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Radio heads West

Your preview to the NAB Radio Show

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THE RADIO TECHNOLOGY LEADER
Radio Magazine
www.beradio.com
September 2004 • Volume 10, Number 9

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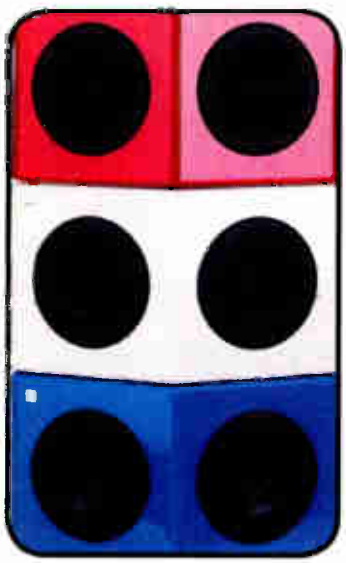

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Currents Online

Highlights of news items from the past month

Court: File Sharing Companies Not Liable

All because Grokster and Streamcast software can be used for legitimate purposes.

Moseley Signs Licensing Deal With APT

The agreement allows Moseley to use APT's Apt-x algorithm for three years.

Avid to Acquire M-Audio

M-Audio becomes a business unit of Digidesign.

Cox Radio to Expand IBOC Rollout

Cox will upgrade 80 percent of its stations over the next four years.

KCSN Begins Testing IBOC Booster

Transmission tests began in mid-August using IBOC equipment from Broadcast Electronics.

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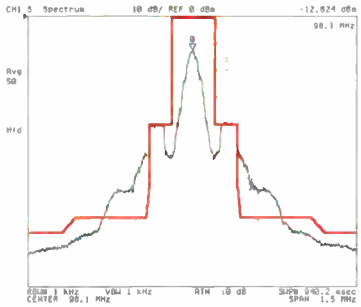

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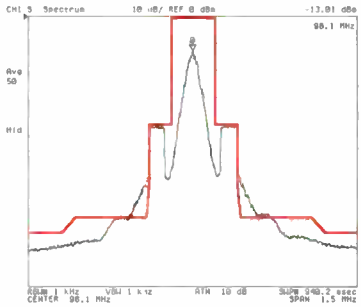

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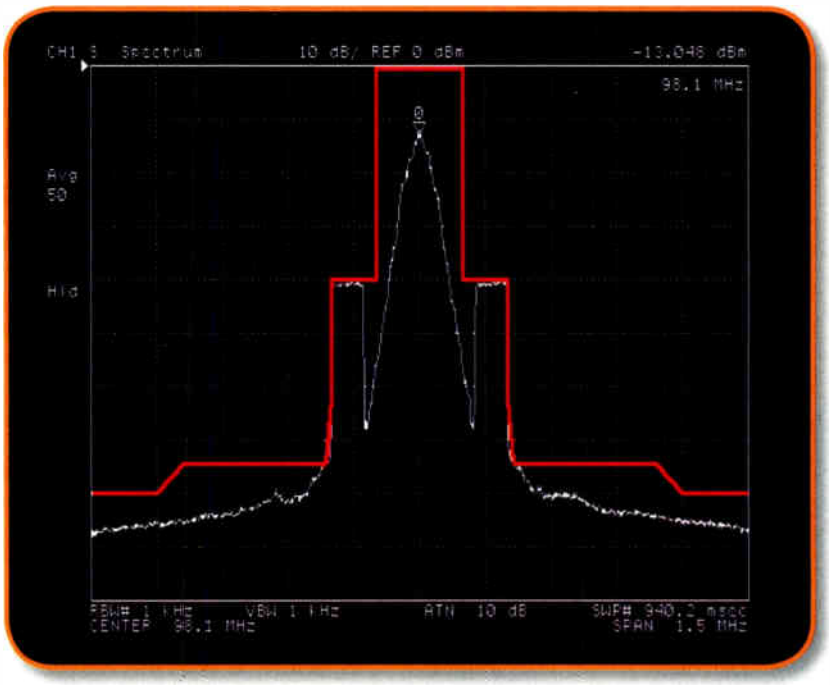

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The Ipods are coming

I am not a typical radio listener, and neither are you. We work closely to radio. I may no longer have keys to a transmitter site, but I still listen critically. Whether it's thinking about how I would tweak a processor setting or determining the possible reason for that last on-air glitch, when I listen to the radio I know what is going on and why. The average listener does not, nor does he care.

The listener wants to be entertained or informed. Unfortunately for radio, the venues available to a listener have increased. Radio market shares may appear to be stable, but while the percentage of an audience listening to a station remains the same, the size of that audience is shrinking.

The typical radio user listens because he likes the current song or is interested in the topic being discussed. If he doesn't like the next song or topic, he changes the station. If he is loyal to a station, he'll be back. If he's a button-pusher looking for instant gratification, who knows where he'll go next. It's this tendency to seek other options that continues to erode the radio audience.

I'm guilty of some of this button pushing. I have a few favorite stations in Kansas City, and when I want something else—or something not being played on the radio—I turn to my CD player. I don't have a portable media player. I always thought that taking the time to load music into a device so that I could listen to it anywhere at anytime was an unnecessary practice. Besides, I like the spontaneity of radio. You don't know what's next (although with some formats you have a good chance of guessing).

It's this spontaneity that always put radio on top for me. But this is no longer the exclusive ability of terrestrial radio. Satellite radio channels can provide this spontaneity across 100 channels. That's a large palette from which to choose. Listeners like the spontaneity of radio, but they also like the ability to have some control over it as well.

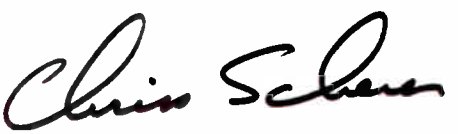
That's where the portable media player fits in so well. My friend owns a unit that stores nearly 5,000 songs or 330 hours of audio at a decent encoding rate. This player, about the size of a deck of cards, holds his entire CD collection. My entire collection exceeds this capacity, but I can't imagine listening to everything in my collection in a continuous run.

My friend uses his player all the time. Not owning one, I assumed that he would have to set playlists every day to begin his listening experience. Sometimes he does. Most of the time he selects a random play mode, which has several variations. Yesterday he chose to listen to a single artist all day.

I asked him about loading material into the unit. For me, taking the time to transfer 300 CDs sounds like cruel punishment. Using his desktop PC, he ripped the CDs and then loaded them through the player's USB connection. The time investment is actually minimal. A few mouse clicks to start the process and then he walks away. Simple. The time to program the unit for his next listening session is also usually done during downtime, such as waiting in line.

The role of establishing technology usage trends is normally left to a younger crowd. With so much technology firmly planted, radio is not only losing the 14-year-old, we are now losing the 30-somethings and more. My friend is now a minor member of the radio listening crowd, thanks to his exposure to the new competition for radio.

Entertainment on demand, personal media players, broadband and satellite delivery, and other yet-to-be invented technologies will continue to reduce the size of the radio listening audience. The added capabilities of digital radio can slow this erosion and maybe even stop it. Radio's long-term survival depends on radio joining the modern age and becoming an active player once again.



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Test and measurement in the digital age

By Kevin McNamara, CNE

Maintaining quality and reliability in a modern digital facility presents some new and significant challenges when compared with traditional analog methods. A few engineers believe it is easier to maintain a digital audio chain because they no longer need to deal with the audible effects of ground loops, noise, crosstalk and mismatches typical in some analog signal paths. Digital signals, on the other hand, either provide flawless audio or dead silence, right? Wrong! Digital infrastructures require a great deal of care when designing, constructing and testing the various paths where digital audio signals travel.

Ethernet testers can evaluate cables, but also provide information on network traffic.

Let's envision a fully digital broadcast facility. It might house several fully automated stations under one roof. The operation requires a combination of digital and analog signal paths to handle the diversity of the various stations, however all of the program and production audio is fully digital to the transmitter site. Analog and digital signal are routed with a large multi-format routing switcher. The respective stations use an extensive digital microwave system. Several channels of digital audio (traditional and IBOC) are transmitted over a 45MHz DS3 radio system to one transmitter site (hub), then each digital channel is split off and fed to other stations over a lower bandwidth 1.5MHz DS1 microwave system. The facility also streams digital audio to the Internet, as well as real-time news, weather and traffic to various websites.

I use this example to illustrate the variety of test and measurement requirements that are currently or will likely be in use the near future. Our facility uses several types of signals operating over a wide variety of protocols and transport methods. These signals include analog, AES/EBU digital and S/PDIF digital formats. The transport protocols that carry these audio formats include Ethernet, Fibre Channel, DS1 and DS3 operating over physical media that include standard single pair shielded, CAT-5, fiber optic, coaxial and wireless media. Protocols such as TCP/IP and IPX are also used extensively for general office LAN and Web server applications.

If you are the engineer of this facility, here are a few pieces of essential test equipment that should be close at hand.

Cable tester

No toolbox should be without some type of cable tester. While most cable testers troubleshoot Ethernet cabling, some also offer the ability to analyze other cabling such as basic paired/shielded, coaxial and fiber optic media. Most networks rely on unshielded twisted pair cable (UTP) as a means to interconnect devices. Because the UTP cable uses copper conductors, it is subject to the usual electrical characteristics, notably signal attenuation and frequency losses that vary directly with its length. Currently, Ethernet networks operate in full-duplex, which means that transmitted and received data is carried simultaneously. Two of the four pairs within the UTP cable are used to transmit and receive. The problem with this arrangement is that the signal levels for transmitted and received data at any given termination point may have extremely different levels. This imbalance could create the problem of near-end cross talk (NEXT). NEXT is created when the transmitted electrical signal (current) on one pair of wires forms a magnetic field, which couples to the pair carrying the received signal. This problem generally occurs at the UTP cable end because this is where the transmitted signal is highest relative to that measured on the received pair, and because the cable pairs may be untwisted to facilitate attachment to the RJ-45 connector, promoting more efficient coupling.

The interference created as a result of NEXT can have severe effects on the performance of the network. For higher performances, Category 5e (CAT-5e) cabling or higher variations of the NEXT measurement are specified. These measurements include equal-level far-end crosstalk (ELFEXT), power sum near-level crosstalk (PSNEXT) and power sum equal-level crosstalk (PSELFEXT), which are derived from calculations, not a specific measurement.

Ethernet network analyzers

A network analyzer is a useful, albeit expensive, tool for documenting and troubleshooting LANs, WANs and even fibre-channel based storage area networks (SAN). These tools allow a network engineer to perform the cable testing functions previously discussed and to monitor and quantify the packets of data traffic moving across the network. These testers provide a comprehensive suite of tools that

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give several views of a network, including discovery of network devices attached to the network; detailed information about those devices including network addresses, names, type of device and protocols used; logical mapping of all devices and connections within a LAN or WAN; detailed IP information; network usage statistics; data performance measurements; and network error information.

Digital audio test systems

The digital audio interfaces prominent in radio broadcasting are either the AES/EBU or the S/PDIF format. While the formats are similar in many respects, the S/PDIF format is commonly associated with consumer electronics, and was formally standardized under a document called IEC958 (for professional and consumer electronics). The AES/EBU standard deals with professional digital audio applications. What is most similar is that each of these formats will operate without the benefit of external timing. The self-clocking feature makes it easy for a digital audio device to interface with other digital audio devices simply by setting the sample rates the same, usually 48KHz (professional) or 44.1KHz (consumer), although other (less common) rates can be used.

Audio test generators and testers provide an easy way to verify performance.

A variety of specialized test systems for the testing of digital audio systems are currently available. The test systems are packaged as stand-alone test systems, custom PC-based hardware/software analysis packages or a combination of both. Most professional digital audio systems use AES/EBU, specifically the AES3 standard, however most can also analyze S/PDIF signals.

The majority of problems found in digital audio systems can be traced to one of the following four conditions.

1) Improper/defective cabling – The additional capacitance caused by excessively long or improperly terminated cables will increase the incidence of bit errors and consequently data losses in a system due to improper timing or insufficient amplitude to adjacent device.

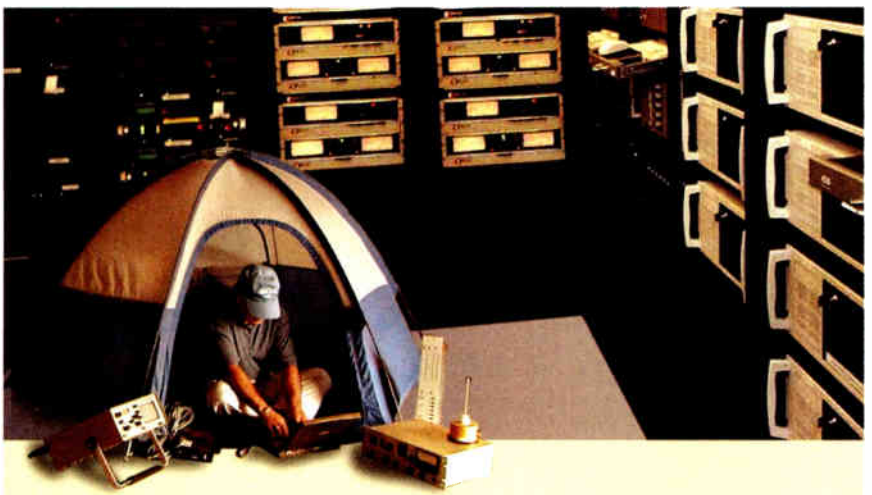
2) Insufficient signal amplitude – Because clocking/synchronization is derived from the transition of the data bits, digital stream may become unreliable or non-existent.

3) Mismatched sample rate – This can be easily detected with a test device.

