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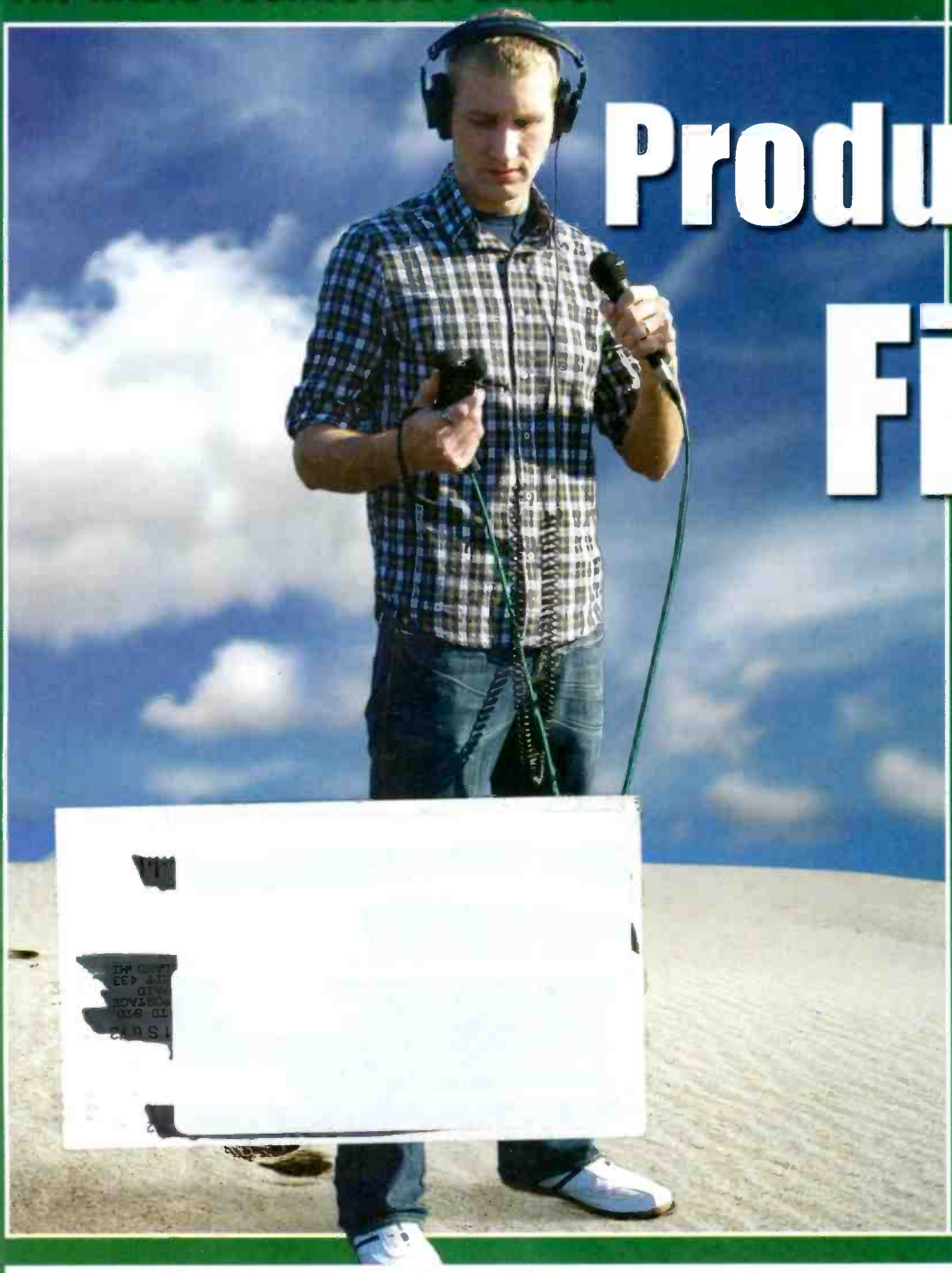

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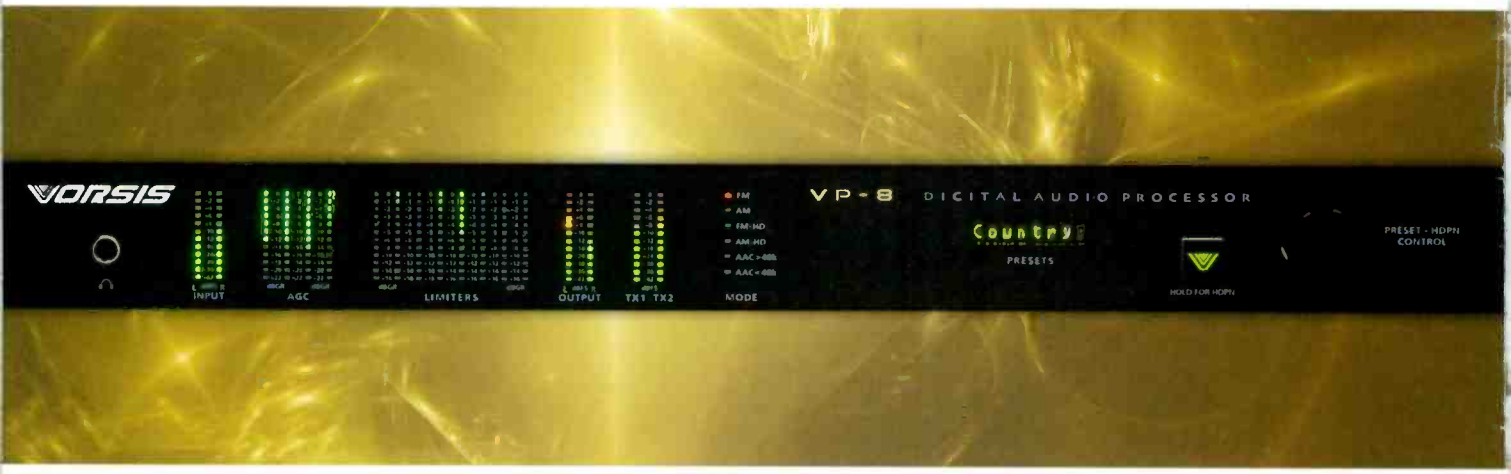

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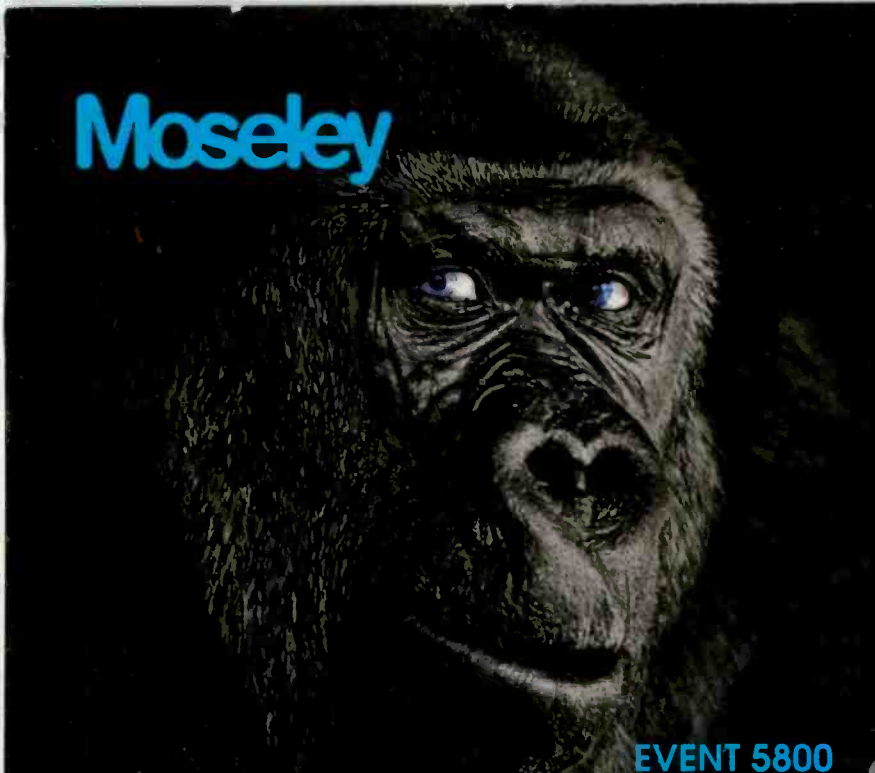

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ON THE COVER

Mobility was a key issue at the 2010 NAB Show in Las Vegas. And if radio listeners are mobile, stations should be, too. New technologies are making remote production easier. Read how starting on page 14.

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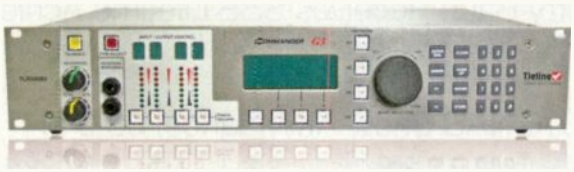

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Currents Online

Selected headlines from the past month.

Terry Baun Receives SBE Lifetime Achievement Award

The SBE Lifetime Achievement Award recognizes outstanding contributions and achievements by an individual throughout his or her professional lifetime.

Baun

2010 NAB Show Attendance: 88,044

International attendance came in at 23,900 with 156 countries represented. The 2009 NAB Show final attendance was 82,650.

NAB Announces 2010 Crystal Radio Award Winners

The 10 winners are recognized for their outstanding year-round commitment to community service.

Davis and Locke Elected SBE Fellows

Sterling E.Davis is vice president of engineering for Cox Media Group in Atlanta, and Robert W. Locke, CPBE CBNT, is the chief engineer for KPTS in Maize, KS.

NAB CEO Gordon Smith Delivers Inaugural State of the Industry Address

Smith focused on three issues: the radio performance tax, the National Broadband Plan and retransmission consent rights for broadcasters. Read his speech online.

The *Radio* magazine Pick Hits of the 2010 NAB Show

The top 15 new products of the convention as selected by our Pick Hits panel.

Seven Automakers Expand HD Radio Commitment

The car companies have added HD Radio as standard equipment or are making it available on additional models.

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 prize courtesy of Hosa.

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Site Features

2010 NAB Show Photo Blog

See the convention through the lenses of the *Radio* magazine staff.

Webinars

Our two-part series of IP audio in the studio and in the field are available on demand.

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Industry Events

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

Podcasts to Go

The Radio Currents Weekly Podcast brings the news headlines to you to take on the road.

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Web links to the advertisers in the May issue.

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Post-show recovery

The 2010 NAB Show is now in the books, and the first impressions confirm that it appeared to be a good convention. Granted, the mood of our industry at this time last year was at an all-time low. Still, registered convention attendance was up, exhibitor moods were high, and attendee interest was focused.

While registered attendance is up slightly (about 5,000 more registered this year than actually attended last year), I was pleased to hear from exhibitors that stations are placing orders. They're not big orders, but the budgets are being opened at least in small amounts.

The theories why were mixed: Some exhibitors cite the statistics that advertising revenues are beginning to rise again. Others speculated that stations had put off capital projects as long as they could so it's just a matter of timing. From the HD Radio standpoint, now that the proposed digital sideband power increase is at least partially settled, some stations are moving ahead with their facility upgrades.

The big change for radio this year was that the radio exhibits were in the Central Hall. Frankly, this was not a big deal to me. Booths move around every year, so North Hall or Central Hall makes no difference to me. Because I rode the Monorail to the convention center each day I liked the Central Hall location. It was a slightly shorter walk from the

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It isn't every day you can broadcast your morning commute. And as far as we know, it's even more rare to broadcast from a bicycle. But that's just what Radio 3FM DJ Giel Beelen did on his 48-kilometer morning commute from Harlem to Hilversum in the Netherlands. How did he do it AND provide audio that's so good it sounds like he was right in the studio? He used ACCESS from Comrex.

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station. One radio advantage to the Central Hall is that the exhibits are closer to the session rooms for the Broadcast Engineering Conference.

Here are some quick takes from the convention.

IP everything. Whether it's IP audio in codecs and routers/mixers or IP control, everything has an Ethernet port on it. This should not surprise anyone. On the IP audio side, I was impressed to see Logitek and Axia sharing IP audio information. While all the studio systems have their own flavor of IP audio, this interaction could be the start of some real standards being used between the various systems.

Portable connectivity. While saying "There's an app for that" is a catch phrase, it seems there really is an app, or at least mobile connectivity, for almost everything. Some companies are stretching the idea by saying a product has iPhone connectivity when the product just has browser control. So it's not truly an app, but nonetheless, taking control with some kind of smart phone has lots of potential.

Taking portable connectivity to its next logical step, several automation companies showed their products with direct upload capabilities. Someone in the field can send an audio bit to the station and insert it directly into the on-air flow. Remotes and breaking news are even easier to manage this way.

I also liked the codec connection via the iPhone for Tieline and the Droid for Comrex. AEQ showed me that there are apps available to connect to SIP-capable codecs. And now that the iPad is available, many exhibitors were using the overgrown iPod as part of their display.

EAS and CAP. While FEMA, the FCC, the EAS-CAP Industry Group and others work on the next generation of EAS, EAS equipment manufacturers are all standing ready to provide updated equipment when CAP is adopted. The FEMA booth had lots of activity with equipment demonstrations going off every few minutes. A useful demonstration showed a text-to-speech implementation to provide audio from the text within a CAP message.

Some predictions were made that FEMA would adopt CAP in September, which will start the 180-day clock for stations to have CAP-capable equipment installed.

