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Assume control

Choosing your next on-air console

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A PRIMEDIA Publication

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THE RADIO TECHNOLOGY LEADER
Radio Magazine
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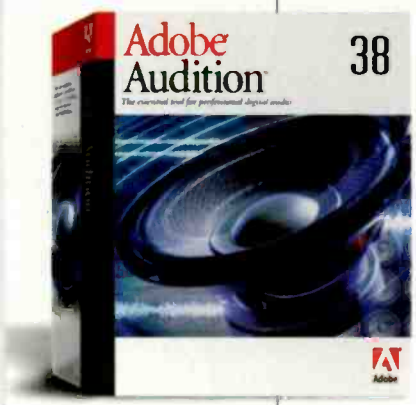

Field Reports

ON THE COVER:
Attention: we have assumed control. The on-air console has evolved beyond a simple mixer. It now serves as the central routing controller for the facility.
Cover design by Michael J. Knust.

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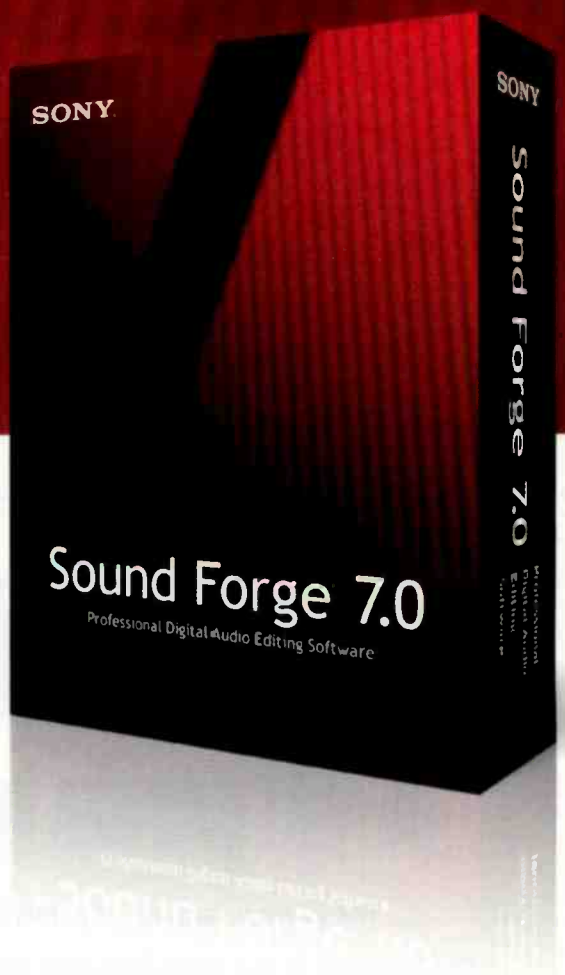

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Currents Online

Highlights of news items from the past month

FCC Looks to Smart Radios

The Commission is considering the technical and operational flexibility for service providers particularly in rural and underserved areas.

Arbitron Eyes Houston for PPM Trial

Discussions are underway to determine market interest in the project.

Satellite Radio With Pictures?

XM and Sirius will debut systems that transmit video to automobiles using the same infrastructure.

Sony Introduces New MD Format

The unit records as much as 45 hours of music on one disc and is backward compatible with existing Minidiscs.

Site Features

IBOC Update E-newsletter

A new, bi-weekly e-mail newsletter dedicated to IBOC/HD Radio. Read the latest issue now and subscribe online.

NAB Insight E-newsletter

Get all the latest information about the NAB2004 convention, the sessions and the products in our weekly e-mail newsletter. The first issue e-mails in March.

The Engineer's Notebook

A handy reference collection of tools and equations

Online Article Archive

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The Demo Room

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The digital age has arrived

The beginning of January saw the introduction and first commercial sale of consumer IBOC receivers in the United States. This day brought forth mixed feelings across the radio industry. The IBOC supporters see it as another step forward in the transition to a terrestrial digital system. The IBOC opponents view it as another blow to the stake already being forced into the heart of radio. While I don't see a decisive mark for or against broadcasters with the January events, I am seeing a raised consumer awareness that includes some unfortunate misconceptions.

Having consumer receivers available removes the chicken-or-the-egg debate for acceptance of the service. While there are only a handful of stations transmitting IBOC signals, it is possible to hear them now. Granted, the receivers are not available everywhere yet, but it has to start somewhere. If we draw a parallel from the proliferation of RBDS to a potential acceptance of IBOC, we're already one step ahead with IBOC. I don't recall the same fuss being made about RBDS that I am seeing with IBOC over the past weeks.

National news magazines, local and national newspapers and news websites all carried something about the introduction of the IBOC receivers. Most of the stories I read all had the same theme, mainly dwelling on the press release points issued by Ibiquity. The promise of reduced interference, less noise, enhanced services (data) and clearer sound are bound to attract the interest of consumers. Unfortunately, consumers don't understand the technology, so the anticipated drastic improvement may be a disappointment if it is not actually experienced.

I read several consumer reviews of the event, but an article in *Time* magazine seems to carry the common theme. An article in the Jan. 12 issue repeats the IBOC dogma that the reporter was fed. I'm sure that she had no idea what some of the statements meant. The point that really made me shake my head was the use of the term "high definition radio." The IBOC technology developed by Ibiquity has been branded HD Radio, which is a trademarked name. I have never heard Ibiquity refer to the technology as high-definition radio. I doubt many broadcasters would call it that anyway. Considering that the technology is based on a low bit-rate transmission scheme with a perceptual audio encoder algorithm, it's technically crippled from the start. The HDC audio encoder sounds exponentially better than the previously used algorithm, but there are limitations.

The *Time* article made a few statements that stand to hinder the acceptance of IBOC. The first concerned the overall quality. The reporter stated that she expected the digital signal to sound richer than the analog signal. This misconception is not new to IBOC, but it is common to the expectation of "digital." Consumers have been trained that anything digital is better than anything analog without the necessary qualifiers. In the reporter's view, the digital signal sounds harsh and crackly while the analog had less static. I have been told that the reporter did not know the difference between studio noise in the source and transmission noise, but it doesn't matter. Her perception is her reality. She thinks that analog sounds better than digital.

The reporter did notice that the quality difference between AM analog to AM IBOC was more distinct than the quality difference between FM analog and FM IBOC. Broadcasters have known this all along. Consumers are just starting to learn it.

Another claim that was made is that the FCC adopted IBOC as the U.S. standard. We know that this is not yet the case. This is a lesser point, but further proves to me that the consumer media does not fully understand what is being developed and blindly believes whatever information is fed to them.

The Consumer Electronics Show ended on Jan. 11. The news stories I read ran in the first few weeks of the month. By the end of January, the news had almost completely disappeared. IBOC had its flash of consumer spotlight. Time will tell if any of it sticks or if it was all just a puff of smoke.

Chriss Scherer, editor
cscherer@primediabusiness.com

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The IBOC FM waveform

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

The world of IBOC encompasses AM and FM operation. At the present time, AM and FM IBOC operation is in use by a number of stations. The use of AM IBOC at night is still under discussion due to a possible problem with skywave signals.

FM IBOC recently received a boost with the introduction of new antennas capable of dual transmitter operation and not requiring expensive and elaborate combiners. The FCC is expected to issue new FM IBOC antenna rules soon.

The FM IBOC system offers four basic services in a single FM assignment. The main program provides audio, the personal data service offers miscellaneous data service as required by the user, the station identification service is provided by a third channel and the fourth auxiliary application service provides a broad choice of specialized transmission applications.

Offset from carrier frequency (kHz)	Power spectral density relative to unmodulated analog FM carrier (dBc/kHz)
120 to 240	-25
240 to 600	-35
> 600	-80 or -43 -10 log [power in watts]*

** Whichever is less. Power refers to total unmodulated transmitter output carrier power.*

Table 1. The FCC-required channel occupancy.

The IBOC system for FM as developed by Ibiquity is a fascinating engineering feat. A tremendous amount of engineering design was involved in complying with the FCC's strict channel width requirements within which Ibiquity had to stay and still produce the desired results. The FCC's rules require that all IBOC signals stay within the FM emission mask in accordance with the commission's rules.

The sum of all parts

IBOC FM is a unique combination of many systems. In fact, *multum in parva* is the best way of describing its many parts. The complete operation is organized into five layers. Each layer performs a specified job, or jobs and the results in a data transmission system (including music and speech) that can be considered free from interference and possible errors within the limits of the transmitter's service range.

The FM IBOC system has been developed as a series of layers, each of which performs a specific operation. From a standard broadcaster's point of view, Layer Five is probably the most important. This is the speech input layer where audio is received, processed if necessary and passed on to Layer Four where it is encoded for digital transmission. The channel encoding counteracts the normal RF transmission imperfections, which can include fading, interference and atmospheric noise. Forward error correction (FEC) adds correction bits to the pretransmitted signal with bit redundancy being used to improve system resistance to errors.

Layers Two and Three perform the multiplexing, which is critical to the success of the IBOC system, and Layer One determines the format to be used for the actual transmission of the signal.

A logical channel is used to describe the optimum circuit path laid out for a signal to follow on its way through Layer One. Because the IBOC system accepts many different types of signal 10 logical channels are provided. Not all of these are used all the time depending on the transmission needs of the audio input. Four of these are classed as major logical channels, and the remaining six are used only with digital waveforms. A channel listing protocol has been established that provides

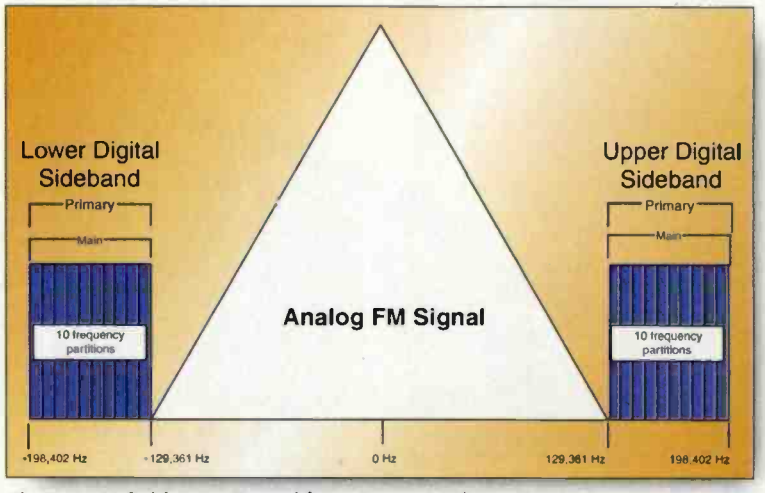

Figure 1. Hybrid operation with analog main channel.

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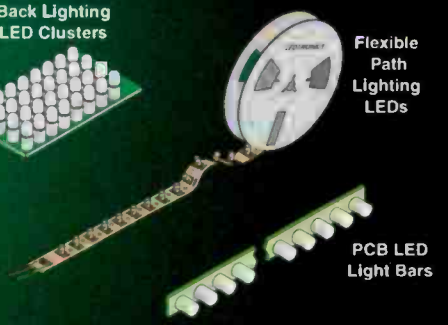
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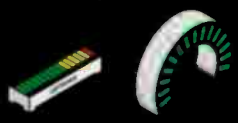
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a guide to the type of service required.

The waveform of the transmitted signal is different from anything heretofore observed in the FM band. IBOC offers different systems or protocols: hybrid, expanded hybrid and total digital. The three waveform characteristics, or spectra, are basically similar but have some clearly defined differences. However, each system's spectrum is divided into a diverse number of sidebands, which represent different orthogonal frequency division multiplexing (OFDM) subcarrier groups.