4) Excessive jitter – Jitter can take different forms, but it can be generally described as any deviation from a perfectly stable clock signal. Jitter can be caused by improper cabling, high noise levels or excessive crosstalk.

An investment in the proper test equipment equates to significant savings of time and increased reliability.

McNamara is president of Applied Wireless.



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Displacement relief for FM translators?

By Harry Martin

The National Translator Association (NTA) has petitioned the FCC to amend the FM translator rules to permit an FM translator displaced from its current operating channel by a new or modified full-power FM station to immediately apply to move to any available FM channel. Currently, displaced translators must wait for the next FM translator application filing window to file the application.

FM translator stations, which generally operate at much lower power than full-power FM stations, are licensed by the FCC as secondary to full-power FM stations. When a new full-power FM station commences broadcasting or an existing full-power FM station modifies its coverage, existing FM translators causing interference to the new or modified full-power stations must immediately cease broadcasting and are displaced from their current operating channels. FM translators receiving interference from new or modified full-power FM stations are similarly displaced as their signals can no longer be heard.

Under the existing FM translator rules, a displaced FM translator may immediately apply to move only to adjacent channels, none of which may be available. Before the displaced FM translator can move to a non-adjacent available channel, it must cease broadcasting and wait several years for the FCC to open an FM translator modification application filing window and then process and grant the numerous applications filed during the window. Commercial translator applicants may have to go to auction to secure a replacement frequency. Meanwhile, the public loses the broadcast service being provided by the FM translator.

The NTA last fall asked the FCC to change its rules to help existing FM translators in this situation. In particular, the NTA proposed that existing FM translators forced to cease operating because they are causing or receiving interference should be permitted to immediately apply to move to any available FM channel. The NTA's proposal would afford the same opportunity for permittees of authorized but unbuilt FM translators precluded from commencing operations because they are expected to cause or receive interference. The NTA also asked that applicants for new FM translators expected to cause or receive interference be permitted to immediately amend their applications to propose available non-adjacent FM channels. In June, the FCC requested comments regarding the NTA's request. Comments filed in response supported the NTA.

Whether and when the FCC may move on to actually propose and adopt rule amendments to assist displaced FM translators remains to be seen. The problem is likely to become more aggravated in the near term, as more FM translators are likely to be displaced when the FCC auctions new FM channels and authorizes new full-power FM stations to operate on the channels. The current rules provide virtually no relief to affected translator licensees and permittees. While they are entitled to file displacement applications, they cannot do so until a new filing window for such applications opens. It may be years before the FCC opens its next FM translator modification application filing window. The last such window opened in March 2003, and in the intervening 16 months the FCC has still processed only a relatively small number of the thousands of applications filed in that window. None of the mutually exclusive applications have been processed.

Recent FCC fines

A Florida AM station was fined $1,000 for not having a fence after the station's general manager told the FCC inspector they could get closer to the tower by avoiding the main gate and walking around to the side that had no fence. Another Florida AM station was fined $7,000 for not having its gate locked. An Arkansas AM was fined $4,400 for having numerous openings in its fence; the FCC was not impressed with the station's argument that a no trespassing sign served the same purpose.

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

Dateline:

Oct. 1 is the deadline for radio stations in Iowa and Missouri to file their renewal applications, ownership reports and EEO program reports. Oct. 1 also is the date radio stations in Colorado, Minnesota, Montana, North Dakota and South Dakota must begin their pre-filing renewal announcements. Issues/programs lists for the third quarter must be placed in all radio station public files by Oct. 10.

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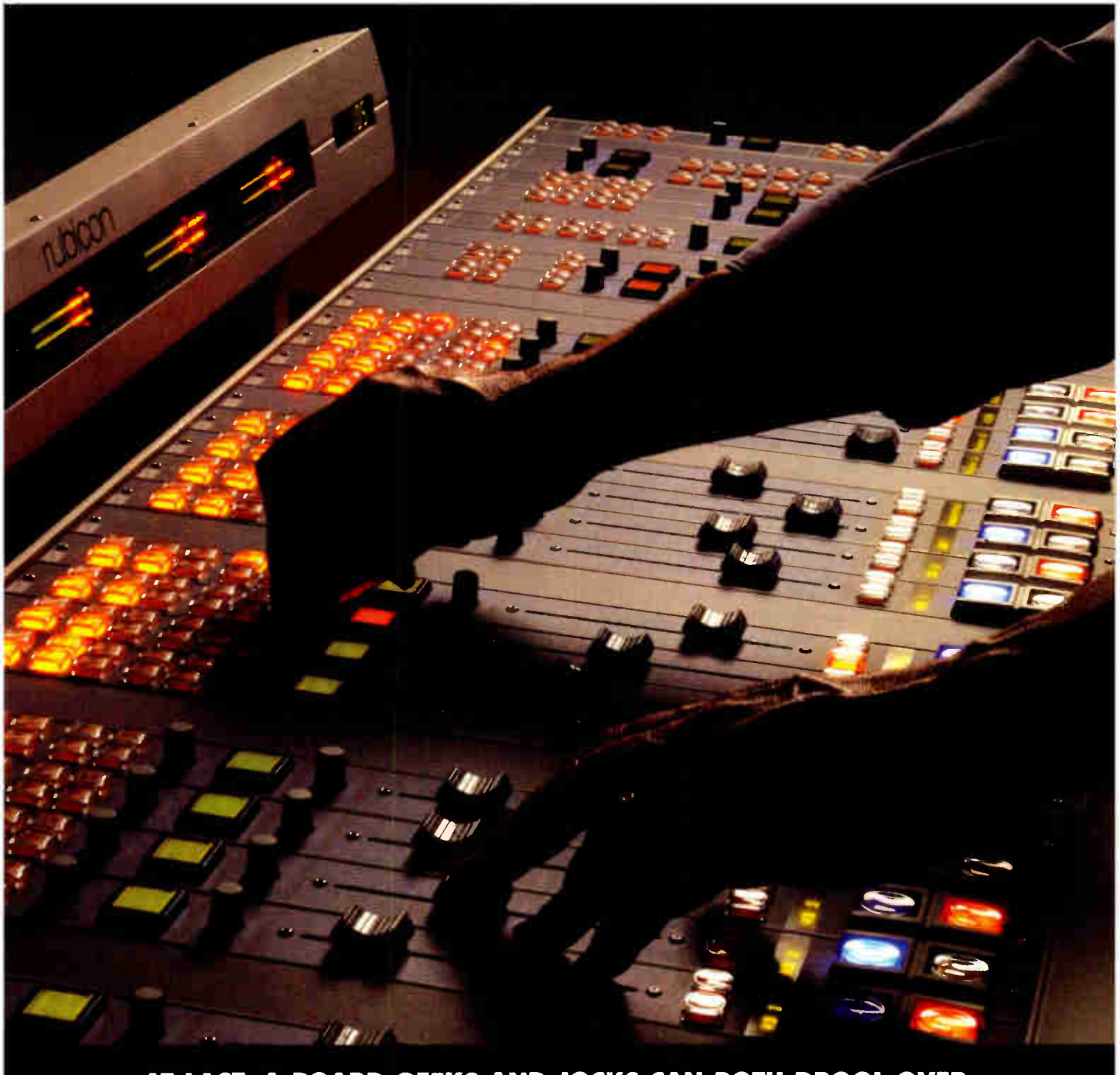

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Managing Content

By Chriss Scherer, editor

Beyond audio storage and playback

The current trend in facility design involves two major components to complete an on-air system. One element is the audio routing and mixing functions, which are becoming increasingly tied together. The other is the audio storage and playback system, commonly referred to as an automation system. From the humble beginnings as a way to provide unattended playback of scheduled material with various mechanical methods, today's automation systems are computer-based and provide much more than just audio playback.

What has long been called an automation system was at one time singular in function; it now actually handles various automated tasks. The primary function is content management: storage and playback of audio files on demand. Add to this the ability to load schedules and apply certain rules to fill time automatically and you describe nearly all the systems available today.

While audio storage and playback are still the key functions, an automation system has actually shifted its primary function to become a facility event controller. Through event triggers, such as contact closures, serial data strings and other control paths, the automation system is able to automatically record audio feeds or capture audio files and control external equipment such as audio processors, routing switchers and satellite receivers.

WAN, LAN, thank you ma'am

The need for interaction, control and insertion from a distance has become important, as have WAN-based media sharing and the ability to manage multiple stations from a central site.

Computers excel at storing and manipulating data, so affecting audio data is a natural function. However, new data needs have become important for stations. Program-associated data (PAD)—

Resource Guide

An overview of available automation systems

see page 18 for an explanation of the abbreviations

OS	Modes	Sound Cards	Third-party RAID support?	File Formats	Non-native file support?	Control	PAD	Playback Modes	Purchase	Support
AEQ • *Mar4Win* •*www.aeq.es*										
W	M, L, F, S, T	Digigram	yes	*	*	S, E, C, E@sy	*	L	P	*
Features: Modules available for new editing, voice tracking, scheduling;										
Arrakis • *Digilink Extreme* • *www.arrakis-systems.com*										
W	M, L, F, S, T	any	yes	W, 2, 3	yes	S, C	separate	L, S, N	P,L	T
Features: 16×3 switcher with built-in audio cards required for satellite operation; switcher also facilitates installation and separates PC functions from broadcast functions										
Broadcast Electronics • *Audiovault* • *www.bdcast.com*										
W	M, L, F, S, T	Digigram, Soundblaster	yes	W, B, 2, 3	yes	S, E, C	separate	L, S, N	P,L	U
Features: Includes integrated CD ripper; supports multiple sample rates and compression types simultaneously from a single audio channel										
Broadcast Software International • *Simian* • *www.bsiusa.com*										
W	M, L, F, S, T	any	yes	W, B, 2, 3, TM Century, Dolby AC-2	*	S, C	*	L, N	P	T
Features: Spanish menus; programmable hot keys; rotating carts										
Broadcast Software International • *Wavecart* • *www.bsiusa.com*										
W	M	any	*	W, B, 2, 3, TM Century, Dolby AC-2	*	*	*	L	P	*
BTSG • *Generation IV* • *www.btsg.com*										
W	M, L, F, S, T	any	yes	W, B, 2, 3	yes	S, E, C, I/O boards	separate or imbedded	L, N	P,L	T
Features: Available as a full or modular system										

table continued on p. 20

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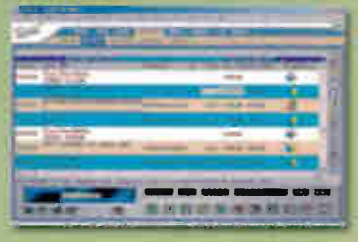

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the basics of song title and artist name—are being used today to feed RBDS encoders and station websites with "now playing" information. This data will also be transmitted on an IBOC stream. With plans to provide radio receivers with more detailed displays, additional data can also be provided, such as an artist's concert dates and information about the performer. Similar added data can be applied to commercial audio files as well.

This data can be tied to audio files and delivered on a schedule through the automation system. The PAD information is likely already part of the stored audio file, so retrieving it for on-air delivery is not a complex matter. This data may be a part of the audio stream or a separate data stream.

The supplemental PAD, such as concert dates or artist news, can also be stored and retrieved as needed. Most systems already have the capability to provide live copy with any audio file. This live copy is simply stored data. Not to oversimplify the idea, but data is data to a computer, regardless of whether it is fed to an in-studio monitor or made available to an RBDS stream.

Multi-channel audio is a developing technology for IBOC. There are currently two ways it is being developed. The Tomorrow Radio project, a joint effort between NPR, Harris and Kenwood, adds a supplemental audio channel (SAC) in addition to the main channel so that two program streams are created. Most automation systems can handle more than one program stream, although it is preferable to have a separate workstation to provide the second stream as backup. The other form of multi-channel audio of IBOC is surround sound. While still dealing with audio data, surround-sound files will have a different format than traditional mono or stereo files. Systems vary in this capability today, but it is something to keep in mind if your station is considering an IBOC roll-out with an eye to the leading technology.