Overall, it seems the convention was a success. Attendance was up, spirits were high, and the media industry in general appears to be on an upswing. This is one trend that we certainly want to continue.

Chris Schaer

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

Effects of tower standard 222G

By Jeremy Ruck, PE

The ANSI/TIA/EIA-222 tower standard, now in its 61st year of existence, is in its seventh revision: version G. The current revision took effect in 2006, and has since undergone two addendums. The standard is required to be reviewed every five years, and has at some times been left as is. The venerable revision C was active for almost 20 years until being replaced in 1987 by the D revision. G and its two addendums make significant changes in the way structures are contemplated. As the next round of changes to our industry occurs, the implications of the G standard should be considered, as they not only affect new construction, but will impact the carrying capacity of existing structures.

Under G, a more comprehensive look at structure performance is taken. Two limit states, or conditions, for each structure are considered. Under the strength limit state, compliant structures are safe under the most extreme of loading conditions. The serviceability limit state ensures that the structure in question is capable of providing the desired service under normal conditions.

Gone is the fastest mile wind speed concept that had been previously utilized. Mainly the change here is due to the way the National Weather Service and other agencies measure wind speed. The new accurate methodologies to determine wind speed have translated into the change in the standard whereby wind loading is calculated according to a three-second wind gust to accommodate instantaneous loads. Most of the sites used by the Weather Service record three-second-gust wind speeds, so more accurate averages are available for G and subsequent revisions should this methodology be continued.

In addition to the changes for wind loading, we also find considerations different for ice and seismic loads. Ice loads are escalated with height, as are wind loads, and G is the first version of the standard that seriously addresses earthquake loading. In general the seismic provisions should have minimal impact on broadcast structures unless the structure is irregular in some fashion. In the case of ice loading, older towers with no such consideration will almost certainly see their capacity decrease. Conversely, towers designed for a higher wind speed combined with certain ice thicknesses may see their capacity increase. The end result, of course, is that your tower may move into an overloaded condition, or be ripe for additional revenue.

Dig deeper

Previous revisions of the standard have discussed "normal soil," however, G eliminates this designation. In G, an annex is included that lists parameters for various soil types that may be used for bid purposes in the absence of a boring report. Before a final design is completed, however, borings should be performed and this data considered. This is one area in which corners should never be cut. While the potential exists that adequate geotechnical information could reduce cost of a project, Murphy would tend to dictate that structure failure, the other end of the spectrum, will result if proper borings are not obtained.

These design items among others are applied to structures depending on the applicable categories in which they fall. Broadcasting towers would typically be considered Class II structures: Those that represent a significant hazard to human life and/or property should they fail. In addition, each structure is also considered under exposure categories, which are used to adjust wind loading based on the terrain roughness in the vicinity of the structure. There is an additional topographic category that corrects for sites on hills or elevated locations other than buildings. The result is a much more specific solution for each structure rather than a cookie-cutter approach based on broad regional assumptions.

Other important items have been included as part of the latest revision. G has taken a much more comprehensive look at corrosion protection. Previous revisions have listed hot-dip galvanizing as the minimum corrosion protection, and this is continued in G. What is so important in the latest revision is that the requirements for protection of anchors in corrosive soil are expanded. Guy anchors are kind of like icebergs in the sense that what you see above ground is not the full enchilada, and not necessarily representative of their overall condition. There have been numerous failures in recent years of towers as a result of

corrosion of steel guy anchors going unnoticed. If your periodic inspections have neglected comprehensive examinations of the guy anchors, now is the time to get them checked before the tower becomes horizontal.

Not just the tower

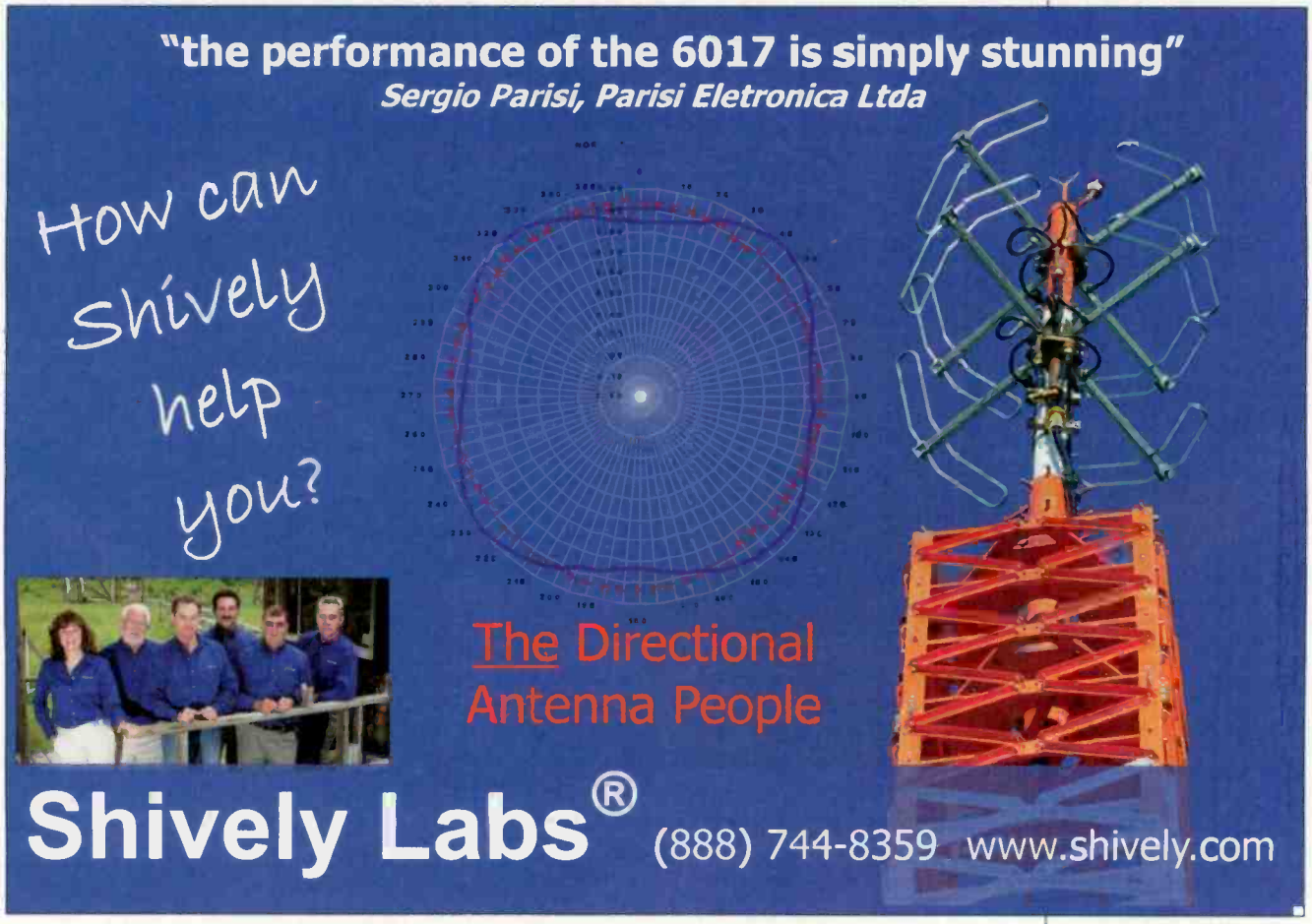
Revision G contains a significantly greater number of climbing and working requirements. The minimum spacing between rest platforms on towers greater than 500' in height has been reduced. Warning signs are required if a structure does not comply with the provisions of the standard pertaining to climbing and working facilities. Safety climb systems must also now carry a stamped or engraved metal tag at their base indicating the size and type of cable. This is to insure compatibility with the safety equipment of personnel. A 3/8" cable is defined as the standard to minimize the equipment that must be maintained by climbers.

So although Rev G winds up being more detailed, it offers many advantages affecting the design of a structure and related pricing. A better understanding of loads on a structure may allow for more capacity, although this should not be expected in every case. Nevertheless, by considering more detailed parameters, a given structure becomes a truly custom solution, and allows for increased capacity without over or under designing a tower.

It should be noted that the use of G is required when analyzing an existing structure for applications beyond the original scope of design performed under previous revisions. So if your tower was built during the era of the C revision and you propose the addition of an auxiliary antenna not initially considered, your engineer must study the structure under G not C. Most jurisdictions and insurance companies will, however, require use of the most current revision regardless.

Although the face of our industry is changing somewhat, the necessity of towers is an undeniable fact. Failure of one or more structures can clearly result in significant economic impact. While some of the design portions of Revision G may have limited applicability to older towers for which no changes are proposed, the safety and protection portions certainly apply, and should be considered regardless of the age of your tower. The bottom line is that Rev G is a good thing, and the standard authors have crafted an excellent standard.

Ruck is a senior engineer with D.L. Markley and Associates, Peoria, IL.



Earlier AM pre-sunrise operations proposed

By Harry Martin

The FCC has invited comments on a proposal that would permit earlier commencement of pre-sunrise (PSR) service by Class D and certain Class B AM stations.

Generally, Class D and Class B AM stations operating on regional channels are not allowed to operate at full daytime power prior to sunrise. Before 6 a.m., most daytimers are limited to very low power. Class D AM stations, for example, are typically limited to 100W. Recognizing the hardship this creates for many stations, particularly in winter months when sunrise occurs late (e.g., after 7 a.m.), the Commission has been approving PSR authorizations that permit pre-sunrise operations at up to 500W uniformly at 6 a.m. regardless of when local sunrise occurs.

In a petition for rule making filed in February, Richard F. Arsenault, a broadcast engineer in New Jersey, suggested the FCC permit AM stations on regional channels to commence PSR operation at 5 a.m. rather than 6 a.m. These stations, it was shown, are at a substantial competitive disadvantage during morning drive-time hours, which typically begin between 5 a.m. and 5:30 a.m.

Dateline

For *noncommercial* radio stations in Michigan and Ohio, the biennial ownership report deadline is June 1. The deadline for submission of biennial ownership reports for commercial radio stations has been suspended pending a further redesign of Form 323.

June 1 is the deadline for radio stations licensed in the following states to place their Annual EEO Reports in their public files: Arizona, DC, Idaho, Maryland, Michigan, New Mexico, Nevada, Ohio, Utah, Virginia, West Virginia and Wyoming

To remedy this situation, Arsenault proposes that the Commission permit Class D and Class B stations operating on regional channels to commence operations at 5 a.m. under PSR authority with up to 500W. He provides supporting calculations indicating his proposal could benefit as many as 2,063 Class D and Class B stations, and claims there will be no international issues raised by such an extension of PSR authority.

How much interference the proposed change might permit to domestic stations is not clear. The Arsenault petition lacks detailed engineering analysis on that point, most likely because it is assumed at least a limited amount of interference is to be expected. Thus, the Commission will have to balance whether improving the pre-sunrise coverage of the many Class B and D stations outweighs increased interference to affected stations operating on regional channels. Comments on the proposal were to be filed by April 26.

New tower safety system proposed

OCAS, Inc., a company founded by two former military pilots, has petitioned the FCC for approval of a new system that the proponent says would eliminate the need for towers to be continually lit, thus saving power and improving the environment.

The OCAS system consists of three basic components: a low-power continuous wave radar, an energy supply source to turn on and control the lighting on the structure, and a VHF radio that can transmit simultaneously on virtually all aviation-band frequencies.

The continuously operating radar device is to be attached on or near a tower to constantly monitor a series of pre-established warning zones. If an aircraft enters the first warning zone, the system automatically turns on the tower lights to provide a visual warning to the pilot. If the aircraft continues to advance toward the tower and enters the second warning zone, the VHF radio transmits an audio warning on all aviation channels alerting the flight crew to take immediate action to avoid a collision.

Deployment of the OCAS system as a substitute for current lighting requirements will require amendments to Parts 17 and 87 of the FCC's rules. The FCC has not yet set a date for comments on the proposal.

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

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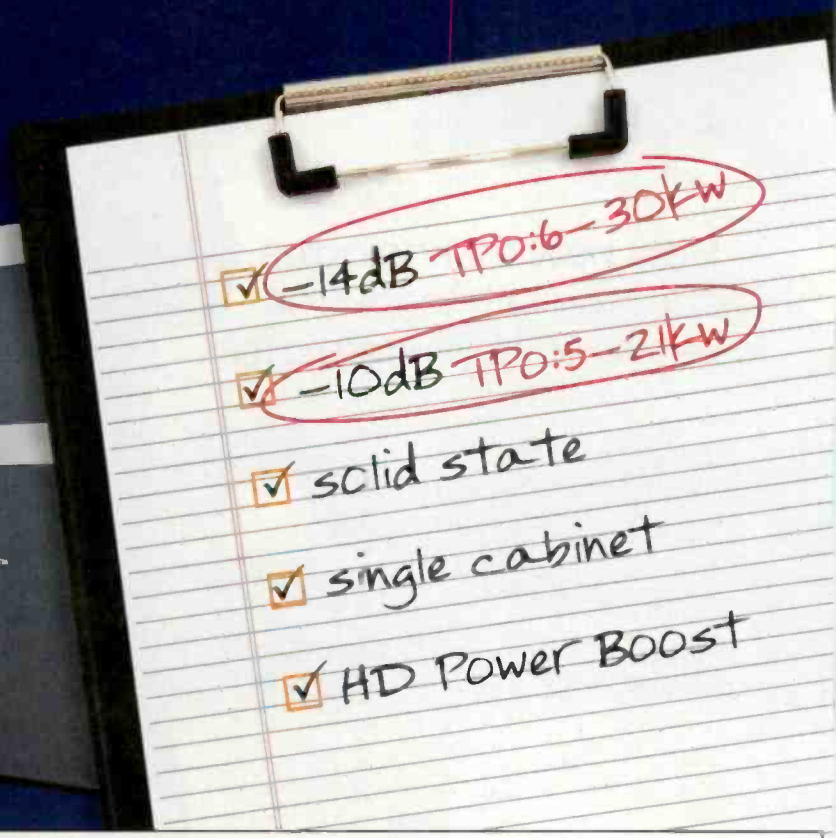

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Production from the Field

How new technologies can mix with long-time basics to deliver remotely.