All three of the FM IBOC transmission systems use OFDM for the digital portion of the signal. It uses the properties of OFDM, which is a parallel modulation system in which a number of narrowband subcarriers called partitions are simultaneously modulated. These narrowband sub carriers produce resistance to multipath, fading and interference because they are transmitted at a comparatively low symbol speed and provide a comparatively long information holding time.

One of the major differences between IBOC and other single carrier digital systems is the use of frequency partitions. Each partition consists of 18 data subcarriers and one reference subcarrier. The manner in which the subcarriers

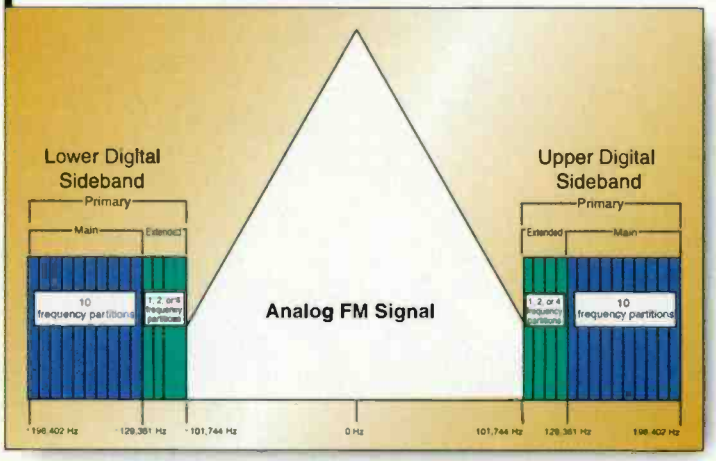

Figure 2. Extended hybrid operation with analog.

are handled depends on whether the IBOC system in use is the hybrid, extended hybrid or all digital.

The first two waveforms, hybrid and extended hybrid use an analog FM signal and differ in the sideband usage. As its name implies the all-digital system does not use any analog signal at all. The bandwidth of the sidebands from the main digital signal is expanded and lower power secondary sidebands are inserted in the space formerly used by the analog signal.

Hybrid operation. The analog audio channel can include stereo and SCA operation. Located on each side of the analog audio signal are the primary main sidebands. The sidebands consist of 10 partitions, which may be allocated among the various subcarriers. Two additional reference subcarriers are included in these sidebands.

Extended hybrid operation. To operate in the expanded hybrid condition OFDM subcarriers are added to the primary main sidebands in the normal hybrid configuration. As many as four frequency partitions can be added between the

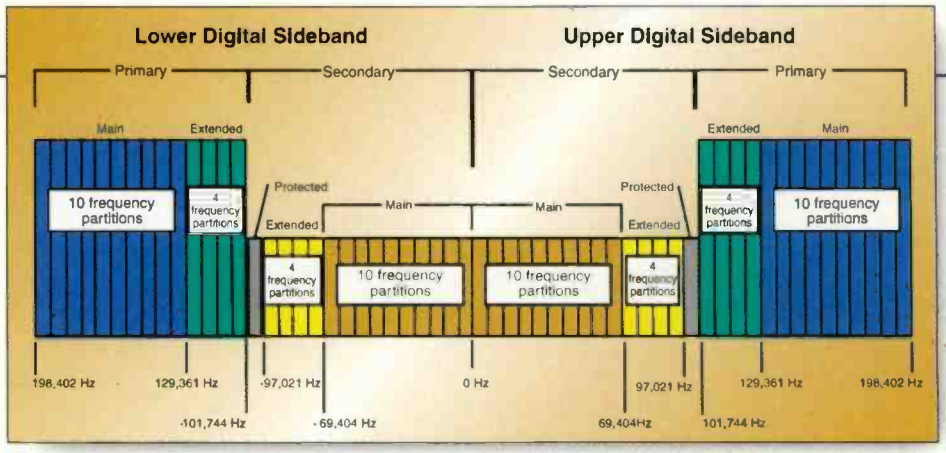

Figure 3. All-digital spectrum with full channel occupancy.

edge of each primary main sidebands and the analog signal. This is called the primary extended PX sideband. Figure 2 shows the spectrum in the extended condition and shows four additional subcarriers. The channel width is greater but still within the FCC's requirements.

All-digital FM operation. The IBOC all digital mode produces a complex waveform. By disabling or removing the analog signal ample space is left to insert the primary digital sidebands and lower power secondary sidebands. Extended frequency partitions are present in this operation. Each secondary sideband also has 10 secondary main and four secondary extended frequency partitions and the secondary main frequency partitions are closer to the channel center.

In addition, each secondary sideband has a small, protected area located where there is least likelihood of interference from adjacent analog or digital signals. In this area are 12 OFMD subcarriers and one reference subcarrier. The center of the channel carries one more reference subcarrier. The resulting channel spectrum is symmetrical with several reference subcarriers available to ensure correct decoding in the receiver.

The frequencies span of the complete spectrum is 3.96803MHz, which falls completely within the commission's general FM requirements. The total average power of a primary digital subcarrier is at least 10dB above the total power of the hybrid primary digital subcarrier.

Thanks to Jeff Detwiler of Ibiquity for providing information for this article.

E-mail Battison at batcom@bright.net.

RF Engineering in the April issue:

FM Combiners

INTRODUCING

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Navigate electronic filing systems

By Harry Martin

The FCC has several electronic systems for filing applications and reports. Most applications must be filed electronically, including the renewals and ownership reports. The system used for broadcasting is the Consolidated Database System (CDBS), which is located on the FCC's website: www.fcc.gov. In addition, all licensees must have an FCC Registration Number (FRN), which can be obtained electronically through the Commission Registration System (CORES).

An FRN is obtained by using the licensee's Taxpayer Identification Number (TIN) (Social Security Number for individuals and Employer Identification Number for business entities). When a licensee obtains an FRN, a password is associated with that FRN. The password, usually set by the licensee, is used to confirm identification for electronic filing or fee payment. While the system for obtaining an FRN through CORES is easy to use, licensees sometimes are faced with unexplained password resets that make it impossible for them to access their FRN account or file electronically. There have also been cases where the FCC thoughtfully created an FRN for a licensee without their knowledge, with the wrong TIN and an unknown password. In many of these bonus FRNs, the contact person is also wrong.

CORES

Determine if you already have an FRN: If you paid regulatory fees this year, or have filed any applications or paid any fees since December 2001, you should have at least one FRN. In the CORES system, click on the search button and select advanced search. Type your TIN into the box marked TIN and search. If your TIN has been used to register an FRN, it will show up with this search. You can also call the FCC's CORES help desk (877-480-3201, Mon. through Fri. 8 a.m. to 6 p.m. ET).

If you have your FRN but do not have a password: You need a password reset. Call the help desk to have a new one assigned. This may take more than a day, so don't wait until the last minute.

Maintain your FRN: Even if you have an FRN and password, you are not in the clear. Check to make sure the password still works by selecting the CORES link on the left side of the FCC's homepage and selecting update on the CORES homepage. The computer will ask for your FRN and FRN password. If the computer pulls up your FRN registration, the password works. If the computer tells you the password is invalid, it needs to be reset. Make sure your information is accurate. Your address should be current and the contact person should be someone who still works for the licensee and can be reached at the telephone number listed on the FRN registration. This will streamline any corrections that may be needed in the future. All corrections of FRNs must be done through the CORES help desk and they will want to speak to the contact person whose name was provided when the FRN was originally obtained.

CDBS

To file on CDBS: You need a CDBS account number and password and an FRN and its password to file on CDBS. If you plan on paying electronically, or if you would like the computer to generate your 159 forms, you also need the EIN or SSN number of the party who will be paying.

If you lose your account number or password: CDBS accounts are not unique (as are, by contract, FRN accounts). You can open as many as you like. If you lose your account number, you can always open a new account. The FCC's help desk can sometimes find your account number, but you must have filed something from that account first. The FCC's help desk can reset your password.

If CDBS is slow: Check the status of the system on the e-filing link at the top of the FCC's home page. If you see a lightning bolt or a red X, wait a while and try again. If you see a green check, the system is supposed to be OK. If you still have problems, try filing early in the morning (before 10 a.m. ET) or later in the evening (after 7 p.m. ET).

Martin is an attorney with Fletcher, Heald & Hildreth, PLC., Arlington, VA. E-mail martin@fhhlaw.com.

Dateline:

April 1 is the deadline for filing license renewal applications for radio stations in Indiana, Kentucky and Tennessee. Biennial ownership reports must be filed with these renewals even though stations in Indiana, Kentucky and Tennessee filed such reports in 2003.

Also on April 1, biennial ownership reports must be filed, and annual EEO reports must be placed in the public files of stations in the following additional states: Texas, Delaware and Pennsylvania.

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The ins and outs of On-air consoles

Take advantage of the latest designs and build an audio infrastructure that is future-proof

By Chriss Scherer, editor

When it comes time to install a new on-air audio console, where will you begin? Determining the number of source inputs and is only a small part of the process. The audio console, which sits at the focal point in any studio, serves a valuable function, but unlike audio source equipment and peripherals, which can be easily upgraded and modified as the station's needs change, the audio console is a long-term commitment.

Determing the basic needs and then specifying the piece of equipment to fill these needs is not always a simple process. The on-air audio consoles available today offer many choices and configurations. In addition, the console itself is undergoing an evolution that changes its function as a central routing point to an interface control point. This new flexibility makes the selection process more involved as the console becomes an integrated part of a facility's audio routing system.

The basic starting point is deciding on an analog or digital console. Digital designs, once high-priced items practical only for larger installations, have become affordable and rival the costs of analog designs. In addition, many digital designs have moved beyond the stand-alone equipment phase and become a part of the consolidated audio networking system. We used to categorize audio consoles as analog or digital, but now it makes more sense to categorize them as stand-alone or integrated.

Resource Gulde

A sample of available on-air audio consoles

The **Telos Systems Livewire** conveys audio and peripheral data streams over standard Ethernet hardware and cable, reducing the infrastructure costs. A single CAT-5 or fiber conveys multiple audio channels, control, program-associated-data, VoIP telephone and computer data. A Livewire 100Base-T link can carry 50 bi-directional stereo channels of 48kHz, 24-bit linear PCM audio. Multiple audio terminals can be distributed around the network to provide audio routing and control. Mixing functions are controlled with the **Smart Surface**, a console control surface that provides a familiar console controller for adjusting levels and assigning inputs and outputs.

www.telos-systems.com

The **Harris BMX Digital** is an all-digital design that features 48 digital buses that can be configured for program mixes and talkback channels. It has four program buses, four utility buses and two send buses, each with analog and digital outputs. It supports as many as six telco modules with their own off-line mixes, with two additional off-line mixes for other mix-minus uses. The meter assembly features stereo bargraph meters, a digital clock and a timer. The modules are hot-swappable and have alphanumeric displays for input labels. The console surface can directly communicate with **Vistamax** audio network frames to provide a comprehensive routing system.

www.harris.com

The **Audioarts Engineering D-16** digital console features a compact footprint and a built-in router that assigns any source to any input or monitor. The D-16 controls 16 input channels and two caller phone channels. It is equipped with digital bargraph metering, alpha source displays, provides analog and digital stereo PGM and AUD, Mono 1 and 2 output buses in addition to four mix-minus outputs. Assignable machine control ports are opto-isolated. The D-16's direct access to rear DB-25 I/O connectors facilitates easy countertop installation.