Abbreviations

* - check with manufacturer

OS:
W - Windows 2000 or XP
L – Linux

Modes:
M – manual
L - live assist
F - full automation
S - Satellite
T - timed recording/playback

Formats:
W - WAV
B - BWF
2 - MP2
3 - MP3
A - Apt-x
C - Cart Chunk

Control:
S - serial
E - Ethernet
C - contact closures

Playback Modes:
L - from local sound card
S - from server sound card
N - over network to workstation sound card

Purchase:
P - full purchase
L - ongoing license fee

Support
U - free unlimited
T - tiered support based on contract terms

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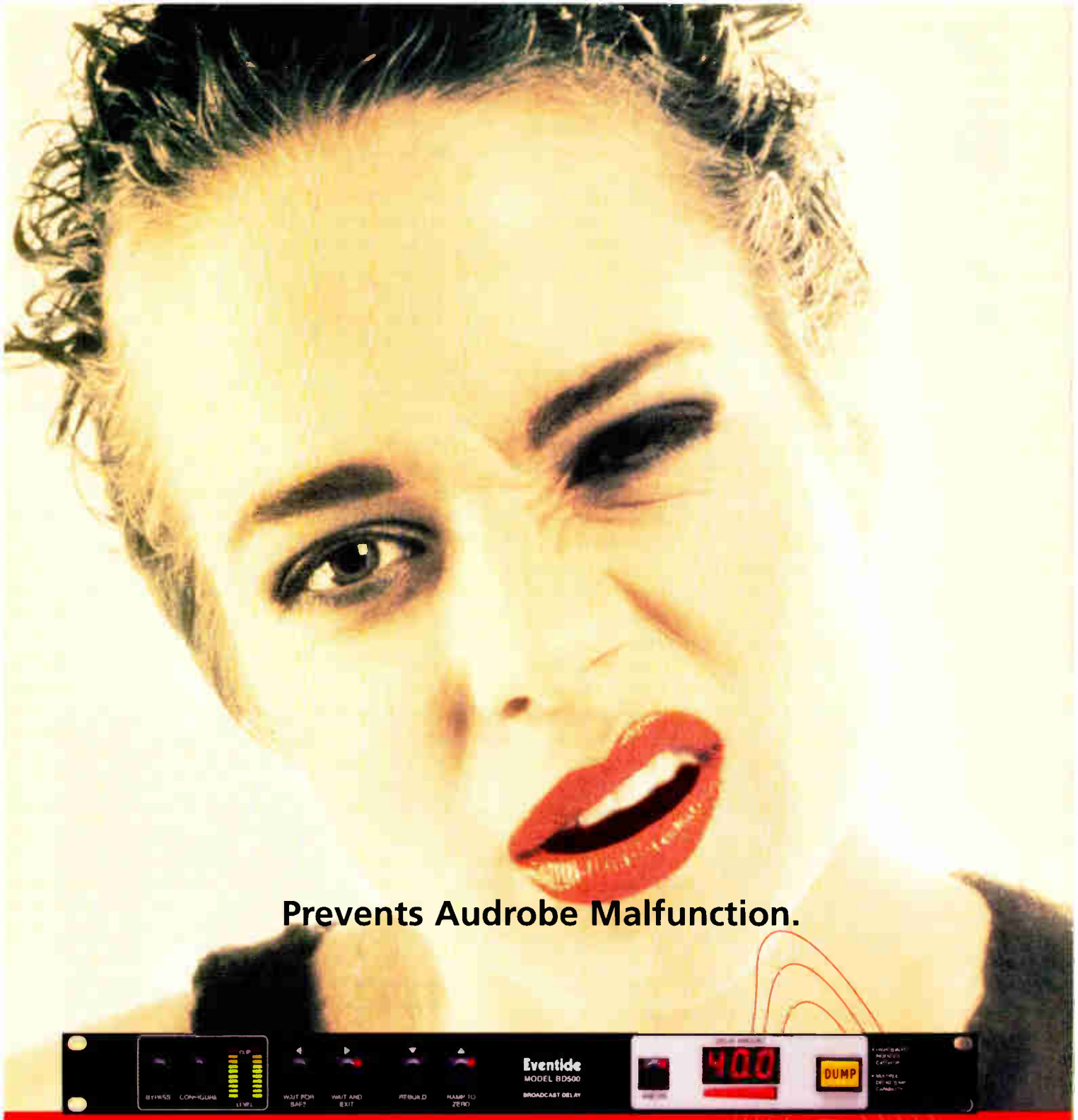

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OS	Modes	Sound Cards	Third-party RAID support?	File Formats	Non-native file support?	Control	PAD	Playback Modes	Purchase	Support
Computer Concepts • *Maestro* • *www.computerconcepts.biz*										
W	M, L, F, S, T	any	yes	W, B, 2, 3, A, C, WMA	yes	S, E, C	separate	L, S, N	P	U, T
Features: Voice tracking via Internet; voice tracking in air studio while on-air; built-in air studio phone recorder-editor; Protégé is the a la carte version of Maestro										
Dalet • *Dalet Plus* • *www.dalet.com*										
W	M, L, F, S, T	Digigram, Soundblaster	yes	W, B, 2, 3, WMA	yes	S, C	separate	L	P	T
Features: Modular system design; redundant architecture										
D.A.V.I.D. • *Latitude* • *www.digasystem.com*										
W	M, L, F, S, T	Digigram, Lynx	yes	W, B, 2, 3, Dalet SND, MFX, WMA, Realaudio	yes	S, E, C	separate or imbedded	L, N	P	T
Features: Content Bridge exports and imports files; multi-tier rights management including personal desktop configuration; content distribution and exchange via WAN/MAN; Web-based remote reporter kit										
Enco • *DADpro32* • *www.enco.com*										
W	M, L, F, S, T	Digigram, Audioscience	yes	W, B, 2, 3, plays AC-2	yes	S, E, C	separate	L, N	P	U
Features: Command language to program complex tasks; conditional programming language for if-then-else administration; Customizable interface for screen colors and layout; security to enable or lock out features										

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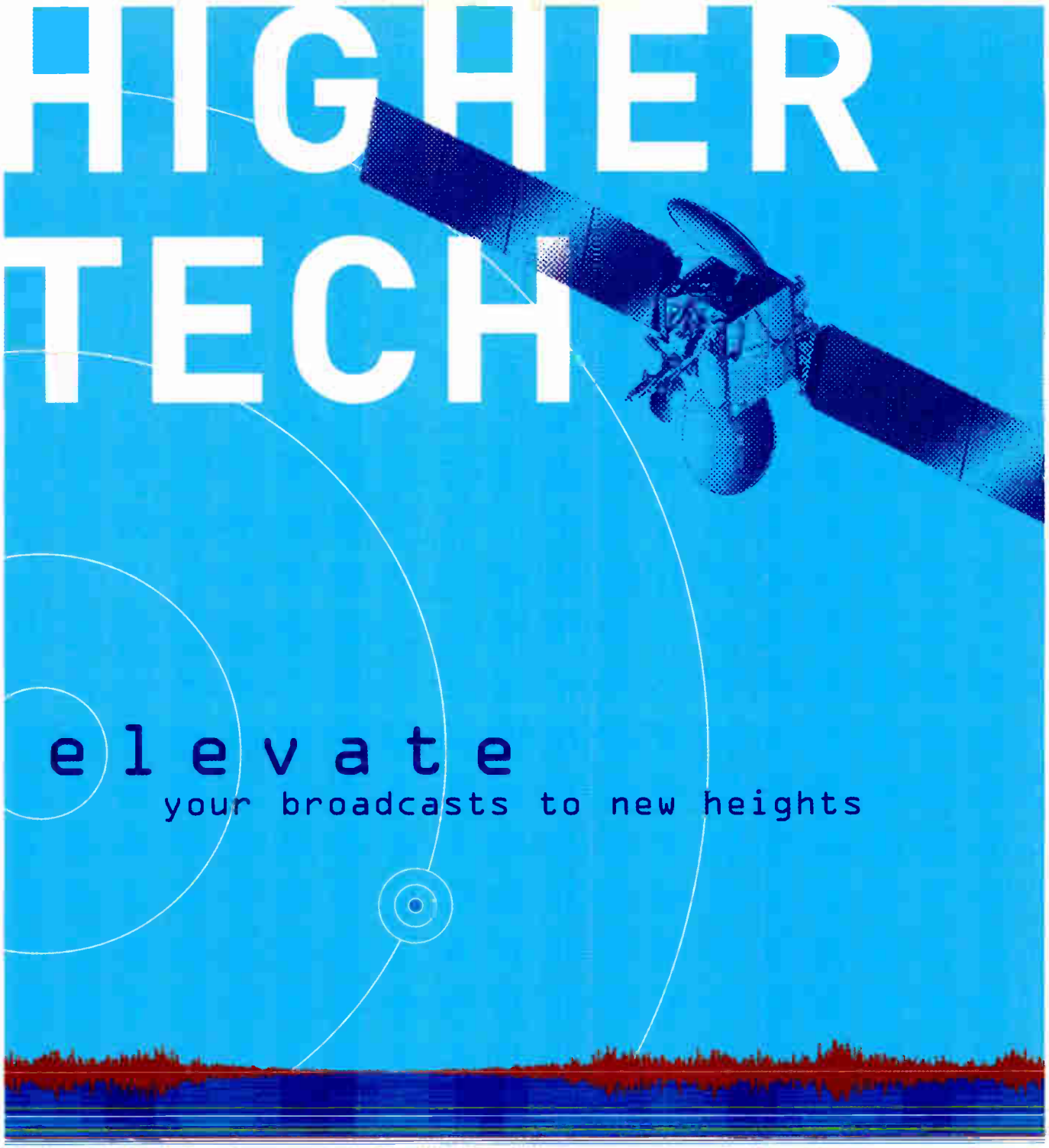

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OS	Modes	Sound Cards	Third-party RAID support?	File Formats	Non-native file support?	Control	PAD	Playback Modes	Purchase	Support
Netia • *Radio-Assist 7.5* • *www.netia.fr*										
W	M, L, F, S, T	Digigram, Sounblaster, M-Audio, Terratec, Soundmax, Yellowtec	yes	W, B, 2, 3	yes	*	separate or imbedded	L	L	T
OMT • *Imediatouch* • *www.imediatouch.com*										
W	M, L, F, S, T	any	yes	W, B, 2, 3	yes	S, E, C	separate	L	P	T
Features: Version 2.2 adds features to eliminate downtime with redundant databases										
On Air Digital • *Radio Suite* • *www.onairusa.com*										
L	M, L, F, S, T	Audioscience, Soundblaster	yes	W, B, 2, 3, A, ADPCM	yes	S, C	separate	L, N	P	U
Features: Includes Radio Suite Linux; software encoding and decoding; interfaces with all Windows-based editors, news systems, CD rippers										
Pristine Systems • *CDS32* • *www.pristinesys.com*										
W	M, L, F, S, T	Audioscience	yes	W, 2, 3, A, Dolby AC-2, Cart Chunk	yes	S, E, C	separate or imbedded	L, N	P	T
Features: Includes music scheduling, voice tracking, editor, RBDS text output, Website text output, audio browser software, audio grabber										
Prophet Systems • *Nexgen 101* • *Innovationswww.prohetsys.com*										
W, L	M, L, F, S, T	any	yes	W, B, 2, 3	yes	S, E, C	separate or imbedded	L, S, N	P	T
Features: Central database and storage can be on Linux; includes integrated automatic music scheduling; optional profanity control module; automatic hot sparring redundancy for on-air workstations; automatic program logging and archive module										

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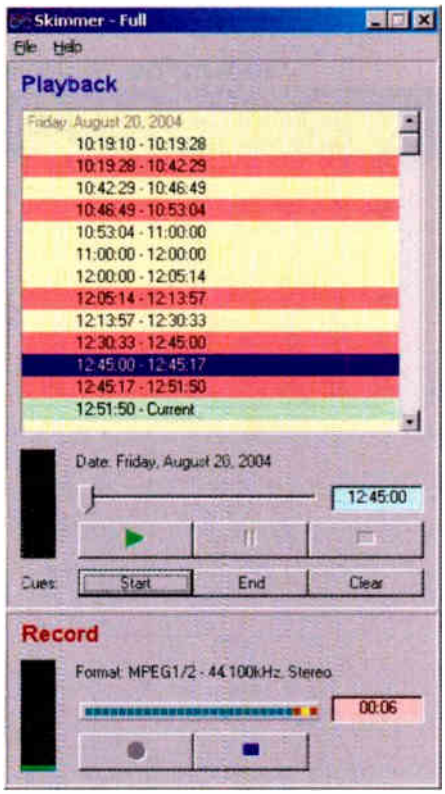

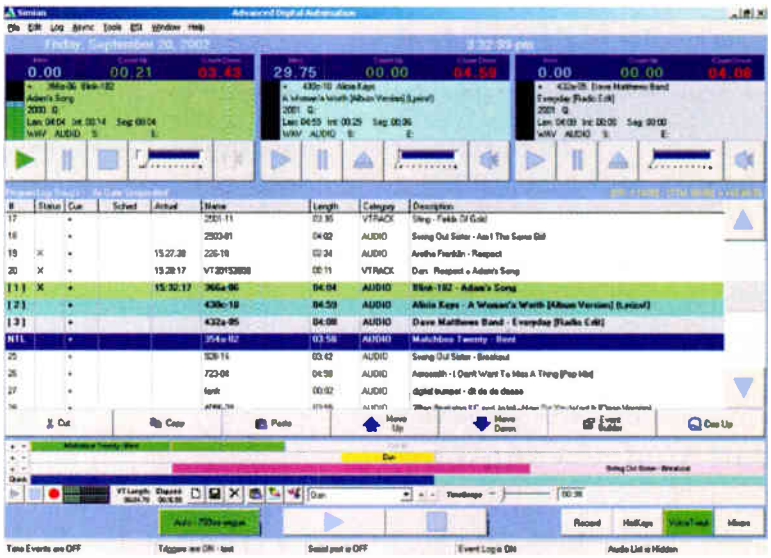

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OS	Modes	Sound Cards	Third-party RAID support?	File Formats	Non-native file support?	Control	PAD	Playback Modes	Purchase	Support
Register Data Systems • *The Phantom* • *www.registerdata.com*										
DOS	M, L, F, S, T	any	yes	*	*	S, E, C	separate	L	P	U
RCS • *Master Control* • *www.rcsworks.com*										
W	M, L, F, S, T	Digigram, Moto, M-Audio, Soundscape	yes	W, B, 2, Cart Chunk	yes	S, E, C	separate	L, N	L	T
Features: Living Log eliminates reconciliation; Internet Voice Tracking; Internet Proof Schedule; drag and drop files to editors; e-mail trouble alerts; Segue Editor; programmable Hot Keys										
Scott Studios • *SS32* • *www.scottstudios.com*										
W, L in beta	M, L, F, S, T	any	yes	W, B, 2, 3, A, WMA, Cart Chunk	yes	S, E, C	separate	L, S, N	P	U, T
Features: Remote control of up to 48 systems via one Internet computer; remote control by DTMF, remote control by Pocket PC; voice tracking via Internet; voice tracking in air studio while on-air; timing adjustment with Audioscience sound card; built-in air studio phone recorder-editor; RBDS out can insert spots in text, weather, contests										
Wireready • *Controlready* • *www.wireready.com*										
W	M, L, F, S, T	any	yes	W, any supported by sound card	yes	S, E, C	separate or imbedded	L	P	T
Features: Integrated newsroom and wire capture system in same software; logic operations are independent of sound files and traffic logs; imports traffic and music schedules independently; audio file information is stored in the audio file; automation can distribute information via RBDS and update station websites; can find audio from backup sources including FTP and autofills if needed; can launch third-party applications										