By Ron Bartlebaugh, CBNT

The market's response to an increased flurry of audio gathering and production in the field has brought us new products and gadgetry. Creative spirits have been ignited to greater levels with tools that are now, more than ever, highly versatile, powerful and compact. A simple news reporter field kit used to consist of a heavy tape recorder and a bulky microphone. Now a solid-state recorder with many hours of recording time, a built-in microphone, and an internal microprocessor so feature packed that it rivals audio software found on many desktop computers, fits in the palm of your hand. Audio recording and distribution applications for smart phones are developing at an unforeseen pace. When marrying existing technologies with new, the end results can be remarkable. While we look at cutting-edge technology, we need to be mindful of many long-time basics – especially when responsible for one-shot, one-take productions.

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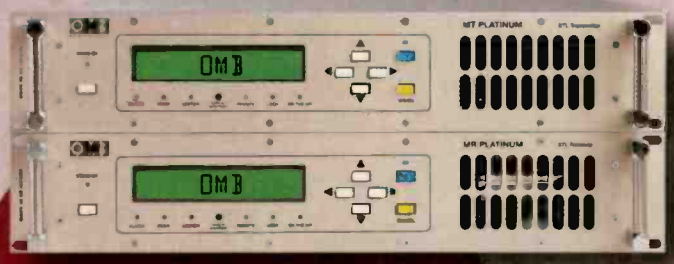
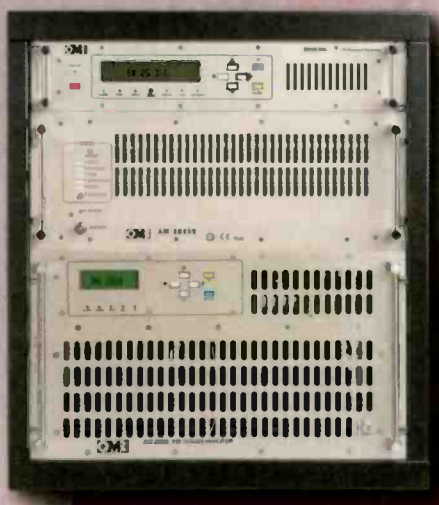


MT/MR PLATINUM >1GHz

is a high-performance Studio-to-Transmitter Link. It is made up of the 5W MT transmitter externally synthesized in 0MHz 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 (6-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

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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 amplifiying modules works independently thanks to a power combining structure that provides high isolation between them.

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Production from the Field

Phone it in

The iPhone has made an obvious mark on technology users, and several companies are capitalizing on the device's popularity. Tieline recently announced its Report-IT Live iPhone application for wireless IP reporting. The application turns an iPhone into an IP audio codec for live, portable, two-way wireless news gathering. The application enables the phone connection to an in-studio Tieline codec. The iPhone can, among many other features, be used to simultaneously report and record live or record and forward at a later time.

Tieline Report-IT

Comrex recently introduced a free app called the Access Reporter Codec (ARC). ARC makes an IP call over an Android-based mobile phone's 3G or Wi-Fi channel to a selected Access or Bric-Link codec in the studio using a high-quality wideband, full-duplex audio channel between the two devices.

For Enco program automation software users, the company recently announced its iDAD product for use with the iPhone and iPad. The iDAD provides for the record, trim and tail, and labeling of audio for transmission to in-station Enco DAD and Presenter systems. Remote control of those systems is also possible through the iPhone and iPad.

Similarly, RCS has released the iPush, which allows users to voice track and upload files to RCS NexGen Digital systems via an iPhone.

JK Audio offers several products for use with Bluetooth-equipped phones. The BlueDriver uses Bluetooth wireless technology to send and receive audio from professional audio equipment. The BlueDriver model F3 connects directly to the mic-level audio output of an audio mixing console or to a dynamic microphone. The model M3 connects to the microphone input channel of an audio mixer. If you need maximum portability, the JK Audio BlueKeeper wireless audio gateway provides a method for conducting and recording desktop interviews using a cell phone.

There are many options available to send audio to the studio from the field. DSL, cable modem, IP, Wi-Fi, 3G and 4G networks, BGAN/VSAT, PSTN and ISDN (albeit to a lesser degree now) are all viable options. It used to be that codecs were designed to work with one or two services; now, for the most part, many codecs can interface with almost any available interface. Some may require optional interface modules. And thanks to cooperative standard setting efforts, different brands of codecs can easily be used on each end of a path. Equipment from Tieline, AEQ, Telos, Comrex, Barix, AETA, APT, Musicam, MDO, Mayah and others can typically find common ground to establish an audio pathway.

Comrex Access Reporter Codec (ARC)

Enco iDAD

Recording and editing

The availability of audio recording and editing software for computers is at an all-time high. USB interfaces provide for easy routing of audio to and from a computer. Laptops have made portable recording and production increasingly convenient. Portability is often further enhanced with the addition of a wireless network card for point-to-point transmission or posting of audio from any Internet access location.

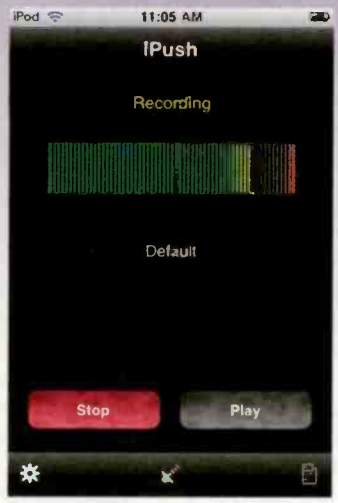
Two recorders that look like a microphone are the Yellowtec iXM and HHB FlashMic. These both combine a studio-quality microphone element with a flash recorder. The iXM stores audio on SD cards and is powered by a dual power source: An internal, rechargeable LiON supply powers the recorder up to 8 hours, while three AAA batteries can be installed to double that time. A line-in jack is standard. Mic capsules manufactured by Yellow and Beyer Dynamic are available in omni, cardioid and super-cardioid (six total capsule choices). A headphone jack and USB port round out the connections. The recorder controls are

placed comfortably on the side of the mic body.

The Flashmic can transfer files via USB, and is available with an omni-directional or cardioid mic element. Its 1GB flash recorder provides up to 18 hours of recording time depending on recording mode. The DRM85-1 features a line input that is convenient for connection to a press box. All models sport a headphone jack with volume control. Continuous operating time for the two on-board AA batteries is quoted at 8 hours.

There are a plethora of small portable recorders available. There are many and most are highly worthy of consideration. A good overview of these products can be found in the February 2010 Trends in Technology feature of *Radio* magazine. Be sure to purchase a unit that provides phantom power if your microphone requires such.

These products, plus new equipment announced at the NAB Show create new opportunities for versatile production at affordable costs. Balanced with terms such as compact and feature-filled are long-established practices that require proper diligence to assure a successful field production.



RCS iPush

Established practices

Battery management is mandatory. Field production equipment still requires power. Many units now have internal batteries that recharge via a USB connection. Others operate on multiple AA or AAA batteries – some of which can be recharged in the field. Lithium batteries, the type typically used in digital cameras, are a better choice for longer life expectancy. Always become keenly aware of your unit's power requirements, run times, recharge methods, and battery replacement procedures and requirements. Write the date and time on each battery during initial installation and each subsequent replacement so as to not confuse bad with good. Develop an established plan for battery replacement or recharge as necessary during long-run productions. Keep a log of battery activity and usage when multiple field units are in use. Cell phones used for remote broadcasts from sports or business venues may require an external battery source if commercial power is not available at the location.

Machine recording time has become an increasingly confusing matter. It used to be that a 7.5" tape reel would yield x recording time dependent upon its speed

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Production from the Field

of operation. Present-day recording format times vary widely by the amount of on-board and/or portable memory storage, recording mode, audio format, sample rate and bit rate. Times can range from a few minutes to many hours. As a general rule of thumb, the higher the desired quality of the recording, the lower the recording time for a given amount of storage. The issue of available recording time directly correlates to the run time of the machine's power source. Plan both accordingly so you don't run out of one or the other in the middle of an important press conference or symphony performance. For machines that use portable storage media, always carry extras in case of loss, defective operation, or need for additional storage space.

Use of the proper microphone type for any event is essential. Omni-directional microphones pick up sound in a 360-degree pattern whereas cardioid mics typically have a 180-degree sound pick up effectiveness. Long, narrow shotgun microphones have a very narrow sound pick up angle and are an excellent choice for sound pickup at farther distances – especially if one needs to gather sound bites for an important feature story. Head worn microphones – the type that are a headphone with an attached boom microphone – are a favorable choice for sportscasters and newscasters who anticipate being on-site for long periods of time. Clip-on lapel microphones are often beneficial when recording multiple guests during an interview segment. Ribbon element microphones have seen renewed popularity and are frequently a good choice for specialized applications including the recording of bands, orchestras and choral groups. A microphone that contains a condenser element requires phantom power for proper operation. That power is sometimes available from an internal battery; however, most units seek power from the connected audio mixing console or recorder. Once again, the iPhone comes into play, and add-on mics for the device, such as the Blue Microphones Mikey, are practical options for improved

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audio capture. Always gain knowledgeable advice when placing your microphone selections to assure best long-term results.

Be prepared

When entering the production field, do so with enough microphones, cables, adapters, headphones, batteries, memory storage media and whatever else you *might* need to get the job done. Press conferences often require special and sometimes unusual methods of microphone attachment to podiums. Microphone windscreens can be invaluable when recording at outdoor venues. A person cannot carry too many adapters of various types related to the mission at hand. And, always have your stuff close by in the event of quick need. Don't park the car 10 blocks away only to realize there is no time to return for that one thing you need but don't have with you.

Permanently label and otherwise identify your equipment. When at major events where multiple media personnel are in attendance there will be lots of equipment in use – some perhaps the same make and model as yours. Confusion over what equipment belongs to who can easily cause inerrant departure of your equipment. Maintain a record of all equipment including brand, model number, serial number and method of ownership identification. When at an event, watch over your equipment carefully. Guard that rare, just-recorded, once-in-a-lifetime opportunity, award-winning interview.

With so much advanced technology now available, opportunities are greater than ever for the capture, editing, and transmission of audio in a swift and efficient manner from practically anywhere. So head to your favorite coffee shop's Wi-Fi spot and have fun!

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

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The Rebuilding SPIRIT

By John Morris, with Chris Sampson

WBVM in Tampa Bay completes a $1 million

What began as a Catholic radio ministry in a former 1950s motel has blossomed into the driving force of Christian music in the Tampa Bay market. WBVM 90.5 FM, a.k.a. Spirit FM, owned by the Diocese of St. Petersburg, had humble beginnings when it initiated broadcasting in 1986. Much of the studio equipment was donated gear that no one else wanted. Music consisted of donated LPs and carts with worn-out pads. Volunteers came and went like the tides and it was difficult to keep staff happy with inadequate equipment. Despite these obstacles, donations came in and this Catholic radio ministry grew to the point that space became a premium: Something had to be done.

Permission from the local bishop was granted to launch a capital campaign. In short order more than $1 million was pledged to construct a new facility. Then the unforeseen happened: the largest economic tumble since the Great Depression. Gifts fell off and the plans were scrapped from constructing a stand-alone facility to building out an existing area. Although cash was still trickling in, the diocese gave the green light to move forward with the new facility. Plans were finalized in March 2009 and the first workers showed up in June. Nearly four months later, the build-out was complete: 7,000 square feet of office and studio space to accommodate the main 90.5 FM channel and two HD Radio multicast channels, plus a production room and small performance studio.

The space

The existing space was the top floor of a recently constructed three-story facility owned by the adjacent church. It was un-

occupied and constructed with the hope of leasing to a willing tenant – and Spirit FM was the perfect tenant. The building was adorned with windows around the perimeter, providing natural light and break points for offices and studios. The only downside was that the building overlooked a major artery in Tampa, FL, that created considerable traffic noise. This was a minor nuisance that could easily be remedied when construction started.