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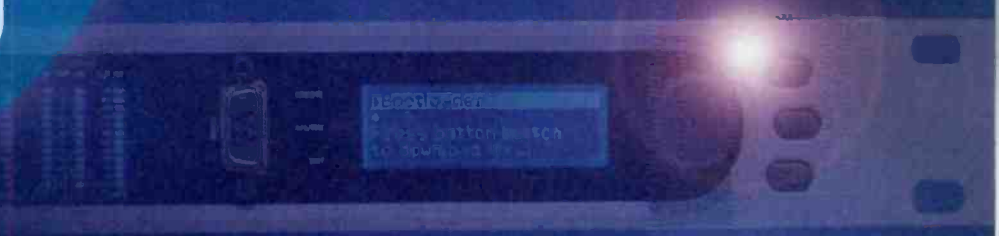

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The ins and outs of On-air consoles

Solo player

A console that functions on its own, without the need for a routing system or audio engine qualifies as a stand-alone console. The conventional analog design typifies this approach. All audio sources are connected directly to the console, and the outputs of the console are routed to their final destination. In smaller installations, this approach is still practical. These systems are simpler to install and usually simpler to maintain than integrated systems, primarily because they can be isolated in their function.

All the analog designs and some digital designs fit into the stand-alone category. The stand-alone approach will work well for smaller, stand-alone stations that may only have one or two studios. Stand-alone consoles may play a role in a larger system, however.

LPB Communications manufactures the **MX Series** of analog consoles, from the MX A Series with as few as four channels to the fully loaded 18-channel MX18EW. The consoles are designed for small to medium market use. Solid-steel frames build the foundation, and reverse-screened Lexan overlays on the modules protect the labeling. The modules are interchangeable and carry all of the channel electronics; no active components are mounted on the console's motherboard. Each module uses VCAs for noise-free operation. Consoles are available with rotary or linear faders and feature active-balanced line inputs, a cue amp with speaker, headphone output and remote module on/off control.

www.lpbinc.com

Integration of resources

The integrated console approach changes the function of the audio console. Instead of serving as the central wiring and control point of a studio, the console becomes a controller for a much larger system. The console is no longer a mixer, but a control surface, which changes the way that a facility is designed.

The integrated approach is generally more complicated to set up, but offers a great deal of flexibility to future changes. By connecting all the sources within a facility to a central audio network, sources can be called on as needed without additional wiring. Frequently used console configurations can be stored and recalled as a preset. The number of output buses can also be changed dynamically, assigning outputs as needed.

In reality, switching audio sources and destinations is just a small advantage. With source switching usually comes the need to switch control logic. Most current integrated designs allow

for this. In addition, special mix-minus feeds can be established so that when a device is assigned to a console control, the necessary mix-minus switching is also made.

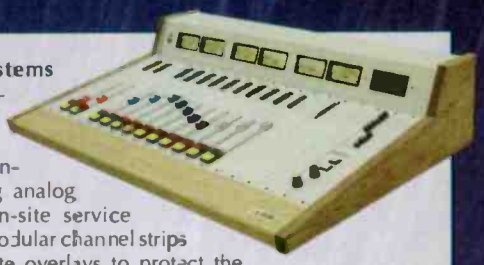
The console usually presents the greatest challenge if it needs to be replaced in a studio. The integrated approach removes this obstacle. If a larger control surface is needed at a later time, the entire studio does not need to be rewired. In most cases, the old control surface can be unplugged and new one put in its place. Some additional programming may be required.

The initial integrated designs required all the audio sources to be connected to a central audio frame or engine. It makes no sense to route the output of a CD player to the central rack room only to have it assigned back to the studio where it is installed. Most, if not all, integrated systems today provide remote source input frames. These allow the sources within a studio to be connected to a module or mini-engine within the studio. That mini-engine is then attached to the audio network. These mini-engines are connected to the audio network via CAT-5, fiber optic or some other high-capacity cable. In then end, the overall cable requirements are greatly reduced by using an integrated system. When several studios are involved, this can be a significant savings in labor and cable

Further considerations

Stand-alone consoles can be incorporated into integrated systems. While the full advantages of logic and audio routing may not be realized, the integrated design will provide an audio router to the stand-alone studio. Most integrated systems offer controller units that function like source and destination selectors.

As an added bonus, the integrated system can likely provide a facility intercom as well. The studio mics are already in the audio network; with a little additional programming, a momentary



The Arrakis Systems 12,000 series consoles are available in 8-, 18- and 28-channel mainframes. Featuring analog electronics for on-site service and support, the modular channel strips have polycarbonate overlays to protect the painted surfaces from wear. VCAs and dc on and off switching eliminate scratchy faders or popping switches. Optional modules include remote selectors and distribution amps. Optional input modules add panning or stereo mode selection. The 12,000 supports a master control room and two studios with monitor feeds, muting and talkback. All input modules feature two active balanced inputs, output assignments to program, audition and utility buses, stereo cue by fader detent and control logic.

www.arrakis-systems.com

The ins and outs of On-air consoles

closure and talkback output can provide a facility-wide intercom.

Integrated systems can be programmed and reprogrammed as a facility's needs change. An important element to understand is the method used to make these programming changes. Make sure you understand the method and the philosophy behind a system's method before making the final purchase decision. If the system is impossible to program, its potential flexibility is worthless.

Wheatstone's GEN-9 digital on-air control surface adds a significant tool to the Wheatstone radio line as an extension of the established Bridge digital audio network routing system. The Bridge provides a practical and compact cost-saving solution for new and growing studios with mixed audio standards. The Bridge engine components allow up to 256 mix buses in one rack-mount system. Multiple GEN-9 components can be linked to form a networked system, making it useful for large station integration projects. The GEN-9 system provides total integration of routing, machine logic and communications.

www.wheatstone.com

Logic control can be a confusing element. Switching the audio is the easiest part. Learn how a system assigns and controls various logic inputs and outputs to a single source. It's not always a one-to-one correlation.

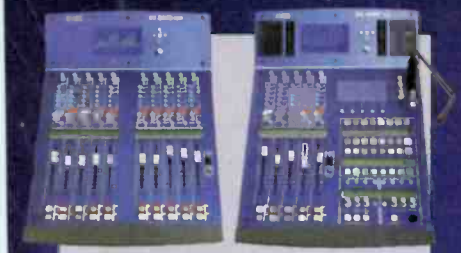
Regardless of a system's design and flexibility, the console surface itself is an important consideration. Evaluate the tactile feel of the switch and faders. A control surface will still be treated like the battleship-built consoles from years ago, so be sure that it will stand up to the use (and occasional abuse) in a studio. Don't forget the lesser elements such as indicator lamps and component replacement.

There are practical applications for stand-alone and integrated router console designs. As you evaluate your station's needs, keep an eye on the big picture and the potential for future growth. Be prepared to change your approach once all the factors have been considered.

The Resource Guide provides a brief look at some of the products available in the equipment category. While this is far from a complete list, it should provide enough basic information to help you get started.

The **Ward-Beck Systems R2K** is available in three studio frame sizes (12, 20 or 28 modules) and one rack-mount configuration (eight modules). All connections are made with Phoenix connectors. The power supply is housed in a Ward-Beck 8200 series rack-mount frame, which can also host other 8200 accessory modules. The meter bridge sits low on the console to permit a clear view. The console features a modular design, a RS-422 serial port for turret or automation control, A/B input selectors on all modules, four stereo program outputs, two assignable mono mix buses, six telephone mix-minus feeds, and a timer and clock that supports all time-code standards.

www.ward-beck.com



The **AEQ BC-2000 D** accepts up to 2,048 inputs and provides up to 2,048 outputs. Multiple control surfaces can be connected to multiple engine frames to tailor the size of the system. The routing engine handles all the input and output routing as well as dynamics and equalization controls. A studio configuration is built on a five-fader main module, and additional faders can be added with five-fader or 10-fader expansions. The audio network communicates via MADI, Ethernet and RS-422. An LCD display shows current console-channel status.

www.aeq.es

The **Klotz Vadis D.C. II** supports the decentralized **Vadis 880** and **Vadis 220** audio/media network frames. The surface provides a user-configurable modular digital audio console for live and production broadcast applications with as many as 24 fader positions. Through the audio network, the system accesses a variety of input and output cards to route any source to any fader position. Multiple mix buses and mix-minus feeds can be created. In addition, DSP audio frame modules provide EQ and dynamics. Audio frames can be networked via fiber-optic cable to reduce wiring needs.

www.klotzdigital.com

The ins and outs of On-air consoles

The **Autogram Pacemaker IIk PM228** is a modular, table-top mount analog console. It can accept as many as 60 stereo inputs and four or eight microphones. The output complement includes two stereo program outputs (program and audition), one mix-minus output, one mono output, two monitor outputs, two headphone outputs and a cue output with internal speaker. The console is also available in a smaller frame as the Pacemaker IIk PM218. All indicator lamps are LEDs. Modules can be replaced while powered without pops or clicks. It features all electronic switching, P and G faders, four lighted meters and an autoclock.

www.autogramcorp.com

Available in six, 12, 18 and 24 channel sizes, **Radio Systems Millenium** consoles all feature three output buses, remote control and metering, a comprehensive monitor section with standard eight-position selector and a clock and timer. Models differ only in their channel count and number of meters on the overbridge. The soft touch rubber keypads are illuminated by LEDs and are rated for 1,000,000 operations. Audio is controlled with VCAs and electronic switching. By keeping audio path short, the console maintains a high RFI immunity. All input and output audio wiring is via removable barrier strips. Each input module accepts a mic or line-level source.

www.radiosystems.com

The **Logitek Audio Engine** router functions as a full X-Y router, permitting selection of any input to any output. A separate X-Y router controller is also available. The Supervisor software, included with the Audio Engine, provides the Matrix IP router controller, which offers complete X-Y routing functions. The DSP cards can provide equalization and dynamics processing, a 10-second talk show delay double dump feature and pre-fader input meters with a compression indicator. Up to 24 mix-minus buses can be established. A slave fader was recently added, which allows a fader to be slaved to another for use in split advertising applications on two stations running the same programming.

www.logitekaudio.com

The **Studer On Air 2000M2** series is a second-generation digital console with an input configuration router. The M2 can be equipped with six, 12, 18 or 24 channel faders and with as many as 24 input modules. A maximum of 24 input modules and 64 input signals can be controlled by the router. Each module can be analog or digital offering two or six inputs, equipped with or without transformers and suitable for mic or line levels. The modular design allows the self-contained desk components to be arranged as desired with the I/O section separate from the surface. The On Air series also includes the model 1000 and 5000 consoles.

www.studer.ch

The **Otari DB-10** has a range of AES-3 and S/PDIF inputs and outputs, and it supports 32kHz to 96kHz sampling. Inputs are controlled with the 10 input-channel faders. Channels five through 10 have an A/B input switching function. The internal memory can store 99 snapshots, nine projects (console settings) and 20 compressor presets. Snapshots and projects can be saved and loaded to an external PC via RS-232. With the password-protect function, certain items in the menu system are accessible to only specified users. Pressing the EMG button connects one mic and one line input to the program bus.

www.otari.com

A stand-alone control surface, the **Sierra Automated Systems Rubicon** integrates into the SAS 32KD digital audio network to control mixing, switching, level control and effects. Completely modular, customizable and fully programmable, the control surface is designed for a medium- or large-market facility. Frame sizes can house from four to 40 modules. Each module provides full router selection of all the sources on the 32KD. Each module has four program assign switches and four effects/aux assign switches, but the actual number of assignable buses is unlimited.

www.sasaudio.com

Radio

Find the Mic Sweepstakes Winners

Since 2000, our annual sweepstakes has tasked our readers with finding the mic icon on each cover from the previous year. The icon, like the ones shown below, is placed on every cover of Radio magazine. While the mic icon is part of the logo and is also used in the 10 Years logo, the challenge was to find the hidden icon placed on the cover. Sometimes it was easy to find. Sometimes it was a real challenge.