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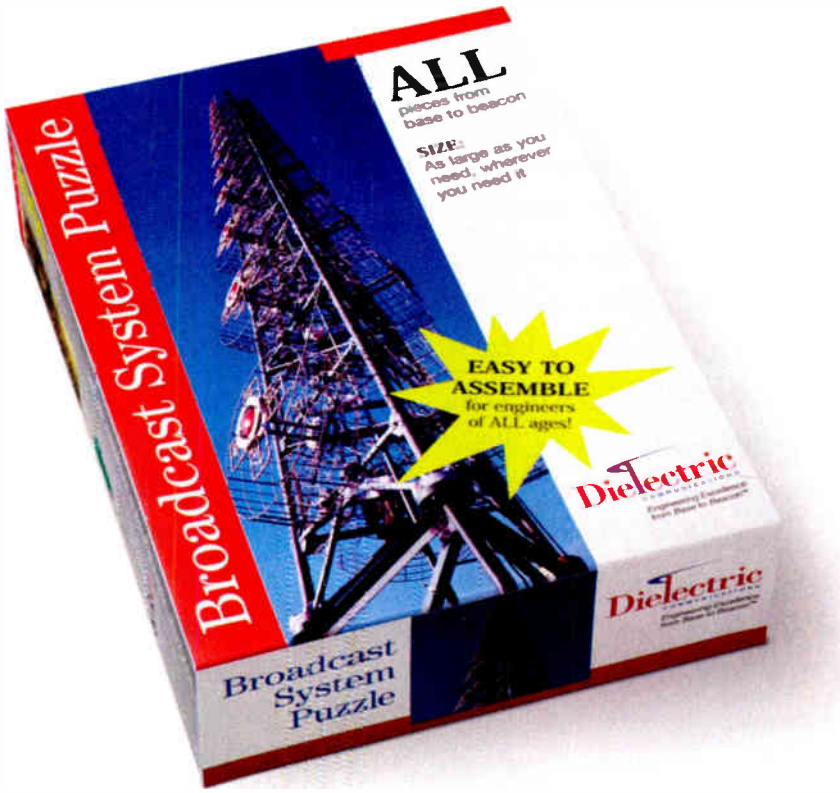

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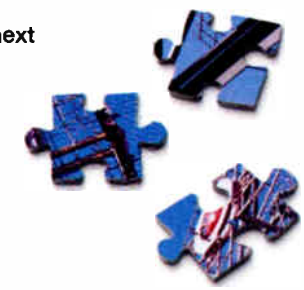

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World Radio History

Build it big, build it right

World Radio History

Inside the air studio at Super Estrella, one of the 27 new studios built in Los Angeles.

27 New Studios for Entravision in Los Angeles

By Matt Sheahan

The Entravision Communications-Radio Division developed a plan to create a new, centralized facility for its radio stations in Los Angeles that would also house its satellite operations from Campbell, CA, near San Jose. This would prove to be a significant move. The target date was for the facility to be completely operational by early 2004.

Entravision has created one of the largest U.S. Hispanic radio networks in the nation, reaching a potential audience of more than 20 million listeners. The new Entravision facility houses a number of the company's flagship broadcast networks including Radio Romantica, which consists of adult-contemporary, romantic ballads and current hits; Radio Tricolor, which is a personality-driven, Mexican country-style format; and Super Estrella, which is music-driven, pop and alternative Spanish rock.

The new studios are located on the Miracle Mile in Los Angeles, in the same building that houses Miramax and *Variety*.

World Radio History

Build it big, *build it right*

This radio station cluster includes a total of 27 studios: nine on-air studios, nine image studios and nine production studios. The floor that Entravision planned to occupy had to be completely gutted, redesigned and rebuilt to accommodate the new studios, a massive master control and router system area, as well as office and lobby space.

For this project to work, Entravision had some decisions to make. Decisions regarding control surfaces, studio furniture, the myriad choices of studio equipment—CD players, cassette decks, headphones, interconnection cable, more than 5,000 XLR connectors and studio monitors—were all considered to build an entirely new studio infrastructure built from the ground up.

The master control room houses rows of racks. Much of the wiring was completed off-site and then installed later.

The decision to use an integrator instead of locally contracted help was based on availability of technical talent in LA. Retaining the required number of people to create an installation team for the duration of the project was a challenge. Hiring an integrator solved this problem.

Entravision needed 27 control surfaces for this project. The choice was the Wheatstone Generation-5 digital control surface

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World Radio History

for all 27 studios. Wheatstone describes this new product as "a straightforward operational surface with the benefits of digital technology and the graphics of digital display." The Gen-5 provides the flexibility of system-wide source, mix, and destination control, an extensive mix-minus section, and an event store, name and recall system. Entravision LA was the first broadcast company to install the Wheatstone G-5 control surface in all its studios and CSS was the first integration firm to install them.

John Buckham, Entravision's project engineer, approached Omnirax for the design and construction of the on-air, production and image room furniture. While well known in the music industry, Omnirax is a relative newcomer to broadcast furniture. Buckham was familiar with the company's work and thought the design approach would be a good fit for the unique requirements of the project.

Entravision wanted a stylistic feel that reflected its modern, upbeat corporate image while at the same time taking advantage of all the technological advantages their new equipment would offer.

The Omnirax design process proceeded from simple drawings to CAD design and full-scale renderings. Each type of room was addressed individually, paying special attention to the Showcase and Super Suite studios. Site visits from Buckham confirmed fit, finish and detail as prototype rooms were completed. The furniture was shipped largely assembled with major components installed on location.

Studio equipment

There were still studio equipment choices to be made. Entravision chose Tascam, Neutrik, Telos Systems, Krone, Belden and others to help create their new studios. Hundreds of pieces of equipment, thousands of feet of interconnection cable, and more than 5,000 XLR connectors were needed for the job.

Broadcast integrator Creative Studio Solutions (CSS) contacted an Entravision station in the Midwest to inquire about the station's future integration needs. That phone call put CSS in contact with John Burger, Entravision's vice president of engineering. Burger told CSS of the future plans in LA and through a series of meetings, Entravision chose CSS as its broadcast studio integrator.

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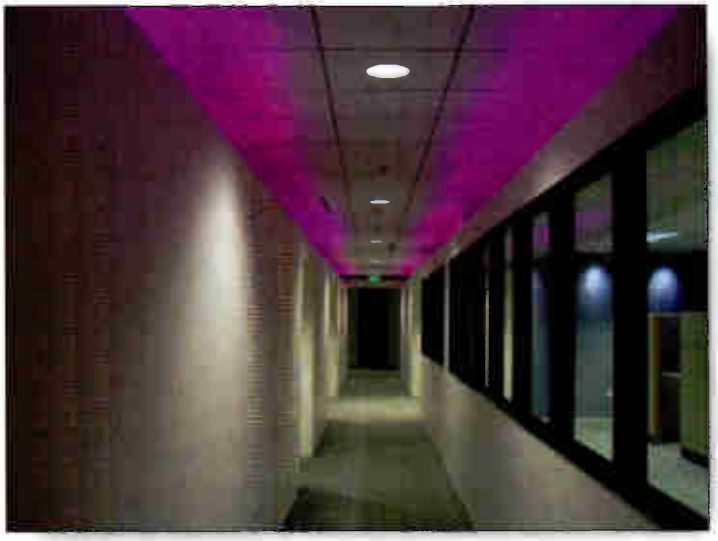
World Radio History

Build it big, *build it right*

One of the significant integration challenges was logistical. CSS used its Pre-Build Solution for this integration project. The majority of the wiring infrastructure was built, tested and documented at the CSS facility in Colorado and then shipped to Los Angeles for final installation.

With the assistance of Omnirax, CSS was given a working template of the three types of studio to be installed: on-air, production and imaging. Using these templates, CSS built most of the wiring infrastructure without having to be on-site. CSS used Stardraw Studio Documentation Software for this project, which facilitates the process of creating detailed engineering schematic of the studio infrastructure.



The corridor walls have an open space at the top that conceals the wiring trough. The designer used this space to provide colorful, indirect lighting, which provides a changing palette of colors.

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- THD+N & k2→k5
- VU+PPM meter/monitor
- 1/3 octave spectrum analyzer
- Frequency/time sweeps
- Scope mode & AFILS

MR1 Minirator
Analog Audio Generator
- Sine, Square wave & Sweep
- Pink & White Noise; Polarity
- Low Distortion
- Bal & Unbal Out

DL1 Digilyzer
Digital Audio Analyzer
- AES, SPDIF, ADAT
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- Status/User bits
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The main lobby at the Entravision studios.

A project of this scale required all the participants to work closely to meet the specific deadlines. The Entravision engineering staff, Wheatstone, Omnirax and CSS collectively solved the common last-minute issues that arose, smoothing the integration process.

One unique design element solved a challenge in cable routing. Instead of running cable through conduits or beneath floors, a cable trough soffit was built into the hallway walls. The walls stop about one foot short of the ceiling. Over the top is a cable tray that is about 1' wide and 8" deep. Cables can be easily added or accessed with minimal effort. This soffit also houses the hallway lights, creating an aurora borealis effect throughout the facility.

Today, the Entravision LA stations broadcast full-force from their new studios on the Miracle Mile. All studios are fully functional and Entravision is back to the business of increasing its visibility as one of the nation's dominant Hispanic-language broadcasters.

Sheahan is the communications manager at CSS, Wheat Ridge, CO.

Soffit detail photos by Rick Hunt, VP and director of radio engineering, Entravision Communications.

Equipment List

- Belden wire and cable
- Bose speakers
- DBX Quantam II
- Dorrough 280 meters
- Drawmer DA-6 distribution amps
- Enco DADpro32
- Gepco wire and cable
- Hafler P1000 amplifiers
- LPB Silent Booms
- Middle Atlantic racks
- Neutrik connectors
- Omnirax furniture
- Shure SM7-B mics
- Stardraw Studio Documentation Software
- Tascam 122 MK III cassettes
- Tascam CD-450 CD players
- Tascam DA-40 DATs
- Tascam DDRW2000 CD recorders
- Tascam MD-801R MKII Minidiscs
- Telos Systems 2101 phone systems
- Vox Pro editors
- Wheatstone Bridge router
- Wheatstone Gen-5 control surfaces

World Radio History

NAB Radio Show
Convention Preview

By Chriss Scherer, editor, and Kari Taylor, associate editor

The NAB Radio Show, held every fall, has seen a slow decline in attendance over the past few years. This changed last year when the convention was held in Philadelphia. Because of the success in 2003, the NAB Radio Show will return to land of cheesesteaks in 2005. This year, the convention heads west to the always-pleasant climate of San Diego.

As with previous conventions, plenty of events are scheduled for the three-day conference. Between the sessions, the exhibit floor and special presentations, you'll stay busy the entire time.

The sessions are always an anticipated event at the convention. This year's slate has a broad range of topics, but the engineering side has a focus on IBOC technology and applications that spans the three days. The HD Radio Workshop covers the entire IBOC chain, from audio origination to the antenna, and includes a section on test and measurement.

It's not strictly IBOC, however. While all the sessions have something to offer, some are probably more in line with your interests as a *Radio* magazine reader. We have included these sessions as well for your reference. The sessions start before the exhibit hall opens, so arrive early if you want to attend the sessions on Wednesday. A preview of some of the products being exhibited is on page 64. Use the show floor map on page 44 to find your way. Also, look for some excursion ideas in the San Diego area.

See you in San Diego.

Session and Event Highlights

Wednesday, Oct. 6

Signal Performance and Antenna Systems for HD Radio

9 a.m. to 9:30 a.m.
An Overview of the HD Radio System

9:30 a.m. to 11 a.m.
AM Antenna Systems and HD Radio
Ben Dawson and Ron Rackley discuss the important aspects of AM antennas to IBOC performance. Following an explanation of the basics of modulation, the specifics of antenna-related factors, including impedance matching and bandwidth, will be discussed.

11 a.m. to noon
AM IBOC Installation and Performance Case Study
Tom Cox, Jeff Littlejohn and John Warner of Clear Channel will show several AM IBOC installations and cover topics related to the challenges of implementing IBOC at these facilities. Studio headphone monitoring and covering live events outside the studio will also be covered. In addition, perspectives on digital vs. analog coverage will be discussed.

World Radio History

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World Radio History

NAB Radio Show
Convention Preview

1:30 p.m. to 2 p.m.
The ERI Digital Radio Solution
Bill Harland of Electronics Research will review all the approved methods of implementing simulcast FM analog and digital IBOC transmission. The focus is on the elements that follow the transmitter outputs in configurations using separate analog and digital transmitters, which is the most common and complex implementation scenario.

2:30 p.m. to 3 p.m.
Strategic Planning for HD Radio Implementation
Bob Surrette of Shively Labs details the proper steps to take when implementing an IBOC strategy. He will present the pros and cons for each technique with background information that can help a station identify specific strategies.

3 p.m. to 4 p.m.
Avoiding the IBOC Gotchas
Steve Fluker of Cox Radio Orlando provides the insight to help stations avoid unexpected or unanticipated costs of installing an IBOC operation, from the studio to the antenna.