Alfonso Architects and Bollenback Builders were tapped to design and construct the facility. Both companies had worked on church projects and commercial ventures, but neither company had experience in constructing or designing a

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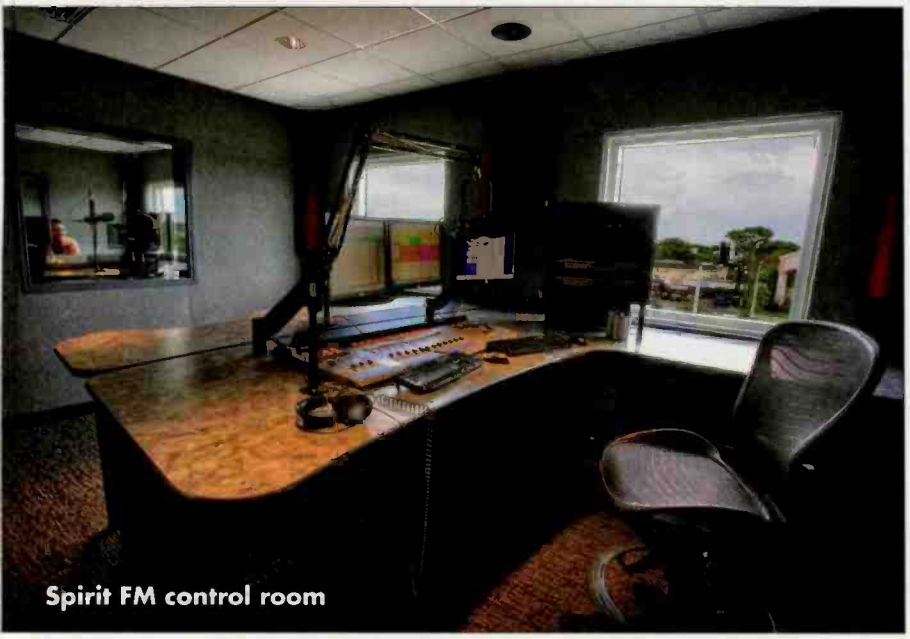

Spirit FM control room

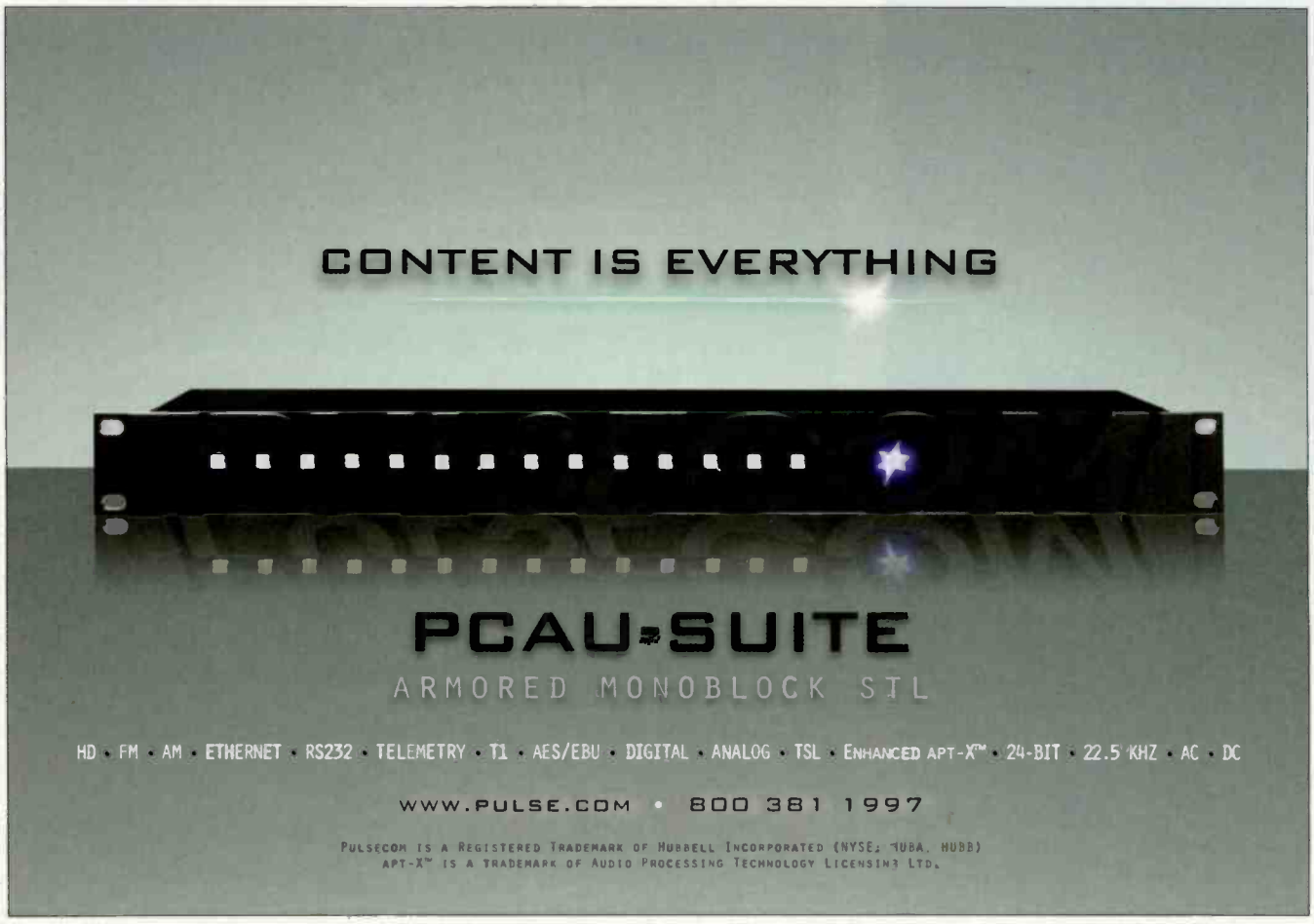
The floor space was basically a rectangle with large windows on the north and south ends of the building and smaller windows on the east and west walls. After numerous notepad and napkin drawings it was decided that the studios would be housed on the east wall facing the main road and downtown Tampa. The north and south ends of the building would house the staff, management and conference room. The center of the building would house the heart of the facility: electrical, mechanical and broadcast technical center (rack room).

The windows afforded a great opportunity to capitalize on the natural lighting and create an open atmosphere in the building. The architect envisioned an open office setting and keeping offices clean with store front glass in the private offices. One unique feature was that the walls separating the offices do not go to the ceiling, creating an openness to distribute lighting and HVAC. However, designs for the studios would be much different.

radio broadcast facility. It was refreshing that both companies were open to input and direction. They relied on Spirit FM's Chief Engineer Chris Sampson for design and layout assistance. Sampson came with build-out experience in the Miami market while with Clear Channel.

The studios

Knowing the two areas of the building where sound and delivery of audio would be critical, Sampson designed studios adjacent to the tech center, making cable runs shorter and more efficient. To decrease the sound transmis-



sion, double walls were constructed between each studio with air space to attenuate the sound. Sound channel fabric and Acoustics First sound panels were strategically mounted throughout the studios to eliminate bounce. Overly acoustical doors and double-paned windows were mounted to keep the sound transmission at a minimum.

When laying out the studios, we determined it was necessary to have at least three microphone positions in each studio, and with limited space, this was tricky, but doable. Omnirax furniture got the nod to work on the project. They were able to customize the furniture based on our room dimensions, announcer positions, sound tolerances and ADA laws. Plus, we liked the variety of color options and materials to meet the aesthetics we desired. We had a number of conversations with Omnirax representatives and sent CAD drawings to the designers who built to our specifications. Once received, it took us a few days to piece everything together. You could tell that the furniture was the real deal as the weight of it going up three flights of stairs put even the strongest to the test. One counter top was damaged in shipping and Omnirax replaced it immediately with no hassles.

The production room is the only studio with a sit-down console.

Equipment

The broadcast tech center houses six Middle Atlantic equipment racks containing the audio servers for the main 90.5 channel, plus two additional HD Radio channels, 90.5 HD2 The Light, and HD3, El Fuego. The Light format is softer music and talk, while El Fuego is Catholic radio in Spanish. Due to the heat radiation from the equipment, we chose to go with two independent HVAC units, one for the offices and the other for the tech center and studios. Daiken High Efficiency VRV AC units were installed over the more traditional AC technologies. These VRV units allow compressor speed to vary with the heat load so the system only consumes the power necessary to match the load. When the heat load decreases the system

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While the studio corridor is carpeted, the office corridor was polished for a marble effect

automatically decreases the power supply frequency and uses less energy. The net effect has been that despite doubling our square footage and increasing our technical facilities by 1/3, our cooling costs have not risen.

In the old facility we had good luck with the Harris Impulse console, and chose Harris again, but this time stepping up to the NetWave consoles. Each studio was equipped with a networked console, running through an Envoy router housed in the tech room, thus eliminating the need for multiple cable runs and simplifying the cabling infrastructure. Two 25-pair CAT-5 cables were run to each room for phones and future considerations.

Flexibility is integral to the design of our new facility and is one of the main reasons we built it around the Harris Envoy system. With the aid of Broadcast Tools passive switchers each program chain can be fed by either a live studio, an audio server, an Envoy routed source or a designated backup studio. Any room can service any program chain or just act as an associated network studio.

With technology moving away from CD and more to digital storage and delivery, a change in our backup audio delivery was in order. After nearly 20 years of being a Denon CD facility, we migrated to the Tascam CD players, thus eliminating the jewel cases and freeing up space. Anyone need several thousand Denon jewel cases?

Tampa Bay is the lightning capital of the United States. Add in power outages and brown outs also commonplace in the south Tampa area, we wanted to be prepared for anything. We invested in whole building surge protection and an extensive lighting protection system designed by Allsouth Lightning Protection of Tampa. Although the cost was significant, we believe in the long run program disruption and equipment failure could be even more costly if we were not adequately protected. In addition, we were able to replace our ever-growing profusion of small UPS brick type units; we stepped up to a Tripp-Lite 20kVA UPS, allowing us enough power to

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Spirit FM Tech Room with racks and servers

keep the studios and tech room running long enough to bring our new Kohler 50kW generator up to speed.

Being a user of the Nexgen Automation System, it was a very easy migration from one building to the next. We backed up the files off our 10-year-old 20GB file server and loaded the data onto a new Dell Poweredge 500G server that was already running at the new building. Then once the studios were operational, we began training the talent on the equipment at the new location. The actual cut-over occurred on Oct. 10, 2009.

Hiccups? The Tripp-Lite product stumbled out of the gate two weeks after putting it online. As of this writing, it is working again and back online. If I had to do it over again, I would have spent the extra money for a different manufacturer's product. Also, invest in solid, up-to-date virus protection for the computers. In this day and age, files can be imported without anyone knowing until it's too late.

With the current economic climate and rapid changes in the way we communicate, there are many uncertainties for radio and broadcasting in general. However, Spirit FM is prepared for the future of HD Radio, networking and any other new technology that tops the horizon.

John Morris is general manager of Spirit FM, Tampa. Chris Sampson is chief engineer and operations manager for Spirit FM, Tampa.

Equipment list

Acoustics First sound panels
Adobe Audition
Broadcast Tools SS4.1III
Burk ARC-16
Cisco 2950
Comrex BRIC-Link
Dell servers, workstations and monitors
EV RE-20
Harris Envoy, NetWave, VistaMax, World Feed panels
Herman Miller Aeron chairs
Inovonics INO 531
Kohler 50kW generator
Middle Atlantic equipment racks
Moseley Starlink SL 9003 T-1
Omnirax studio furniture
Overly acoustic doors
Polk Audio in-ceiling monitors
RCS NexGen Digital
Symetrix 528e
Tascam CD-OU1
Telos Nx12, Zephyr Xstream
Tripp-Lite 20kVA UPS
Yamaha HSM-8

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The technology behind WBVM

RCS NexGen Digital

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KSVL, Yerington, NV

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George Lemait, Station Manager

KSMZ, Alexander, AR

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Improvements in Filter Combiners

Inside the Myat Lo-Loss Solution

By Derek Small

Increasing the IBOC digital sidebands from -20dBc to -10dBc presents more challenges for broadcasters wanting to transmit from one antenna. Currently, at -20dBc, transmitting from one antenna requires digital and analog signals to be combined one of several ways: low-level or common amplification, high-level (couple digital power to transmission line at 10dB), or mid-level, which uses a combination of common amplification and hybrid coupling to minimize FM and digital losses. Common amplification is the most efficient and cost effective way to combine FM and digital sidebands; however, with increased digital sidebands it becomes difficult to use common amplification in a linear mode at powers above 20kW due to peak voltages. Operating the common amp transmitter in a linear mode is required to minimize intermodulation products generated by digital carrier amplification. High-level combining at -10dB is not practical from a cost standpoint due to the increase in size of digital transmitters and the excessive waste.

At the 2009 NAB Show, Myat introduced a patent-pending technique for combining FM and digital sidebands for transmission to a single antenna. The system uses filters to combine the digital sidebands operating in MP1 or MP3 more efficiently than high- and mid-level techniques, and, is ideal for the proposed 10dB digital power increase.