We received a large number of responses, of which more than half correctly identified all 13 cover locations (12 monthly issues plus the September Product Source). The entries with all 13 correct answers were placed into a random drawing for the three prizes.

This year's winners and their prizes are:

Blake Thompson
WZIP-FM, Akron, OH
LPB Silent Mic Boom

Stephen Denemark
WQJC-FM, Quincy, IL
Sonifex RB-MA2 mic preamp
courtesy of Independent Audio

Charles VanHecke
Angelus, Sussex, WI
Neumann BCM 104
microphone

Congratulations to the winners.

Be sure to save each issue of Radio magazine so you can enter next year's sweepstakes.

And if you had trouble finding the mic, here are the correct locations:

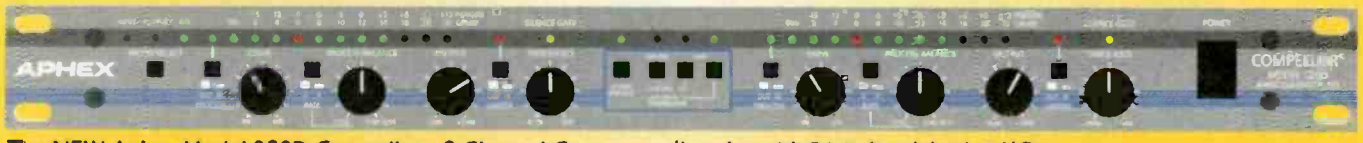
January: On the left computer display above the console
February: Just above the rear tire of the KASE van
March: The cue speaker on the Otari console
April: Just above and to the left of the word "Point" in the headline
May: In the shadow of the computer monitor to the left of the console
June: Painted on the side of the MRN truck behind the satellite dish and tower
July: On the HP pocket PC just above the IPAQ logo
August: At the base of the graph display on the Optimod
September: On the front panel of the Road Star
Product Source: In the inner ring of the cog surrounding the Wheatstone console
October: In the Lissajous display on the Audition screen capture
November: Above the second "s" in "business" in the Harris ad
December: In the marble background above the right side of the furniture over the drawer section

Flushing Away Your Audio Quality??

Swishing and swirling audio is the sad result of bit rate reduction combined with the wrong processing. Unless all sources, storage media and transmission systems are linear the audio will be bit rate reduced at least once, probably several times. Each pass generates more artifacts. Lower quality processing, multiband compression, limiting and clipping can make those artifacts even more apparent. But level control is still essential.

Introducing the new Compellor® 320D - the world standard AGC is now available with both digital and analog i/o. For almost two decades the Compellor has sustained its unrivaled reputation for 'invisible' operation. The same cleanliness of circuitry and intelligence of processing algorithms that make it 'invisible' also make it perfect for processing in the digital domain. The Compellor will not 'unmask' the masking from upstream reductions and it will feed a signal that will sail through downstream reductions.

The 320D fits any plant from all digital to all analog and anywhere in between. Perfect for all HD applications, the Compellor 320D will help keep your great audio great at a price that won't wipe you out.



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A Climate for Change

By Gregg Garcia

A hot new radio facility in the desert

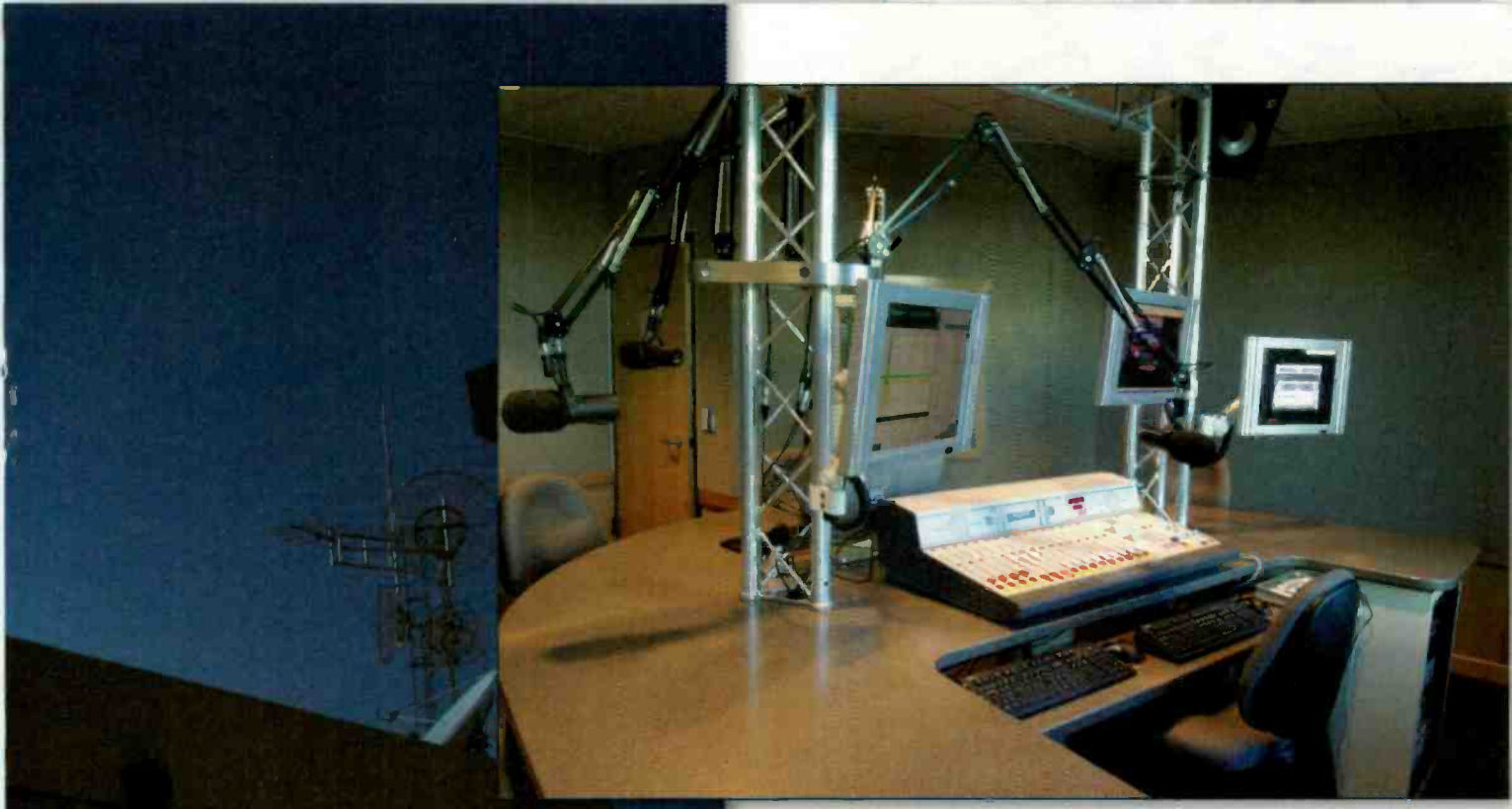
"You need to get out of here!" This familiar phrase was uttered all too frequently by just about anyone visiting our old facility in Tucson, AZ. After more than 30 years in a facility originally designed to house only KTKT, and remodeled once to accommodate KLPX in the early 1980s, it was time for a move. Actually, it was time for a move about 10 years ago. In that 10 years, two more stations were added (KFMA and KCMT) as well as two temporary trailers to hold the additional sales staff. Including the trailers, the old facility covered less than 7,000 square feet, including 1,000 square feet for the transmitter room, which was the original building built in the 1950s.

After months of searching for the perfect building, General Manager Steve Groesbeck found the perfect site. In July of 2002 Lotus negotiated the purchase of a plot of land in an industrial park just off I-10 near the Santa Cruz river and less than two miles from the old studios. By September I completed the space plan and submitted it to our architect.

The new facility would house about 12,000 square feet of new offices and studios. While not overly spacious, it would be adequate for roomy studios, offices for station management, individual account executives, programming, promotions and engineering. After building several dozen studios I was conscious of all the oversights and omissions from past projects.

Designed for change

My biggest concern was to try and not design anything that would limit future growth and change. I couldn't do much about the size



The air studios have similar layouts, and both use the trussing for a cable conduit and accessory mounting.

of the building, but I could make sure that we had enough studios for any possible format change or new addition. Keeping in mind past changes to the studio, wiring is always a concern. I hate trying to cram more wire into already congested conduit runs. Even worse is having to pull up computer flooring to add a new cable only to find that furniture is in the way and that dust, spilled drinks and grime make it completely unpleasant and frustrating. I was tired of having to wash fiberglass insulation out of my eyes every time I had to move a ceiling tile to add another cable run. Because of these irritants, I designed a catwalk above the studio area. Attached to the side of the catwalk is a Wiremold 12-inch-wide aluminum wire-way.

The walls of the studios are covered with 1" fabric-covered Owens Corning Fiberglass Sound Soak that is adjacent to a natural-finished birch chair rail and 24" of matching birch-finish, Formica wainscoting that continues to the baseboard. Hidden behind two doors in

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only good through ~~Februar~~
J

What clients are saying about Zephyr Xport and Zephyr Xstream:

"We do a lot of remotes... we use Zephyr Xports for about half of our remote broadcasts. My remote tech tells me 'It doesn't retrain or drop. The connection is very stable.'"

Vic Jester, Market DoE, Radio One, Atlanta

"We sent stereo music and two presenter microphones into the Zephyr Xstream and applied basic limiting using the built-in processor — the mixer is very flexible and easily configurable, making it simple to set up in the field."

Alex Lakey, Chief Engineer, Virgin Radio

"Xport's audio quality is outstanding. The *aacPlus* algorithm provides great fidelity... Every hit, the metal sticks hitting each other, conversations from the field, all were reproduced with great clarity over the POTS line."

Michael Black, GM, WEOS, Geneva, New York

"I was wary of using a compressed link, but the Zephyr Xstream's AAC algorithm is incredible. The on-air audio is the best we've ever had ."

James Turvaville, Chief Engineer, WAY-FM Media Group

"We were out in the mud [at the Bonnaroo Music Festival] and the phone line had been run over by a thousand cars. But the Zephyr Xport worked great!"

Jake Glanz, Engineer, Sirius Satellite Radio

"Zephyr Xstream is in a class of its own, the only codec really worth having for main broadcast ISDN."

Graham McHutchon, Senior Sound Supervisor, BBC News

(but you get the present).

3 with ISDN in 1993, we had no idea that their offspring would grow up
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codecs in radio stations and production studios around the globe.

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A Climate for Change

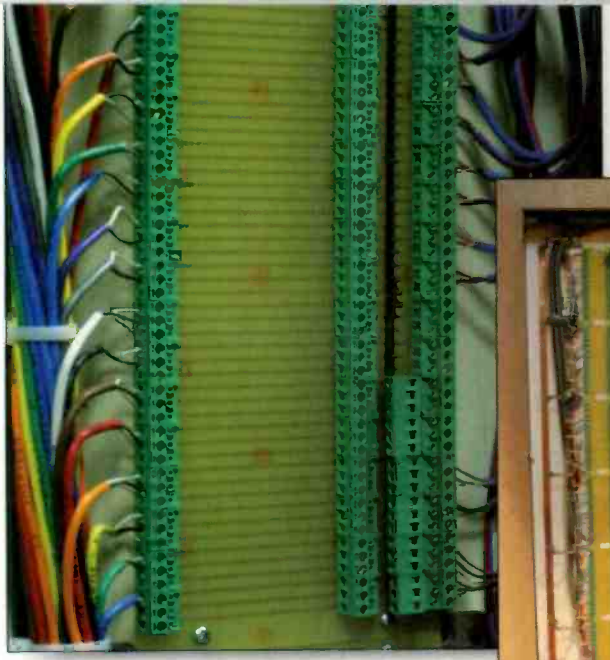
The catwalk built above the studios provides easy cable access.

each studio is the central wiring closet where the console and all signals are terminated. Four-foot long 4" straight conduit runs pop up through the hard double-drywall ceiling and land near the catwalk wire-way. Suspended 18" below the hard ceiling is a fiberglass tiled acoustic T-bar ceiling.

