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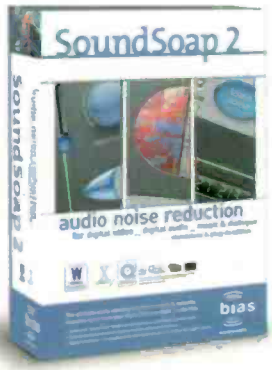

ON THE COVER:
Despite an accelerated construction timeline, Bonneville St. Louis created a functional showcase facility. Cover design by Michael J. Knust. Photograph by William E. Mathis, Mathis Jones Communications.

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Currents Online

Highlights of news items from beradio.com from the past month

ERI Unveils Anechoic Chamber

The 16,000 cubic foot chamber is believed to be the largest devoted to broadcast antenna applications.

Citadel Joins Leading Broadcast Groups in Accelerated HD Radio Rollout

The sixth largest radio group joins the coalition of 21 broadcasters that recently announced accelerated plans to convert stations to HD Radio technology.

HD Radio™ Pure Digital. Clear Radio.

Digital Radio Express Signs Armstrong, Bext

The two companies have signed with DRE to be authorized dealers for DRE's FM Extra.

Several HD Radio Products Debut at NAB2005

ADA, Polk, Radiosophy, Rotel, Sanyo and Yamaha are among the companies with new receivers.

NRSC Approves Digital Radio Standard

The group has approved an IBOC standard for the United States and called it NRSC-5.

Dolby Pro Logic II Approved for HD Radio

Dolby Pro Logic II decoders are already installed in many car audio systems and A/V receivers.

Stull Promoted to VP of Ibiquity

With his new title of vice president of broadcast business development, Stull will continue to drive the licensing and conversion of HD Radio stations and commercialization of broadcast equipment.

McConnell Rejoins the Harris Team

He returns as district sales manager of the western region after three years with SAS.

Site Features

The NAB2005 Photo Blog

Review the sights of NAB2005 with the *Radio* magazine NAB2005 photo blog, which tracked the daily activities from the convention.

Today in Radio History

The dates from the 2005 Radio Industry Calendar are available online.

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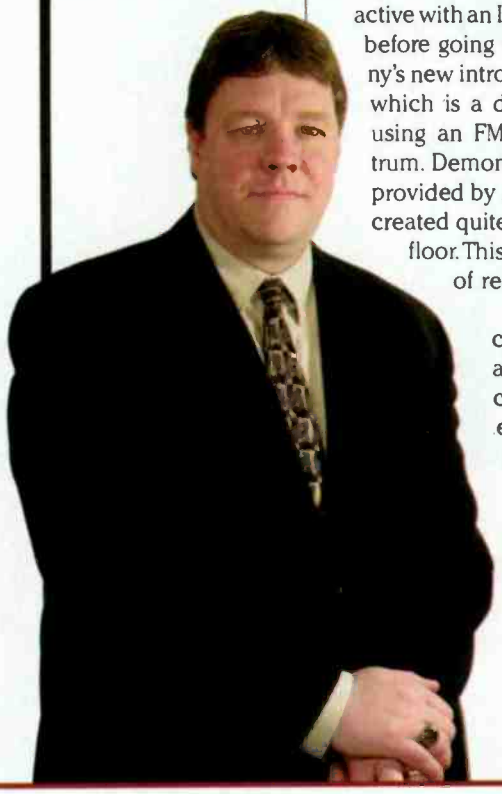
Three for the show

Now that NAB2005 is behind us, our attention turns to the post-show impressions. While our next issue will cover many of the details from the convention, the timing for the May issue allows me the chance to share some brief thoughts from the electronic media bonanza. In general, three terms can summarize most of the discussion I heard at the convention.

IBOC. Terrestrial digital radio continues to be a hot topic. For the past few years, the Ibiquity HD Radio system has been the system getting all the attention from the exhibitors and in the sessions. However, HD Radio is not the only IBOC technology.

Digital Radio Mondiale (DRM) has been gaining interest, and it's now common to see transmitters with the ability to work with the system. There are some who would rather adopt DRM than HD Radio for AM in the United States, but Ibiquity has the lead currently. Technology adoption can be fickle, so it's still something to watch.

The newest introduction for FM is from Digital Radio Express, a company that was active with an IBOC system a few years ago before going underground. The company's new introduction is called FM Extra, which is a digital transmission system using an FM station's subcarrier spectrum. Demonstrations of the system were provided by Armstrong and Bext, and it created quite a buzz on the convention floor. This is one to watch for a variety of reasons.



One added push for IBOC came from the NRSC, which adopted NRSC-5 during the convention. This standardizes the technology for IBOC transmission, of which Ibiquity's HD Radio is a specific implementation. This move is expected to help push the IBOC rollout.

Multicast. The term may be relatively new, but the concept has been discussed for two years already. Call it Tomorrow Radio, Supplemental Audio Channel or Supplemental Program Service, it provides an FM station the ability to transmit multiple program streams via a single carrier. Fortunately, the term multichannel—which was too easily confused with surround-sound—has been dropped. Stations see multicasting as a new source of revenue, adding value to the HD Radio system.

While surround has some interest behind it, many see it as a special feature instead of something that will drive IBOC acceptance. For some stations, surround may be a full-time offering. For many, I believe that multicasting will be the norm, with special programs and features dedicated to the use of surround.

The third term for convention buzz is not surround. While the subject was raised many times, it's because of the special nature for its use that I don't see it as a convention buzzword. In addition, stations are already capable of creating an additional mono or stereo program stream, but producing, storing and routing surround information is a new concept that is just beginning to be recognized. In fact, right after the convention, a certain unmoderated e-mail list (which is little more than a chat room anymore) devoted lots of time to rhetoric and unfounded name calling, which shows that this is a technology yet to be fully understood and implemented.

Podcasting. It's not a bad word for radio, yet many seem to fear the idea. While many enthusiasts providing podcasts from their cars and homes, the production is far from the professional offering that a radio station can create. Nearly every automation system on display offered something that could be used to create a podcast. While some broadcasters see it as a fierce competitor to their terrestrial broadcasts, others embrace it as a new revenue stream. Regardless, it is a technology that must be watched.

The irony is that many exhibitors, including the NAB, offered Ipods as giveaways. Some attendees saw this as the demise of radio as we know it. In reality, change is good.

In general, the convention carried a positive feel. The registered attendance figures are up. The exhibitors seemed satisfied with the audience. The attendees seemed happy with the exhibits and sessions.

Overall, 2005 was a good year for the NAB convention.

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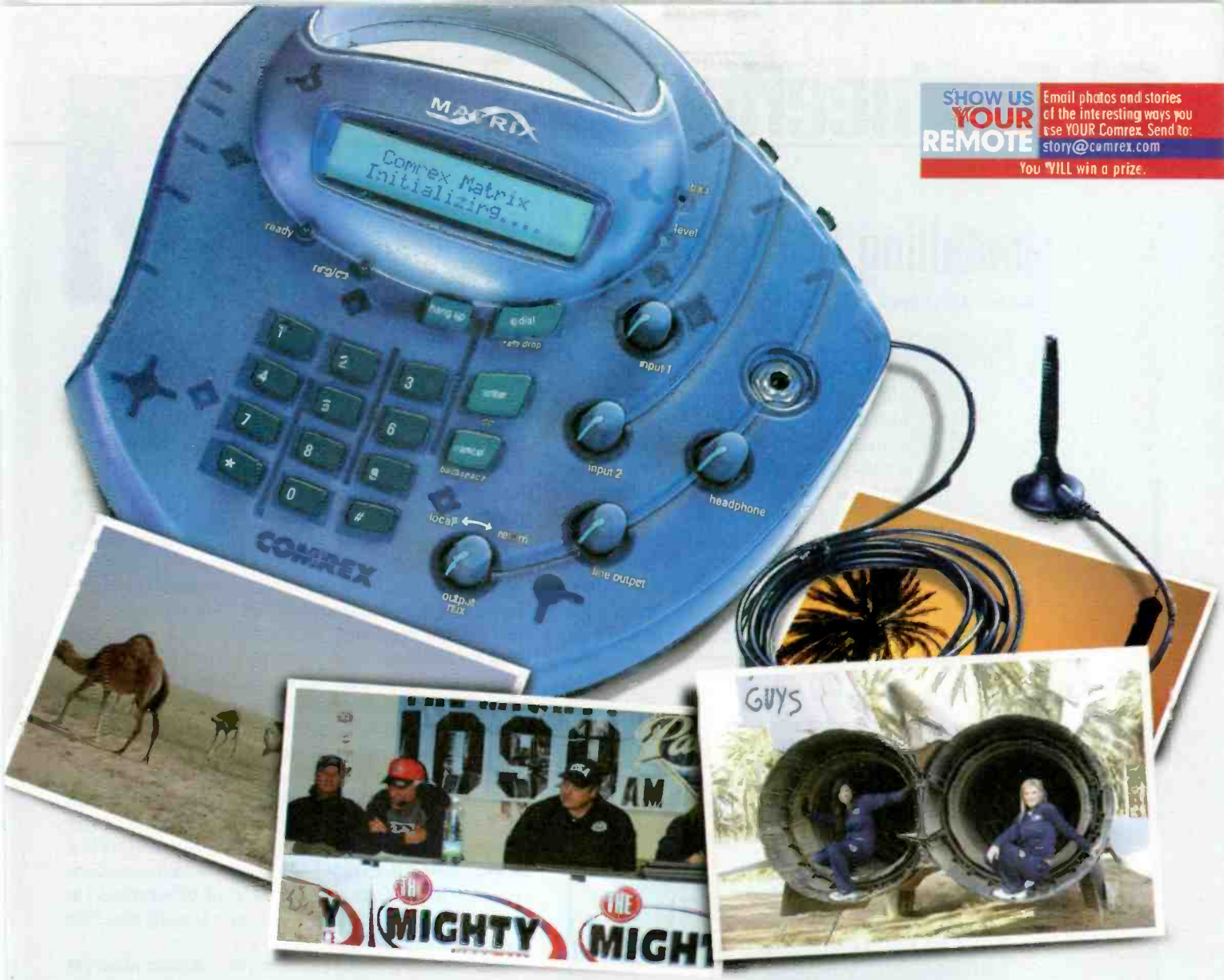

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Armed with little more than two microphones and a Matrix, Ted Leitner of XPRS, The Mighty 1090, broadcast his radio talk show LIVE during morning drive from the Al Asad-Marine Base in Iraq. Leitner is facilitating on-air live communication between troops and their families back home in San Diego, as well as bringing along special guests from the San Diego sports world, including several of the San Diego Charger Girls. "Keeping the spirits of our armed forces up is what its all about," said Ted, "Nothing beats bringing a little piece of home to our troops stationed abroad. Thanks, Comrex!"

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COMREX

Installing AM IBOC

By John Battison, P.E., technical editor, RF

The basic installation of an AM IBOC transmitter is similar to that for an FM IBOC installation with varying exceptions required by the different system of operation. Although new AM stations are still being built, the majority of AM transmitters that are being converted to IBOC will be existing facilities that will have to be modified to handle digital transmission and operation. A typical existing AM station will require considerable attention to its audio and studio facilities, but the majority of work will probably involve modifications to the existing transmission system.

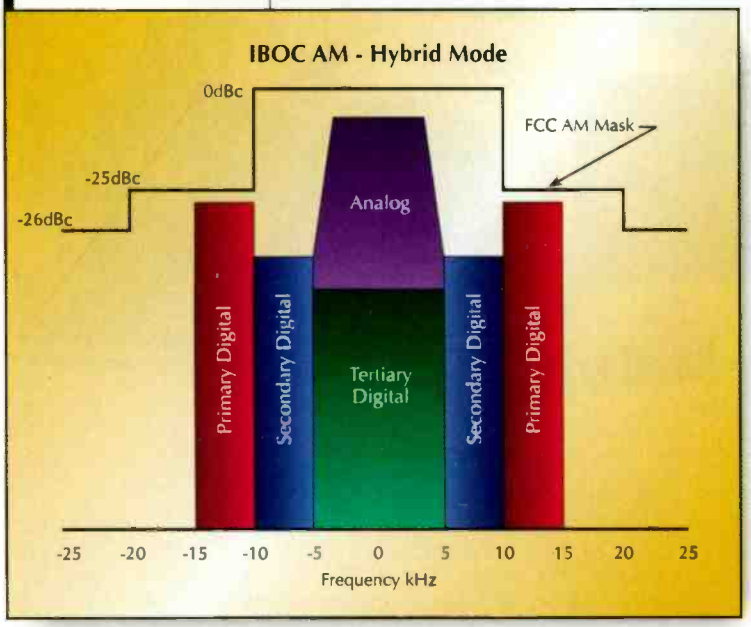

Figure 1. The greatly increased use of sidebands in AM IBOC requires maximum antenna system bandwidth.

The basic items to consider are the method of producing AM IBOC, the radiator system and transmission lines, the transmitter itself, possible changes in primary power requirements and the STL.

Upgrade or all-new

If an existing facility is being upgraded, several areas will require consideration before final project plans are prepared. The first one is site security. Unfortunately, the days of rather haphazard and sketchy security are long gone. Steel fences around tower bases and studio/transmitter buildings are requisite these days. Many of us can recall going out to a remote transmitter in a relatively insecure building on a dark night and not feeling in much danger. Today conditions call for high steel fences, fortress-type building construction and well-illuminated areas. If the newly acquired site is a building with other businesses, security is the first requirement that must be satisfied.

In addition to robbery and vandalism safeguards, protection must be provided against fire and also to ensure primary power supply continuity. This calls for a UPS. How these items are handled depends on local conditions as well as budget considerations. However, they are of primary importance. These items apply equally to digital or hybrid operation but they warrant careful consideration.