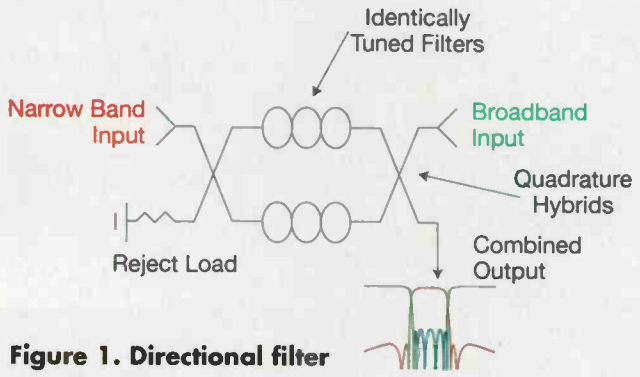

Figure 1. Directional filter

The low-loss IBOC combining system utilizes the typical directional filter circuit seen in Figure 1 and consists of two quadrature hybrids, two identically tuned filters and a reject load. A signal at the narrow band input port is split in quadrature (90-degree phase difference) and passes through the bandpass filters. There it is recombined at the output hybrid and delivered to the output terminal due to the phase relationship of signal at its input terminals. Signals at the broadband input will again be split in quadrature, reflect off the bandpass filter and be delivered back to the hybrid where they are recombined to the output terminal. The transmission response from each input to the output is shown in Figure 1 and color coded. Note the transmission

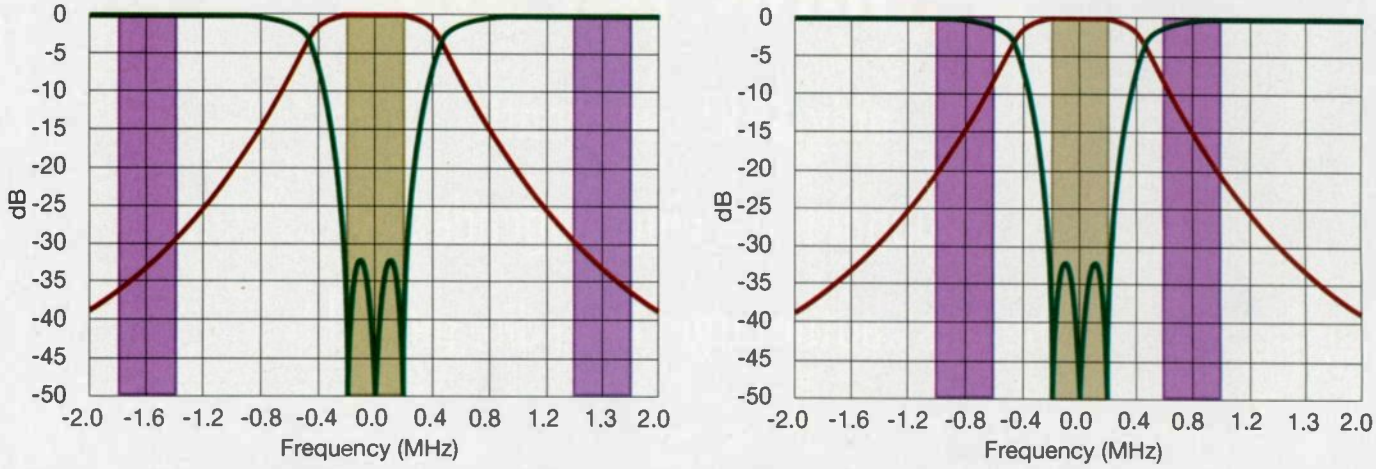

Figure 2. Three-section filter response, S21 and S11, 1.6MHz and 800kHz channel separation.

response for each input is similar to the S-parameters of the bandpass filters (i.e. the narrow input is the filter's transmission response, S21, while the broadband input is the filter's reflected response, S11 or S22) and makes analysis of the directional filter simple.

There is nothing new about the directional filter layout in Figure 1 other than the type of filtering used to perform the combining function of analog and digital signals for IBOC. Directional filters have been used for years to combine multiple FM stations to one antenna while providing adequate isolation between transmitters. Isolation between inputs is provided by the system directional properties and filter function. Properly functioning hybrids and identical filter S-parameters are key to achieving a directional system – in particular the isolation from narrow input to the broadband input (typical isolation -40dB). The isolation from the broadband input to narrow band input gets additional help from the filter's rejection, which for classic FM channel combiners is typically around -30dB. This system does not require lossy unreliable circulators for isolation.

Classic combiners, as stated above, will have approximately 30dB of rejection at the channel to be combined. Illustrated in Figure 2 is the typical frequency response (S21 and S11) of a three-section filter used for combining channels with 1.6MHz separation and the same filter with 800kHz separation. The limited rejection (approx. 7.5dB minimum) for 800kHz spacing results in higher loss (approx. 1.2dB) at the broadband input.

Filter rejection vs. module insertion loss at broadband input to output is plotted in Figure 3 and illustrates the need for high rejection for low insertion loss at the broadband port.

The use of filters to combine FM and digital sidebands was discussed early in the rollout of HD Radio, but quickly ignored due to filter order (required for 30dB rejection) and related cost, size and loss issues. A six-section sharp-tuned filter with multiple cross couplings would be required to achieve 30dB rejection at the IBOC MP1 digital sidebands. Six-section pseudo-elliptic function filters are not difficult to design. However, due to narrow bandwidth compared to

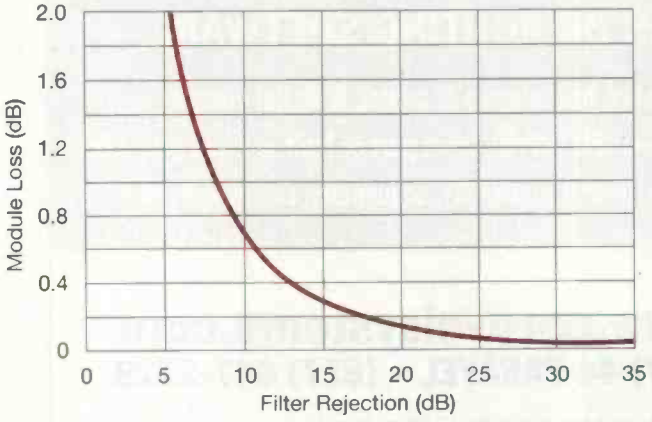

Figure 3. Rejection vs. broadband port loss

Mississippi Public Broadcasting Adds HD Radio

In June 2009, Mississippi Public Broadcasting (MPB) culminated a multi-year effort and inaugurated two-channel HD Radio transmission to all eight of its Class C FM analog stations. A digital signal now covers the entire state with better penetration and reaches portions of Alabama and Louisiana. In addition to the analog signal, listeners now have the choice of a separate HD Radio Think Radio channel, primarily a talk format, or an HD Radio channel that is mostly classical music. The project was funded through a grant from the Digital Distribution Fund of the Corporation for Public Broadcasting and makes MPB the only statewide HD Radio broadcaster in the state.

Besides the objectives of offering HD Radio quality with improved reception throughout the state, especially in areas where reception was marginal, MPB's decision to go digital was in response to listener complaints and preferences. Classical music lovers, an important group of MPB listeners and avid supporters, resented having their music interrupted with news and talk. The talk shows constantly vied for more air time to broadcast information. Two HD Radio channels solved the programming conflict while delivering more focused content to both audiences.

Continued on page 32

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

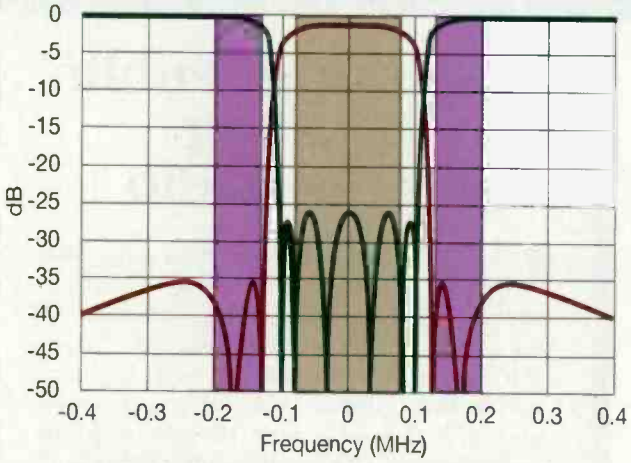

Figure 4. Sharp-tuned filter response for combining digital sidebands to FM.

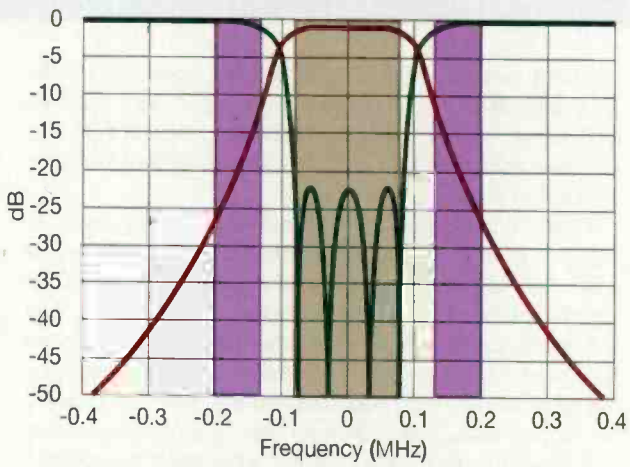

Figure 5. Mild-tuned, four-section filter response for combining digital sidebands to FM

classic-tuned FM filters, and the higher order, significant losses are incurred.

Higher losses result in low-power handling capability for a given size filter. The six-section sharp-tuned filter and table summarizing loss results is illustrated in Figure 4. The integrated, or average loss of this narrow sharp-tuned filter using high Q, 20" to 24" square cavities providing 30dB rejection at the digital sidebands is approximately 1.31dB. Note however, that due to the finite cavity Q there is still significant loss at the

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sideband inner edges. Using this size cavity in a classic four-section filter with wider bandwidth (400kHz plus) would have approximately 0.25dB loss and handle 30kW. The sharp-tuned filter in Figure 4 using the same cavity geometry can only handle 6.5kW without a lot of additional cooling. It's easy to see why sharp-tuned filters were quickly disregarded as a solution to combine FM and digital sidebands.

A directional filter combining solution that *purposely* exhibits loss was overlooked. Reducing filter order and requiring less rejection at the digital sidebands has less impact on the host FM loss, and digital loss is less than current high-level combining solutions. Figure 5 illustrates one solution using a four-pole filter with a Chebyshev response. Note the integrated loss and variations over the FM (±75kHz) is significantly less than the sharp-tuned filter.

The loss numbers in Figure 5 are calculated using cavity unloaded Qs of 20" to 24" square cavities.

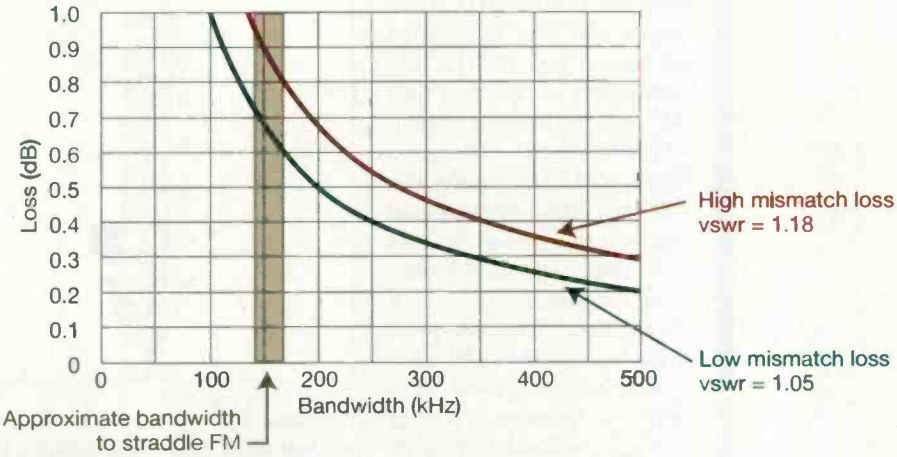

Figure 6. Mild-tuned, four-section filter response for combining digital sidebands to FM

The higher losses as compared to classic-tuned, four-section filters are due to the narrow bandwidth. Figure 6 illustrates the effect of bandwidth on losses for a four-pole filter.

Derek Small is director of filter products for Myat.

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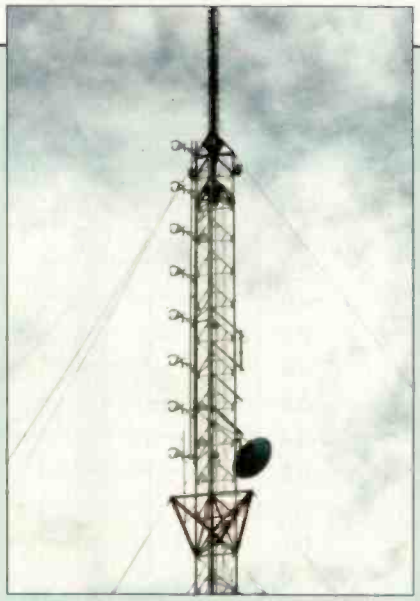
Continued from page 29

Digital transitioning

MPB transitioned to DTV in 2002, but it wasn't until 2008 that the road to HD Radio began with the installation of Continental 816HD FM transmitters at four of its eight FM stations. A major upgrade of the master control television studio to HDTV occurred in 2007 and 2008, which included equipment upgrades for the radio control room and studios. The installation of four more Continental FM transmitters, eight Jampro JHPC-HD high-power antenna systems along with new transmission lines began in January 2009 and was completed on June 23, 2009. Startup of the final installation was delayed somewhat because MBP's WMAB-FM transmitter located in Ackerman, MS, and licensed to Mississippi State University had a minor interference issue with WABG TV 6, an ABC affiliate located in Greenwood, MS. The FCC required WMAB to remain on its analog antenna until after the WABG converted to digital in mid-April 2009.



MPB's Technical Services Department worked closely with Kessler & Gehman Associates, their broadcast engineering consultant based in Gainesville, FL, to design and specify the HD system, which was released for public bids.

Jampro was selected as the best cost-to-specification for the eight new antennas. Because most stations were non-directional, circularized pattern optimization was critical to MPB's decision. In order to select the best pattern for each station, to offer maximum coverage and greatest penetration, MPB personnel traveled to California and worked with Jampro engineers on its 7,000' full-field test range. Approximately 10 different pattern tests for each station were run in several scenarios to achieve the required optimizations.

Under a turn-key contract, three Jampro tower teams installed the antennas that averaged 10 bays per station on MPB towers that ranged from 500' to 1,500' in elevation. New 3-1/8" Jampro Proline rigid transmission lines were installed on six of the eight towers. Two towers had newer lines that could tolerate the power. Continental handled the connections to its new transmitters.