Inter-studio wiring is comprised of 4,000' of 16-pair Gepco 5596GFC series extra low-loss 110Ω AES-3 digital audio cable, which is terminated in each studio and in our master control rack room with custom connection panels that were designed by Lindy Williams, Lotus' corporate director of engineering. My initial reaction to this system was less optimistic, because using these termination panels would require additional labor and expense to install when compared to the traditional punch-block method. However, once in place they actually offer greater flexibility and allow for faster troubleshooting, patching and easier labeling.

All furniture was custom built by Mager Systems of Phoenix. I'm not a fan of the typical boxy, removable side-paneled studio furniture. Instead, I prefer a more open design with minimal furniture touching the floor. Wiring is typically designed to route via a D-ring path attached to the underside of the solid-surface countertop where easy access is helpful yet hidden. Each of the five control rooms (one was built for a future station) has its furniture placed in the center of the room.

Figuring out the cable path into the furniture without buried conduit runs, computer flooring or floor chases was a challenge. Initially, I planned to have two 4" conduit runs dropping from the suspended ceiling to the countertops, one on each side of the



The Lindy blocks are used to terminate all the inter-studio wiring. The photo to the right shows the in-studio wiring closet in KFMA.

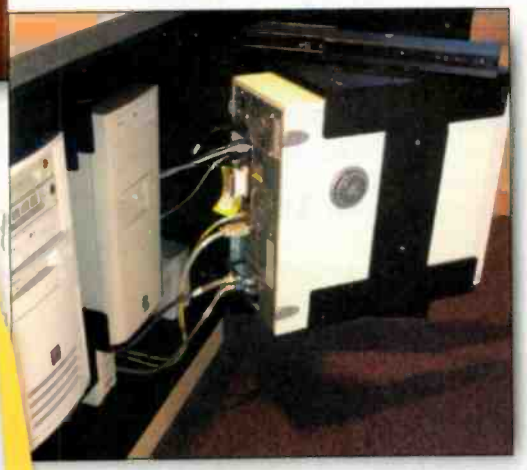
console. Instead, I took an idea from a hair salon that had stage truss around the ceilings above the cutting stations with track lighting attached. I searched and found a supplier in Los Angeles that had triangular trussing with 2" diameter tubular legs. These hollow legs provided enough internal space to run the cable into the furniture. While the truss method did not provide as much cable space as the conduit, the truss introduced an unusual radio-tower look as an architectural design element. The trusses also provided a unique structure to hang loudspeakers and flat-screen computer monitors.

To get the cable from the closets to the trusses we installed 8" D-rings every 16" to plywood strips glued and screwed to the hard ceiling. This would be the only place where ceiling tiles would ever have to be removed to add cable.

The overall goal for the studios was to make it easy for guests and guest hosts to have eye contact with the host. We also wanted to eliminate as much of the usual clutter from the countertops. Keyboards and mice, phone editors and other playback devices all make for a busy and messy work environment.

To avoid the clutter, Mager Systems installed a secondary counter 2" below the top counter in front of the console. This gave all the wires from the keyboards and mice a place to go without being draped across the countertop. I don't like keyboard trays because they tend to jam, roll back or otherwise become a headache from an operational and a maintenance standpoint. This secondary counter seemed to be an efficient way to deal with the problem.

The other problem encountered in today's modern radio studio is what to do with all the computer workstations. We use Airforce by Tim Valley as our hard-disk automation system. Each air studio has a main playback workstation (Pilot) and a backup workstation (Co-Pilot). The Co-Pilot workstation is also the Voxpro phone editor. We chose Voxpro because it eliminates additional equipment from the counter top and because we could network it to access its files from our production rooms. Additionally, we have installed Internet-capable workstations in each control room that uses Promo Suite



Access to the studios computers is facilitated by the mounts installed inside the Mager furniture.

A Climate for Change

The subcounter for the computer keyboards can be clearly seen in this shot of Studio A.

for reading liners, tracking contest winners and gathering news.

All of these workstations need to be maintained and we decided to keep them in the studio for a number of operational considerations. Again, Mager Systems came through with an efficient design solution comprised of a three-workstation cabinet that included slings for mounting computer cases. These slings pull out from the cabinet and swivel for easy access to the rear connections. They also provide plenty of ventilation and room for the UPSs.

The inner works

The heart of each station has traditionally been the console. We insisted that the console be digital and preferred to have truly modular fader modules rather than the all-on-one motherboard design. We looked at all the available options. For budgetary reasons it looked like our modular desire would not be possible. I also wanted a central router, which I thought would also be out of the question. This all changed when I looked at the Wheatstone product line. I chose the Auditronics 220 console, which is actually an Audioarts D70 packaged in modular design. Because these were the last five consoles available, we were able to include a new Wheatstone Bridge 32x32 router, which fit neatly within my budget. In keeping with our clutter-free goal, we were able to fit a Comrex telephone module into the console and eliminate the traditional phone set on the counter.

Space was an issue in the central rack room. The floor plan shrunk once all the ADA requirements were fulfilled. Because of this, the depth of our central rack room was shortened by nearly 2', making traditional racks inconvenient to work on. Instead, I designed a rack wall, which allows plenty of room for equipment and plentiful access to it from behind.

There never seems to be enough time when it comes to moving into a new facility. One month before our scheduled move to the new facility, the old site was hit with a flood. Rather than taking our time and moving the stations when everything was ready we were forced to accelerate the move date. Because of the hurried schedule, the initial wiring was not as neat as I would have liked, but we're in the process of correcting that. The beauty of the design is that wiring changes are a breeze in this new facility.

A look inside the rack room.

The new building is still a work in progress with many refinements left to complete. However, it's certainly a pleasure to be working in this new building with all its flexibility, room and newness.

Garcia is chief engineer of Lotus Tucson, AZ.

Equipment List

Air Force automation system
Aphex Compellor compressors
Auditronics 2200 consoles
Comrex TS612 phone systems
Echo MIAMIDI audio cards
Gepco 552616 multichannel cable
Gepco D61801EZ two-channel cable
Gepco GA72416 QTY=3000' multipchannel cable
Gepco GEP-61801 STP cable
Hafler P1000 amplifiers
KRK ST-8 monitor speakers
Mager Systems custom studio furniture
Marantz PMD340 CD players
Mid Atlantic MRK4431 racks
OC White mic arms
Patriot 3.8m satellite dishes
Rolls PM-52 headphone amplifiers
Shure SM-7B mics
Soundcraft RW5656us mixer
Symetrix 528E mic processors
Tascam DA-40 DATs
Vox Pro editors
Wheatstone Bridge 2001 router

More Online

More photos of the Lotus Tucson facility are available in the online version of this article at *www.beradio.com*.

Facility Focus

the technology behind Lotus Tucson

Waitt Radio Networks AirForce

AirForce Automation is not new to the radio industry, but few people know that it drives Waitt Radio Networks' groundbreaking STORQ Delivery system. WRN supplies every affiliate station with a state-of-the-art STORQ Automation System preloaded with music, programming and custom imaging. AirForce accepts, manages and airs digital satellite downloads from the network containing voice tracks, music, music schedules, production, imaging and even software updates. STORQ Automation equipment packages powered by AirForce are available from Waitt Radio Networks for facilities of all sizes. AirForce simplifies digital. See the website for more information.

www.wrnonline.com
402-957-7600

Comrex TS612

Comrex is the premier source for broadcast telephone gear, combining the features you want with the quality you can trust. From the simplest couplers to full-featured digital hybrids and talk show systems, Comrex makes it simple to add callers to your programming and make them sound great! And with Comrex POTS codecs, broadcasters can deliver studio-quality audio from virtually anywhere. For the latest technology in broadcast telephony, radio and television stations and networks around the world trust the Comrex name. The TS612 is a powerful, full featured system able to handle the ever most challenging talk situations. And with every Comrex solution, customers enjoy Comrex's unparalleled support, yet another reason to put Comrex on the line.

www.comrex.com
800-237-1776

2004 PICK HIT Radio
THE RADIO TECHNOLOGY LEADER

NAB2004
is just around the corner

And so are the top radio technology innovations from the convention!

The *Radio* magazine 2004 Pick Hits

The radio industry's original technology award is still the most coveted. There are other awards given at the convention, but the *Radio* magazine Pick Hits stand above them all as the true indicator of technology innovation.

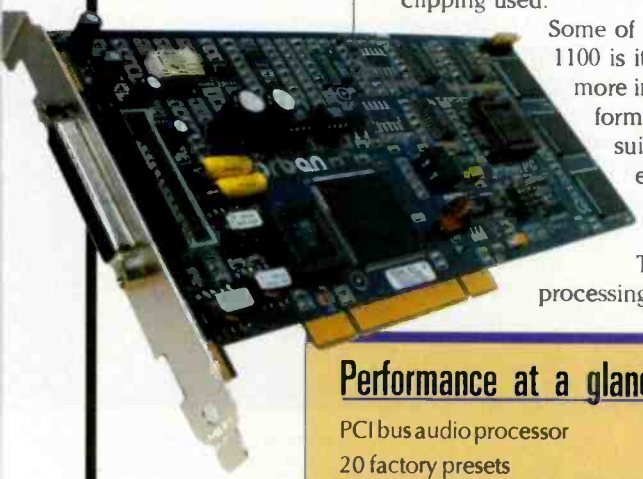
Who will win?

The winners are announced at the end of the NAB2004 convention and are featured in the June issue as part of the *Radio* magazine NAB Review.

Orban Optimod-PC 1100

By Gary Blau

The Optimod 1100 merges the worlds of PCs and professional audio. It's a sophisticated DSP-powered audio processing system; an Optimod on a PCI card. In operation, the 1100 does all the work in its own DSPs, leaving the PC's CPU alone to handle other applications, such as a media encoder. The 1100 is functionally identical to the Orban 6200 DAB processor. It is not intended as a conventional FM or AM final processor because there is no NRSC, pre-emphasis or clipping used.



Some of the appeal of the 1100 is its lower cost, but more importantly, its performance and perfect suitability to the task establishes it as the standard of webcast processors. The 1100 main processing system consists of a two-band AGC, three-band parametric EQ, five-band compressor/limiter, a look-ahead final peak limiter and selectable final low-pass filter. The card features two AES-3 or S/PDIF balanced digital inputs and one output, and one balanced analog stereo I/O. These all appear on one DB25 connector, but an optional pigtail cable with XLRs is available from Orban. The mixer application permits selecting and mixing any of these as the user might need. The user-adjustable parameter control panel offers 50 controls, and the mixer 56 controls. There's a tremendous range of adjustment available, which is particularly important for webcast applications.

Performance at a glance

PCI bus audio processor
20 factory presets
PC needed only for setup
Includes I/O cable
Drivers for Windows and Linux
Look-ahead limiter

DEMO ROOM

Setup is simple. Power the PC down, plug in the card and reboot. Insert the driver CD when the new hardware found prompt is displayed. The process is typical Windows plug-and-play automatic install. The machine must be running Windows 2000 or XP. Drivers for Win98 are not included because the OS is not supported. Running the card on XP allows the user to feed the output of the 1100 to multiple applications simultaneously, even at different sample rates, which 2000 can't do without additional third-party drivers.