4 p.m. to 4:30 p.m.
One Site, 7 HD Radio Installations in Seattle
Clay Freinwald of Entercom reveals the details of the seven-station IBOC installation at the West Tiger Mountain transmitter site.

Show floor hours

Wednesday, October 6 ..... 5 p.m. to 8 p.m.
Thursday, October 7 ..... 9 a.m. to 5 p.m.
Friday, October 8 ..... 9 a.m. to 1 p.m.

Out & About in San Diego

Miramar Speed Circuit

Miramar Speed Circuit offers its guests an impressive 1/4 mile technical road course. The karts, which can travel up to 40 miles per hour and are equipped with Honda 6.5BHP engines. Each kart has ROC Timing, which electronically clocks each kart as it rounds the track to give detailed information for each lap completed. Walk-ins welcomed. The cost is $23.
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SR 64

6 x 4 STEREO SWITCHER

SR 201

20 x 1 STEREO SWITCHER WITH PARALLEL REMOTE CONTROL

SR 61M

6 x 1 STEREO SWITCHER WITH METERING AND MONITORING

World Radio History

Other Sessions of Note

2:15 p.m. to 3:30 p.m.

The People Meter and Ratings: How are They Measuring Up?

After several years of testing and roll-outs in new markets, it's time for an in-depth update on the PPM, including a discussion of sample sizes. Also, a look at the other implementations and options that are available.

5 p.m. to 7 p.m.

Opening Reception on the Exhibit Floor

The exhibit floor officially opens with on Wednesday evening.

Out & About in San Diego

San Diego Aerospace Museum

The San Diego Aerospace Museum offers more than 65 aircraft and spacecraft, and an aviation library and archives. The museum also houses the International Aerospace Hall of Fame honoring engineers, pilots and aviation industrialists. Take a behind-the-scenes restoration tour, which is available for an additional fee. Open daily from 10 a.m. to 4:30 p.m.

www.aerospacemuseum.org

Thursday, Oct. 7

Transmitters, Tests and Measurements for HD Radio

9 a.m. to 9:30 a.m.

New Methods to Upgrade to HD Radio Transmission

George Cabrera of Harris will discuss information about two FM IBOC cost-reducing implementation methods: separate radiation and split-level combining.

9:30 a.m. to 10 a.m.

FM Broadcast Transmitter Site Conversion for HD Radio Transmission

Tim Hardy of Nautel will overview the transmission equipment requirements for FM IBOC, with an emphasis on the effect of transmitter non-linearity and its mitigation using digital adaptive pre-correction.

11 a.m. to 11:30 a.m.

FM IBOC Installations Real-world Case Study

Paul Shulins of Greater Media Boston describes the planning, budgeting, installation and maintenance of the FM IBOC systems installed in January 2004 on Greater Media's five Class B stations in Boston.

Marconi Radio Awards

Reception, Dinner and Show

The awards recognize overall excellence in radio in five categories. Stations and personalities compete for this coveted award. Beginning at 6 p.m., the event is hosted by syndicated morning show personalities Bob and Tom.

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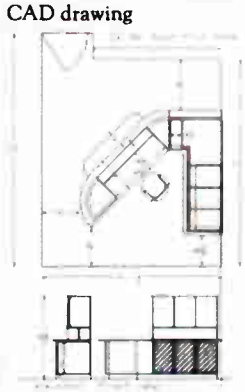

CAD rendering

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Entravision Studio
Los Angeles, California

World Radio History

NAB Radio Show
Convention Preview

11:30 a.m. to noon
Measuring Your Hybrid IBOC Signal
David Maxson of Broadcast Signal Lab explores the complexities of measuring the IBOC signal. With the addition of a digital waveform to the analog, a host of measurement challenges arise relating to analyzing digital signal carriers and determining occupied bandwidth.

1:30 p.m. to 2 p.m.
AM Broadcast Transmitter Site Conversion for HD Radio Transmission
Wendell Lonergan of Nautel will discuss site requirements to transmit an IBOC signal. Problems encountered during various site conversions and solutions to these problems will be explained.

2 p.m. to 3 p.m.
Linearity Measurements of AM Transmitters for HD Radio Performance
Geoff Mendenhall of Harris will detail an independent measuring technique that predicts digital modulation performance without the need of an IBOC exciter/demodulator.

3 p.m. to 3:45 p.m.
Real Life Operation of an AM IBOC Facility
Tom Ray of WOR, New York, will take attendees through an AM IBOC installation from concept to operation.

3:45 p.m. to 5 p.m.
Developing a Troubleshooting Plan
John Bissett of Dielectric explains the method to adopt a logical troubleshooting process. While the focus will be transmitter troubleshooting, the skills can be applied to any repair situation.

Out & About in San Diego

The Antique Radio Store
Located in San Diego, this store refurbishes old radios and resells them. From antique parts to test equipment, this store has everything a radio enthusiast could want and more.
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World Radio History

Other Sessions of Note

7:30 a.m. 8:45 a.m.
FCC Breakfast
FCC Commissioners Jonathan Adelstein and Kevin Martin are scheduled to appear. They will discuss the current regulatory issues facing radio broadcasters.

9 a.m. to 10:15 a.m.
Keynote Address
NAB President Eddie Fritts will give opening remarks before introducing the keynote speaker, who has not yet been announced.

11:45 a.m. to 1:30 p.m.
Exhibit Floor Lunch
Taking a cue from regional conventions, a free lunch will be available on the show floor.

2:30 p.m. to 4:30 p.m.
Live Remote Broadcast:
Dick Robinson's American Standards By The Sea
The music of Sinatra, Bennett, Basie, Rich, Callaway and many more are featured during the weekly syndicated show, which usually originates aboard a studio-equipped 70-foot yacht.

4:15 p.m. to 5:45 p.m.
Happy Hour & A Half
A social event at the end of the middle day.

6 p.m. to 9:30 p.m.
Marconi Radio Awards Reception, Dinner & Show
The awards ceremony recognizes stations for overall excellence. The hosts for the event will be syndicated morning personalities Bob and Tom.

Out & About in San Diego

San Diego Automotive Museum

This museum displays more than 80 automobiles and motorcycles from the Model T to the Maserati. An automotive research library is open to the public. Open daily 10 a.m. to 5 p.m.
www.sdautomuseum.org

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World Radio History

NAB Radio Show
Convention Preview

Friday, Oct. 8

Studios, Audio and Data for HD Radio

8:45 a.m. to 9:45 a.m.
Studio Equipment and Infrastructure
Jim Haupstueck of Harris, Ted Lantz of Broadcast Electronics and Chad Sterling of Dmarc Networks will discuss the IBOC broadcast audio chain.

9:45 a.m. to 10:45 a.m.
Studio Operations
Jay Adrick of Harris, Jeff Detweiler of Ibiquity and Frank Foti of Omnia Audio will discuss the challenges of processing for hybrid transmission and maintaining clean audio. Methods of emergency alerting will also be covered.

10:45 a.m. to 11:45 a.m.
Advanced Applications and Services
Frank Foti of Omnia Audio, Robert Hylkema of Teleatlas and Mike Starling of NPR will cover the enhancements of IBOC: multichannel audio, surround sound, data are more.

1:30 p.m. to 2p.m.
International Update: A Look at DAB Data Services and Opportunities for HD Radio

2 p.m. to 2:30 p.m.
Receiver Update
Mike Bergman of Kenwood will discuss the features of IBOC radios and preview some of the possible enhancements.

Out & About in San Diego

Mission Trails Regional Park

Located eight miles northeast of downtown San Diego, this park encompasses nearly 5,800 acres of natural and developed recreational areas. Featuring more than 40 miles of trails, boating on Lake Murray, camping at Kumeyaay Lake, numerous informative hikes and a Visitor & Interpretive Center, Mission Trails Regional Park provides a natural escape from the city.
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World Radio History

2:30 p.m. to 3 p.m.
Impulse Radio MAT Protocol
Paul Signorelli of Impulse Radio will discuss various methodologies for multiplexing data services over the transmission layer of the IBOC system.

Other Sessions of Note

7:30 a.m. to 8:45 a.m.
Breakfast with Charlie Cook
Charlie Cook, editor and publisher of *The Cook Political Report* and a political analyst for the National Journal Group, will share his views on politics and the November Presidential election at this breakfast session.

9 a.m. to 10:15 a.m.
HD Radio Made Easy
This session provides a non-technical review of IBOC digital radio, with insight to its revenue-generating potential. The panelists will discuss the special considerations in making the decision to commence IBOC operations.

Noon to 1:30 p.m.
Radio Luncheon
Clarke Brown, Jefferson Pilot Communication's president of the Radio Division, will receive the NAB National Radio Award at this year's Radio Lunch.

NAB Radio Exhibitors

615 Music Library 1012
ABC Radio 1206
Advertising Edge 104
AEQ 305
Air Force Recruiting 1107
American Blues Network 1106
Arbitron 1102
Armstrong Transmitter 1701
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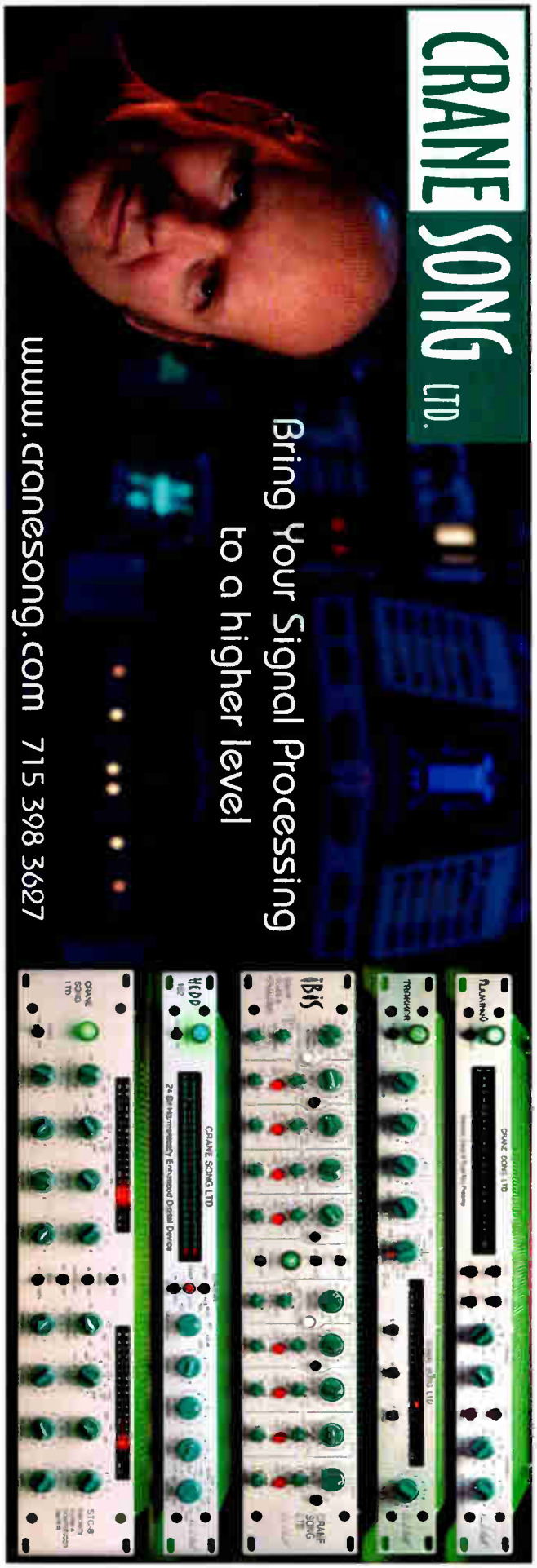

NAB Radio Show
Convention Preview

NAB Radio Exhibitors

Dmarc Networks 607
DRS Broadcast Technology 1306
Enco Systems 1112
Energy-Onix 1704
ERI-Electronics Research 700
Explosive Promotions and Events 1504
FamilyNet 907
FCC 308
Firstcom Music 212
Harris 902
Ibiquity Digital 1209
Inovonics 302
Intertech Media 1400
Jampro Antennas/RF Systems 200
KD Kanopy 1401
Larcan USA 208
LEA International 511
Logitek Electronic Systems 100
LR Money Machine 103
Mackay Communications 410
Marketron 909
Mayo Clinic 611
Media Professional Insurance 1300
Mediatouch 613
Megatrax 1708
Miller, Kaplan, Arase 309
Moseley Associates 1404
Musicam USA 900
National Hole in One/National Media 411
National Weather Service 300
Nautel 1410
Omnirax 1707
Open Radio Software 1703
Orban/CRL 413
Pike and Fisher/Rules Service Co. 101
Precision Communications 209
Prophet Systems Innovations 709
Radian Communications Services 304
Radio Advertising Bureau F7
***Radio* magazine 1210**
Radio Music Licensing Cmte F6
Radio Systems 1110
RCS 106
RF Parts 1312
Roll a Sign 1007
SCA Promotions 401
Scott Studios 705
Shively Labs 1403
Sierra Automated Systems and Eng ... 812
Stainless 206
Superior Electric 303
The Media Audit 403
Thermo Bond Buildings 310
Valcom Limited 1408
Visibility Solutions 110
V-Soft Communications 1109
Westar Music 203
Wheatstone 500

Turn to page 44 for a show-floor map.

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World Radio History

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The same way our red apple stands out from a group of green ones, savvy air talent knows Scott's SS32 stands out from other digital systems.

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Shown above is Los Angeles morning personality Shawn Parr of KZLA (FM) at his SS32. Emmis also uses Scott systems at KPWR (FM) in LA, in Chicago, St. Louis, and more.