For Mississippi Public Broadcasting the two new HD Radio signals have been a resounding success according to toll-free listener calls, e-mails and personal feedback from listeners, and glowing satisfaction from classical music buffs.

Design team

Kessler and Gehman Engineering
Bob Gehman, Sr. and Jeff Gehman

Mississippi Public Broadcasting
Bob Buie, director technical services;
Cy Vance, assistant director technical services;
Jerry Ladd, director microwave network;
Jason Klein, director of radio

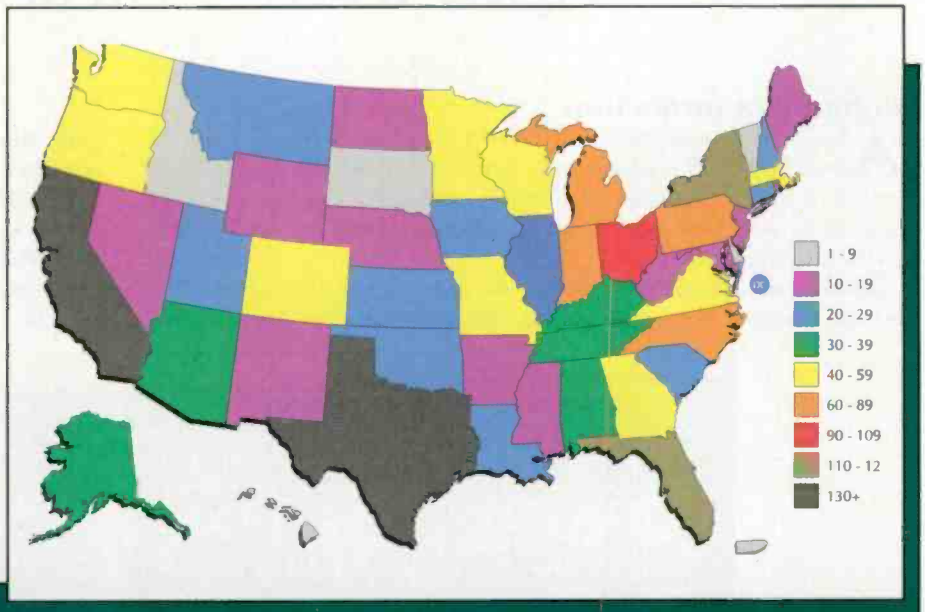
Jampro Antennas
Greg Montano, sales engineer

Sample and Hold

By Chriss Scherer, editor

Periodically, we have tracked the progress of the HD Radio rollout by state. Through 2008, the number of stations adding HD Radio saw a steady increase. From 2009 to today, the roll out has slowed slightly, but the numbers continue to increase. The 1,000 station mark was achieved in September 2006, and we are now almost at the 2,000 station mark.

According to the latest tallies from Ibiquity, every state has at least three stations transmitting an HD Radio signal now. California, Texas, Florida and New York have led in station counts all along. All states have added at least one HD Radio station in the past two years.



Track the HD Radio station count by state from our last three reports at *RadioMagOnline.com*

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Tips, tricks, hints and more

By Chriss Scherer, editor

Equipment protection

After building new studios for WHMI, Michael Bradford, CPBE, of Broadcast/Audio Services in Jackson, MI, noticed a problem with the location of the mic processors. The studios use high-back chairs, and as the announcers would swing in the chair, they hit their knees against the knobs on the mic processors.

This led to not only some interesting audio changes from the random strikes, but the employees were also bruising their knees. Bradford tried mounting

the rack rails a few inches back, but that did not completely solve the problem.

While glancing through the online Middle Atlantic catalog, he spotted the LBP-1.5 lacing bars. These are designed to be mounted on the rear rack rails to facilitate neater cable routing. Bradford has used AWG#6 copper wire for this a purpose in the past, but these lacing bars were substantially better, more sturdy and came formed and ready for mounting.

As he considered using the lacing bars on a future project, he had another idea: Why not use these lacing bars on the front of our processors? He had considered other type of covers, but many of the available covers are designed for security. He wanted to allow access to the controls when needed, but he wanted to shield the knobs from knees. He ordered a package of 10 to try.

The lacing bars mount under the mounting screws and provide a neat, smooth and sturdy protection for the equipment. The rails extend beyond the knobs, so swinging knees or a pushed chair won't disturb the settings. Bradford also likes the neat appearance of the bars, and is pleased that they blend in with the surrounding equipment.

Critter control

Michael Bradford also offered this timely tip for spring. As the plants and animals come back to life after the winter, it's time to be pre-emptive about keeping wasps, mud-daubers, tiny birds and other critters out of the LNB enclosures on satellite dishes.

Bradford has installed several Patriot 4M dish antennas that utilize a one-size-fits-all, C-Band LNB assembly. These housings come with a small plastic insert that fits up into the throat of the LNB housing to keep insects out of the LNB probe assembly. Unfortunately, the plug has a shallow tunnel where the bugs like to settle.

Patriot does not offer a true full outside cover, so Bradford went to his the local hardware store for a piece of Mylar screen material and a large diameter, stainless-steel hose clamp. With a little cutting and trimming, he fit the Mylar over the entire opening and secured it with the hose clamp.

Bradford's Mylar LNB cover that he installed at WHMI.

This keeps moisture out because the material allows some breathing, and, most importantly, it keeps the unwanted residents out. The whole assembly costs less than $6 and took about 15 minutes to install.

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INNOVATIVE PROBLEM SOLVING TOOLS FOR BROADCAST

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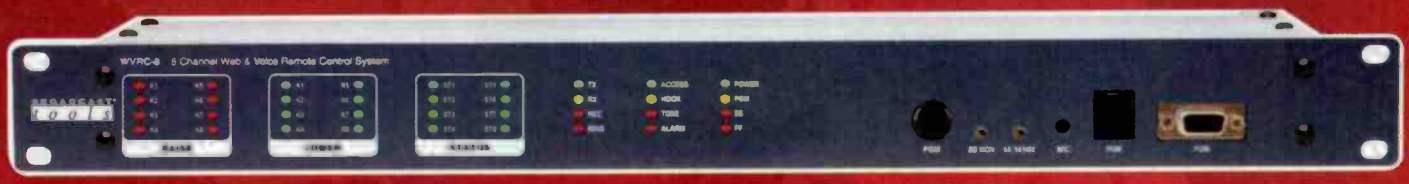

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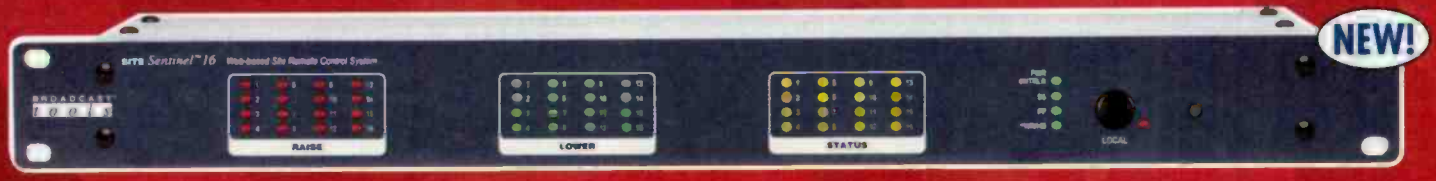

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Web-enabled 16-input status/logic module

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Sage Alerting Systems
Digital Endec

By Tom Atkins

With the imminent approval of the Common Alerting Protocol (CAP), our Olean, NY, and Elmira/Corning, NY, markets decided to take advantage of the newer EAS/CAP hardware available and be ready when CAP is approved. We chose the Sage Digital Endec. The stations in these markets already used the original Sage Endecs and felt very comfortable with the look and feel of the new Digital Endec. The Digital Endec touts downward compatibility by using all the interfaces the original Endec had along with the ability to use legacy external accessories such as the Multi Station Relay Panels and remote control units. This spells ease of installation. Sage will also provide a free software update to allow users to download and field-install support for the final FEMA/FCC approved version of CAP 1.2, expected in September 2010. The software will support CAP 1.1 and 1.2.

What's new?

Other than the shiny new blue color, one glaring and very welcome change to the front of the Digital Endec is that there is no thermal printer. The thermal printer was fine in its time, and to say nothing less, it was a way of logging sent and received alerts. However, saving all those cash-register-type receipts was starting to get old. Although the original Endec could connect to an RS-232 serial printer in lieu of the thermal printer (and many opted for this when their thermal printers burned their last receipts), serial printers are scarce today. Sage has provided for either a USB or network-attached printer. Support has been built into the unit for HP printers. However, a serial printer can still be connected to one of the available com ports.

Other notable updates: The mic-in jack in the front of the unit has been changed to a 3.5mm connector and a Digital Audio Lock indicator for AES audio has been added.

On the back, all the usual connections found on the 1822 Endec exist: The analog audio XLR connectors, five com ports and the 20-pin connector to monitor audio, relay connections, line/speaker out/in, encoder in audio and ground. The 20-pin connector is pin-for-pin the same as the model 1822, which makes it easy to insert a Digital Endec in place of an analog unit.

There are some good additions: Four additional GPIO connections for controlling different aspects of the Digital Endec with closures, a fourth relay connection, AES audio in and out, 10/100 LAN Ethernet connector, and two USB connectors.

The magic inside

If you currently use the EndecSet program, download the new EndecSetD software to program the device from a PC. Sage plans to provide the ability to update the settings file from the old EnedcSet to the new EndecSetD. E-mail notifications of occurred events such as sent and received alerts, loss of audio on a monitor input, or an Endec restart are created in the EndecSetD software. The e-mail events option can be configured for standard or encrypted mail servers. One important item worth mentioning about the e-mail option is that if your e-mail server requires the from e-mail address to be authenticated, an e-mail account for the Digital Endec must be created on the e-mail server. The Digital Endec creates the from e-mail address using the call sign or group ID field, and adds an -ENDEC to the end of it. The resulting field will look like this: XXXX-ENDEC@yourdomain.com.

If e-mail is not your thing, you can create status files sent to an FTP server for automatic logging, or the option is available to do e-mail and FTP for that added secure feeling. The EndecSetD software is also used to configure the IP address of a network-attached printer. If a network printer is used, be sure that the Digital Endec is configured for no printer, otherwise it will try to print to a USB printer regardless. The Sage website has a list of compatible HP printers that can be used with the Digital Endec.

Performance at a glance

Ethernet, USB, and GPIO connections

AES3 digital audio interrupt

64MB onboard log storage

Accepts USB memory sticks for alert audio storage

Supports CAP

Boasting a Web-based interface with HTTPS/SSL encryption, all settings and functions can be performed using this internal Web server. Alerts can be initiated or forwarded, and configurations of the unit can be changed remotely. From the Web server, text send and received logs can be accessed and printed,and audio logs can be listened to. Checking the six monitor audio sources is no problem from a remote location as it has a built-in audio stream encoder. One other handy option is the visual indication of monitor audio level via the Web server. You must download the SetupVU.exe software and run it to install the ActiveX control for a Web browser. Audio levels can also be viewed and monitored from the device's front-panel display.

Common Alerting Protocol

When CAP is approved, the Digital Endec will use the LAN connection to receive CAP alerts. CAP support includes the ability to generate an EAS alert based on the data in the CAP message. It will also receive audio or generate audio utilizing its internal text-speech software from the CAP message and then send an EAS alert based on the received data. As previously mentioned, Sage will provide a free software update to allow users to download and field-install support for the final FEMA/FCC approved version of CAP 1.2.

All in all, the changes from the legacy Endec to the Digital Endec are most welcomed. Given the advent of the Internet, the internal Web server makes managing EAS a snap. And the direct plug-in replacement makes upgrading from an original Endec to a Digital Endec simple.

Atkins is vice president/director of engineering for Backyard Broadcasting, Buffalo, NY.

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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.

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WorldCast Systems
APT WorldNet Oslo

By Doug Irwin, CPBE AMD

Over the last 20 years I've used the whole gamut of wireline STLs, including those from Graham-Patten, QEI, Intraplex and now the APT Oslo from WorldCast Systems. We use the Oslo for the main STL system for all of Clear Channel's FM stations here in New York City – and my hunch is that Oslo is well on its way to becoming one of those classic pieces of equipment that engineers will talk about for years to come. Oslo is a frame-based system (3RU) that accepts plug-in modules performing various functions. An entire system is made up of two frames.

Putting the system together

As with any piece of equipment with a tremendous amount of capability, configuration of the Oslo involves many choices. First, the user decides the number of audio channels to be transported along with the type (if any) of audio encoding (including the audio bandwidth and word length). These are the factors that determine the number of bits that need to be assigned to the payload audio. The user may also decide to add auxiliary data services, which will use part of the overall available bandwidth. By using two of the T1 transport modules, up to four T1 circuits can be configured, allowing for up to 96 timeslots (6.4Mb/s of available bandwidth). Here in New York we use the Ethernet transport module, and we use about 11.5Mb/s of data over a 100baseT connection.

Another configuration option for Oslo is to use one T1 interface card (connects up to two T1s) in addition to an IP/MUX card (Ethernet transport). This allows the capability to drop and insert timeslots from T1 to Ethernet and vice versa.

Once the system requirements are determined, the factory will put the system together, configure and test it prior to shipping.

The bench test

When the units arrived, I connected them via an Ethernet crossover and finished the final configuration myself. We hadn't decided on the IP addresses when the unit was tested by the factory. I used this opportunity to learn how to use the NMS GUI as well. I set up a hub so the computer was on the same network as both the MCU cards (these are used to communicate with and configure the system).