Because the 1100 is intended as a DAB/webcast/production/mastering processor, there is no peak clipping that would otherwise corrupt performance in subsequent data-reduced audio codecs.

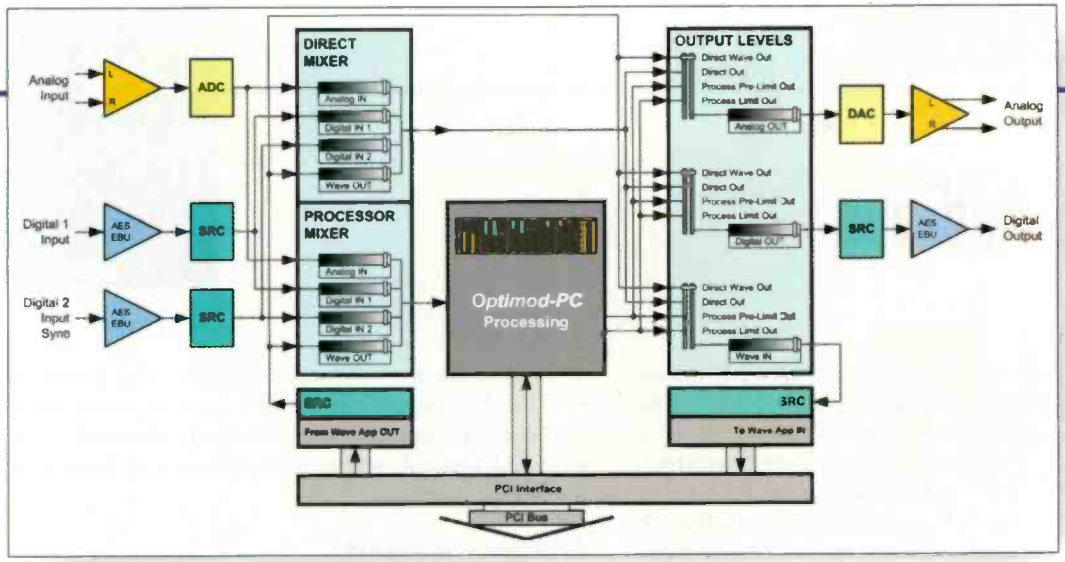
Ready for action

The biggest challenge facing quality conscious webcasters is working around these audio codecs to deliver an acceptable entertainment quality product to the listener. For example, we use the Windows Media 9 codecs at Boomer Radio to reach the majority of already installed Windows users out there. Operating at a low enough bit rate to reliably support dial-up listeners (still the majority of the available audience), these codecs generate many unusual and non-musical artifacts in the encoding process. The massive task of reducing data by more than 35:1 (for 20kb/s mono) is the equivalent of throwing away more than 97 percent of the original information. That the end result sounds anything like the original is an amazing achievement, but the problem remains that certain things will sound strange, and sometimes obnoxious. Attention to every detail in preparing for this encoding process is vitally important, more than it is for traditional broadcast radio, where the medium is much closer to being transparent.

On top of this, different sources will excite different artifacts. For instance, one processor or setting that may work fine for one type of music may fall apart when driven by another type of music. The spectral and dynamic content of each song will make the codec do different things. A processor with a wide adjustment range is necessary to custom tailor the end result to reduce or mask the bad behavior of the codec. When processing for streaming codecs, one size does not fit all.

I have spent countless hours trying to fix this problem. The 1100 has turned out to be the most effective total package solution. We're currently using the 1100 on two of our streams, Classic Mix and The Acoustic Café. These two music formats require different treatment. Although the many presets that come with the 1100 can get you in the general ballpark quickly, we found we had to adjust each to keep the codecs from coming unglued.

The range of adjustments offers complete control over this and allowed us to make the necessary compromises that



A functional block diagram of the Optimod 1100.

resulted in better overall end products for our listeners. In particular, being able to control the processor attack and release times, band mix levels and final output low pass filter cutoff in 500Hz increments, make a huge difference in taming the codecs.

Being able to handle a wide input level range is crucial for streaming because most sources are played back without any manual gain riding, and just normalizing files does not address differences between sources in intro and outro levels. This is important as most webcast listeners typically use smaller computer speakers and listen at lower office-appropriate levels.

If not dealt with properly this can sometimes result in a loud outro going into a low intro, or vice versa, placing a large instantaneous demand on the processing to make it up. The 1100 has a wide control range, 20dB each in the AGC and five-band limiter, so this is not a problem. It also does a nice job of handling this demand without punching holes or swelling, while still maintaining a good dynamic contrast.

The 1100 also has the ability for full remote control over a LAN. This is useful for a control point that is distant from the PC in question.

The only wish we have is for a future upgrade of the two-band AGC to the new 8400-style, window-control AGC. Having used the 8400, we have become spoiled with how well that AGC works. I understand there is enough DSP power on board to handle this and that it may be coming in a future release.

Blau is CTO of Integrity Media Group, owner of webcaster Boomer Radio.com.

Orban

P 510-351-3500
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W www.orban.com
E custserv@orban.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.

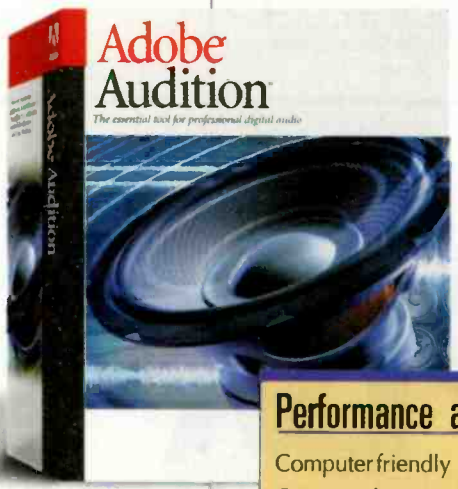
It is the responsibility of Radio *magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* Radio *magazine.*

Adobe Audition

By Bruce Ellis

My friends consider me a tool geek. I suppose it's because I often carry a folding multi-tool on my belt and my woodworking habit always requires just one more power tool. I may be hooked on tools, but I've been in the trenches long enough to realize that the tools only exist to help get the job done. They are conduits for inspiration and creativity. A great way to self-expression with audio can be found in Adobe's multi-track and editing program: Audition.

If you are or have been a Cool Edit Pro user, you know Audition. Adobe Systems acquired the technology assets (Cool Edit Pro) of Syntrillium Software in May 2003. In August 2003, Adobe released the software with the name Audition.



I have not been a Cool Edit Pro user in the past, so Audition was a new audio amusement park for me to explore. While at times software loading can be troublesome, it was not the case this time. I had absolutely no problem loading it on to my 1.80GHz Dell with 384MB of RAM running Windows XP. We all know that the more horsepower we have, the smoother and speedier the program runs, so the recommended requirements to run this software to its maximum potential should be easy to achieve. The software's minimum requirements are a 400MHz processor, 64MB of RAM, 55MB of hard-disk space and Windows 98 Second Edition. But if you are working daily with audio, you already know you want the fastest horse you can afford to carry the load. The included manual was easy to follow and helpful in answering questions.

Performance at a glance

- Computer friendly
- Crisp graphics
- Easy-to-learn commands
- Editing and mixing versatility
- Results in a high quality audio product
- Music loop ready

Getting started

There are two main work areas presented in Audition: Edit View and Multitrack View.

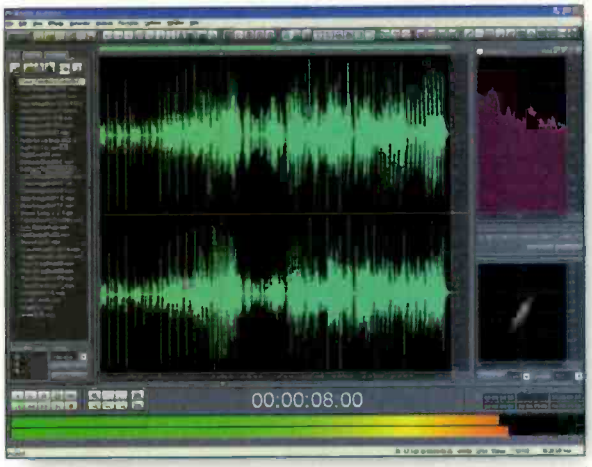
The Edit View is used to view, record and edit high-resolution 32-bit files using any sample rate up to 10MHz. The program supports 24-bit/96kHz for DVD production, but I work in FM radio and I have 47-year-old ears, so I really don't pay much attention to the high-end numbers anymore. My biggest concerns are ease of use and how it sounds on the radio. Even though I routinely use a different editing program, Audition became easy to use after only a couple of days. I quickly learned what to click and double-click and was recording, extracting audio from CD/video and editing with ease.

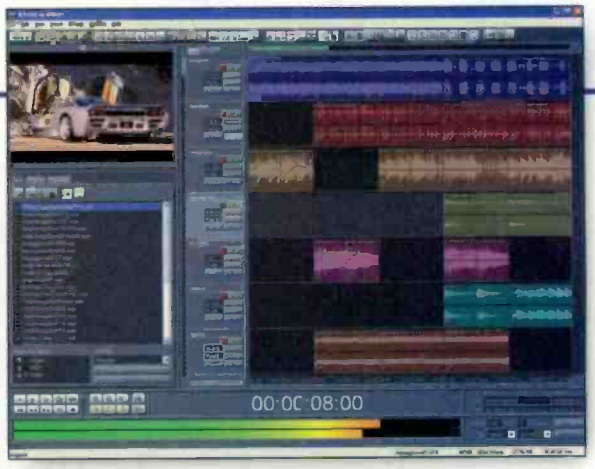
The included effects provide lots of creative input, and there are presets to use as the deadline approaches. Included in the collection of effects are some good reverb settings, a great phase analysis view for those crazy about mono-compatibility and noise reduction, which includes a click and pop filter. We still see some vinyl recordings so I really appreciate this feature. Plug-ins are supported with ease. My Direct-X plug-ins worked like a charm. To add to this, Audio Processing Technology has released a plug-in that allows the software to read and write Apt-x audio files.

The Multi-track View is just a click away from the Edit View. This allows the user to stack audio in tracks—128 of them—and create the mix. The sound files are called blocks and can be split and moved as required. Recording is as easy in this section as it is in the Edit View. Effects can be assigned, blocks of audio can be moved and to replace the tedium of virtual moving faders, Audition uses volume and pan envelopes. Simply grab the green line for volume or the blue line for panning and tug into place.

As with most programs, you have more than one choice for the commands. For instance, instead of clicking the play icon, the spacebar can be pressed to begin playing a sound file. The mouse can be used almost exclusively, or a combination of mouse and keyboard commands.

What appears on the screen and how it's arranged is entirely up to you. I don't have the opportunity to produce many commercials or hip imaging promos. If you do, you should know Audition can also compile music loops and includes a Loopology CD full of royalty-free, 32-bit music loops. My only complaint is that this loop thing is addictive. I spent a few hours pasting an elaborate music bed together and completely lost track of time. This could be a useful





The two main screens for Audition, the Edit View (left) and the Multitrack View.

tool when you've run out of preproduced music beds or you need a certain sound you can't find anywhere else.

The only feature I found difficult to use was the zoom. When I would zoom in really tight there was a tendency for the view to drift off the cursor and force me to go looking for my edit spot. I think once I become more familiar with the program, this shortfall will disappear.

Adobe's Audition is filled with features too numerous to mention. There are more expensive programs on the market that might be faster and have more features. There are cheaper ones that will get you by. However, if you work with audio regularly, you will find this software worth the money. In addition, Adobe is offering a special upgrade price for Cool Edit Pro Pro users. Having Audition on your computer is like having a big toolbox with lots of extra tools tucked away in special compartments. On a daily basis you will find yourself using certain tools over and over. But if you need a special effect for a promo you've been working on, chances are you'll find it in Audition. Audition is an effective tool for audio production needs.