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World Radio History

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Audio Bandwidth @ 24 kbps @ 19 kbps	14 kHz 11.2 kHz	15 kHz 9 kHz	**15 kHz** **15 kHz**
Direct Internet Software Updates	No	No	**Yes, via Ethernet port**
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.**
Available ISDN Option	$850.00 (adds MPEG L3 & G.722)	$850.00 (adds G.722)	**$495.00 (adds G.722 & state-of-the-art AAC-LD for high fidelity and low delay)**
List Price:*	$3,700.00	$3,650.00	**$2,495.00**

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World Radio History

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L-Band Power Amplifiers
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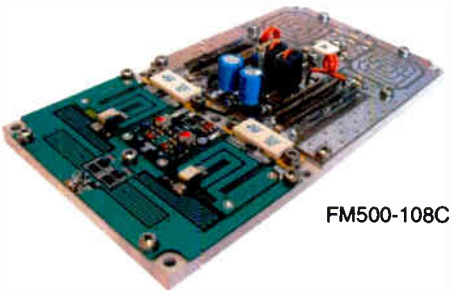
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World Radio History

Specifications

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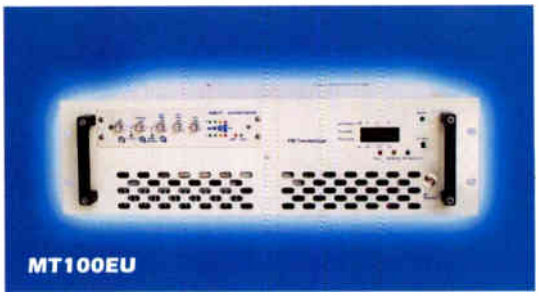
Part #	Class	Gain (dB)	Pout (W) Min.
HF06-ISM	AB	12	6
HF10-0130	A	22.0	10
HF300-0130M	AB	22	300



FM Radio Transposers & Transmitters (87.5 - 108 MHz)

Good gain, low cost, compact and reliable

Part #	Class	Gain (dB)	Pout (W) Min.
MDL30	AB	17.0	30
MDF30	AB	30.0	30
FM300-108SD	B	17	300
FM300-108M	B	17	300
FM500-108-S	B	18	500
FM500-108C	B	18	550
GR00239	B	48	1100

FM SKD Parts and Configurations (87.5 - 108 MHz)

Easy installation, low cost and very good power vs. dimension ratio

Part #	Class	Gain (dB)	Pout (W) Min.
OME-1T-EU exciter	B	NA	1
MX01-EU exciter	B	NA	1
MT100-EU	B	NA	100
MA300-EU	B	25	300
MT300-EU	B	NA	300
MA500-EU	B	30	500
MT500-EU	B	NA	500
MA1K-EU	B	33	1000
MT1K-EU	B	NA	1000

L-Band Digital Audio Broadcasting (1450 - 1500 MHz)

High linearity, small dimensions and efficient

Part #	Class	Gain (dB)	Pout (Wrms) DAB
LDL15	AB	13	15
LDL80	AB	12	80

L-Band Power Amplifier Kits (1450 - 1500 MHz)

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Part #	Class	Gain (dB)	Pout (W) Min.	Pout (Wrms)
AL50-D	AB	50	200	70
AL100-D	AB	53	400	140

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World Radio History

VHF Analog/Digital Broadcasting (170 - 235 MHz)

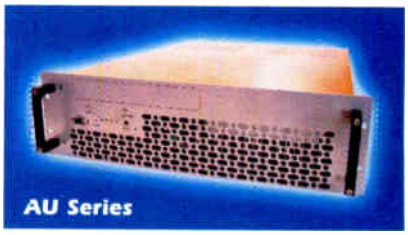
Powerful, reliable, low distortion and high gain

Part #	Class	Gain (dB)	Pout (W) Min.	Pout (Wps)	Pout (Wrms) DVB-T
LDV05M	AB	21	5	5	1.5
THV15-V2	A	31.0	15	15	NA
THV60	A	14.0	60	40	NA
LDV75M	AB	22	75	75	15
THV410C	AB	14.5	300	300	80
THV400	AB	15	300	300	100
THV450C	AB	14.5	450	380	80
THV500	AB	14.5	250	400	120

UHF Power Amplifier Kits (470 - 862 MHz)

Compact, efficient, powerful, easy to assemble (SKD)

Part #	Class	Gain (dB)	Pout (Wps)	Pout (Wrms) DVB-T	Pout (Wrms) DTV-8VSB
AU20-D	AB	46	60	20	40
AU50-D	AB	56	250	80	140
AU100-D	AB	56	500	150	275
AU200-D	AB	56	1000	290	500



UHF Analog/Digital Broadcasting (470 - 862 MHz)

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LDU Series - High linearity, small dimensions, efficient

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LDU25	AB	14	25	15	5
THU35	A	9.5	35	25	NA
THU2600A	A	10.5		25	NA
THU2640	A	11.5	60	40	NA
THU2602A	A	8.5		40	NA
LDU45	AB	13	45	45	10
LDU60	AB	16	)	60	20
THU2604-S	AB	8	175	125	NA
THU2604	AB	8.0	175	125	NA
LDU200	AB	13.5	200	150	40
LDU310C	AB	14	310	200	60
LDU400C/TR	AB	15	400	300	90
LDU400C/TL	AB	15	400	300	90
LDU400C	AB	15	400	300	90

VHF Power Amplifier Kits (170 - 235 MHz)

Compact, powerful and easy to assemble (SKD)

Part #	Class	Gain (dB)	Pout (Wps)	Pout (Wrsm) DAB	Pout (Wrms) DVB-T
AV125-D	AB	56	250	125	80
AV250-D	AB	56	500	250	150
AV500-D	AB	56	1000	500	300

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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 ⅛" 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...

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

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.

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.

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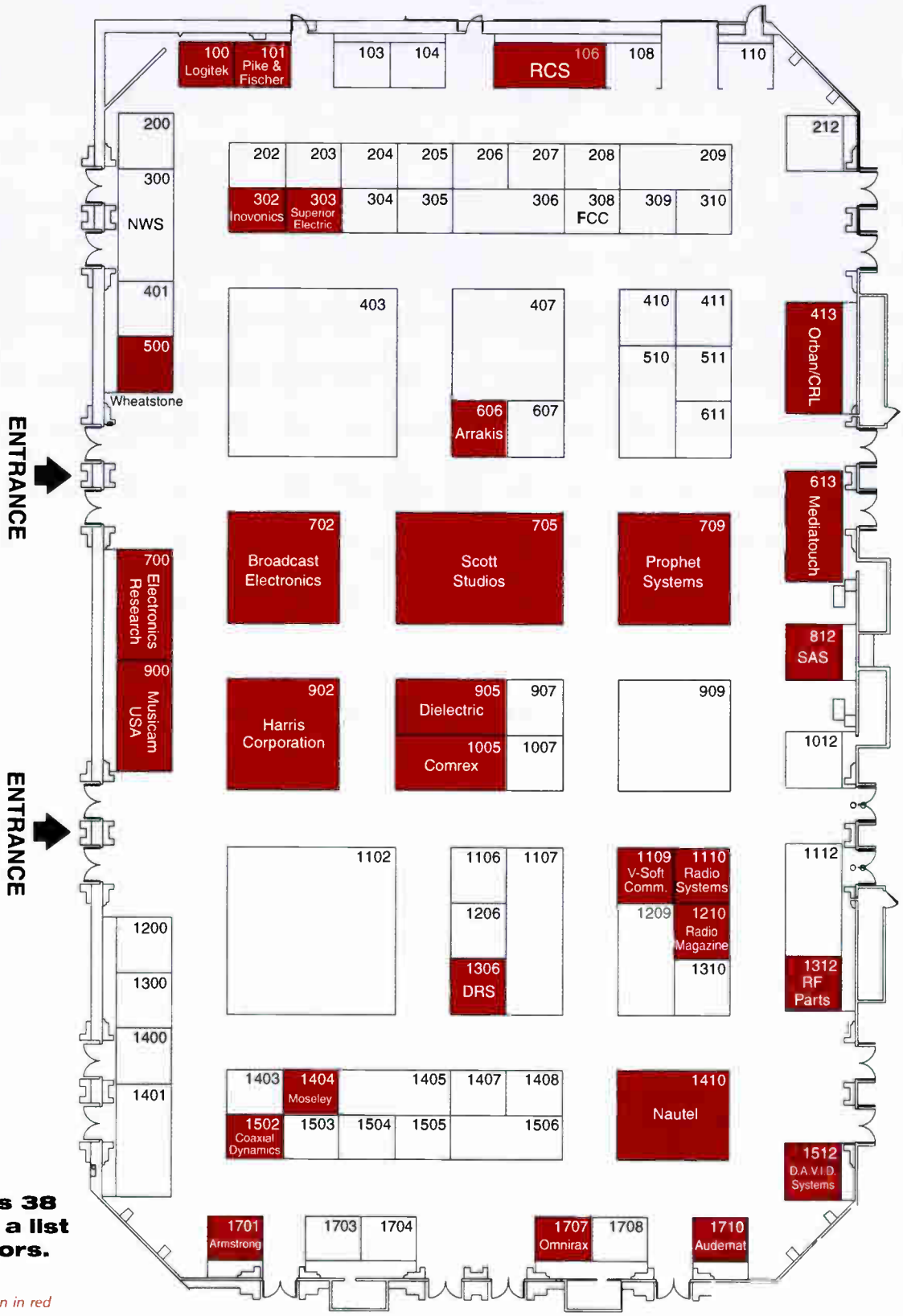

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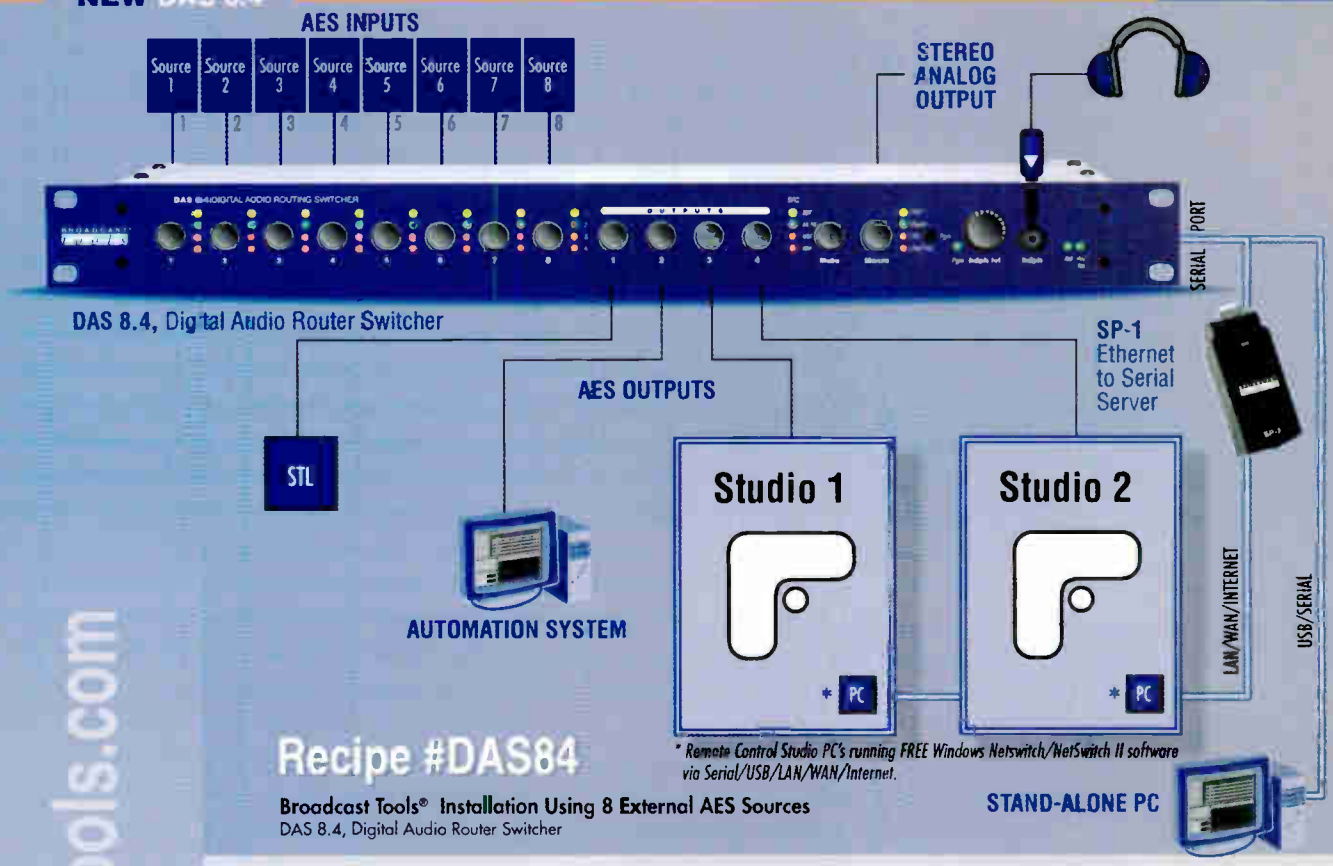