Once the GUI was running, I viewed a page called the tree, which shows only the computer. From there I added icons to the tree view to correspond to each individual frame. Double-clicking on the frame icon opens all the unit-specific configuration tabs.

While the system came with a basic configuration, I added optional alarms. The frame has seven form-C relays that correspond to the alarms. I assigned one relay to silence on a particular audio module (we use five), one relay to report critical alarms such as a power supply failure or loss of IP on the IP transport card, and another alarm that reports loss of AES on any of the five inputs to the frame. On the far end we program silence sensors. The audio threshold levels and the delay time are adjustable parameters.

IP-based audio transmission

As I mentioned earlier, we use Oslo for our main STL systems between our HQ in the Tribeca neighborhood of NY and our main transmitter sites at the Empire State Building. We also have a complete backup facility for each of the five FMs at 4 Times Square, and we have another complete Oslo system, identical to our Empire system, for our backup site. In each case, the Oslo frames talk via IP. Our sites are connected via T3 data circuits. We use Adtran MX2800s to mux 28 T1s together into the T3 data format. 16 of the 28 T1s are assigned to connect two Adtran 5305 routers – one in our master control and one at the far end. In the configuration of the Adtran routers I have made two networks: one that we use for a remote LAN (7 T1s worth of data) and the other for Oslo (9 T1s worth of data). In that way, Oslo has its own, non-contentious network. We connect Oslo to the Adtran directly via an Ethernet crossover on both ends.

I will note that Oslo is designed to work just fine over a shared network, and has parameters that

Performance at a glance

Interfaces with Ethernet (IP) or T1/E1 circuits

Four audio channels per module

Six modules per frame

Analog and/or AES3 input/output

Audio bandwidth from 10Hz to 22.5kHz

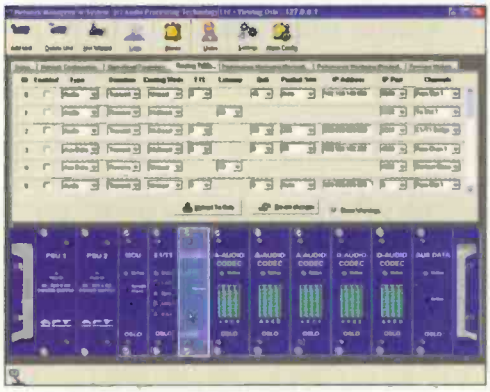
Enhanced apt-X and PCM encoding

RS-232 or Ethernet control

Supports auxiliary data services

can be reconfigured by the user (if necessary) to compensate for the particulars of the IP network.

We are fortunate though to have the network completely under our control, end to end. And that control pays dividends: The performance of Oslo over this network is identical to its performance with an Ethernet crossover cable connecting the two frames together. Via the GUI, you can drill down into the performance monitoring to see how well the system is doing. As I write this, I'm looking at our own performance monitoring, and there are four streams (linear, 48kHz sample rate, 24-bit word length) that have each sent more than 750 million packets, with zero loss. The fifth stream has lost a grand total of two packets.



IP connection settings of the WorldNet Oslo

It's been my experience that the audio quality of devices built by APT is unsurpassed, and Oslo is no different. It's a real pleasure to listen to. The unit is built extremely well, and I have the utmost confidence in it. I have had questions for factory service, and APT is very attentive to its customer base.

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

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.

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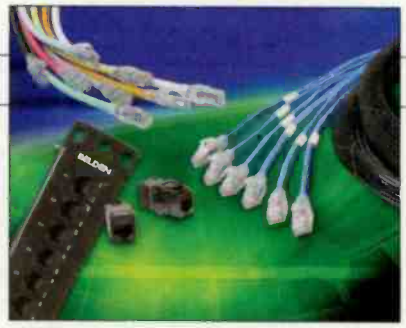
NEW PRODUCTS

by Erin Shipps, associate editor

Field mixer
Fostex

FM-3: The FM-3 portable mixer is equipped with balanced three-channel inputs and two-channel main outputs each featuring high-quality, custom transformers in addition to a wide variety of sub outputs. Housed in a solid aluminum body, it also features a newly developed Organic EL display. Features include metal axis fader pots, master, trim and HPF knobs with pop-up mechanism, mixer's parameter setting status on the display, and dc output with Hirose connector for powering a wireless receiver.

800-7-FOSTEX; www.fostexinternational.com
sales@fostex.com



Cable assemblies
Belden

3600: 3600 pre-terminated cable assemblies are small and flexible. When combined with RJ45 plugs they offer fast, easy installation and termination. The use of a braided sleeve and pulling eyes provides additional protection when pulling and routing the assemblies through overhead trays, raised floors, cabinet poke-throughs and cable management hardware. The cable assemblies come in standardized six-cable bundles. Each 23 AWG 4-pair cable features Belden's patented Bonded-Pair technology to ensure CAT-6 performance and reliability, before and after installation. The assemblies are available in 1' increments from 6'-50' assembly lengths, and in 5' increments from 55' to 295' assembly lengths. Each is labeled with a unique serial number and bar code for easier asset management.

800-BELDEN1; www.belden.com
info@belden.com

Distribution amplifier
Musicam USA

DA14: The Musicam USA DA14 is a versatile distribution amplifier capable of simultaneous distribution of both stereo and mono audio at a wide range of levels. Both balanced and unbalanced loads can be driven at professional or domestic levels, with each output totally unaffected by the settings or load on any other.

732-739-5600; www.musicamusa.com; sales@musicamusa.com

Mic processor
Vorsis

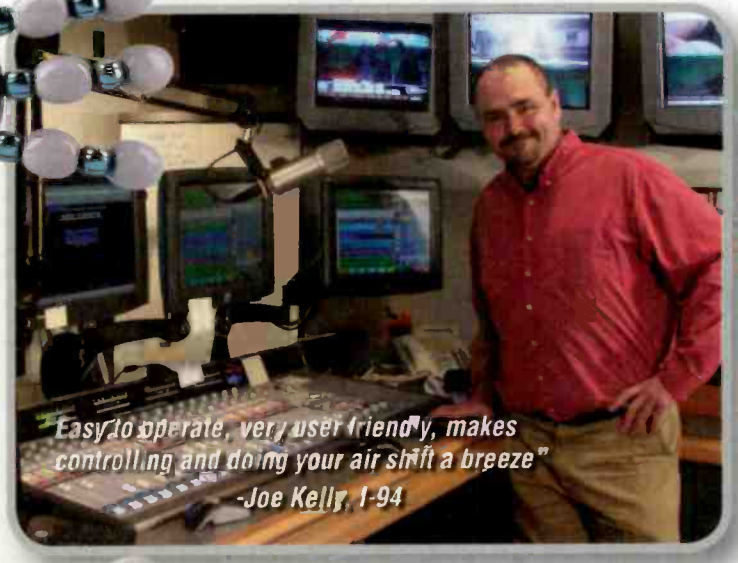
M2: Among the M2's features are twin high-grade, extremely low noise, wide bandwidth microphone preamplifiers, phantom power, Vorsis designed audio processing algorithms and analog and digital outputs. The M2 is controlled utilizing a Graphical User Interface equipped with three user levels. No user controls are on the front panel. Its dual independent processing channels can take the place of two conventional microphone processors. Full processing features are available such as de-essing, downward expansion, equalization, high pass, low pass and notch filters.

252-638-7000; www.vorsis.com
sales@vorsis.com

Digital radio recorder
RadiVo

RadiVo: RadiVo is like TiVo for the radio. It features a dot matrix LCD display and AM/FM digital radio with six preset memories for each band. It records AM/FM broadcasts in real-time or via pre-programmed schedule to internal flash in WAV format. Time-shift recording pauses live radio so listeners don't miss programming, and one program can be recorded while another is listened to. RadiVo has 1GB internal memory for up to 70 hours at 32kb/s mono WAV or 35 hours at 32kb/s stereo WAV of recording time. It also features a built-in FM transmitter, built-in speaker and connects to computer via USB port for file transfer to PC. A remote control and cigarette lighter adaptor are included. External connections include: headphone jack, dc input jack, USB jack and external antenna jack.

800-2-RADIVO; www.radivo.net
info@radivo.net



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631-390-6500; www.korg.com

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Enberg Electronics

3L: The 3L LED logo light is all LED – never replace another lamp. It includes a PS3L power supply/controller, features steady/flashing operation, free station logo, side view light, warm white hue, powder-coated aluminum sides, black or beige color, and no-glare glass front. It is available with generic lights without a logo, features 120/230V operation and consumes just 8W. The 3L is also available in a flush-mount model.

317-683-8792; www.enbergelec.com; info@enbergelec.com

UPGRADES and UPDATES

Enco Systems has released iDAD, a companion mobile application for the Enco DAD and Presenter audio automation studio systems, for the iPhone and iPad. (www.enco.com). **OMT Technologies** has released Imediatouch version 4.0 radio automation software that includes an advanced client graphical user interface and more than 25 new feature enhancements. (www.imediatouch.com). **Axia Audio** has released a software updates for its Element 2.0 mixing console and the Power Station and Studio Engine console engines. (www.axiaaudio.com). **Audemat** has updated its support for the RDS RT+ radio text functionality and iTunes tagging on the company's flagship FMB80 encoder and Radio All In One range. (www.worldcastsystems.com)

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203-299-0233; www.optimengineering.com; sales@optimengineering.com

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Find the mic winner
March issue

Congratulations to
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of Citadel Media en Español,
Coral Gables, FL.
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The mic icon was on the superhero's right arm glove.

www.samsontech.com

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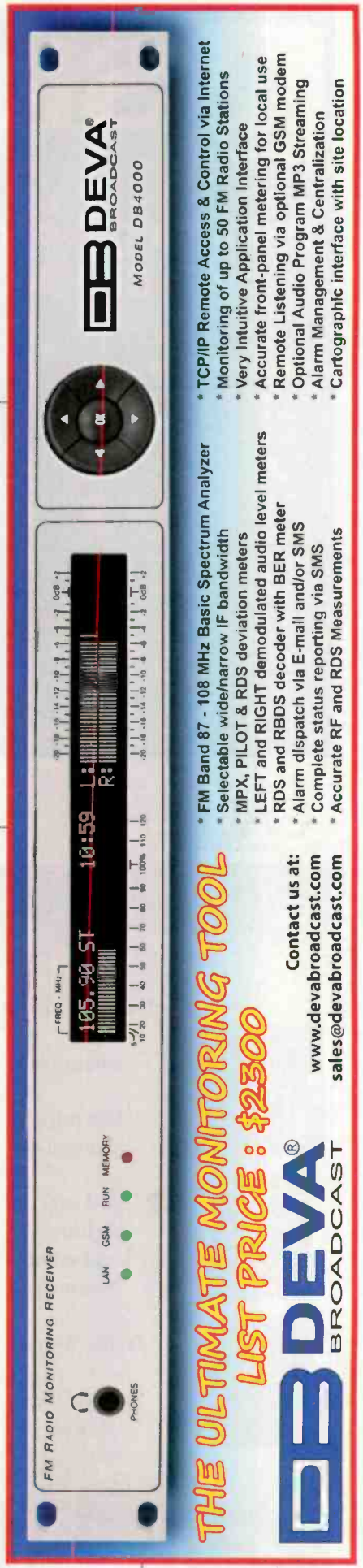

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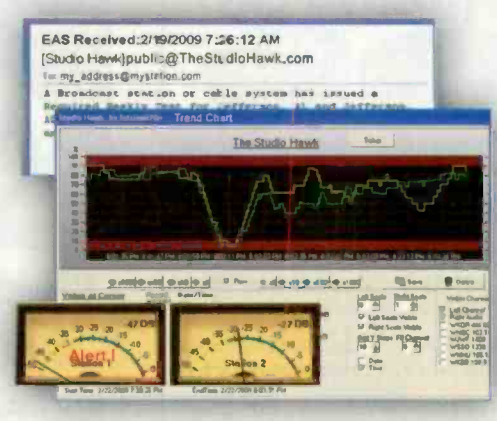

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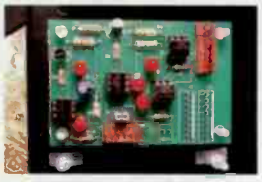

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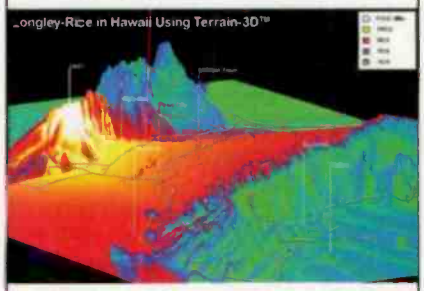

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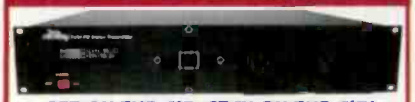

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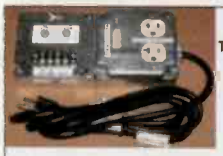

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Penton Media
Penton Media, Inc. • 249 West 17th Street • New York, NY 10011
Chief Executive Officer – Sharon Rowlands, *sharon.rowlands@penton.com*

SUBSCRIPTIONS: Free and controlled circulation to qualified subscribers. Non-qualified persons may subscribe at the following rates (Prices subject to change): USA and Canada, 1 year, $66.00, 2 years, $116.00, 3 years, $165.00. Outside the USA and Canada, 1 year, $83.00, 2 years, $149.00, 3 years, $215.00 surface mail (1 year, $127.00, 2 years, $237.00, 3 years, $347.00 airmail delivery). To subscribe or change your address, visit: www.radiomagonline.com and click on Subscribe. We can also be reached by e-mail: radio@pbinews.com; Phone: 866-505-7173 or 847-763-9504 or write us at Radio magazine, PO Box 2100, Skokie, IL 60076-7800 USA. Back issues are available for $10 each by calling customer service.