Ellis is production director of WGUC, Cincinnati.

Adobe

P 800-833-6687
F 408-537-6000
W www.adobe.com

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New Products

By Kari Taylor, associate editor

www.beradio.com

Speaker support system
Blue Sky International

The Stand: This fully adjustable speaker support system is designed to work with nearly any manufacturer's monitors that weigh as much as 80lbs. Its unique and patented center pole permits easy adjustment without any tools. It can be set for heights from 33.5" to 45.5" in 1" increments. The Stand weighs 25lbs. and features a stable, four-leg, 30" diameter, cast iron base. The bracket allows angle adjustment of 15 degrees, as well as horizontal adjustment of a full 360 degrees.

516-249-1399; fax 516-753-1020
www.abluesky.com; info@abluesky.com

Switcher/router
Broadcast Tools

SS 4.1 III: The SS 4.1 III passively switches or routes a variety of electrical signals to a destination or vice-versa. The unit selects any one of four stereo inputs to a single stereo output. The router/switcher provides passive switching through gold contact relays. The passive switching means that the unit can route a signal in either direction. Due to the passive nature of the switching, any input level and impedance can be used. Inputs may be balanced or unbalanced, while output levels, impedance, distortion, noise and balancing will match that of the selected input. Additional features include a selection of any active source at power-up, last source selected, audio mute, step input, control logic, open collector and multidrop serial port. Removable screw terminals are provided for most connections.

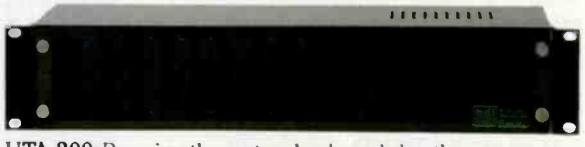
877-250-5575; fax 360-854-9479
www.broadcasttools.com; bti@broadcasttools.com

Grounding kit
Andrew

Sureground: Providing lightning protection in an easy-to-attach compact, self-sealing package, these grounding kits feature a one-piece assembly with the weatherproofing molded directly into the grounding strap. The self-locking, self-sealing weatherproof boot eliminates added loose hardware and tape. The kit provides more than 200mm of surface area for minimum contact resistance and maximum protection. The kit is tested to withstand more than 100,000 amps peak current. The snap and lock installation process is especially designed for ease of installation on tightly bundled coaxial cables. The kit includes a universal grounding lug that can be connected to typical ground buses with one-hole or two-hole attachment points.

800-DIAL-4-RF; fax 708-349-5444
www.andrew.com; rose.wolski@andrew.com

Utility amplifier system
Broadcast Devices



UTA-200: By using three standard modules, the system can accommodate a variety of standard and custom D/A configurations. The system is totally modular, including the power supply. All modules plug in from the front panel. There are two analog modules available in addition to a D/A converter module. Each frame is fully configured, labeled and tested before shipping.

914-737-5032; fax 914-736-6916
broadcast-devices.com; sales@broadcast-devices.com

Sound design library
Crossing Point

Mixed Variables: This production library contains an array of unique ambiences plus a plethora of hard effects. Numerous tracks were recorded with the Neumann KU 100 binaural head, which creates exceptional stereo imaging and soundfield depth over loudspeakers and stunning 3D qualities in headphones. Spatial enhancement was added to some tracks for broader stereo imaging. The three-CD set includes a broad range of sounds, containing 579 effects.

866-755-3055; www.crossingpoint.net; info@crossingpoint.net

Hand-held mic
Heil Sound

Goldline Pro: By mounting the wide frequency response dynamic element into a special sorbothane shock mount system, Heil has created a mic with low handling noise. Features of this mic include a magnet structure and a large aluminum 1-1/8" low mass voice coil assembly; a phasing plug assembly with equally placed ports that sense audio from behind the source entering them out of phase, thus producing a linear cardioid pattern and reducing the proximity effect; a 40Hz to 18kHz frequency response; and an impedance of 600Ω balanced. The mic is usable in high sound pressure levels and is immune to overload conditions. The cardioid pattern offers rejection at 180 degrees off axis, which is directly behind the microphone and creates virtually no off-axis coloration while providing the greatest possible rejection of unwanted audio.

618-257-3000; fax 618-257-3001
www.heilsound.com; info@heilsound.com

Studio suites
Prophet Systems

Nexgen 2: Choose from four Nexgen 2 Studio Suite digital automation solutions: Studio 11, Studio 22, Studio 41 and Studio 44. As with any studio solution, the company includes all the Nexgen software needed to run a station: Nexgen Digital, WANcasting, VoiceTRAC, Musicgen, CDX/AFC, Digital Reel-to-Reel and PhoneTRAC.

800-658-4403; fax 308-284-4181
www.prophetsys.com; sales@prophetsys.com

Studio monitor
NHTPro

M-80: This studio tracking monitor produces high output with detailed, transparent sonics in a compact, space-saving enclosure. The monitor can have a horizontal or vertical orientation to be mounted across a meter bridge, on walls or on stands. The unit features high output and flat frequency response. The speaker complement includes two 8" long-throw woofers, two 2" aluminum-dome midrange drivers and a single 1" aluminum dome tweeter. The cabinet is constructed of 3/4" medium density fiberboard, measures 10"H x 22.5"W x 14"D and weighs 38lbs.

800-648-9993
fax 707-748-5945
www.nhthifi.com

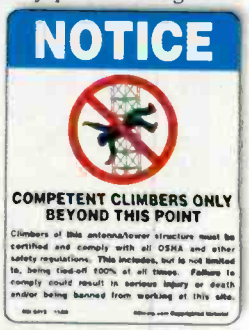
Control surface for Nuendo
Steinberg

Steinberg ID: This control device allows audio professionals to control their audio software with a familiar console work environment. The fader section offers 24 channels for direct access. LCD displays provide track names and the current status of important channel parameters: solo, cut, track arming, direct channel strip access and automation status. The encoder section features a complete channel strip layout with 24 endless encoders with button function, 24 two-line displays and 24 level indicators for direct access to any channel parameter. The edit section's integrated matrix ASCI keyboard and trackball allow the user to operate the computer and the software without mouse and keyboard.

+49 40 210 330; fax +49 40 211 598
www.steinberg.net; info@steinberg.net

Tower safety sign
Radiofrequency Safety International

RSI 6412: RSI specializes in assisting companies and organizations in developing comprehensive safety plans through site assessments and employee safety training. This competent climbers-only notice sign alerts personnel that anyone climbing the structure must be competent and qualified. OSHA requires being tied off for structures higher than 6'.



888-830-5648; fax 866-825-4324
www.rfcomply.com; info@rfcomply.com

Sony introduces new MD format

Sony unveiled its Hi-MD format and audio players. The new format records as much as 45 hours of music on one disc. The players provide an extensive battery life and a compact design. The Hi-MD recorders incorporate the ATRAC3plus codec. With ATRAC3plus compression, more audio files can be burned to Hi-MD media or to a standard Mini Disc. Music can be compressed to 132, 105, 66, 64 or 48 kb/s. The Sony Hi-MD recorders connect to a PC via a USB cable for high-speed music transfers.
www.sony.com

Nullsoft releases Winamp 5.0

The audio and video file player Winamp has received an upgrade. Two versions are available, a Winamp Free and Winamp Pro.
www.winamp.com

Orban now shipping Opticodec-PC

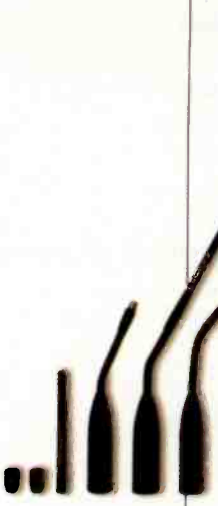
Orban is shipping the Opticodec-PC, an MPEG-4 aacPlus software encoder. The software lets streaming providers supply content encoded with the Coding Technologies aacPlus codec. Media players such as Real Player 10 can now decode aacPlus streams. Opticodec-PC is available for Windows 2000 and XP and supplies streams compatible with the free Darwin Streaming Server, which is available multiple platforms including Linux, Windows and Macintosh. Opticodec-PC is available in two versions, LE and PE.
www.orban.com ■

Condenser mic
Lawson Air

The Lawson Air mic features an original capsule design using a variant of the company's L47 capsule. The mic is a 48V phantom-powered, 1" large-diaphragm cardioid condenser mic with a six-micron gold-sputtered diaphragm. The capsule diaphragms are connected by the edge rather than at the center for more warmth, robust articulation and more resonant proximity effects. Air features the Lawson Quick Change capsule system that is easily removable and may be plugged into all other Lawson mics. The mic's solid-state circuit features a Neutrik transformer, hand-soldered all-discrete components and a gold-plated XLR connector. The mic offers 20Hz to 20kHz frequency response.
615-269-5542; fax 615-269-5745
www.lawsonmicrophones.com; mail@lawsonmicrophones.com

Modular condenser microphone
Sennheiser Electronics

Contractor series: The Contractor series of microphones feature three capsules, the ME 34 cardioid, ME 25 super-cardioid, ME 36 mini shotgun and two goosenecks, the MZH 3015 and MZH 3040. The capsules can interface with the two different-sized goosenecks of the series, the 15cm MZH 3015 and the 40cm MZH 3040. The compact MZH 3015 is flexible from the preamp to the capsule while the MZH 3040 has a single flex point above the pre-amp and a non-bending neck up to the capsule for a clean appearance. The system operates on 12V to 48V phantom power and will be initially available in black.



860-434-9190; fax 860-434-1759
www.sennheiserusa.com; lit@sennheiserusa.com

Headphones
AKG

K101, K301 Xtra, K71: The K 301 Xtra is a semi-open, large diaphragm headphone that provides audiophile grade sound. The Varimotion XXL transducers deliver high sensitivity and low impedance. In addition, the headphones provide deep bass, a frequency response of 18Hz–26KHz, its sensitivity 102dB and its output impedance is 55Ω. The K 101 headphones are an open-back headphone with a computer-optimized MX20 transducer design. The K 101 has a wide 18–22,000Hz frequency response and 101dB sensitivity and low 19Ω impedance. The K 71 featherweight headphones are a semi-open headphone featuring high 100dB sensitivity and low 19Ω impedance. The lightweight design weighs only 140 grams (5 oz.) and its easy load helps extend the life of the expensive batteries in portable devices. The K 71 headphone delivers a full 20–20,000Hz frequency response.

615-620-3800; fax 615-620-3875
www.akgusa.com; akgusa@harman.com

Compressor, leveler, limiter
Aphex Systems

Compellor 320D: Now available with digital and analog I/O, this processor is useful for digital applications that receive or send bit-rate reduced audio. This product's circuitry provides level-controlled audio through the use of simultaneous, complementary intelligent compressor action, leveling and peak limiting. Patented control circuits continuously analyze the input signal and vary the control characteristics to provide virtually undetectable operation. Heavy processing is imperceptible. This product will not unmask the masking algorithms of upstream bit-rate reductions and will feed a signal to the downstream bit rate reductions that will not create more artifacts.

818-767-2929; fax 818-767-2641; www.aphex.com; sales@aphex.com

Snake cables
Whirlwind

Connect series: Designed with many of the same features found in the Medusa Standard snakes series, this series contains a 100" snake with 16 sends and four XLR returns. Other features include fanout with multiple layers of heat shrink; wire-mesh strain relief and grip on the box; and the connectors are hand soldered to the XLRs, not crimped.

