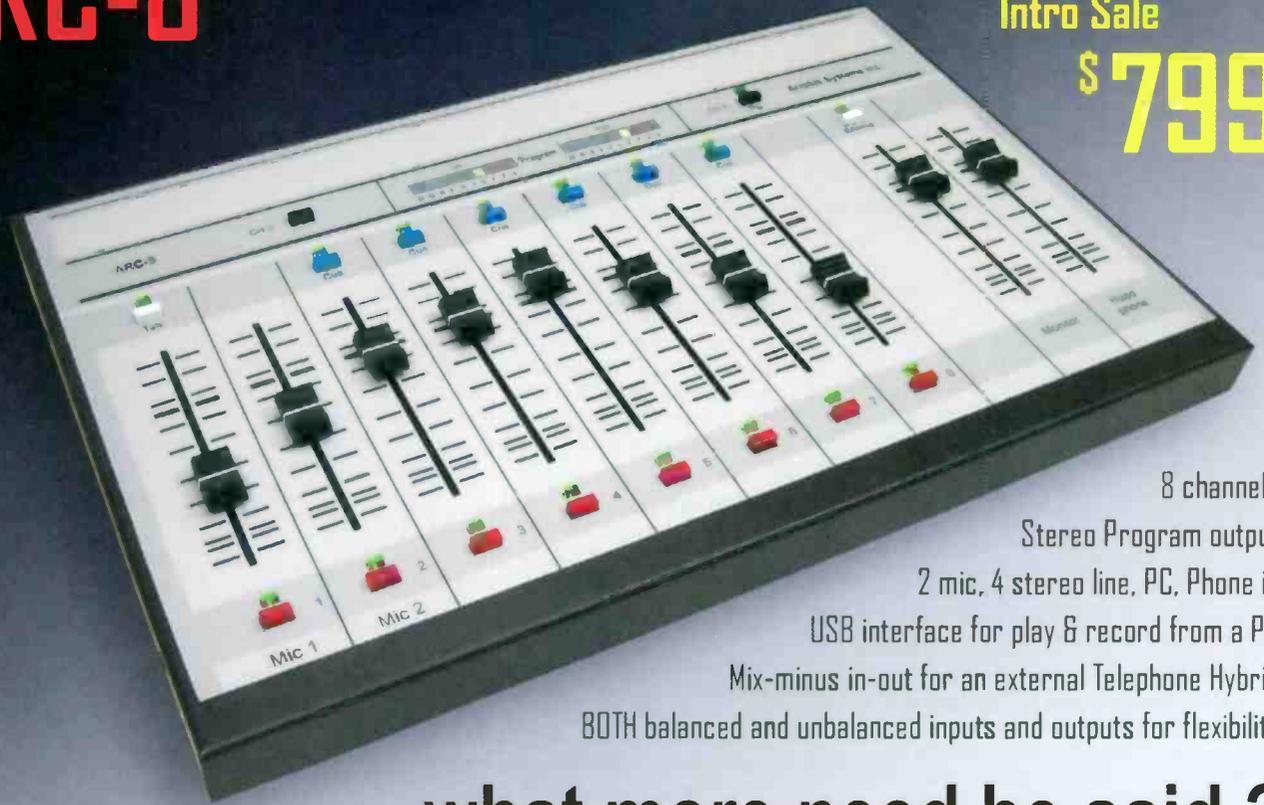
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3. Redundancy is critical. A typical WheatNet-IP installation has multiple levels of redundancy. Each BLADE holds the complete map of the entire system within its onboard memory – we call it distributed intelligence – a system with 50 BLADEs has

49 backups with failover in the event of a failure. Cisco Stackwise technology provides redundancy in the central core TOC switch. A WheatNet-IP/E-Series console studio complex can stand alone, even if the TOC goes down, with backup analog or digital program audio feeding a back end router independent of the core Gigabit infrastructure.

4. Modular is better. Why would you want to combine your switch, mix engine and I/O into one box? Beats us. With WheatNet-IP, you install only what you need, where you need it. We believe in not overselling.

5. Manufacturing quality is very important. Wheatstone is proud to have the best track record in the business for build-quality, reliability and intelligent functionality. With far more up-and-running installations than anyone else, this is where we really shine. An investment in WheatNet-IP and E-Series control surfaces today will reward you with a future-proof, failsafe networking/control environment that's infinitely updatable and in for the long run.

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Take a look at your entire environment. Wheatstone is a perfect partner because we are always there, always innovating. Built into every WheatNet-IP BLADE are features others just didn't think of – handy utility mixers, silence detection, crosspoint routing control, headphone monitoring of any source, lots of logic GPIO, and comprehensive metering of audio I/O, not just signal-presence indicators. And, in the hugely unlikely event that a BLADE needs to be replaced, you just plug in a new one and enter the BLADE number. That's it.

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