POSTMASTER: Send address changes to Radio, P.O. Box 2100, Skokie, IL 60076-7800 USA.

ARCHIVES & MICROFORM: This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, LexisNexis, and Proquest. For microform availability, contact National Archive Publishing Company at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at napubco.com.

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EDITORIAL and BUSINESS OFFICE: Penton Media, Inc. 9800 Metcalf; Overland Park, KS, 66212; 913-341-1300; RadioMagOnline.com, penton.com.

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month:
Facility Showcase, page 20

John Morris, General Manager, WBVM 90.5 FM, Tampa, FL

John Morris, University of South Florida graduate in broadcasting, began his career with WBVM 90.5 FM in 1987 as a volunteer. He worked as an announcer, traffic manager, production director, operations manager and program director. Morris earned the GM duties in 1997. He has created and developed Spirit FM, oversaw transmitter relocations and upgrades, build out of new facilities, and partnerships with other religious broadcasters in the state. His greatest joy is bringing people closer to Christ through Spirit FM.

Radio
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

Radio, Volume 16, Number 5, ISSN 1542-0620 is published monthly and mailed free to qualified recipients by Penton Media, Inc. 9800 Metcalf, Overland Park, KS 66212-2216 (www.penton.com). Canadian Post Publications Mail Agreement No 40612608 Canada return address: Bleuchip International, P.O. Box 25542, London, ON N6C 6B2 Additional resources, including subscription request forms and an editorial calendar are available online at www.RadioMagOnline.com. To order single copies call 866-505-7173 or 402-505-7173

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Arrakis Systems	26-27, 51	970-461-0730	www.arrakis-systems.com
AudioScience	37	302-324-5333	www.audioscience.com
Barix Technology	32	866-815-0866	www.barix.com
Broadcast Software Int'l	41, 44	888-BSI-USA 1	www.bsiusa.com
Broadcast Tools	35	360-854-9559	www.broadcasttools.com
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Continental Electronics	18	800-733-5011	www.contelec.com
Deva Broadcast	43	+359-56-820027	www.devabroadcast.com
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Moseley Associates	3	805-968-9621	www.moseleysb.com
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Radio Design Labs	31	217-352-3498	www.rdlnet.com
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RCS Media Monitors	25	800-ENCO-SYS	www.enco.com
RF Parts	47	800-737-2787	www.rfparts.com
RF Specialties	24	816-628-5959	www.rfspec.com
Sandies USA	42	215-547-2570	www.sandiesusa.com
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Shively Labs	11, 47	888-SHIVELY	www.shively.com
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TieLine Technology	5	800-950-0750	www.tieline.com
Transcom Corporation	45	800-441-8545	www.fmamtv.com
V-Soft Communications	47	800-743-3684	www.v-soft.com
Wheatstone	2, 52	252-638-7000	www.wheatstone.com

This index is a service to readers. Every effort is made to ensure accuracy, but *Radio* magazine cannot assume responsibility for errors or omissions.

by Erin Shipps, associate editor

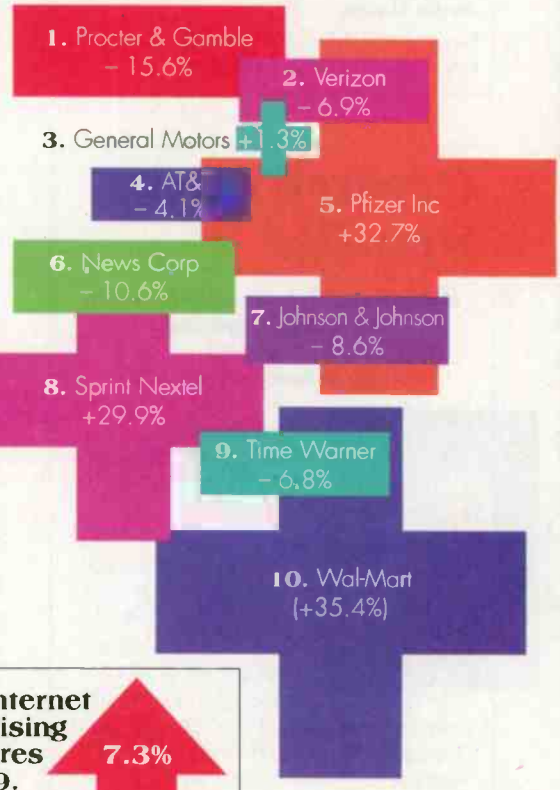
Sample and Hold

Kantar Media recently released a study on advertising expenditures, noting a fall of 12.3 percent in 2009 to $125.3 billion. Fourth quarter 2009 ad spending was off 6 percent against 2008, with nearly all media improving upon their January-September performance. Jon Swallen, SVP Research at Kantar Media said, "Given the restraint in consumer spending, it appears marketers have more confidence right now than their customers. As we get deeper into 2010, the pace of consumer activity will be a key determinant of the strength and durability of the advertising recovery."

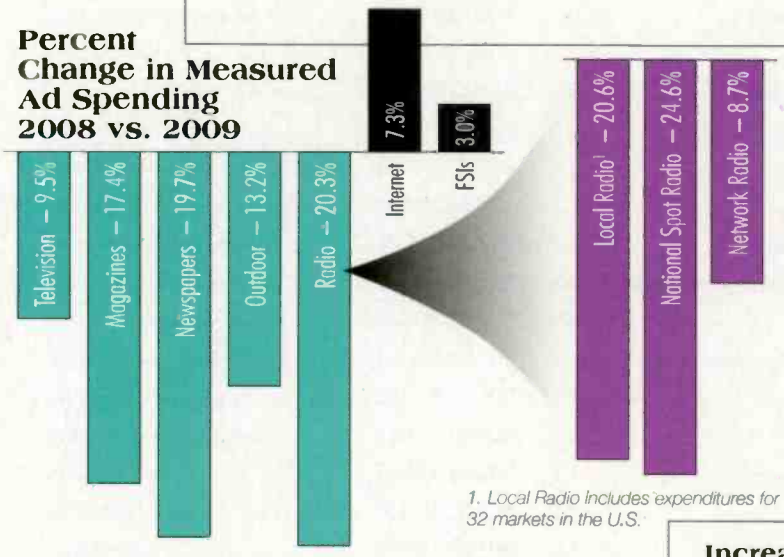
$16,556.1M

Amount spent on measured media by the top 10 advertisers of 2009, which was just 0.9 percent lower compared to their 2008 outlays.

Behind the stat: Top 10 Advertisers Percent Change from 2008-2009



Percent Change in Measured Ad Spending 2008 vs. 2009



1. Local Radio includes expenditures for 32 markets in the U.S.

Increase in Internet display advertising expenditures in 2009. 7.3%

Top 10 Advertising Categories: Jan-Dec 2009 vs. Jan-Dec 2008[2]

Rank	Category	Jan-Dec 2009 (Millions)	Jan-Dec 2008 (Millions)	% Change
	Automotive (Manufacturers) (Dealers)	$10,977.6 ($7,175.5) ($3,802.1)	$14,338.9 ($8,400.9) ($5,938.0)	-23.4% (-14.6%) (-36.0%)
	Telecom	$8,606.8	$8,470.1	1.6%
	Financial Services	$7,820.1	$9,572.1	-18.3%
	Local Services	$7,490.9	$8,628.0	-13.2%
	Miscellaneous Retail[3]	$7,124.7	$8,361.7	-14.8%
	Direct Response	$6,626.5	$7,489.9	-11.5%
	Food & Candy	$6,261.0	$6,046.8	3.5%
	Restaurants	$5,541.2	$5,718.7	-3.1%
	Personal Care Products	$5,538.9	$6,026.6	-8.1%
10	Pharmaceuticals	$4,751.8	$4,575.0	3.9%
	TOTAL[4]	$70,739.4	$79,228.0	-10.7%

2. Figures do not include free standing insert or PSA activity.
3. Miscellaneous Retail does not include: department stores, home furnishing/building supply stores.
4. The sum of the individual categories may differ from the total due to rounding.

Source: Kantar Media.

35.4%

Increase in Wal-Mart's 2009 advertising budget behind the launch of its "Save Money, Live Better" campaign.

32.7%

Increase in Pfizer spending as the company boosted marketing support for Lipitor ahead of the brand's 2011 patent expiration.

29.9%

Amount Sprint Nextel hiked its expenditures, battling for market share against its larger wireless rivals.

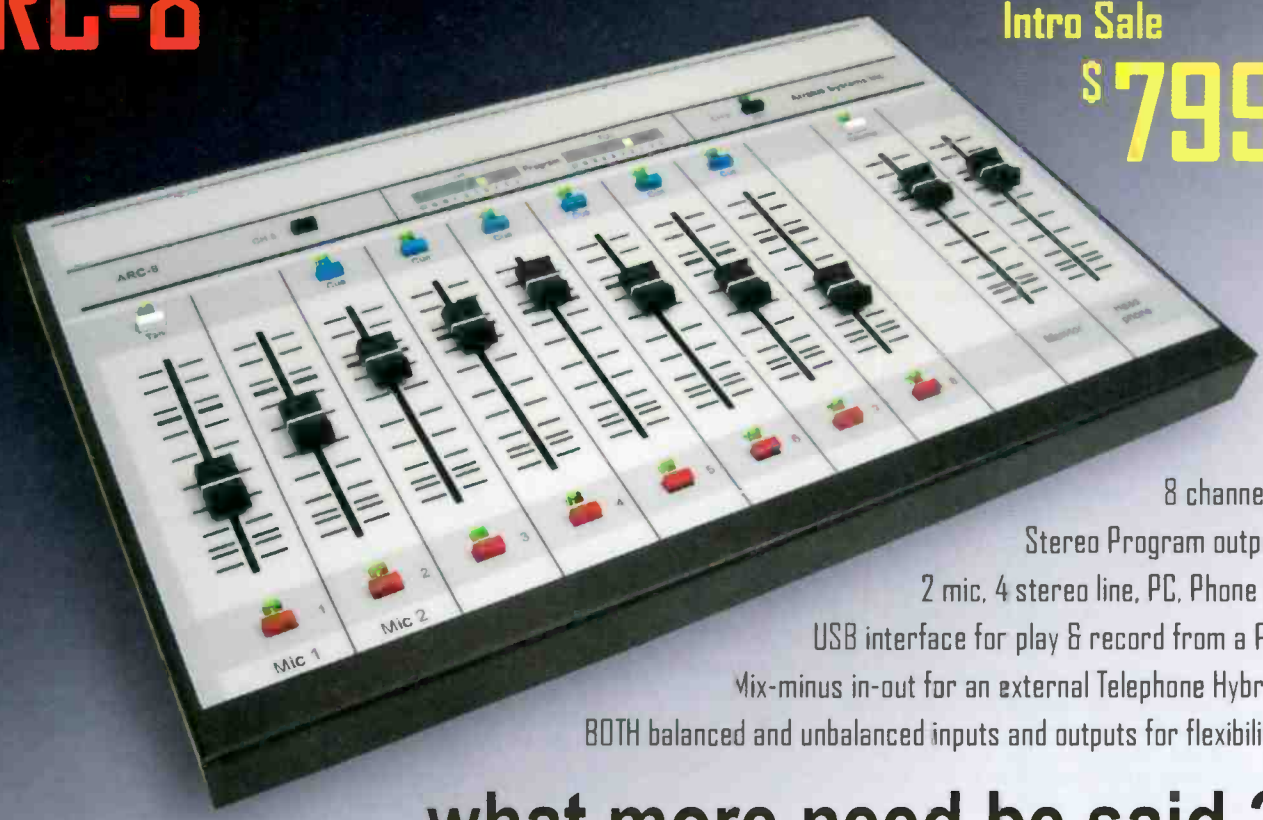
NEW

full featured, professional consoles at amazing prices from ARRAKIS

ARC-8

Intro Sale

$799



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Stereo Program output
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...what more need be said ?

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Wheatstone's Audio-Over-IP product is the best in the business. Here's why:

1. WheatNet-IP is easiest for a station to implement and configure. It is, hands down,the easiest in the industry. No need for Wheatstone to provide factory on-site assistance unless you really WANT us there. The manual and app notes will have you up, running and stable in less time than any other system.

2. WheatNet-IP is a natural for large facility multi-station networking (and for smaller facilities too!). It uses the IGMP features of Ethernet Layer 3 switches to identify a multicast packet, see which ports are requesting that packet, and send it only to those ports. Traffic control is maintained and system bandwidth is optimized.

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.

6. WheatNet-IP has an advantage. 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.

7. Wheatstone is local. WheatNet-IP and the E-Series, just like ALL Wheatstone products, are designed, engineered and built from start to finish in our New Bern NC USA facility. Everyone who works on our products is 100% knowledgeable and immediately available. You can relax – like the famous insurance company, you actually ARE in good hands.

With WheatNet-IP, we think we've done our homework. In fact, we know we have. And we're happy to say that we've got the best product on the market. To learn more, and there's a LOT more, get us on the phone or visit us on the web. We'll be happy to meet with you and get you everything you need.

Wheatstone

Audio Networking—Simply Evolved

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