An existing AM operation may be assumed to have an operating AM antenna. If the station is non-directional, less antenna work is required. The FM antenna can be mounted on the existing AM tower and the most convenient method of getting the FM line across the base insulator can be used. Remember that even though an isolator is used a new base operating impedance measurement will be required. In the event that a shunt-fed AM antenna is being used this measurement is not as critical.

In the case of a directional array, the addition of an FM antenna on one of the towers may cause more work. If one of the towers is already supporting an auxiliary antenna use this tower to support the new FM antenna, provided that the tower will carry the load of the new antenna and transmission equipment. Once again, be sure to get a structural engineer's report before adding the new antenna.

In with the new

Someone will need to decide the fate of the old transmitting equipment. Unless the existing AM transmitter is new, install a solid-state transmitter because it will have been designed with new techniques in mind and will handle IBOC without any problems. Unfortunately, tube transmitters seem to have more trouble with linearity, and good linearity is essential for hybrid and all-digital AM IBOC operation.

Keep in mind that space may be required for a hybrid injector and combiner in the transmitter room. However, the IBOC system is constantly changing and improving itself so that eventually one may not be required.

Space for the new transmitter will be required adjacent to the existing transmitter and possibly any other additional RF equipment. In the case of a directional station, don't do anything to change the transmission lines length between the phasor and the tower bases. This caveat also applies to the antenna monitor lines because any changes

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to the transmission lines or the antenna monitor lines will automatically involve a new partial proof of performance.

Wider is better

Successful AM IBOC transmission requires adequate bandwidth in the AM antenna. Figure 1 shows the basic typical hybrid AM IBOC waveform and the effect of inadequate bandwidth can easily be observed. A transmitter and antenna system suitable for stereo AM for hybrid IBOC should work well.

Fine-tune the antenna system as closely as possible to 50Ω+j0 impedance and the sidebands should be symmetrical with amplitude symmetry as near as possible to 0.02dB. This will ensure proper quadrature operation and minimize crosstalk between analog and digital channels.

In many cases deep nulls in directional antenna patterns result in inferior reception in regular AM operation. This is usually caused by rapid changes in antenna characteristics at the side band frequencies. This factor should be considered when selecting an AM operation for conversion to hybrid IBOC because deep null reception is frequently poor under these conditions. Consider this point long before deciding on an AM operation to be converted to AM hybrid IBOC.

Additional rack space will be required to accommodate equipment for the new digital signals, such as audio processing. Audio considerations should follow along the same lines as those for digital IBOC operation, and modified as required for the digital and analog portion of the hybrid installation. The IBOC signal will only be as good as the audio that is fed into the transmitter. This means that all studio wiring must be in accordance with AES specifications. If excessive bit reduction is used, audio degradation can occur. When planning audio monitoring systems remember the time delay caused by IBOC.

Treatments for STL problems and requirements depends on the type of installation, path considerations, audio processing and budget. If the audio processing is at the studio, two audio paths may be required. If audio processing is the at the transmitter site, a single STL system may be used. To obtain maximum AM IBOC performance system equivalence to an AM stereo system will be needed. The second generation of IBOC transmission equipment simplifies this process with an exporter and importer.

E-mail Battison at batcom@bright.net.

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Big changes for LPFM, FM translators

By Harry Martin

On the heels of the FCC's February public forum on LPFM and an emergency petition filed in March by the Media Access Project (MAP), the Commission has adopted changes in its rules that will immediately benefit LPFM operators and applicants. It also has proposed sweeping changes in the relationship between LPFM stations and FM translators and adopted a six-month freeze on the processing of applications for new translator stations pending resolution of these proceedings.

In its petition MAP argued that just two applicants filed more than 4,000 applications for new FM translator stations with the specific intent of selling them to other parties. The two applicants have opposed the emergency petition, arguing that MAP failed to demonstrate any violation of Commission rules. In addition, they argued that improper *ex parte* contacts were made by a former commissioner on behalf of the MAP petition, in violation of the Commission's rules.

For its part, the Commission released its Second Order on Reconsideration and Further Notice of Proposed Rulemaking in the long-running LPFM proceeding. In this latest order, the FCC amended the LPFM rules to provide additional flexibility for LPFM licensees in modifying their authorized facilities. Specifically, LP-100 licensees may now file applications at any time to move their transmitter sites up to 5.6 kilometers (the former limit was 2 kilometers). The Commission authorized the Media Bureau to extend the construction period for LPFM stations to three years instead of the current 18 months.

The Commission seeks comment on several issues relating to the long-term operation of the LPFM service, including:

- whether LPFM licensees should be able to assign their licensees to other qualified entities;
- whether the FCC should extend the period during which mutually exclusive LPFM applicants may reach time-share agreements from 30 days to 90 days;
- whether the Commission should permit the renewal of licensees that were granted on the basis of an involuntary time-share arrangement between two or more parties;
- whether to require that all LPFM licenses be restricted to local entities;
- whether to extend the prohibition on entities holding more than one LPFM license.

Elevated status

But the most significant question raised for comment is whether the Commission should give primary interference protection to LPFM stations over translator facilities, including licensed translators. The Commission suggested that such a preference may be warranted because LPFM stations, unlike translators, originate programming. The significance of the source of programming may be particularly striking where noncommercial translators are concerned: NCE translators in the reserved band can be located hundreds or thousands of miles from the community in which their programming is being originated.

Also, the Commission seeks comment on whether all pending translator applications should be dismissed in anticipation of a new LPFM filing window, or alternatively, whether the only applications that would be dismissed would be those found to be mutually exclusive with the LPFM applications filed in the window. Alternatively, the Commission suggested that it might make primary status for LPFM stations prospective only, which would obviate any such dismissals.

In light of these questions, the Commission ordered the Media Bureau to immediately stop processing all pending translator applications that were filed as part of the August 2003 filing window.

Martin is president of the Federal Communications Bar Association and a member of Fletcher, Heald & Hildreth, Arlington, VA. E-mail martin@fhhlaw.com.

Dateline:

June 1 is the deadline for radio stations in Arizona, Idaho, New Mexico, Nevada, Utah and Wyoming to file their 2005 renewal applications, biennial ownership reports and EEO program reports.

June 1 also is the date for radio stations in California to begin their pre-filing renewal announcements.

California radio stations must file their renewal applications, biennial ownership reports and EEO program reports on Aug. 1, 2005.

Erratum: Last month we reported that Michigan and Ohio radio stations are required to file their renewal applications by June 1. That deadline applies to Michigan and Ohio TV rather than radio stations, which filed in 2004.

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Automation

Beyond audio storage and playback

By Chriss Scherer, editor

We call them automation systems, which is an accurate name, although the function of these systems have grown into their name more and more. The humble beginnings of a system to automate the functions of an announcer with a mechanical, tape-based machine are only a small part of the wide range of functions that can be handled today. It starts with audio storage and playback as a primary function, but the capability to handle data, schedule events and control additional equipment are just some of the enhanced features.

Computer-based automation systems saw initial acceptance as replacements for cart machines. This practical use has made cart machines almost completely disappear from regular use. Most stations considering an automation system today are probably looking to replace or upgrade an existing system.

What sets each system apart?

At first glance, most systems have certain similar function, features and appearance. The most popular operating system is Windows. There are a few that are built to run on Linux. While Linux has a strong following and it has shown to be a reliable operating system, the proliferation of Windows gives this operating system an advantage from a user's standpoint, but also simplifies maintenance.

The first step before making any decision is to see it in action before you buy it. Get the demo and operational tour from the manufacturer to get a feel for what it can do. Ask questions unique to your operation. Pose specific scenarios and ask to see the solution.

Once this is done, find some experienced users and ask them about their systems. Don't stop with one. Everyone has his preference for software, and one person having a problem could

Leading POTS Codecs Compared.

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Digital PC Audio Input	No	No	Yes, via Ethernet port and supplied driver
Audio Metering (XMIT/RCV)	Transmit only	One-at-a-time	Simultaneous
Audio Processing	None	Simple AGC	Digital multi-band AGC with look-ahead limiter by Omnia
Remote Control	No	RS-232 and dedicated computer	Ethernet via Web browser
Auto Dial Storage	19 Numbers	50 Numbers	100 Numbers
Frequently-Used Settings Storage	none	none	30
Standards-based POTS Codec	No - Proprietary	No - Proprietary	Yes - aacPlus (MPEG HEAAC)
Transmit-Receive Quality Display	No	Yes	Yes
Contact Closures	2	2	3
Display Resolution	120x32 LCD	120x32 LCD	128x64 LCD
Analog Cell Phone Interface	Optional	Standard	Standard
Mixer Inputs	1 mic, 1 mic / line	2 mic / line	1 mic, 1 line
Phantom Power	No	No	Yes - 12 volt
Automatic Voice-Grade Backup	No	No	Yes
Power Supply	External	External	Internal auto-switching
Local Mix Audio Outputs Headphone Line Level	 Yes Yes	 Yes No	 Yes Yes
Direct Receive Audio Output	No	Yes	Yes
Uses ISDN at the Studio Side for More Reliable Connections	No	No	Yes - your Zephyr Xstream becomes universal POTS and ISDN codec.
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be that person's own understanding of the system. Talk to more than one type of user as well. Talk to the engineer, program director, production director and announcer if you can.

Once you have a system or two in mind, arrange a demo for some station personnel to evaluate its operation. Allow them to see the system and how it works, and not the system as demonstrated by the sales person. Ultimately, this system will be the center of your content management system, so it deserves the appropriate attention to detail.

Systems come in all price ranges and feature sets. Some are sold only in complete packages while others can be assembled a la carte by adding modules or sets of features as they are needed. Another approach is for a manufacturer to provide the software alone while the user provides the hardware, or to bundle both together. The advantage to having software and hardware in one bundle is that the system is tested as a complete system, which limits the unknown variables. If you choose the software-only approach, don't scrimp on the hardware and try to use the cheapest computers you can find. Software is only as reliable as the hardware that supports it.

In the last few years, product support has shifted from all-inclusive and free to providing tiers of service based on support packages. This concept is new to broadcasters, but with the profit margins on software being as close as they are, companies can't afford to offer their complete resources for every user.

An important part of the system is the computer audio card. While the automation system needs to be reliable and robust, the final audio output needs to deliver the best possible quality. There is a wide range of professional audio cards available, all of which are designed to work well within Windows. Many also have Linux drivers.

Routing audio is common in any facility, but new concepts in audio management are being applied to radio. Digital audio—typically the AES-3 format—is in wide use, and sound card manufacturers offer models to provide AES-3 connectivity. Newer formats, such as Cobranet or Livewire, use a Cobranet or Ethernet card to provide the audio connection. This function is based in software drivers and the hardware interface, so in most cases, the automation system doesn't really care about the audio output format.

While some systems have broadened their scope to provide systems for any application, others have tuned their systems for specific uses, such as newsroom content or satellite automation. These tailored applications often interact with other systems, so it might work to your advantage to consider a different newsroom system to complement the on-air system.

The least resistance

If you are changing automation system manufacturers, be prepared for the announcers to rebel. Even if the outgoing system is the most difficult to use and completely unreliable, the announcers will likely

Insight to IBOC

May 2005 Part of the *Radio* magazine DAB Answer Series

The extra bits

IBOC richness is in the data

By Chriss Scherer, editor

Enhancements over the existing analog service have been part of the promise of completing the digital transition in radio. An improvement in audio quality is cited most often to consumers because this change is easy to demonstrate. More recently, Supplemental Program Service and surround sound have been added to the audio improvement list. Throughout the transition, the ability to transmit data has been listed as an enhancement as well. This change leaves more to the imagination of the broadcaster, which makes it harder to evaluate and fully understand the benefit. Now that consumers have come to recognize and value the enhanced displays of satellite radio, Internet radio and RBDS, IBOC is poised to provide this ability and more.

PSD displays will provide more than just artist name and song title.

Data has always been a part of the IBOC plan, but it is just being recognized for its current and future capabilities. In the HD Radio system, there are three parts of the data stream: Main Program Service (MPS), Station Information Service (SIS) and Advanced Application Service (AAS). These are all part of the IBOC service interface, which dictates how data is transmitted. IBOC is a pipe that transmits data, with a large chunk of the data being audio.

The Main Program Service provides the data functions that consumers are already accepting from the familiar media offerings. The MPS Program Service Data (PSD) provides a description of the current audio segment such as artist name and song title.

The MPS uses an information format that is described by the ID3 standard. This format includes fields called title, artist, album, genre, comment and commercial. Figure 1 shows the type of information that can be used in these fields depending on the type of audio being transmitted. Most if not all of this information is already stored in a station's automation system. The leading automation systems provide a utility to format or map the fields to be delivered with the audio. This data can be provided via an Ethernet, serial or other data connection. For HD Radio, this stream is an easy payload that requires less than 1.516kb/s to deliver.

The data is formatted through an MPS Program Service Data-enabled Program Server. The MPS PSD data requires a relatively slow data rate of 1.2kb/s, which must be transmitted along side the audio to the transmitter. The data can be serial or Ethernet.

PADding the truth

The ability to display program-associated data (PAD), such as artist name and song title, is a common quest whether it is used for RBDS, a station's website or HD Radio. This information is already stored in the automation system, so it should be an easy matter to send the data to the HD Radio exciter.

Easier said than done.

The data input on an HD Radio exciter is a TCP/IP port with specific parameters. The output of a station's automation system is not the same format. It might be Ethernet, but it could also be a serial stream, XML or a disk file. In addition, the data stream may be loaded with information, so extracting certain fields may be a challenge. Making the two communicate can be a problem.

Some automation manufacturers provide an interface to feed an RBDS encoder or HD Radio exciter. For many broadcasters, the interface problem has been turned over to a third party, such as the Radio Experience or Dmarc Broadcasting, to facilitate the data transition. In rare cases, stations may elect to roll their own interface, but programming the translation from one system to another can be a daunting task.