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PRODUCT FEATURES

- Routing type switching, any one input may be assigned to any/or all outputs.
- Logic functions via microprocessor and non-volatile memory
- Internal digital/analog audio activity/silence sensor monitors any one-output channel. The unit is equipped with four front panel sample-rate led indicators, SS, Digital Error and ACT LED indicators; adjustable SS/DIG error alarm delay and restore duration. Analog silence sensor sensitivity set at -34db.
- Front panel input selection switches are provided for each input channel with separate output indicator LED's
- Power-up selection of inputs to outputs, mute or last source selected.
- Eight user configured macros
- Most configuration options via rear panel dipswitches.
- 16 input GPI port (Remote Control or PIP) with LED indicator.
- 16 open collector channel status outputs or programmable via burst commands.
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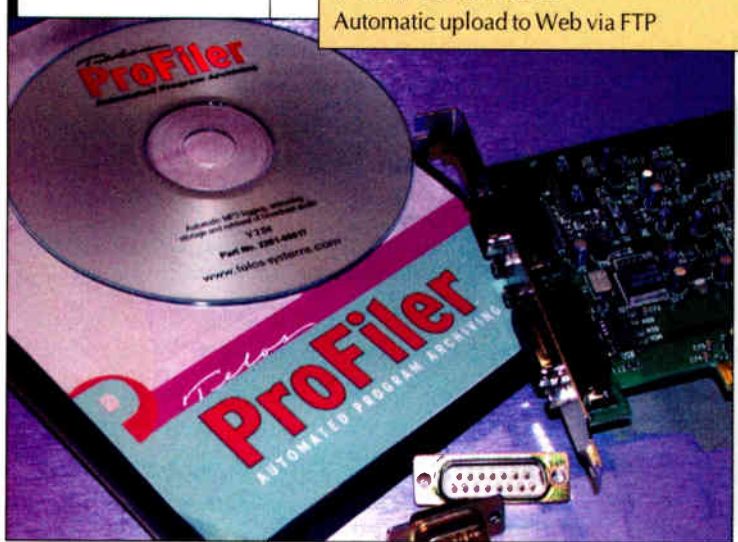
Telos Systems Profiler

By Michael Kernen

At first glance, the Profiler from Telos Systems appears to be a replacement for the modified cassette machine that exists in nearly every radio station. We've all installed such machines after spending hours trying to devise ways to keep the auto-stop feature from activating while the motor is stopped, or to keep the pause/run of the machine synchronized with the microphone on/off state. I've gone so far as to install breadboard circuits inside to convert the console logic to one the cassette machine could deal with. Many times, these machines would soldier on in the studio with little or no maintenance, but when they broke and the new one arrived—sans the needed modifications—hours were spent cooking up new modifications. The cassette's day is at sunset nonetheless.

Performance at a glance

- Pre-record buffer for skimming
- Supports bit-rates from 16 to 320kb/s
- Fraunhofer MP3 compression
- Multiple archive capability
- Simultaneous skimmer and logger
- Creates time-stamped audio files
- IP archive client access
- Automatic upload to Web via FTP



At closer inspection, the Profiler could replace the dreaded open-reel logger, too. How many times have you tried to find an air check on one of those historical artifacts? Never mind the abhorrent audio quality present on the segment you actually found; try sending that to a client.

The Telos Profiler is entirely digital and devoid of nasty mechanical mechanisms, tape heads and best of all, backroom modifications. Profiler runs on a Windows-based PC. The minimum PC specs are a Pentium-II/400MHz PC (or better) running Windows 2000 or Windows XP Professional with 128MB RAM and an open PCI expansion slot for the included balanced-I/O audio card. It requires 5MB of hard drive space for the system files. A minimum of 30GB free space is suggested for audio storage. The playback software requires a Pentium-class PC, 64MB RAM, Windows 95 or better and 5MB of hard drive space. Telos includes a 5V PCI card, so don't plan on running it on the newer 1RU computers that feature the 3.3V PCI slots.

The benefits of the Profiler system are abundant. All audio is collected in the form of 15-minute chunks; these files can easily be transported via the LAN, USB memory drives or CD/RW. Copying these types of files happens at many times normal speed and you can easily fit several hours on a single CD. Profiler uses Fraunhofer MP3 compression so the files it creates are of respectable quality and can easily be imported into editing programs such as ProTools or Audition. We even re-air them in our weekend "best of" compilations.

Another feature of the Profiler system is its ability to act as a logger when the mic is closed and a skimmer when it is opened. The system will automatically increase the encoded bit-rate when it detects a contact closure so that live segments are captured in higher quality than the recorded programming—or the opposite, if you prefer.

Good housekeeping

Profiler keeps tabs on disk space and continually knocks the oldest element off to make space for the new ones. If you prefer, you could have a program such as Retrospect archive the files to an alternate location and keep an infinite history. Because each file is time stamped with the date and time, simple file copying will create a somewhat organized archive. Further organization is provided by way of folders that contain each day's audio. Any more organization would be manual or a function of the backup software you choose.

Experience to date with Profiler has shown more ups than downs. On the positive, the Profiler will continue to run without user intervention or maintenance. I'm archiving three streams at the 160kb/s 44.1kHz sample rate on two separate 1RU server-class machines. One of these machines has two Profiler cards and is responsible for two

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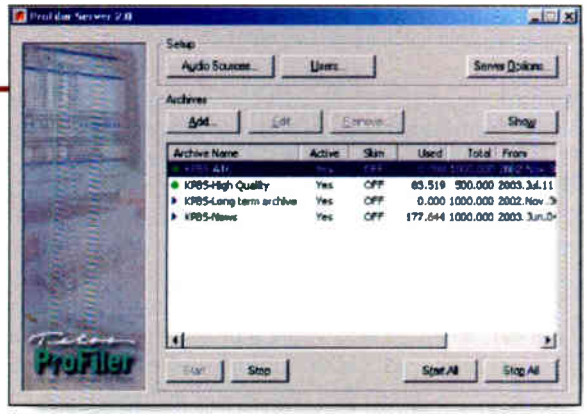

The server software configures the various recording streams.

of the three stations we serve, the other has just one. Each card can be used in a dual-mono format so that this same hardware could be configured to archive six mono streams if I desired.

While reasonably well thought out and easy to use, we have experienced several crashes and some slow response times with Telos' client side software. Further investigation is needed to pinpoint the problem exactly,as the circumstances surrounding the crashes are unclear. I'm in favor of building a Web access system into the Profiler server software. This would allow jocks to review their air checks from home, programming personnel to acquire air checks for clients and PDs to review performances remotely. Telos would also do well to include a simple burn-to-CD feature that would make Profiler more accessible to the less computer savvy among us. I've found little use for the app that streams live audio over the network, though some engineers might and it sounds quite good. It can be configured for a different bit-rate than the archive so you can balance sound quality vs. network bandwidth according to your needs.

Extra credit

One hidden benefit of 24/7 logging is that it aids in troubleshooting. When someone reports an issue related to something that was on the air,all that is needed is the approximate date and time of the occurrence in order to review the affected audio. It actually helped us find a faulty fiber optic card in our distribution system by allowing me to hear what the reported static sounded like.

Telos uses a proprietary PCI audio card with a Crystal Fusion engine. Contact closures are sensed using a game port on that same PCI card. Telos documentation shows several pins on the port linked, but it is unclear as to whether the pins are already linked on the card or must be linked by the user. A

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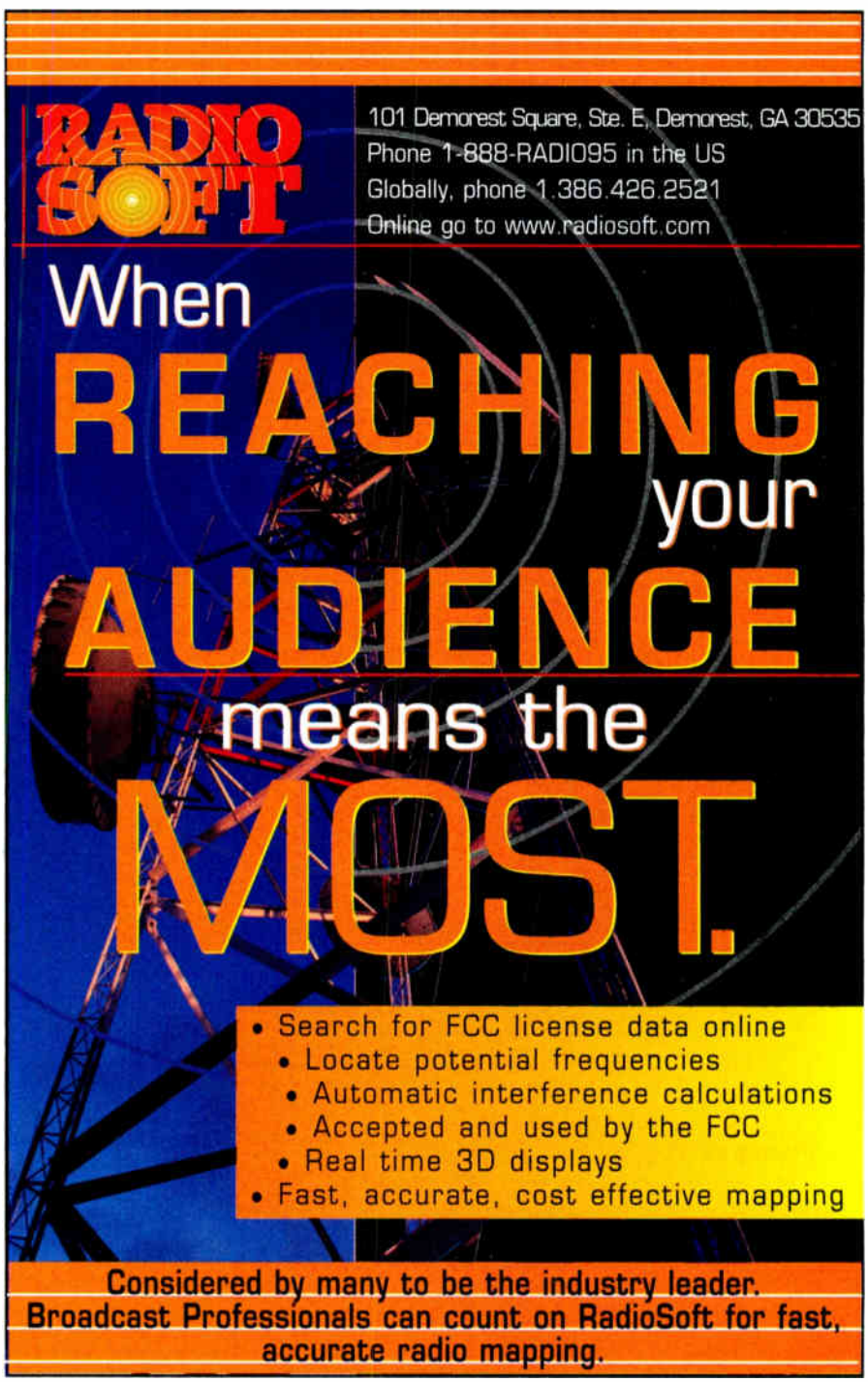

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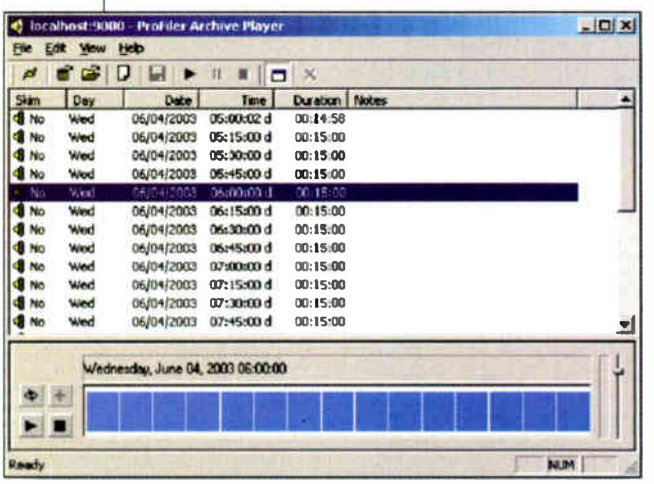
suggestion would be to use an off-the-shelf audio board such as the Creative Labs Sound Blaster Live. That card maintains the needed game port but provides widespread driver support and the ease of simply picking one up at a local computer retailer.



The archive player software provides an interface to review archived audio elements.

Software security could be provided by use of a USB dongle or a software authentication system. In this way, future host PC technology could be more easily accommodated.

You can also create archives by daypart so that each talents show can be saved in a different shared folder on the network and security can be assigned accordingly. This would allow each talent access to only their audio. An e-mail feature would also be handy—each daypart could be sent to the inbox of the appropriate person at a reduced bit rate for review upon returning home. A slow-acting AGC would be helpful too, for those of us that wish to re-air Profiler audio and don't want to record the heavily processed air signal.

Whether it's to provide an affidavit for a client or fodder for station improvements, we are quickly finding the Profiler to be indispensable.

Kernen is chief engineer of Greater Media Detroit.

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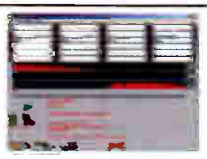

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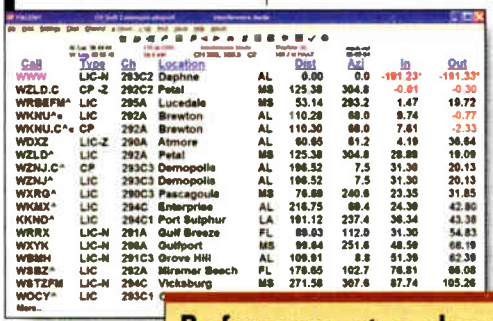
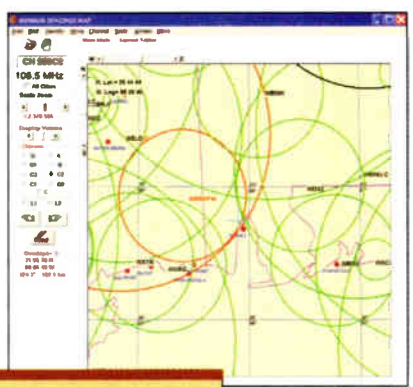
V-Soft Communications FMCONT

By Carl E. Gluck, CPBE

Broadcast engineers are commonly asked if there is any way to improve or upgrade an FM broadcast facility. In some cases, a small or out-of-market station might want to improve its signal into a nearby, more densely populated community. Sometimes there is interest in finding a new tower site for a station. The upcoming FCC auction of vacant FM allotments has engineers wondering if they might have value beyond their opening bid price. For all of these questions a tool is needed that will conduct FM channel frequency searches. FMCONT is one such tool.