800-733-9473; fax 716-865-8930

www.whirlwindusa.com; sales@whirlwindusa.com

Reader Feedback

www.beradio.com

The search continues

In the summer of 2003 we began our search to find the oldest transmitter in daily use. We received some submissions directly from stations, while others came from people who suggested we contact another station. After many phone calls and e-mails, we were able to confirm that a Gates BC-1T was still in use at WNAH, Nashville. We announced our finding in the *Sign Off* column in the December issue.

Despite our diligent search, it seems that many readers chose not to respond to the initial request. Since then we have received submissions for transmitters that predate the 1960 unit. The letter concerning the oldest one to date follows. If you have an older transmitter that is used as a main transmitter, let us know at radio@primediabusiness.com.

—Kari Taylor, associate editor

I was reading the December issue and saw the article on the oldest transmitter in *Sign Off*. I have an older one for you: WFLO-AM 870 went on the air August 1947 and we are still using the original transmitter today. It is a Raytheon 1kW AM transmitter (model RA-1000). Dan Churchill of Commercial Radio Company in Cavendish, VT, has referred to this transmitter as the Rolls Royce of transmitters. Churchill is an expert on Raytheon transmitters and helps us whenever we have technical problems. Our Raytheon purrs like a kitten and its pushing 57 years of fulltime service as our main AM transmitter.

Francis Wood
general manager
WFLO AM/FM, Farmville, VA, and and WSVS AM, Crewe, VA

Debates on IBOC

What will IBOC do for FM? Only cost money (for the benefit of the equipment manufacturers) and put digital hash on the adjacent channels. In addition, the digital time delay, which might be somewhere between 5 and 10 seconds, will really mess up a call-in program.

All I can say is that I refuse to install it. I see no reason to think that it will help either the stations or the listeners. It's just the idea that digital is supposed to be better—more high-tech. Radio Shack sells digital-ready headphones. But the salesmen don't know what that means.

Stanley Swanson
chief engineer
KBNL, Laredo, TX

There is an incredible drumbeat to push digital AM and FM with sketchy-at-best articles in the trades explaining how it will benefit anyone. Initially it looked like AM radio could get an FM-grade signal—a pretty good deal—while FM would get pretty much nothing and spend a whole lot getting it. It still looks like FM will get nothing out of IBOC.

For AM, the notion of FM quality is a good idea, but the technology seems to be flawed. For example, we can hear hash in South Carolina from WSAI [Cincinnati] 1530 at sundown when WSAI is still on IBOC. Can you imagine every station in the country generating that kind of ruckus? The people looking to make financial gain from this proposal tell us that it is not a problem. If we follow their lead, we will soon learn that dial is filled with hash, which is not good. By then it will be too late.

What's really wrong with radio? It has nothing to do with IBOC—it's the content: consultant-driven, canned, boring playlists; not a real person in the building.

Jim Jenkins
owner/general manager
WAGS/WJDJ, Bishopville, SC

Data dismay

I was reading the January 2004 issue and stopped to read your Viewpoint *The Data Dilemma*. I got to the point in the article where you identify Clear Channel as "the new champion" after "installing RBDS encoders in its stations nationwide." No other radio operator was identified. Needless to say, I was disapponted that Entercom and its dynamic RBDS initiative was not mentioned. I believe it was Entercom (working with Allen Hartle and the RadioExperience) turning on 60 of our stations' 57kHz subcarriers and displaying artist and song title information that caught CC's attention, and got them to follow suit. I wonder if CC would be transmitting RBDS on more than 190 stations now if Entercom hadn't started doing it first?

I recall what the Shortline railroad owner had to say about the much bigger Great Northern Railroad: We may not be as big, but we're just as wide.

John Price
Entercom Corporate Engineering
Seattle

comments?
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Contributor Pro-file

Meet the professionals who write for *Radio*.
This month: Facility Showcase, page 28.

Gregg Garcia
Chief Engineer
Lotus Communications
Tucson, AZ

Garcia started his career at KROY-AM/FM in Sacramento, CA, in 1977 as an assistant engineer. He then worked in Los Angeles as chief engineer of KFAC and then KKGO. In 1986 he moved to the network side and joined the Transtar Radio Network and later became the director of technical operations for ABC Watermark, which produced American Top 40 with Casey Kasem and Shadoe Stevens. Since then, he has worked for KKXX and KLLY/KNZR/KCHT in Bakersfield, and then Tucson stations KMXZ/KKHG/KFFN and KRQQ/KWFM/KNST/KCEE before joining Lotus Communications.

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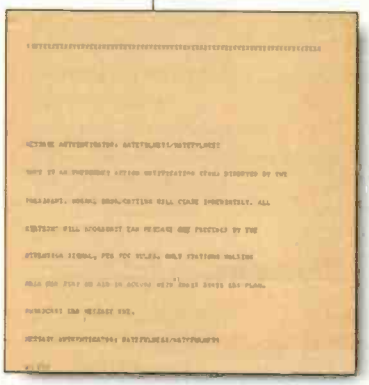
Shaping radio today and tomorrow

By Kari Taylor, associate editor

Do you remember?

On February 21, 1971, the National Warning Center at the North American Air Defense Command (NORAD) in Colorado accidentally transmitted an Emergency Action Notification (EAN) message instead of the scheduled test message. The EAN message was sent at the time of a regularly scheduled test, and was sent over the AP and UPI wire services, which NORAD could control for EBS purposes. The EAN message was supposed to be issued to the industry network control points only when the President activated the national-level EBS.



A copy of the accidental EAN printout from UPI, courtesy of Mike Anderson, stlmedia.net.

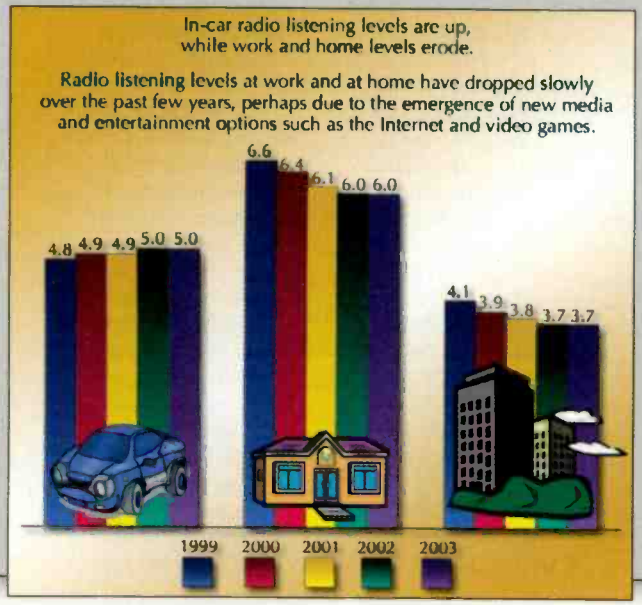
A study of the event followed. The investigation revealed that some stations thought the message was a mistake because it was issued at the same time as the routine NORAD weekly wire service test message. Many broadcast stations did not immediately respond to the EAN message as required by the FCC EBS rules. Others searched for confirmation from other sources such as the major networks but could find none. Some stations simply failed to hear the wire service alarm or see the printed wire copy message. Some stations actually aired the message.

In 1972, the government, in cooperation with the National Industry Advisory Committee (NIAC), corrected deficiencies they found as a result of the NORAD error. Their corrective actions were to:

- Remove the "Attack Warning" function from EBS. This action removed NORAD as an activator of the national-level EBS, leaving the President as the sole activator the national-level EBS.
- Revise and simplify the EBS instructions issued by the FCC such as the Part 73 EBS rules, EBS Checklists, EBS National Control Procedures and Authenticator Lists.
- Improve the activation and authentication procedures.

Sample and Hold

Trends in radio listening



Data expressed in AQH ratings, 12+.
Source: Arbitron Inc./Edison Media Research

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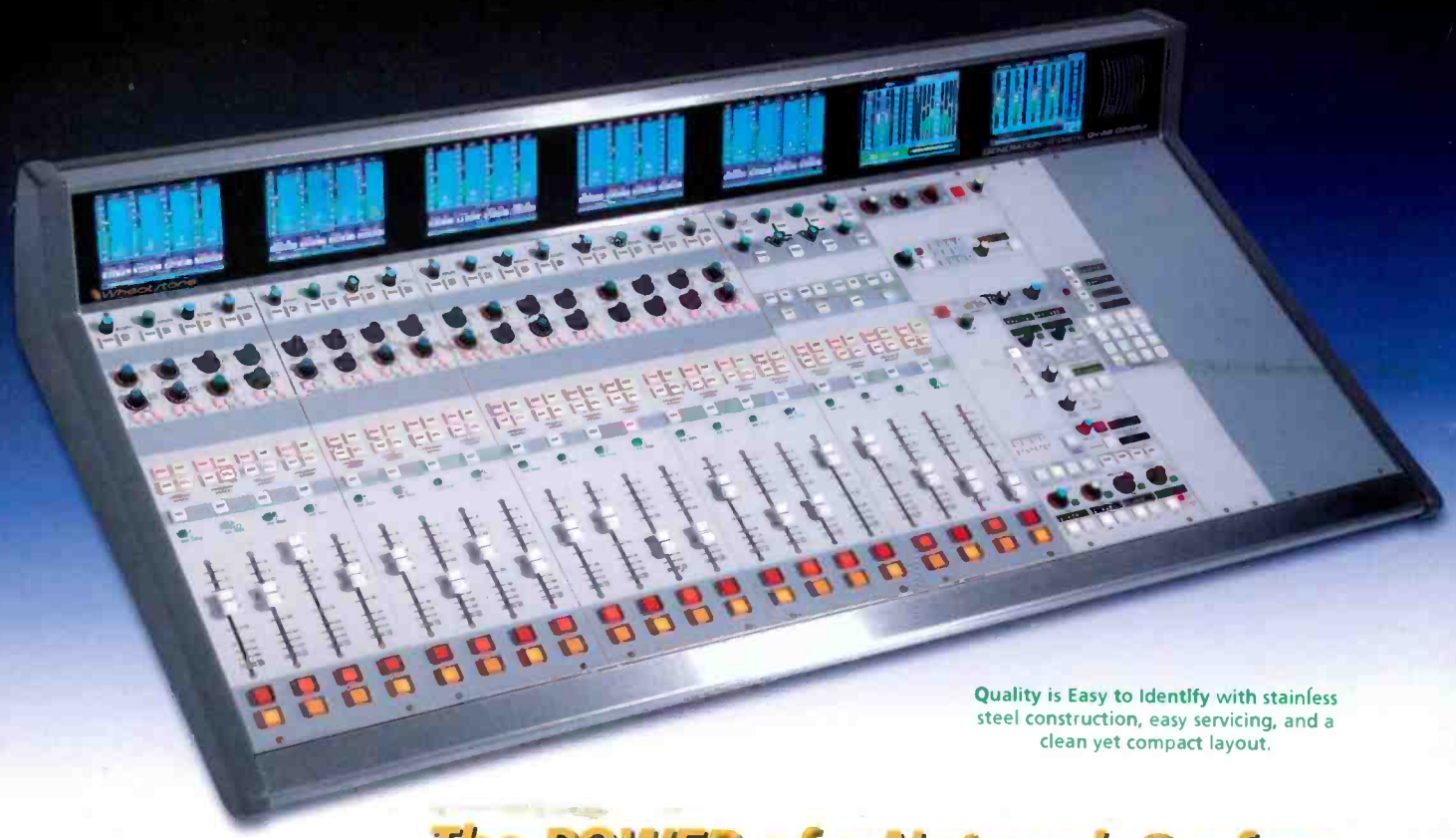

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