Clean data

One obstacle in displaying PAD from an automation system is that the information entered into the

continued on page 3

Inside

A special supplement to
Radio
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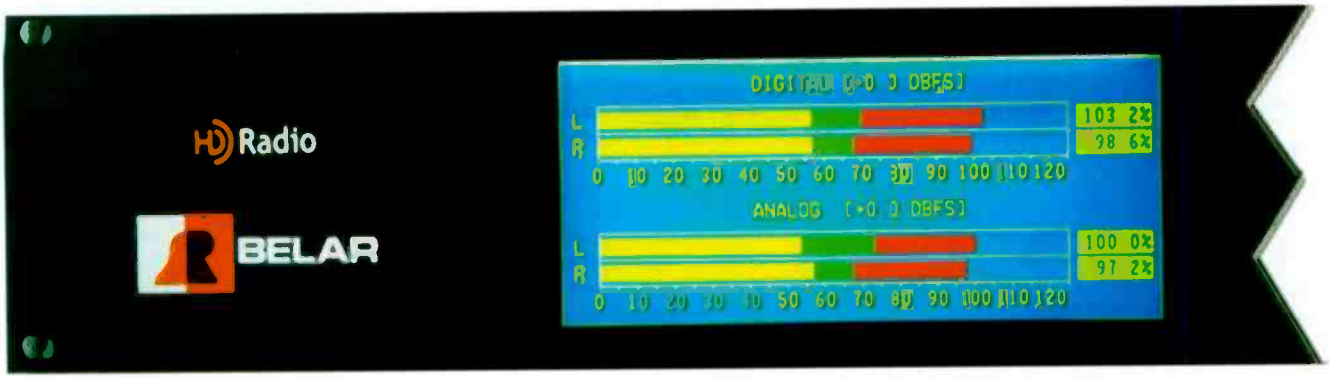

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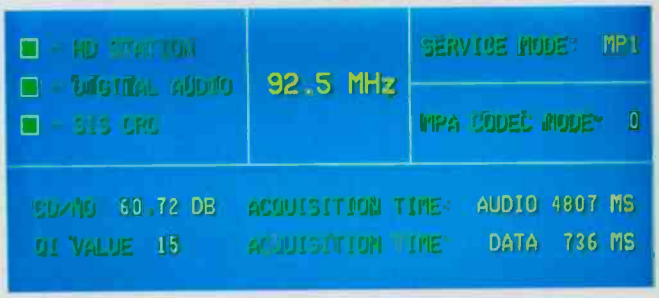
Here are some sneak preview screen shots!



For updates and more information on the **BELAR FMHD-1** and **AMHD-1** go to

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Extra bits

Information please

Today, the Station Information Service is a common information channel for all modes of IBOC. It provides the station ID in a short and long form (call letters and station slogan or moniker). Planned enhancements to this data string will be used by a receiver to immediately identify available services of the station. It will instruct a receiver that the station offers traffic information, programming in surround sound, general location information and other data. It includes provisions for future expandability, such as an enhanced electronic program guide (EPG) and a station message that can be changed depending on the daypart.

ID3 Field	Audio		
	Music	Talk	Announcements
Title	Song Title	Topic	Title
Artist	Artist	Host	Author or Sponsor
Album	Album Name	Show Name	Sponsor Name
Genre	Jazz, Rock, etc.	Speech	Speech
Comment	Contact Info	Call-in #	Information
Commercial	Product Sale Info		

Figure 1. The types of information that could be placed into the MPS data fields.

Looking to the future, the Advanced Application Services provide the ability to deliver new features. On-demand audio, reading services, traffic information and telematics are some of the capabilities of AAS.

Adding a data stream

To describe how data is inserted into an HD Radio transmission, we first need to understand how the HD Radio signal is created. In the first generation of HD Radio exciters, all the functions were in one unit, so audio and data were fed into that one device. The drawback to this design is that all the elements must be delivered to the IBOC exciter. Creating a linear path for the stereo audio and data could require a path capable of delivering more than 1.44Mb/s. It also required all the transmission equipment to reside at the transmitter site.

To make more efficient use of the spectrum needed to send audio to the transmitter, the second generation of HD Radio exciter was developed. This separated the functions of encoding audio and data from the modulation. It also reduces bandwidth requirement for an STL from 1.44Mb/s to about 356kb/s.

In this split operation mode, three devices comprise the HD Radio chain.

The Exporter handles the encoding of the primary Main Program Service (MPS) audio and program service data (PSD). This device currently operates on Linux.

PADding the data

continued from page 1

system may not have been keyed in a form that is suitable for the public. It's not profane, but the shorthand used may be cryptic or confusing. For example, the word "tonight" in a song title may have been shortened to "2nite." Both are understood, but the correct word is clearer.

If this data is not ready for display to the public, the information needs to be corrected or updated. The Muse Database and All Music Guide are two large databases of song and album information that can be referenced to import the data when music is imported into an automation system. In the case of the Radio Experience, song data is cleaned before displaying by comparing the song to a "clean" database to ensure that the displayed information is ready to be displayed on the air or online.

An HD Radio display will provide now playing information on some station websites.

For HD Radio, the minimum information that should be displayed is the artist name and song title. Some stations are already displaying the album name. Additional information may be displayed as well, some of which is related to what is currently playing, but not just about the current song. Some refer to this as near-PAD. For example, when a song from the Dave Matthews Band is playing, the usual PAD can be displayed, but simply rotating this information for four minutes is not an effective use of the display. Near-PAD could include concert dates, ticket information, facts about the band or song, or possibly a contest to win the CD, song download or concert tickets. As near-PAD sees more use the type of information displayed will likely expand.

Also, adding near-PAD really needs to be a function

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Image credits:
Page1 - Radio image courtesy of Ibiquity Digital.
Page 6 - ID3 diagram courtesy of ID3 and Ibiquity Digital.

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

Open Mic
The possibilities of data

While the fields of the HD Radio data stream are defined, the information that stations can provide is open. We talked to two broadcasters who are looking ahead to the possibilities of HD Radio data.

Marty Hadfield
Vice President of Engineering
Entercom Communications
Seattle

How are your stations using the data capabilities of HD Radio?

Entercom has implemented RBDS at all its FM stations, allowing us to display program-associated data (PAD) such as artist name and song title. Once IBOC is activated at a station, it is expected to provide at least the same data-display capability on the digital signal as it does on the analog. In most cases, the IBOC display also displays additional fields when available, such as the title of the album.

What future data-display enhancements do you anticipate incorporating with IBOC?

At a minimum we will probably display the album jacket artwork, which is already being displayed on our stations' enhanced websites. This will make the HD Radio receiver look similar to the website "now playing" presence. Later on, once a data back channel becomes available, the ability to add a "buy now" button will be typical of the integrated connectivity with cell phones, PDAs and a consumer's radio.

Rich Eiswerth
President, GM
WGUC-FM
Cincinnati

How is your station using the data capabilities of HD Radio?

We are using it in much the same way as we use RBDS. As the HD Radio receivers with enhanced displays become available, we will use more of the meta data capabilities. WGUC is a classical music station, and title of the work and performer name are the minimum. We want to also provide composer, soloist and featured performers and other information that is relevant to the work being played.

What are your future data plans?

Our announcers already research their commentary about the music, and only a fragment of that information is usually shared on the air. This information is ideal for use on a data display. Each announcer's data can be loaded into a database and recalled as near-PAD as needed.

We will soon acquire WVXU, another NPR affiliate in Cincinnati. We plan to program WGUC with music and WVXU with predominantly talk and news. On WXVU we will run a news ticker with additional information, headlines and weather.

Extra bits

The Exporter is intended to be placed at the studio.

The Importer serves two basic functions: to manage the data, bandwidth and quality of service (QOS) of the signal, and to act as an insertion point for the Supplemental Program Service (SPS) data and audio. The SPS channels can be inserted as AES-3 at 44.1kHz or as IP audio. The Importer can be connected to a first-generation HD Radio exciter or an Exporter. However, the data interface between the Importer and the Exporter or first-generation exciter must be bidirectional Ethernet. If an Exporter is not used, the MPS audio data can be sourced directly to the Importer.

The Importer is also called the Ensemble Operations Center (EOC). EOC is the general term to describe a data management and data generation system, of which the Importer is a specific implementation. The Importer operates on Windows Server and XP. The unit has several applications running on it to encode the SPS audio and generate the PSD for the SPS.

The Exgine is a DSP implementation of the modulation for HD Radio. It handles the OFDM transfer of the data. Several manufacturers are looking at updating their current analog transmission exciters and adding an Exgine card to handle the analog and OFDM modulation. The Exporter connects to the Exgine via a User Datagram Protocol (UDP) Ethernet connection.

The functions of the Importer and Exporter currently run on separate hardware and software systems, but it is conceivable that the Exporter functions could be reduced to a card that becomes part of a station's audio processor or STL, or a function of the automation system.

A single Exporter can be used to distribute a signal to many Exgine-based HD Radio exciters. Each Exgine can then insert its own Station Information Service (SIS) data. This was successfully tested at the end of 2004 by WUMB in Boston and National Public Radio Satellite Services. In this test, a single Exporter encoded information that was received via a 200kb/s SCPC satellite channel at several locations.

Ready to go

The data capability of HD Radio is designed to provide at least as much information to the listener as RBDS. With listeners already expecting enhanced displays on media services, HD Radio can easily make the move to provide this and more.

Jeff Detweiler, Senior Broadcast Technology Manager at Ibiquity, provided information for this article.

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Glossary

The data aspect of HD Radio includes lots of new terms and abbreviations. Here are some of the more common abbreviations and terms that you will likely encounter.

AAS Advanced Application Services
API Application Programming Interface
EOC Ensemble Operations Center
EPG electronic program guide
MPS Main Program Service
PAD program-associated data, See PSD.
PSD program service data; the updated name for PAD
QOS quality of service. Sometimes abbreviated QoS.
SAC Supplemental Audio Channel. See SPS.
SIS System Information Service
SMIL Synchronized Media Integration Language
SPS Supplemental Program Service. Sometimes called SAC. In initial tests, NPR called thisTomorrow Radio.
telematics emerging technologies in automotive communications, combining wireless voice and data capability for management information and safety applications.
UDP User Datagram Protocol. UDP is a connectionless protocol that does not require the sender and receiver to establish a connection before data is transmitted.

PADding the data

continued from page 3

with minimal intervention. If data must be manually pulled for every song, the action will likely become infrequent or get sloppy. Whenever possible, this function should be automated.

Because datacasting was first discussed, the common idea was that non-program-associated data (NPAD) such as sports scores, stock tickers, weather information and traffic data would be displayed. RBDS—in a sense the groundwork for data via HD Radio—has been around for 10 years, yet any efforts to display this news information has been limited to pet projects and trial runs. Some of this is because stations want to maintain their image to the full extent. Shifting between random data and song information is not yet a welcome feature.

Regardless, when NPAD is needed, the role of a data server will increase in importance. The data server can retrieve clean song information, add the near-PAD data when it's appropriate, and poll other systems, such as NOAA for weather information automatically.

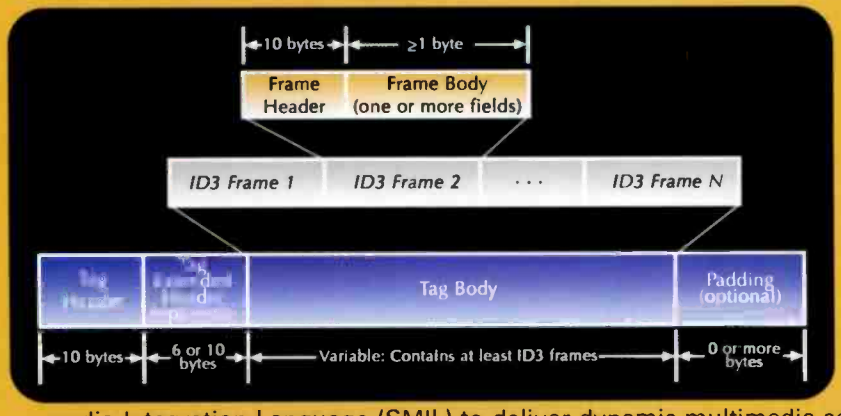
HD Radio displays are rather limited right now, but they will likely improve to provide more information.

Alan Hartle of the Radio Experience contributed information for this article.

Standards in data

In addition to the audio quality improvements of HD Radio, the technology will allow broadcasters to provide digital information services. The first generation of data services is already a part of the HD Radio system. The plans have been laid to add additional services and capabilities in the future.

An informal standard for data services is defined by ID3 (www.id3.org), which grew from the popularity of MP3 files and the desire to include information about the audio within the file. ID3 provides fields that include artist name, song title and album title. More recent additions to the format include other user-defined fields such as a URL, lyrics, equalizer presets, pictures and even other files. ID3 is currently in version ID3v2.4.0. The figure here shows the coding format of the ID3 data string.



The ID3 format lists 80 entries in the Genre field. Nullsoft/Winamp has added an additional 46 types to the list.

Plans are also in place to include a variation of the Synchronized Multimedia Integration Language (SMIL) to deliver dynamic multimedia services via IBOC. This will provide the means to transmit enhanced information services such as breaking news, sports, weather and traffic alerts as text or audio files, listener-controlled audio services that allow listeners to pause, store, fast-forward, index and replay audio with the help of an integrated program guide, and supplementary data delivery to deliver telematics, navigation information and rear-seat entertainment.

When Advanced Application Services are implemented, they will draw on the HD Broadcast Multimedia Language (HD BML), which is a defined XML structure that is based on the SMIL profile.

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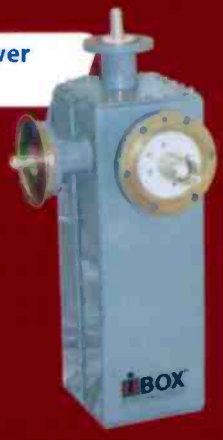

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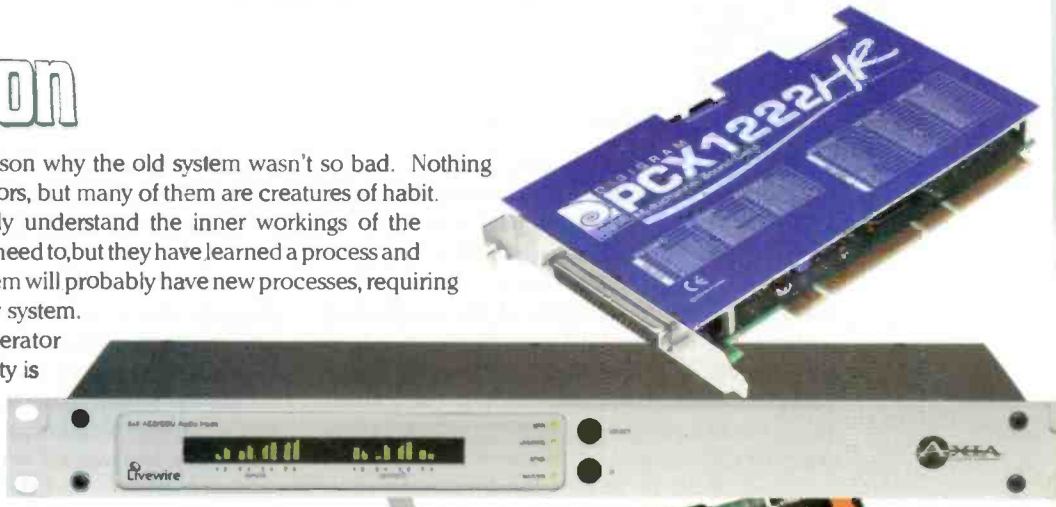
Automation

find every reason why the old system wasn't so bad. Nothing against operators, but many of them are creatures of habit. They don't fully understand the inner workings of the machinery, nor do they need to, but they have learned a process and can follow it. A new system will probably have new processes, requiring each user to learn how to use the new system.

If the manufacturer offers on-site operator training, consider using it. Each facility is different, but in the end this is a computer-based system. Some users will fear it because it's a computer. Others will fear that they will break it somehow. There is a fine line to providing sufficient user guidance to make him comfortable with a system before it gets too involved into the details of networking.



Audio transmission via analog and AES-3 streams is tried and true, but automation systems are beginning to support newer technologies such as Ethersound, Livewire and Cobranet.

Bit manipulation

The computer industry has made many automation functions simpler and better. When disk storage space carried a premium price, it was necessary to reduce file sizes to control costs. While storage is not yet free, it is much cheaper now. In many cases, it is possible and practical to store audio in a linear file format. If some type of data reduction must be used, choose the format and settings carefully, keeping in mind that the STL and transmission system may also use data compression.

Bulk storage is also simplified because of computer advances. Compact RAID systems are inexpensive, making data backup more reliable. In addition, many STLs have additional data capacity. Use this capacity to create an off-site data backup at the transmitter. This not only provides confidence in automating the off-site backup, but it also places a backup system at the transmitter, where it can be used as a backup audio source if needed. A common problem with the reliability of a backup plan is ensuring that the offsite backups are kept off site. Using the STL removes that worry.

The needed features of an automation system have seen some cyclical demands. For example, a few years ago, Internet streaming was a hot topic. Then it cooled considerably when digital copyright concerns were debated. Now, streaming is coming back as an important element. The Internet stream may be a complete simulcast of the on-air signal, which required nothing of the automation system, or it can be the same stream with alternate advertising that uses an ad replacement system. Further still, a station may offer alternate audio streams with deep-cut audio formats and specials. Regardless, these needs can be accommodated through the automation system.

Automatic recording is a common feature of many systems. A variation on this feature is logging. Logging provides a valuable function for verifying program content, and it can be useful to create best-of shows and promos. The logger feed can also be used to capture a program for the latest consumer audio obsession: podcasting. The captured program can be trimmed, packaged and then delivered to the server to make the station's podcast

ready in minutes.

Audio is not the only element that an automation system can handle. The capability of RBDS and IBOC to display an artist name, song titles and more are a natural function of the automation system. Most systems can be configured to deliver this data via RS-232 or Ethernet to feed the appropriate encoder. This capability has been taken further to add additional capability with the addition of a data server.

Looking to the future

The IBOC rollout is gaining steam, and two variations are being viewed as possible killer apps: multicast and surround. Supplemental Program Service, often referred to as Multicast SAC or Tomorrow Radio, allows multiple audio streams to be provided over the same channel. For an automation system, this is like adding another station. The specifics of the system you use will determine the needs to provide this second audio stream, but it is like adding another station the system. Additional playback systems and file storage space may be needed to provide the additional streams. Likewise, additional program capture, scheduling and data management may be needed.

A more complex feature for IBOC is the possibility of surround sound. There are four systems being shown, all of which use different methods of encoding the surround audio. There's no single standard yet, and there could be several options to storing the surround audio. Regardless of what is finally decided, automation systems should be able to handle the data with little trouble, because it will still be data no matter the format of the final transmission.

Resource Guide

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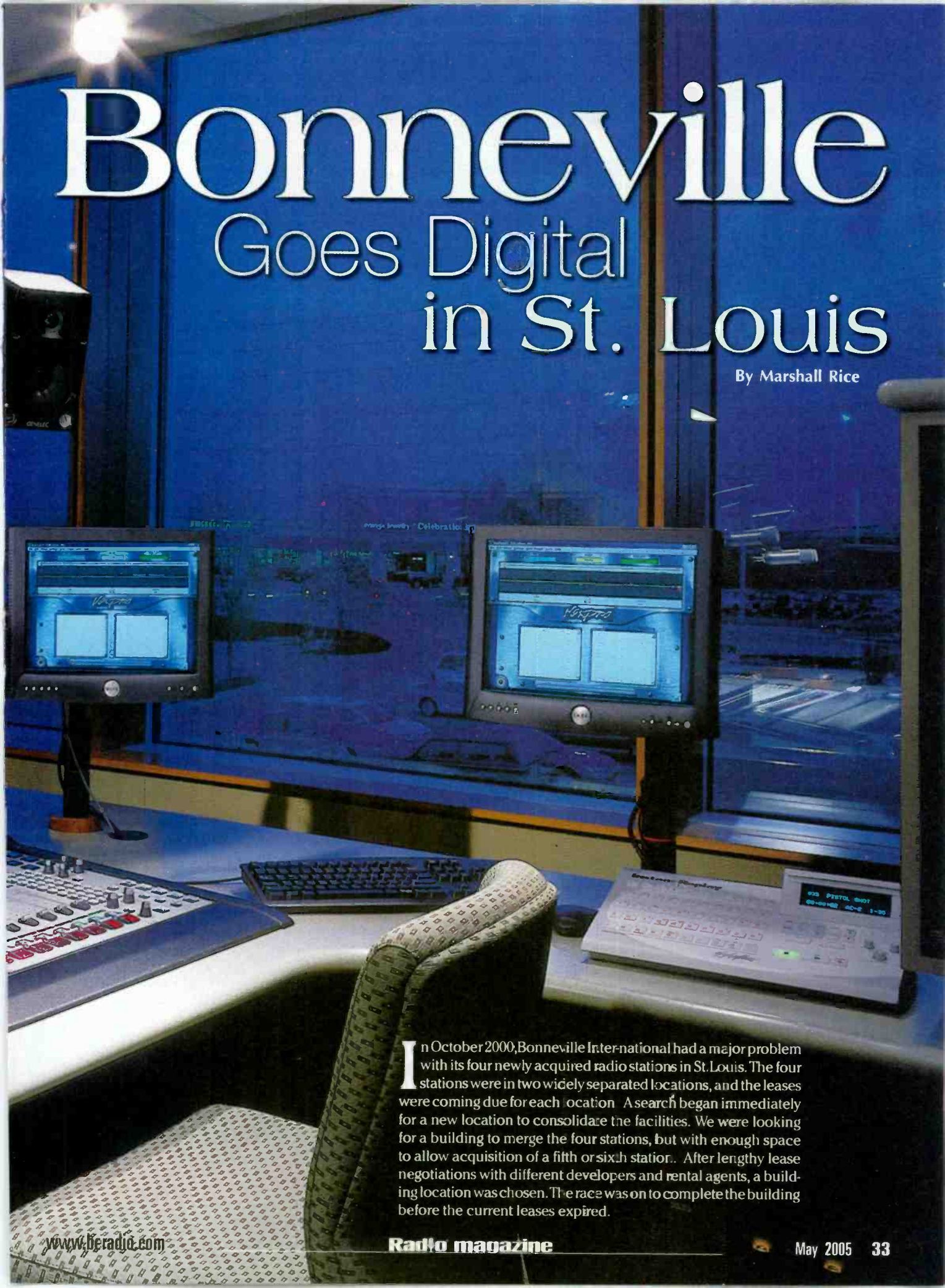
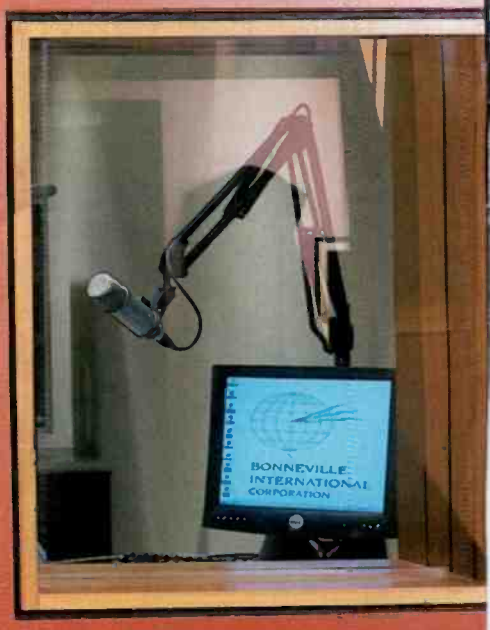
By Marshall Rice



In October 2000, Bonneville International had a major problem with its four newly acquired radio stations in St. Louis. The four stations were in two widely separated locations, and the leases were coming due for each location. A search began immediately for a new location to consolidate the facilities. We were looking for a building to merge the four stations, but with enough space to allow acquisition of a fifth or sixth station. After lengthy lease negotiations with different developers and rental agents, a building location was chosen. The race was on to complete the building before the current leases expired.

Bonneville Goes Digital



Bonneville was fortunate to find a developer who was willing to modify a proposed retail building to accommodate a radio facility on the second floor. We had a spacious and efficient 26,000 square-foot space to work with. The building is located in an upscale office and retail complex in a suburban setting. This was an exciting project to be part of because we had all of seven months to break ground and move in, plus construction would occur through the fall and winter months. To meet this schedule the project was handled as a design-build, which means that the building was constructed throughout the design process. This process requires a great deal of flexibility in the initial phases of the project. The building itself is a tilt-up, but used a new and unique technique of imbedding brick in the face of the poured concrete walls, allowing the speed of construction and strength of a tilt-up, yet giving the appearance of an all-brick structure to match the finish of the retail and office park in which we are located.

What is tilt-up construction?

Tilt-up construction uses concrete panels that are poured on the job site. This eliminates the time to manufacture and ship the panels. The set panels are then set in place and tilted up into place.

The imaging production studio enjoys the same clean sightlines as the air studios.

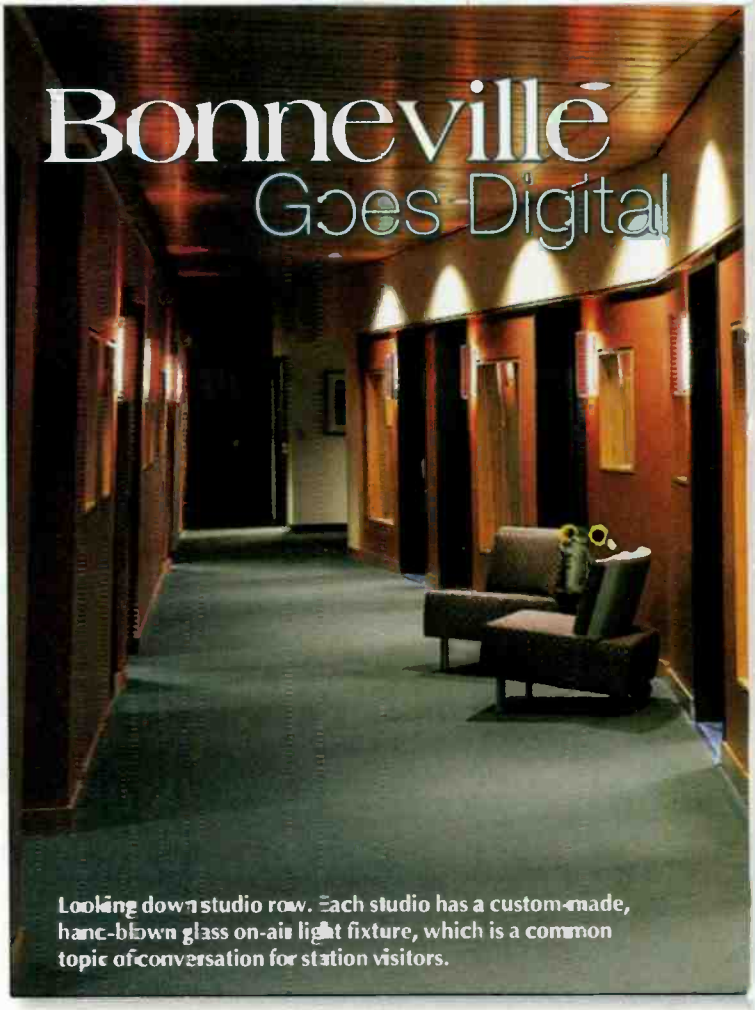
The attacks of 9/11 occurred during the design. In light of the changing social environment we decided to incorporate some extra security measures to ensure the safety of our staff. The most significant change was to secure the receptionist within a bullet-resistant area from which she can greet visitors and, either allow them through to a reception area or transact business through a window similar to that in a bank. Although at first we thought this might be a little impersonal or imposing it has worked out well. Our receptionist can screen visitors before she allows them to enter and she feels safe and secure when dealing with them. From her seat the receptionist can monitor all of the entrances and exits as well as all stairwells through a video security system.

After entering the reception area, access to the rest of the facility is through another set of secure doors, which further controls access to the suite. As you enter the facility the first look is down a long hallway we call Studio Row. All of the on-air studios, news and production rooms are along this hallway. The air studios are along the south side of the hallway, which provides each one with a large window facing the main street. Each pair of air studios shares a news studio that is between them. Along the other side of the hallway are the three production and three imaging studios. Outside each studio is a custom designed, hand-blown

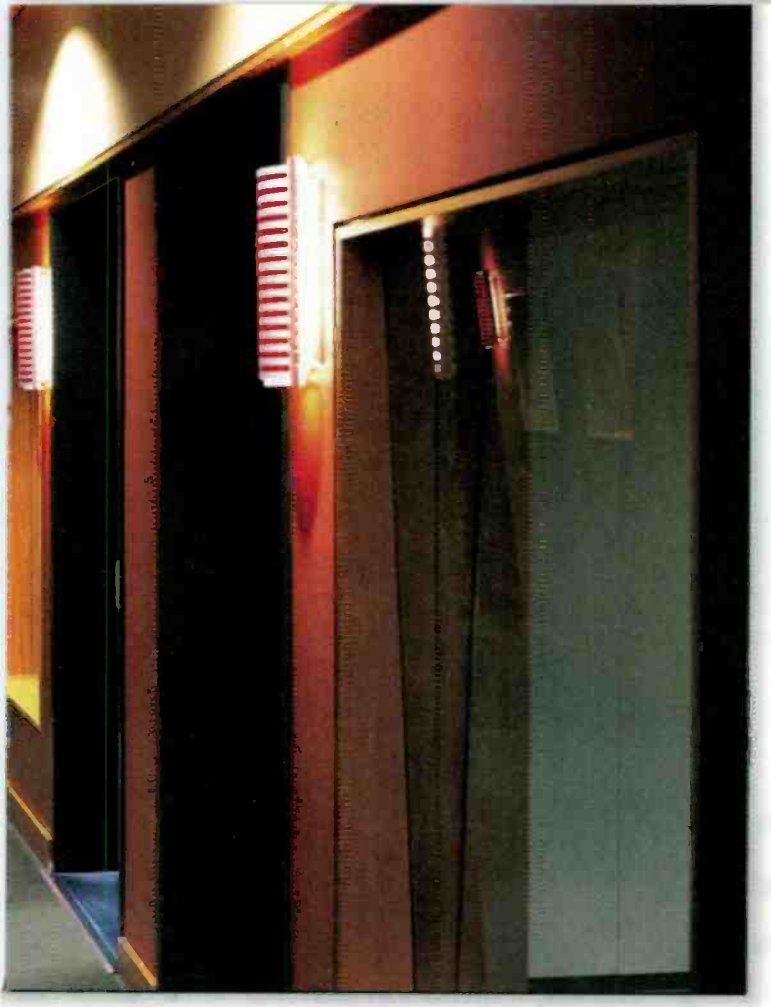
glass on-air light fixture. These fixtures attract a lot of attention especially from tour groups when an announcer opens a mic. Halfway down this hallway is a corridor that leads to the technical operations center (TOC). The TOC is heart of the facility and houses the hub of the routing system, telephone interfaces, audio processing, streaming servers, audio servers and enterprise servers. Large windows looking into the TOC accentuate the technical aspects of the facility. The first row of racks is on display. The most important criteria for equipment placement, especially in the first row, were the number of blinking lights on the equipment faces. Further down Studio Row is the sales area. We used an open floor plan with lots of windows in the surrounding offices to let in light and give a spacious feeling. Continuing around the suite brings you to the program and promotions area. Through here you return to the reception area, like a big figure eight.

Great expectations

Bonneville insisted on building a state-of-the-art facility that would incorporate the latest technology available. To that end we chose the Klotz routing platform and consoles for the facility. The power and flexibility afforded by a digital platform allowed us to simplify installation, which saved a significant amount in infrastructure wiring and minimized cable and labor costs. By using an integrated digital platform we can share resources such as telephone codecs and incoming audio feeds. The Klotz system automatically builds a mix-minus for each feed, which is controlled from the studios. The console can be configured to match the needs of each announcer and has proven reliable and easy



Looking down studio row. Each studio has a custom-made, hand-blown glass on-air light fixture, which is a common topic of conversation for station visitors.



to learn and use. The announcers, who work modern A/C, country, smooth jazz and adult standards formats, all adjusted to using the new equipment quickly.

One of the first things visitors in the studios notice is the number of flat-panel monitors at each announcer's position. The announcers are surrounded by flat screens supplying them with Internet, news, console levels, clock, phone recorder, automation system information and automation control. We designed the air studios to match each other and each is similarly equipped. In the case of a major failure any air studio can be quickly changed for another, any of the other studios can be changed into a backup air studio, or the audio automation can be directly routed to the processing bypassing the studios entirely. The digital routing platform makes these changes quick and relatively easy.

The biggest challenge in building the facility was integrating all the new digital equipment. At the time much of the ancillary equipment, STLs, telephone interfaces, phone recorders, exciters, audio processing and automation systems, though digital, were not ready for prime time. Features that were standard on the analog products were not functional or not included in the digital product, audio card drivers were in beta, and some equipment was

Project participants

Contractor: Murray Company
Architect: Tri Architekts
Dealer: RF Specialties of Missouri

and here...

WXPN/World Café
Philadelphia, PA
StudioHub+
connects the Logitek Numix consoles with RCS Digital Delivery in 7 studios.

WCBS NewsRadio
New York, NY
StudioHub+
connects the Klotz Digital Vadis platform with Prophet Digital Delivery in 7 studios.

StudioHub+ is here...

and here...

and here...

Radio Free Europe
Washington,DC
StudioHub+
connects the Klotz Digital Vadis platform with D.A.V.I.D Digital Delivery in 4 studios.

WTOP Radio
Washington,DC
StudioHub+
connects Pacific Recorders' VistaMax consoles with ENCO digital delivery in 3 studios.

Nassau Broadcasting
Southern New Hampshire
StudioHub+
connects Radio Systems' Millenium Consoles to Scott Studios' Digital Delivery in 9 studios.

and here...

XM Satellite Radio
Washington, DC
StudioHub+
connects the Klotz Digital Vadis platform with Dalet digital delivery in 80+ studios.

working in these prestigious broadcast facilities and hundreds of others across the country.

and here...

KRCW Radio
Santa Monica, CA
StudioHub+
connects the Klotz Digital Vadis platform with Dalet Digital Delivery in 7 studios.

WIP News Talk Radio
Philadelphia, PA
StudioHub+
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StudioHub+

is the CAT-5 shielded wiring solution for plug-and-play connectivity of every analog or digital device in your facility. Save time and money on and make your next installation fully digital-ready with StudioHub+. Call today for a free custom configuration and a certified installer in your area.

StudioHub+®

manufactured by
Radio Systems, Inc.
601 Heron Drive, Logan Township, NJ 08085
phone: (856) 467-8000 Fax:(856) 467-3044
www.radiosystems.com

Bonneville Goes Digital

The receptionist has a secure area to greet station visitors.

just not as reliable as the analog counterpart. However, the manufacturers were quick with upgrades and modifications to address these issues and the problems were resolved and the products were made fully functional.

Another major challenge was local building inspectors who had never seen the type of low-level audio cabling and fiber optics used in this facility. It took many meetings with the city planners, inspectors and contractors involved to resolve these issues to everyone's satisfaction.

Equipment List

360 systems Instant Replay
360 Systems Shortcut
A esis Monitor One Mkz
Audion Labs Voxpro
Best Power FE18KVA UPS
Burk ARC-16
Comrex Matrix
Corning Optical Fiber
Dell computers and flat-screen monitors
Denon DN-951FA CD players
Digidesign ProTools LE
Eventide DSP4000B Ultraharmonizer
Genelec 2029B monitors
Generac SD130
Gepco multipair analog cable
Klotz multipair digital cable
KlotzVadis DCII Consoles
KlotzVadis Router
Mosely Starlink SL9003Q
Neumann U-87
Orban Optimod 8400
RCS Master Control
Rode Broadcaster
Rode NT-1000
Sony MDS-12 Minidisk
Sony PCM-R500 DAT
Symetrix 528
Tascam CDRW 2000 CD recorder
TC Electronic Finalizer Express
Telos 2x12
Telos Zephyr

The routing switcher gets a new twist.

(About five twists per inch, actually.)

Everybody needs to share audio. Sometimes just a few signals — sometimes a few hundred. Across the hall, between floors, now and then across campus. Routing switchers are a convenient way to manage and share your audio, but will your GM really let you buy a router that costs more than his dream car? Unlikely.

If you need a routing switcher but aren't made of money, consider Axia, the Ethernet-based audio network. Yes, Ethernet. Axia is a *true network*. Place our audio adapter nodes next to your sources and destinations, then connect using standard Ethernet switches and Cat-6. Imagine the simplicity and power of Ethernet connecting any studio device to any other, any room to any other, any building to any other... you get the idea.

Routers are OK... but a network is so much more modern. With Axia, your ins and outs are next to the audio, where they belong. No frame, no cards, no sweat.

Scalable, flexible, reliable... pick any three.
An expensive proprietary router isn't practical for smaller facilities. In fact, it doesn't scale all that well for larger ones. Here's where an expandable network really shines. Connect eight Axia 8x8 Audio Nodes using Cat-6 cable and an Ethernet switch, and you've got a 64x64 routing switcher. And you can easily add more I/O whenever and wherever you need it. Build a 128x128 system... or 1024x1024... use a Gigabit fiber backbone and the sky's the limit.

Are you still using PC sound cards?
Even the best sound cards are compromised by PC noise, inconvenient output connectors, poor headroom, and other gremlins. Instead, load the Axia IP-Audio Driver for Windows® on your workstations and connect *directly* to the Axia audio network using their Ethernet ports. Not only will your PC productions sound fantastic, you'll eliminate sound cards and the hardware they usually feed (like router or console input modules). Just think of all the cash you'll save.

There's a better way to get audio out of your PC. No more consumer grade '1/8" connectors – with Axia your digital audio stays clean and pristine.

Put an Axia Microphone Node next to your mics and send preamplified audio anywhere you need it, over Ethernet — with no line loss or signal degradation

Put your preamps where your mics are.
Most mainframe routers have no mic inputs, so you need to buy preamps. With Axia you get ultra-low-noise preamps with Phantom power. Put a node in each studio, right next to the mics, to keep mic cables nice and tight, then send multiple mic channels to the network on a single Cat-6 cable. And did we mention that each Mic Node has eight stereo line outputs for headphones? Nice bonus.

Put your snake on a diet.
Nobody loves cable snakes. Besides soldering a jillion connectors, just try finding the pair you want when there's a change to make. Axia Audio Nodes come in AES/EBU and balanced stereo analog flavors. Put a batch of Nodes on each end of a Cat-6 run, and BAM! a bi-directional multi-channel snake. Use media converters and a fiber link for extra-long runs between studios — or between buildings.

An Axia digital audio snake can carry hundreds of channels of digital audio on one skinny CAT-6 cable. We know you're not going to miss soldering all that multi-pair...

With a little help from our friends.
A networked audio system doesn't just replace a traditional router — it *improves* upon it. Already, companies in our industry are realizing the advantages of tightly integrated systems, and are making new products that reap those benefits. Working with our partners, Axia Audio is bringing new thinking and ideas to audio distribution, machine control, Program Associated Data (PAD), and even wiring convenience.

Axia is already working with some great companies. Like Enco Systems, Scott Studios, Radio Systems, Bolsys Technology Group, and of course Telos and Omnia. Check AxiaAudio.com/partners/ to find out who's next.

Would you like some control with that?
There are plenty of ways to control your Axia network. For instance, you'll find built-in webservers on all Axia equipment for easy configuration via browser. PathfinderPC® software for Windows gives you central control of every audio path in your plant. Router Selector nodes allow quick local source selection, and intelligent studio control surfaces let talent easily access and mix any source in your networked facility.

Control freaks of the world, rejoice: intelligent Axia mixing surfaces give talent complete control of their working environment. Reconfigure studios instantly and assign often-used sources just where they're most useful.

"This sounds expensive." Just the opposite, really. Axia saves money by eliminating distribution amps, line selectors, sound cards, patch bays, multi-pair cables, and tons of discrete wiring — not to mention the installation and maintenance time you'll recover. And those are just side benefits: our hardware is about half the cost of those big mainframe routers. That's right... *half*. Once you experience the benefits of networked audio, you will never want to go back. AxiaAudio.com for details.

AXIA
A TELOS COMPANY

Bonneville Goes Digital

News studios are positioned between two air studios so that the room can be easily shared.

An interesting feature of our main conference room is the ability to use it as a performance studio. One corner of the room looks into a production room where we can mix a live band. The conference table folds up and rolls out of the way to allow more room. A great amenity provided by the office park where the studios are located is the use of a 1,444-seat auditorium. A fiber optic run between the office buildings provides an audio link to and from the auditorium. We feature live performances from major artists there and can broadcast them live or record them for later broadcast. Some artists we have presented include Kenny Chesney, Rascal Flatts, Josh Kelley, Steve Oliver and Jeff Lorber.

We are preparing to celebrate our third year in the facility. We are pleased with the building and the equipment has all settled in well. Maintaining close relationships with the suppliers and manufacturers was imperative throughout the installation and break-in period and are important to maintain. The flexibility and ease of use of the digital consoles and related equipment are greatly appreciated by the air staff. The design and layout of this facility is a source of pride for the rest of the staff. We often invite outside organizations to hold their meetings in our conference rooms. Clients are delighted to come in for recording sessions and tours are always welcome.

Rice is the engineering director for Bonneville International's St. Louis Radio Group. Photographs by William E. Mathis, Mathis Jones Communications.

Facility Focus

the technology behind Bonneville

Moseley Starlink SL9003Q

The Starlink used by Bonneville is a 950MHz-licensed STL with a 44.1kHz, 16-bit uncompressed linear stereo pair and a compressed ISO LII 384kb/s stereo channel for back-up to another STL system. The STL uses 32 QAM to convey an aggregate date rate of 1792kb/s in less than 500kHz of spectrum. Bonneville engineers considered using twin 44.1kHz stereo pairs at approximately 3Mbp/s at 128 QAM, but opted for the configuration described because 32 QAM is considerably more robust in hostile RF environs than 128 QAM.

www.moseleysb.com
805-968-9621

Tascam CD-RW2000

The CD-RW2000 that the Bonneville Group chose for its St. Louis site is the most advanced stand-alone CD recorder available. It's made for professional use with a host of desirable features. The production staff will appreciate comprehensive audio I/O, word sync input, call function for checking play cues, digital gain adjustment and digital fade in and fade out. A RAM buffer is included to ensure tight ID markers, and the SCMS code can be set via the user menu on the CD-RW2000. Digital gain adjustment allows the user to boost level adjustments without going back to the analog source, and the adjustable auto cue function lets one locate right to the start of actual audio, rather than the track ID.

www.tascam.com
323-727-7617

Comrex Matrix

The Comrex Matrix offers the ultimate in flexibility for remote broadcasts. Whether on regular telephone (POTS) service, ISDN lines, or GSM wireless networks, the Matrix can send high-quality remote audio to the studio from virtually anywhere. As a 15kHz POTS codec, the Matrix can connect with all Comrex POTS codecs, and with the optional ISDN module, the Matrix is compatible with most ISDN standards. When the remote site has no phone line, the optional GSM module allows the Matrix to transmit 7kHz audio with an internal GSM wireless phone. Along with the full line of Comrex codecs and telephone hybrids, the Matrix will help your station broadcast great-sounding audio from anywhere.

www.comrex.com
800-237-1776

Klotz Digital Workflow Implementation

Klotz Digital congratulates Marshall Rice and his team on their world-class facility. Through his vision and leadership and with a little help from Klotz Digital Workflow Implementation, Bonneville has ensured that its facility is truly a showcase with the efficiency and flexibility to meet the ever-changing face of radio.

With just the basic 5 Workflow Implementation concepts you to can be one step ahead of the crowd:

- Format Source and Preset Assignment
- Dynamic System-wide Routing
- Resource Sharing with Logic Follow
- Airchain Management
- System-wide Status monitoring

Workflow Implementation
= Return on Investment
+ Functionality + Efficiency + Security

www.klotzdigital.com
678-966-9900

The 1st annual

2004 Radio Innovative Product Reader's Choice AWARD

WINNERS

Introduced in 2004, the *Radio* magazine Innovative Product Awards were developed to honor excellence in new product development in the radio industry. The 2004 award winners were the finalists among the entries of several products introduced during 2004. The awards demonstrate the talent and commitment of the people in every aspect of development at each company, from concept through sales. The entrants were listed in the 2005 *Radio* magazine Buyers Guide that was included in the December 2004 issue.

Manufacturers submitted products in several categories, and the winners were selected by you, the *Radio* magazine reader, through an online form. The results were tallied at the end of February, and the winners were presented with their awards at NAB2005.

Look for expanded profiles of each of these products in upcoming issues of *Radio* magazine.

Facility Support

CircuitWerkes
Sicon-8

The CircuitWerkes Sicon-8 is a full-featured dial-up remote control. Based on voice recording technology, the Sicon-8 can speak in your staff's language because you record your own messages.

All of the I/O, including eight channels of relays, are included on the main board so there is no need to buy anything else to use the product. It is easily operated from any dial-up telephone, an auto-answer cell phone or an audio port. A free Windows-based client program, the Sicontroller, offers full access to all of the programming and control functions via the Sicon-8's serial port. Options available from its serial port include Internet access and X-10 device control. An expander chassis increases the total number of channels to 16.

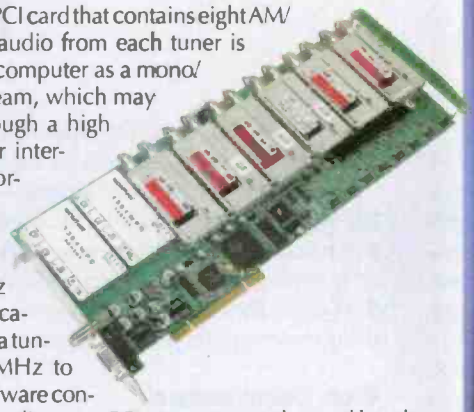
Data & Audio Storage

Broadcast Electronics
The Radio Experience

This is a software suite for RBDS and HD Radio. In addition to RBDS eight-character identifiers and 64-character text of title, artists, promotional messages, advertiser IDs, traffic bulletins and Amber Alerts, the data management software suite includes support for HD Radio's Supplemental Program Service (SPS) such as Tomorrow Radio. It also provides bandwidth provisions for navigational system data downloads to tuners. All functions and user controls for the software suite are accessible from a Web-browser content management tool.

Acquisition

Audioscience
ASI8702



The ASI8702 is a PCI card that contains eight AM/FM tuners. The audio from each tuner is presented to the computer as a mono/stereo record stream, which may be accessed through a high speed bus master interface. The AM portion of each tuner has a medium-wave tuning range of 520kHz to 1,750kHz. FM capabilities include a tuning range of 76MHz to 109MHz with software controlled stereo decoding. An RF connector on the card bracket supplies the AM/FM signal to the tuners. A DB-9 connector supplies a line-level mono version of each tuner signal. The full stereo signal is available from a 50-pin header. Driver support includes Windows 2000, Windows XP and Linux. Applications for the ASI8702 include broadcast monitoring and logging, advertising verification and content identification.

Transmission

Broadcast Electronics
4MX 50

The 50kW transmitter is based on a patent-pending modulation design. The transmitter is IBOC and DRM compatible. The PA modules are accessible from the front of the transmitter, while lift-off rear panels provide access to power supplies and all ac connections. Nighttime power capability is as low as 250W. A 15" XGA GUI is provided for operation and diagnostics, which are also available via IP. The overall power factor is greater than 0.98.

Audio TX STL-IP

By Rich Parker, GSEC

With telephone companies less willing to support dedicated equalized broadcast lines, and in some areas reluctant to setup new ISDN service, the challenges for getting audio from 'here to there' are becoming greater. At the same time, Internet network connections seem to be springing up everywhere—and available at attractive prices. As a statewide network, Vermont Public Radio produces live news forums and msucial events in various areas of the state; getting an ISDN line setup quickly and economically is not always possible, but at colleges or business locations there is almost always some kind of broadband IP service readily available.

The STL-IP from Audio TX is a 1RU device that provides a broadcast-quality audio link over an IP network, with low delay and quality comparable to dedicated copper lines. The unit has rear-panel XLR balanced stereo audio I/O as well as AES/EBU digital I/O, an additional port for external word clock input, and a standard Ethernet port for a 10/100 Ethernet connection to a network. A built-in Web administration tool allows configuration of the unit from a standard Web browser. Front-panel LED indicators show power and transmit and receive status.

There are also two additional ports—one for ancillary RS-232 data and one for GPIO (TTL) with four I/O and four status outputs/ control signals. Serial data can be transported in sync with the audio at speeds between 1,200b/s and 57,600b/s. The manual provides clear documentation for using these various ports for communication and control.

Get connected

The unit is shipped with a default access address of 10.0.0.10. The setup computer's IP address must be changed to that subnet, and a cross-over cable or a hub connects them both. Opening a Web browser to that IP address will open the initial configuration screen. It's fairly self-explanatory from there; the manual is quite good in that respect. When configuring two units, the IP address has to be switched back and forth on the setup computer several times, which is a relatively minor inconvenience. If the units are used in various locations this can become a bit time consuming. There is a handy utility that sends a broadcast message to the unit and displays its current IP number, in case the last setup is forgotten. My one complaint was that the interface worked well with Internet Explorer but was not as happy with Firefox, my preferred browser.

One aspect that might be important to broadcast engineers is that there really isn't much that is user-serviceable about the STL-IP. The manual is clear that "the unit should not be opened or serviced except by appropriately qualified personnel." Indeed, a quick peek under the hood reveals an embedded system board with flash memory storage. This is coupled to what appears to be a high-end audio interface and the appropriate output connections. The company rep was helpful at all points, including saying that for a custom installation there were certain customizations that could be done for a particular application; including my request for a pure software client to monitor the unit from a PC. I got the impression that this was not an entirely welcome request in general as the company's focus is on the hardware box; and in fairness, Audio TX makes another product called Communicator, which is software-only and designed to be run on Windows PCs. My feeling is that the STL-IP shares that pedigree to some extent.

Performance at a glance

- Low-delay (5ms) transmission
- Multiple encoding algorithms
- Connection rates from 24kb/s to 4.6MB/s
- Automatic link restart after loss
- Analog and digital audio I/O
- RS-232 for ancillary data
- GPI/O for four status/control circuits
- Web-based configuration screen
- Complete manual stored in the unit
- Field-upgradeable firmware

The basic setup adjusts the network IP settings and I/O settings for the digital or analog inputs. The clock rate can be generated internally, and the digital input section provides the ability to lock to the clock on the input. It is important that the clock frequency is set to match the transmit/receive connections for best performance. When I had a mismatch between sample rate and transmit rate I observed occasional digital ticks in the received audio. These clicks disappeared when I reset the rates to match.

For UDP and UDP multicast connections, two levels of FEC (forward error correction) can be set—50 or 100—with a directly corresponding increase in occupied bandwidth for the signals. For all connections there is also a configurable receive side jitter buffer, which can be set in 1ms increments up to five seconds to smooth out a troublesome network connection if needed.

To many from one

Each unit can send one audio source, or a choice of separate audio from left stroke right inputs, to six dedicated far-end units using the designated TX-0 through TX-5 configuration fields. Each unit also has one RX setup field for receiving audio from one other TX unit. Both RX and TX modules can be setup for outgoing or incoming TCP, UDP or UDP multicast connections by assigning a different port number to each TX field. This was a bit confusing to me at first, but it soon became obvious—the audio transmit side takes the source audio and sends it to the network interface—then ports TX-0 through TX-5 can be configured to either initiate an outbound TCP or UDP connection or to accept incoming connections from another STL-IP unit; this unit can itself be set to receive audio by accepting an outside IP connection or by initiating one. Setting it up for UDP multicast allows audio to be sent to an infinite number of far-end units on a multicast-capable network.

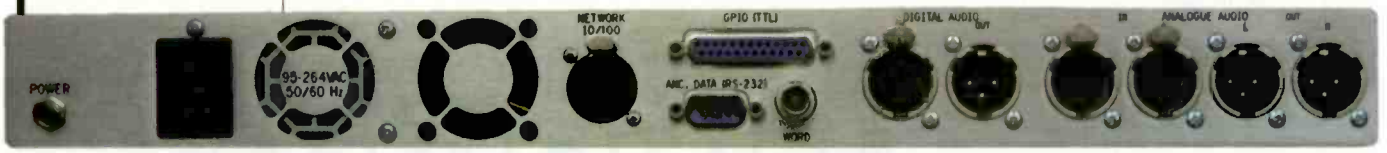
On a dedicated LAN in our station I sent full bandwidth linear audio from a 44.1kHz digital source to a unit in a different part of the building with almost no detectable delay. Sending audio around a campus or site with a dedicated network would certainly be an acceptable way to avoid running lots of audio cable—particularly in areas where a good network infrastructure already exists—and there would be no stranded investment in cabling if either end needed to be relocated.

Setting the various audio parameters is done from the same Web interface. Choose anything from 24-bit, 96kHz PCM linear stereo audio using 4.096Mb/s of bandwidth, down to 16-bit, 22kHz Layer 3 mono at 24kb/s bandwidth with nearly everything in between—MPEG L2, L3, J.41 and ADPCM at

various combinations of sample rates in mono (L,R or L+R), dual mono, joint stereo (L2/L3) and stereo.

With the cooperation of a wireless ISP who shares our building we setup a test over a Wi-fi connection. One STL-IP was placed at a concert hall several blocks away and connected via a DSSS wireless link back to another STL-IP at the studio. We sustained a full 44.1kHz PCM linear signal at 1.504Mb/s. This was the limit of our link because of power and antenna configurations, which could be easily improved. We then setup a full-duplex link at 44.1kHz MPEG L2 Joint Stereo at 384kb/s full duplex between the sites and the audio quality was excellent—better than the ISDN link we had previously used for a concert.

For one last extreme test I took one of the units home to try on a 256kb/s up, 512kb/s down DSL connection with a Linksys WRT54G wireless router. For the first test there were some nasty dropouts on the connection. I upgraded my router to the third-party HyperWRT firmware and used the added traffic shaping feature to give priority to the STL-IP connection on one of the hardware ports and installed the latest upgrade to the STL-IP software. All of the packets had to traverse at least 21 hops from my house to the studio yet I was able to establish a link back from the station for a 44.1kHz, L2, 384kb/s joint stereo signal with only rare drop-outs. Because of the number of hops I then set the receive jitter buffer to 100ms to smooth the connection and I left it running for most of a weekend with no perceptible loss of audio—a pleasant surprise because this is the same data rate we use over a dedicated



The rear panel is loaded with connection for audio, control, word clock and the IP connection.

T-1 STL to our transmitters now.

You will have to evaluate your particular network link to determine if it is robust enough to sustain a full-time connection when using these units for an STL, but on dedicated networks there would be no problem shipping high-quality, low-delay audio. Given the wide variety of protocols, sample rates and bandwidth settings, it should be possible to find just the right combination that will work reliably in just about any situation, particularly for emergency backup, even over the Internet. With the falling price and increasing availability of high-speed IP links, this type of system appears to be the wave of the future for getting sound from here to there—a welcome addition to the engineer's bag of tricks.

Parker is director of engineering for Vermont Public Radio.

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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.*

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.

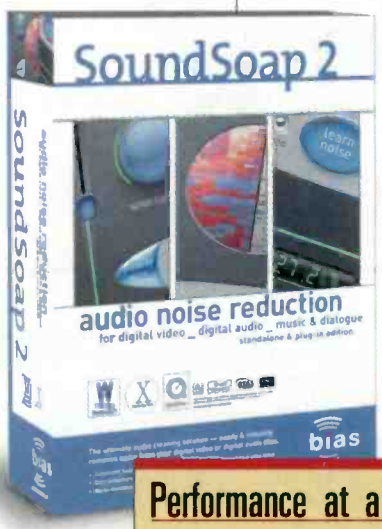
We know IBOC

Part of our continuing DAB Answer Series, *Insight to IBOC* brings you the inside information on specific technology elements of IBOC throughout the year. Look for the latest installment inside this issue.

Bias Soundsoap 2

By Gordon S. Carter, CPBE

Soundsoap 2 is the latest upgrade to Bias' family of software designed to clean audio. It runs as a stand-alone program or as a plug-in for one of the many popular audio editing software packages available. However, it will only allow installation on Windows XP or Mac OSX. It will not install on earlier operating systems.



Soundsoap 2 is noise removal software. It will not fix the problems of poor equalization or poor equipment, but it is designed to remove hiss, hum, buzz and clicks. Bias has other products to deal with other audio problems.

I evaluated Soundsoap 2 using a laptop PC running Windows XP Pro with Service Pack 2 installed. I used the software in stand-alone mode and as a plug in for Adobe Audition 1.5.

Performance at a glance

- Easy to use
- Reduces clicks, crackles, hiss, hum, buzz, rumble and most other noise
- Works stand-alone or as a VST, RTAS, Audio Units plug-in
- Works with most audio editing software
- Runs on Windows XP or Mac OSX

Getting started

When the program is first run, the window that opens looks a bit like a radio. The controls are few and it is easy to understand their function.

On the left of the screen is a vertical slider called Remove Click and Crackle. This does exactly what it says it does. Use it in the manual mode to get rid of record clicks and similar problems.

To the right of the slider is a knob called Noise Tuner. To the right of that is an oval window split into left and right halves. To the right of that is another knob called Noise Reduction. The two knobs are used together to tune out and reduce broadband noise such as tape hiss. The window gives a visual representation of the audio, the left half being before Soundsoap is applied and the right half being after.

To the far right of the window is another vertical slider called Enhance. The Enhance slider is a multiband compressor with a bass and treble boost to raise lost frequencies from poor or old recordings.

Below the knobs and the oval window is a series of buttons. The Preserve Voice button modifies the automatic processing algorithm to minimize the effect of the noise reduction on voice. Music tends to mask the effect of the noise reduction, so it is not necessary on music.

Next is a series of three radio buttons marked Broadband. They are Off, On and Noise Only. One of these buttons may be selected to activate, deactivate or monitor the characteristic of the filtering of the audio.

At the far right of the oval window is a button marked Remove Rumble. This function filters low-frequency noise. To the left of that is another series of three radio buttons marked Remove Hum. They are marked 50Hz, 60Hz and Off. Use these to select the type of hum filter.

At the bottom of the Soundsoap window is a series of controls to control the play of the audio, show the progress of the audio and the elapsed time. There is also a button marked Apply to apply the filtering.

Feel the power

The most powerful button in the Soundsoap window is in the middle of the oval button window. It is marked Learn Noise. To use it, simply open an audio file, press the Learn Noise button and then play the audio. As the file plays you will hear the audio being modified and the buttons and controls will change as the filtering is applied. For audio files that have changing noise characteristics, break the audio into segments using the Edit pull-down. By setting a Set Point 1 and a Set Point 0, specific sections of audio can be affected. There are also controls on the timeline that users can grab to divide the file into areas for different levels of processing.

I tried Soundsoap 2 with an old 78 record I had as a kid. It was a recording of train sounds with a station call of the Pennsylvania Railroad's famous Broadway Limited. I played it for hours on end while playing with my trains. One day I was pulling out the record and it stuck a bit and as I pulled harder a piece broke off. By this time I was old enough to work with glue, and actually managed to glue the piece back on. From that time on the record always had a click-click as it passed over the glue joints. There was also a general layer of surface hiss and noise from repeated mishandling. My wife recently pulled out this record and I tried to put it on a CD for my grandson who is a budding train fan as well.

The program screens are similar whether it is used stand-alone (left) or as a VST plug-in (right).

My earlier attempts to clean up this record were moderately successful, but I could never really get it to sound as good as I would like. I tried it on Soundsoap in the automatic mode and was amazed at the results. The click and hiss were totally gone and there was no audible change in the audio. This is particularly amazing because a good part of the audio is steam escaping, which is hard to distinguish from white noise. I tried using the manual controls and was able to achieve the same results, but using the Learn Noise button was much faster. I was not able to improve on the results the program came up with.

I tried another audio file, which was an interview originally recorded on a portable cassette recorder in the 1970s with a hand-held microphone. Soundsoap was able remove the tape hiss, but, as expected, did nothing to improve the quality of the desired audio.

In summary, Soundsoap 2 is an excellent product for what it does. It is priced low enough that even those only needing to clean a few files can justify the purchase. If you are in a position to be restoring or cleaning a number of audio files, it is a must-have piece of software.

Carter is chief engineer of WFMT, Chicago.

Bias

P 800-775-2427
F 707-782-1874
W www.bias-inc.com
E sales@bias-inc.com

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.

Reader Feedback

www.beradio.com

All uphill for IBOC

Nice work in the April Viewpoint. I just read it. Your point is well taken: who is going to promote digital radio to the masses? Ibiquity is a technology broker. Radio has a big enough job selling itself to advertisers. Given the marketing challenges, I have to wonder why a radio broadcaster that isn't invested in Ibiquity or equipment manufacturing would invest in HD Radio?

Meanwhile, what happens when every other medium has higher quality audio than radio? We're already trying to get multiple channels out of a limited bandwidth.

I'm sure broadcasting will be around for a long time, but we're so far behind the curve that I hope there's still a strong future!

Chip Morgan
president, CMBE
Bridgport,VT

Electron emission

I have to say thanks. I was surprised by a boost of visitors this week until I noticed that you chose my website as the Website of the Week (Radio Currents e-mail newsletter, April 11). I was even more surprised when I saw that it was a radio broadcast site that placed the link. Your site at beradio.com is a new place on the Web for me to visit.

This was more interesting to me once you know that my profession is a broadcast engineer at a regional radio/TV station in northern Holland (www.omropfryslan.nl).

Henk Dijkstra
webmaster
The Cathode Ray Tube site
members.chello.nl/%7Eh.dijkstra19

On-track career

I really enjoy reading *Radio* magazine. I look forward to every issue. You always have great articles, and I learn something new every time. I really enjoy the Facility Showcase articles. I have built a few studios and these articles always give me new ideas.

Why have I never seen an article or a feature on developing the next generation of radio engineers? I am a 27-year-old man who wants to be a radio engineer more than anything. My ultimate goal is to be a chief engineer. I worked for Clear Channel as a staff engineer for five years and I am also going to a community college to study electronics and computers.

I had some practical experience while working for Clear Channel. I went to work for another company, but it didn't work out. The Clear Channel CE wanted me back but the GM froze the budget. I also do some contract engineering and have built several studios in Sacramento for some LPFMs. I am the contract CE for a high school radio station.

I started in 1996 as a board operator for KSTE, which was then owned by Chancellor, which also owned KFBK-AM, KHYL-FM and KGBY-FM. I was with those stations for nine years and then Clear Channel bought the group. I worked my way from board operator to staff engineer for Clear Channel until I left in 2005.

I have several SBE Certifications and am eager to learn. I don't have a lot of transmitter experience. We had a contract engineer do that for us at Clear Channel. I would like to see more broadcast-engineer mentoring programs and more stations offering internships in engineering. I have approached some engineers about mentoring, but they don't have time or see a young guy like me as a threat, probably because of the fear of showing me everything that he knows will lead his employer to hire me for a lower wage. I don't want to take anyone's job, I just want to learn more.

I have approached some contract engineers and I get the same response.

I would like to see an article in your magazine that deals with preparing the next generation of broadcast engineers and what they need to know. The gray beards will be retiring some day and I feel it is important now to start training the next generation of broadcast engineers. I would also be interested in any advice that you would have for me.

Thank you for your time in reading this, and your magazine is awesome.

Tim Parish, CBT CBNT CRO
timparish@hotmail.com
Sacramento, CA

comments?
radio@primediabusiness.com

Looking to touch your listeners?

APHEX MODEL 230 MASTER VOICE CHANNEL

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Every element of the Model 230 is superior to any other voice processor's similar function...

- The RPA™ tube preamplifier provides warmth, image and detail.
- The Easyrider® Compressor controls output levels without pumping or breathing.
- The Logic-Assisted™ Gate won't false trigger or cut off words.
- The Split Band De-esser effectively cuts sibilance without dulling.
- The Big Bottom® and Aural Exciter® add resonance, depth, presence and clarity.
- The parametric EQ takes care of any frequency anomalies with surgical precision.
- Post-processing insert point, -10dBV and +4dBu analog outputs, 24/96 digital outputs on AES3, S/PDIF and Optical, word clock I/O, and a cough switch with soft mute allow the Model 230 to be easily interfaced into any system.

So if you *are* looking to touch your listeners, you should be looking at the Aphex Model 230.

www.aphex.com

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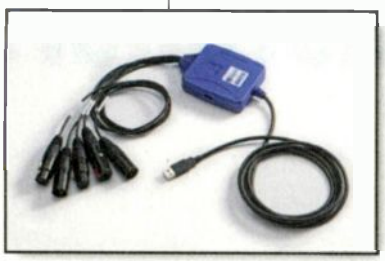
New Products

By Kari Taylor, associate editor

www.beradio.com

USB audio interface
Digigram



UAX220: This USB audio interface is supplied in a 17cm x 22cm bag. The unit features two balanced analog input and two balanced analog outputs on Neutrik XLRs, 24-bit/48kHz resolution, a dynamic range greater than 103dB (A-weighted) and a 1/4" headphone output. Once connected to a USB port on a computer (Windows 2000 and XP, Mac OS X, Linux), the unit is automatically recognized as a USB audio-compliant device without needing additional drivers. External power is not required.

703-875-9100; fax 703-875-9161
www.digigram.com; input@digigram.com

Compressor limiter
DBX Professional Products

162SL: Based on the Blue Series 160SL compressor limiter, this device offers a maximum input level of 24dBu balanced, and its connectors are XLR, 1/4" electronically balanced/unbalanced, RF filtered. The unit's bandwidth is greater than 200kHz. The system provides a dynamic range of greater than 118dB and a signal to noise ratio of +4dBu. The threshold range for the compressor is -40 to +30dBu and the limiter's threshold range is +4 to +24dBu.

801-568-7660; fax 801-568-7662
www.dbxpro.com; customer@dbxpro.com

Codec pre-conditioner
Harris

Neustar Ultralink: Ultralink improves audio performance and quality across platforms that use data reduction or compression, including HD Radio, DRM, DAB, audio over ISDN, satellite uplinking and Internet streaming. The pre-conditioner uses a determined amount of bits to eliminate noise and reduce resolution on audio as it passes through a codec so the true audio signal is cleaned and properly conditioned before transmission.

800-622-0022; fax 513-459-3890
www.broadcast.harris.com; broadcast@harris.com

Flat-screen mounting arms
Innovative Office Products

7500, 9120 and Arc View: Model 7500 supports one monitor up to 42 pounds, tilts more than 200 degrees, offers nearly 16" of vertical movement, extends 27" and folds into 3" of space. Cables are integrated inside the arm. The 9120 dual side-by-side pole mount gives users up to 14" of extension on the standard arm, with a tilt mechanism that allows greater than 200 degrees of tilt-upward, downward as well as portrait to landscape viewing modes. It provides 200 degrees of rotation at two pivot points. The Arc View flat panel mounting system features an arched pole, to support as many as four-flat panel monitors, ranging from 2' to 6' long. The system is specifically designed for users needing a bank of monitors that can be arranged easily in cockpit fashion.

800-524-2744; fax 610-253-9521
www.lcdarms.com; sales@LCDarms.com

Broadcast furniture
Omnirax

Innova: CAD/CAM manufacturing processes are used in the furniture line to ensure precision fit and finish, repeatability and ease of modification. Layouts are fit tested and photo-documented prior to shipment. Surfaces are typically high pressure laminate with a variety of substrates. Other options include solid surface and Marmoleum for countertops. Edges are finished with matching or contrasting tee-molding for comfort and durability.

800-332-3393; fax 415-332-2607; www.omnirax.com; info@omnirax.com

Audio processor
Orban

Optimod-FM 8400 Signature series: This series features 10 European presets and a newly designed front panel. A new pointing device and large color LCD display make it easy to navigate through the 8400's menus. The device offers the same basic processing structures as the 8200. New distortion cancellation techniques and overshoot compensation for the 15kHz lowpass filters yield clean and tight control. All clipping occurs at 256kHz sample rate, and the clippers are fully anti-aliased. The processor offers TCP/IP networkability as well as Orban's traditional dial-up PC remote control.

510-351-3500; fax 510-351-0500
www.orban.com; custserv@orban.com

Portable recorder, wave editor
Edirol

R-4: Use the 40GB hard disk drive for extended recording and record four channels at once. The device can record 17 hours at maximum sound quality or 58 hours at CD quality. The portable recorder can also edit waveforms on the recorder itself. Choose 16-bit or 24-bit quantization and a sampling rate of 44.1kHz, 48kHz or 96kHz. Save data as WAV files. The four XLR/phone combo jacks come with switchable phantom power and give users a choice of mono, stereo, stereo × 2 or four-channel recording. Digital input and output is also provided. The recorder can also write the required metadata to comply with the BWF standard.

360-594-4273; fax 360-594-4271; www.edirol.com; sales@edirol.com

Transmitter building
Balsys Technology Group

Plug and Play: Each precast concrete building is custom sized and configured for the specific CP and its unique requirements. Electrical and physical specifications adhere to local codes. All equipment is installed prewired and tested at the Balsys Orlando facility. When delivered to the final site it is placed on a user-supplied pad. Electrical and transmission lines, phone lines or STLs are connected, the system is proofed and the job is done. This process maximizes efficiency, and minimizes on-site time.

407-656-3719; fax 407-656-5474; www.balsys.com; balsysflorida@cs.com

Fanless PC
Hush Technologies

Hush ATX: This fanless PC uses heat dissipation technology for the CPU, Northbridge and GPU to keep the computer quiet. Its front panel features a power button, HDD LED, optional I/R, two firewire, two USB, and two 3.5mm audio jacks.

802-244-8302; fax 802-244-7938
www.logicsupply.com; info@logicsupply.com

Cart replacement
OMT Technologies

Imediapix: This cart replacement software is useful for live assist stations needing a commercial, ID and promo playback system. An infinite number of categories can be created.

888-665-0501; fax 204-783-5805; www.omt.net; omt@omt.net

Vector network analyzer
Rohde & Schwarz

ZVB: With analog and digital interfaces this analyzer offers dual-channel signal processing and generation, recording and replaying of audio signals, a sampling rate up

to 192kHz and comprehensive FFT analysis. Other features include user-programmable filters for analyzers and generators and a jitter analysis and interface tester. The unit features a vector network analyzer, frequency ranges of 4GHz and 8GHz with two or four test ports and balanced measurements, mixed-mode S parameters.

410-910-7800; fax 410-910-7801
www.rohde-schwarz.com; info@rsa.rohde-schwarz.com

Upgrades and Updates

Broadcast Electronics has released a software update for the Audiovault digital audio system. The new version includes a text data interface and dozens of new failsafe features. Version 9.0 improves TCP/IP and network delivery with a total of 37 enhancements. (*www.bdcast.com*) ... In addition to the Standard and Enhanced Apt-x algorithms, the **APT** Worldnet Rio now incorporates MPEG Layer II and III for increased compatibility with other audio codecs. The system is also now available with an SNMP option for remote operation. (*www.aptx.com*) ... The **Sonifex** S2 mixer now offers a 53-LED stereo meter panel. The S2 is a small format, modular digital I/O analog mixer. (*www.sonifex.co.uk*) ... The **HHB** Portadrive, able to record more than 75 track/hours of uncompressed 24-bit/48kHz audio onto a removable 40GB hard disk, can be updated with version 1.4 software. Enhancements of the software include disk mirroring, USB target mode, IXML support and improved auto-shutdown modes. (*www.hhbusa.com*) ... **Digidesign** has released the EQ III Digirack plug-in as a free download. This high-resolution, double-precision 48-bit EQ plug-in is available for Digidesign Pro Tools and Avid systems. EQ III supports TDM, RTAS and Audio Suite formats, and is available in single-band, four-band and seven-band configurations. (*www.digidesign.com*) ... **Nautel** and **Burk Technology** have partnered to deliver the One Connect interface, which provides a direct serial link between Nautel transmission equipment and Burk Technology's GSC3000 transmitter remote control system. One Connect provides integrated remote monitoring and control of the Nautel V10 transmitter with the GSC3000 using a serial connection. (*www.burk.com, www.nautel.com*) ... **Pristine Systems** CDS32 version 3.0 includes support and new features that allow stations to integrate with the PRSS Content Depot. The newly introduced File Express will retrieve audio files from a Content Depot Storage Receiver and import them into the station database using each file's Cart Chunk data. (*www.pristinesys.com*) ... Clients of **Media Monitors** services will be able to view the name of the ad agency of record for advertisers, as well as target demo for a particular spot or campaign. This data will be applied to selected radio stations and newspapers being tracked daily by Media Monitors. (*www.mediamonitors.com*) ■

Music, sound effects
Sound Ideas

Series 6000 Ext V:, Elements Cafe, 9 and Elements Cafe, 10: The General Series 6000 now includes 10 new audio CDs and more than 1,200 new effects. The Series 6000 Extension V features: Drag Racing, Paintball and NASCAR and Freestyle Motocross effects. Elements Cafe, 9 offers more than 420 imaging elements on one audio CD. Elements Cafe, 10 is a blend of more than 430 imaging elements on one audio CD.

800-387-3030; fax 905-886-6800
www.sound-ideas.com; info@sound-ideas.com

Talkback intercoms
Sonifex

TB-6D, TB-6R: Initially designed to interface with the S2 mixer, the TB-6D desktop and TB-6R rack-mount units can be used for general inter-studio talkback. There are also versions that work with the Sonifex Station Master studio switcher (TB-SD and TB-SR). Each studio has a desktop, a rack-mount or mixer-mounted intercom containing a row of six switch buttons. Each switch button connects to another studio and routes the presenter's audio to it.

207-773-2424; fax 207-773-2422
www.independentaudio.com; info@independentaudio.com

Tape label makers
Dymo

Rhino Pro series: The Rhino Pro 1000 labeling tool features one-touch hot keys flagging and fixed length labels, plus dedicated keys for common audio electrical and safety symbols. The label maker works with Rhino Pro labels 1/2" wide. The 3000 labeling tool works with heavy duty Rhino Pro labels up to 1/2" wide. The 5000 meets ANSI/TIA/EIA-606-A standards and features hot keys for automatic formatting of labels for wires and cables, terminal blocks and patch panels. The 5000 works with Rhino Pro labels up to 3/4" wide.

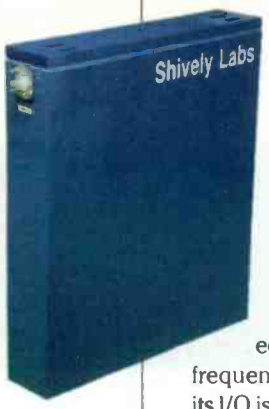
800-426-7827; global.dymo.com

Compact mixer
Rolls

MX152 Mixmate: This half-width, 1RU mixer can handle two microphones and three stereo inputs. Each microphone channel has a level and tone control. Stereo inputs one and two have level adjustments and share bass and treble controls, while stereo input three has a level control only. The mic inputs are on balanced XLR jacks, and the stereo inputs and main outputs are RCA jacks. An included 12Vac adapter powers the unit. Six rear-panel DIP switches provide 12Vdc phantom power to the individual inputs; sum the program material of input three to mono; sum the overall output to mono; provide priority ducking to input three; and configure mic input one as a paging input by ducking the other microphone and the stereo inputs one and two.

801-263-9053; fax 801-263-9068
www.rolls.com; rolls@rolls.com

Bandpass filter
Shively Labs



Series 2600: These bandpass filters feature a footprint 1/3 the size of filters with comparable performance. Standard features include configurations of three and four resonators, low loss and high isolation and natural convection or forced-air cooling. This filter is useful for low-power and IBOC installations and those who have minimal space in their transmitter equipment compartment. The filters frequency range is 88MHz to 108MHz and its I/O is 1-5/8" female flanged.

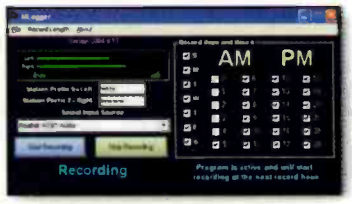
888-SHIVELY; fax 207-647-8273
www.shively.com; sales@shively.com

Bandpass filter
Bartley Machine & Manufacturing

Ultra-Q series: Eliminating RF interference in VHF, UHF 800MHz and 900MHz applications, the active bandpass filter system consists of a bandpass filter in a 19" rack-mountable unit, software for PC use and a power supply. These filters offer high selectivity by eliminating adjacent-channel interference and offer programmable gain or attenuation. After the parameters are set, the unit is disconnected from the PC and all the information entered remains stored in the filter's nonvolatile memory.

978-388-0085; www.bartleym.com; mbartley@bartleym.com

10-channel logger
Digital Juke Box



Multi Station Audio Logger: Users can record as many as 10 audio streams in mono on a PC with this logger. The unit also records to MP3 files and can record 15-, 30- or 60-minute files. Users can select days, hours, bit rates and record sample rates. The logger uses multiple inexpensive audio cards and can be used with any PC with Windows XP or Windows 2000 with a 256MB memory and at least a 40GB hard drive.

740-282-SOFT; fax 443-241-2514
www.digitaljukebox.com; sales@digitaljukebox.com

CD, DVD duplicators
Disc Makers

Reflex Max and Reflex Ultra: The Reflex Max and Reflex Ultra towers are enclosed in silver cases with cooling vents on the front and side panels and a system of cooling fans inside to keep drive temperatures as much as 30 degrees cooler than other units. This prevents drives from overheating and shutting down. The towers are built with 52× CD-R and 16× DVD-R/48× CD-R Plextor drives. An optional USB connection package is available that allows users to send disc images directly from their PC or Mac to the Reflex duplicator.

856-661-5532; fax 856-661-3455
www.discmakers.com; andre@discmakers.com

Sound library software
Creative Network Design

Netmix Pro: This software offers Windows XP integration with Avid ProTools, enabling ProTools and Avid editors to search for sound effects and production music quickly, and transfer sounds with the click of a button into Pro Tools, Avid and many other editing environments. Users can search, audition, track and manage audio files. With playback up to 24-bit and 192kHz, the software can be scaled to 100 users with a customizable server database.

866-511-7006; www.creativenetworkdesign.com
info@creativenetworkdesign.com

Offset antenna
Patriot Antenna Systems

2.4 Meter antenna: This antenna is modeled after the 3.8 and 3 meter antennas. The system provides cross-pol and sidelobe rejection and is available in single or dual optics. Like the 3.8 and 3 meter systems, the 2.4 will be a petalized design that eases installation and reduces shipping charges. The antenna feeds are interchangeable, which allows users to switch between C, Ku, Ka and X-Bands in a matter of seconds.

800-470-3510; fax 517-629-6690
www.sepatriot.com; info@sepatriot.com

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month: Field Report, page 50.

Gordon Carter, CPBE
Chief Engineer
WFMT-FM
Chicago

Carter has been employed by WFMT since January 1969, and has been chief engineer since 1995. He has been involved with three studio moves and three transmitter moves. During the last studio move, he was responsible for the physical, electronic and acoustic design of the facility. In addition to radio engineering, he has a keen interest in trains, real and model.

Radio
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Written by radio professionals
Written for radio professionals

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Sign Off

By Kari Taylor, associate editor

www.beradio.com

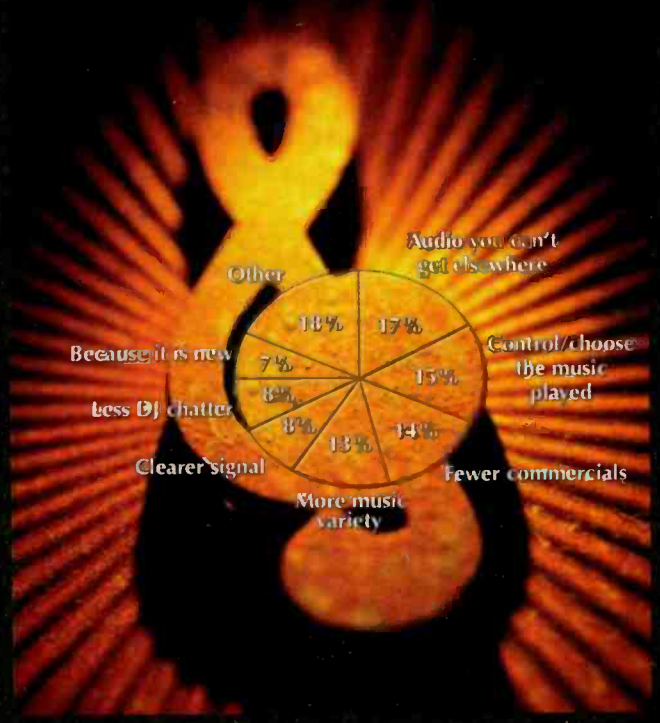
Do you remember?

The Harris Phase Fixer consisted of two compact rack-mounted units. The first, a pilot encoder, injected an inaudible pilot signal on the audio as it was recorded onto tape. The second unit was the time base corrector. When an encoded tape was played, the time base corrector was automatically enabled, electronically reducing stereo phase error and flutter to insignificant levels. Tapes that were not encoded were played normally.

According to ads, the Phase Fixer improved the on-air sound by eliminating cancellation drop-outs and retrieving missing musical notes. The system used existing cart recording and playback equipment, and carts without modification. In 1985 Harris advertised that the source material could sound five to 10 times better. One Phase Fixer system could accommodate all the tape source machines at a station.

Sample and Hold

What is the main reason you listen to Internet radio?



Source: Arbitron/Edison Media Research, Internet and Multimedia 2005, The On-demand Media Consumer.

That was then

This photo of the NBC Master Control Room at 111 Sutter St. in San Francisco was taken sometime between 1927 and 1942. At the extreme left is the Morse code operator's position, where the NBC Pacific Division communicated with New York, Chicago and other cities in the network. In the center is a panel containing the studio amplifiers, bridging equipment, power and testing equipment. This area also houses a panel with the incoming broadcast lines and audio lines from other points in San Francisco. On the far right wall are generator controls with a cable cabinet. To the right of that is the supervisor's desk, and the dc switchboard is at far right.

Source: www.adams.net/~jfs/, San Francisco Radio History Photo Archive

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