Call	Type	Ch	Location		Dist	Azi	In	Out
WWW	LIC-N	283C2	Daphne	AL	0.00	0.0	-181.23*	-181.33*
WZLD.C	CP -Z	292C2	Petal	MS	125.38	304.8	-0.01	-0.30
WRBEFM^	LIC	292A	Lucedale	MS	53.14	283.2	1.47	19.72
WKNU^*	LIC	292A	Brewton	AL	110.28	88.0	9.74	-0.77
WKNU.C^*	CP	292A	Brewton	AL	110.30	88.0	7.61	-2.33
WDXZ	LIC-Z	290A	Atmore	AL	60.65	61.2	4.19	36.64
WZLD^	LIC	292A	Petal	MS	125.38	304.8	28.88	19.09
WZNJ.C*	CP	293C3	Demopolis	AL	106.52	7.5	31.30	20.13
WZNJ^	LIC	293C3	Demopolis	AL	106.52	7.5	31.30	20.13
WXRG^	LIC	290C3	Pascagoula	MS	76.88	240.6	23.35	31.85
WKMX*	LIC	294C	Enterprise	AL	216.75	88.4	24.30	42.80
KKNO^	LIC	294C1	Port Sulphur	LA	191.12	237.4	36.34	43.38
WRRX	LIC-N	291A	Gulf Breeze	FL	89.03	112.0	31.30	54.83
WXYK	LIC-N	298A	Gulfport	MS	99.64	251.6	48.50	68.19
WBMH	LIC-N	291C3	Grove Hill	AL	109.91	8.8	51.39	62.39
WBBZ*	LIC	282A	Miramar Beach	FL	178.65	102.7	76.81	66.08
WBTZFM	LIC-N	294C	Vicksburg	MS	271.58	307.6	87.74	105.26
WOCY*	LIC	293C1						



Performance at a glance

- Intuitive, east-to-use software
- Examine entire FM band at a reference location
- Find open channels for upgrades and drop-ins
- One-touch contour-to-contour evaluation of short-spaced and NCE allotments
- Prints tables, reports and exhibits for FCC applications
- Quickly model what-if station relocation scenarios

FMCONT is part of a suit of software tools offered by V-Soft Communications. FMCONT is a software module that performs channel searches through a current FCC FM broadcast records database. The search results show a useable area to which a station may upgrade, or a new station might be dropped in.

What it does

FMCONT has matured over the years into a one-stop toolbox for all things related to FM station allocations spacings. Features include instant contour-to-contour mapping of Part 215 directional rule short-spaced stations and contour-to-contour non-commercial station signals. FMCONT provides settings to look at translator stations, low-power FM (LPFM) stations and full-service FM broadcast facilities. The software automatically considers TV interference issues, when applicable, and includes intermediate frequency (IF) station separations in the tables. The user can move or model a prospective tower site simply by pointing to a spot on the map and clicking. FMCONT then automatically recalculates all of the data using the new reference location for its measurements. Alternately, a user can thumb through the entire FM band at the site under study quickly.

FMCONT produces print-outs showing a spacings table of the reference channel (suitable for filing with an FCC application), preclusion studies showing all or part of the FM band at the reference site with every station protection that may preclude the site's use, contour-to-contour overlap maps, spacings maps, station database record information and an informative help file.

How it works

FMCONT is a Windows-based program. After starting the program the user enters reference data for a site under study by using the menus to call up a particular station record from the FCC database, or by manually entering site information. The intuitive software offers default settings that adapt to the reference entry to define the study as a full service, translator or LPFM study. The program adapts its spacings methods to accommodate the commercial or non-commercial part of the FM band based on the reference site entry. The user may choose to include LPFM and translator records, auxiliary standby transmitter records and whether to include historical allocation markers or not. On my computer, a typical Class C reference search in Denver took four seconds to compile the entire FM band.

Once compiled, the user may interface with the software in any one of several windows that are interactive and tied together. The "home" window is a spacings table that displays the reference station and every pertinent database record. For each record the distance and bearing from the reference are provided along with the FCC required distance and a column that shows the margin between the required and actual distances. Mexican and Canadian database records appear where appropriate with separation relationship information from the appropriate treaty.

The user may open a map window that shows the FCC required distance circles from each database record with

World Radio History

the reference site at the crosshair in the center of the map. Cities may be selected on or off while the user also selects an appropriate zoom level and selects how many stations to show. The circles on the map are green when fully spaced to the reference or red if they are short. The software can automatically flag present day Class C FMs that are candidates to become C0 stations under the new rules (coloring their circles different so they stand out). The user may actually select a short-spacing display on the map, which quickly reduces the circle radii to show the minimum distance separation requirements of 47 CFR 73.215.

The Find Station utility helps to locate potential sites for new stations.

If you click on a station's call sign you may click a map button that instantly plots the contour-to-contour relationship of the station whose call sign you clicked on vs. the reference station. Note that this contour-to-contour plot, and the table display, feed on a terrain database so there's no need to switch to some other program to ensure it all works in the real world. If the station uses a directional pattern a circular plot of the pattern appears. Click on the plot and an interactive antenna pattern editor opens, which allows the alteration of pattern field points simply by dragging the points on the circular plot. Contours shown in the open map window instantly move to conform to the new pattern settings.

The software permits all of the database records to be manually adjusted, so the user can change each station and see the results on the spacings map and tables instantly. This means users can go through a "what if" scenario quickly and see what would happen if some other station were to downgrade or go directional—or change its tower site.

From each window users may go up or down one channel (or several), easily upgrade or downgrade the reference facility

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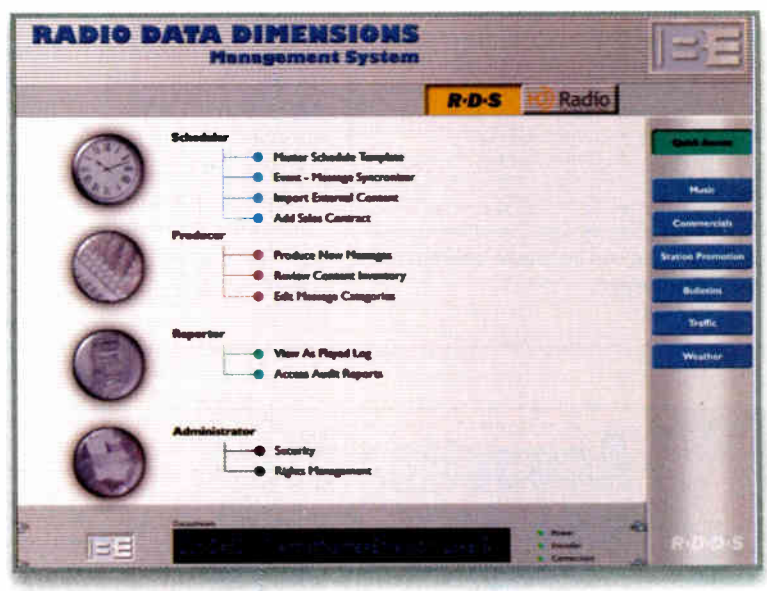

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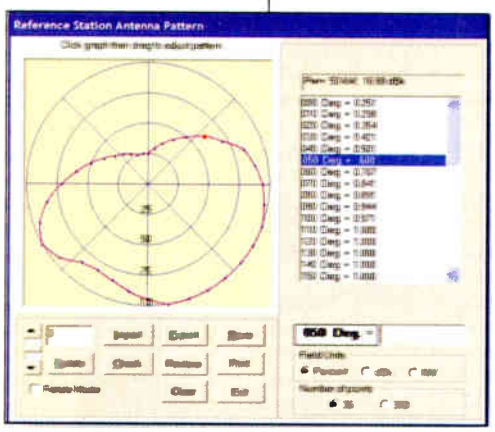

A directional pattern can be drawn and modified to fit a desired coverage.

or investigate the entire FM band at the reference site.There are print options that let a user print out application exhibits, study overlap maps or station database information.

There is a seek option. From any reference site, after selecting the particular class or facility desired, the user can press the seek button to have the software instantly display any and all band openings where a station could reside on the FM band at the reference coordinates.

Another feature worth mentioning is the ability to save a useable area file that exports the map display file so it may be imported directly into a Probe 3 map (another V-soft software product). Probe 3 offers many advanced mapping features (including the importation of every tower in the FCC Antenna Structure Registration database) to help the user define a relocation search area or make some other more detailed exhibit.

Documentation, support and drawbacks

The documentation with FMCONT is complete. A nice binder of information is available with the product. All of the documentation is also included in a Windows Help file with the software. FCC and program databases are updated through the company's website as often as desired. Program bug fixes, enhancements and upgrades are always posted for download. A subscription support service is available with FMCONT that gives the user telephone and e-mail support when needed. I have found V-soft Communications to be responsive, even when the problem was operator error or oversight.

With any allocation software a lot of time must be spent to achieve any level of expertise. Such software will not eliminate the need to use broadcast consulting engineers (although it is used by many such engineering firms).

Gluck is vice president of technical research for Salem Communications, Camarillo CA.

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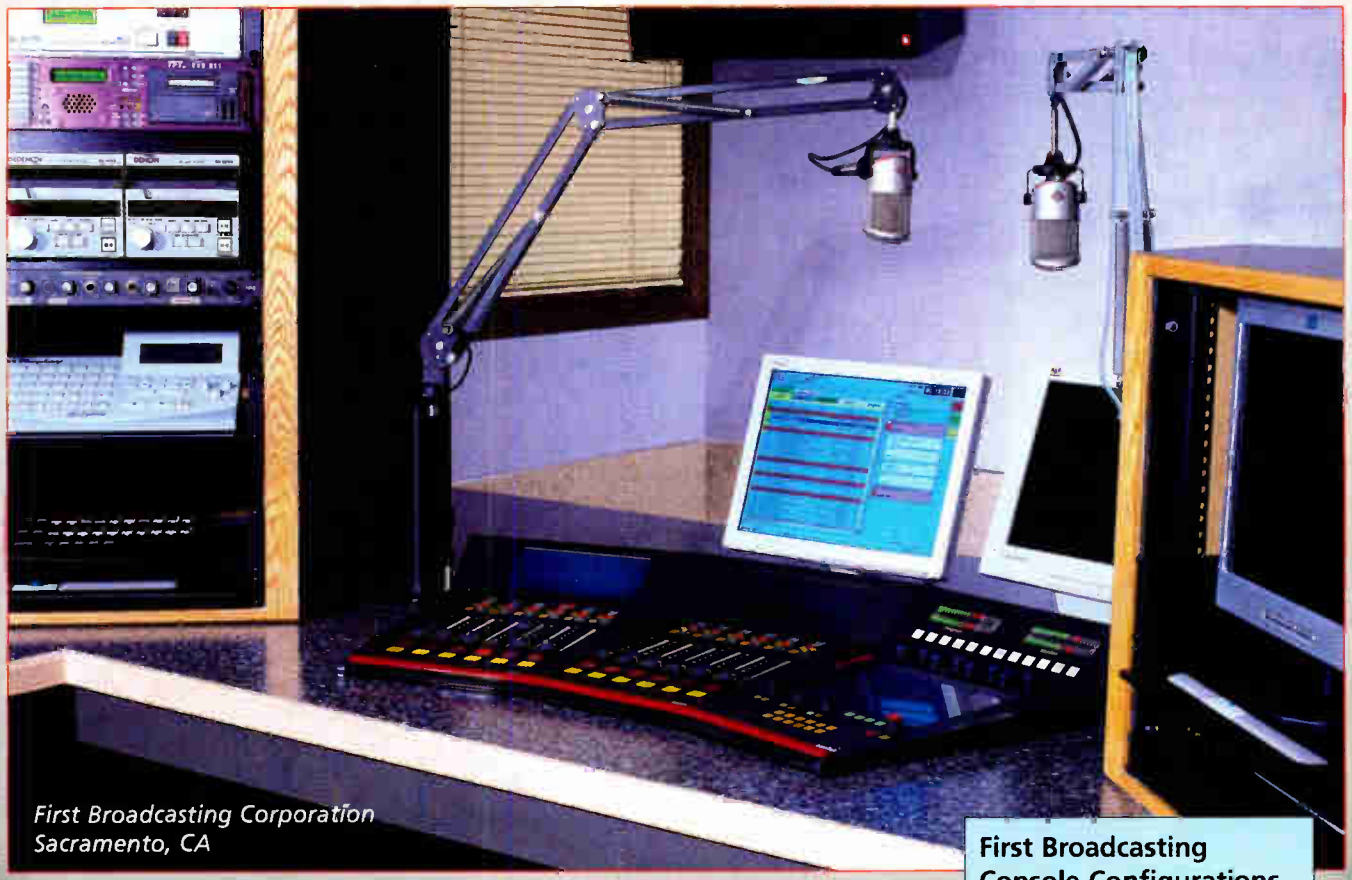

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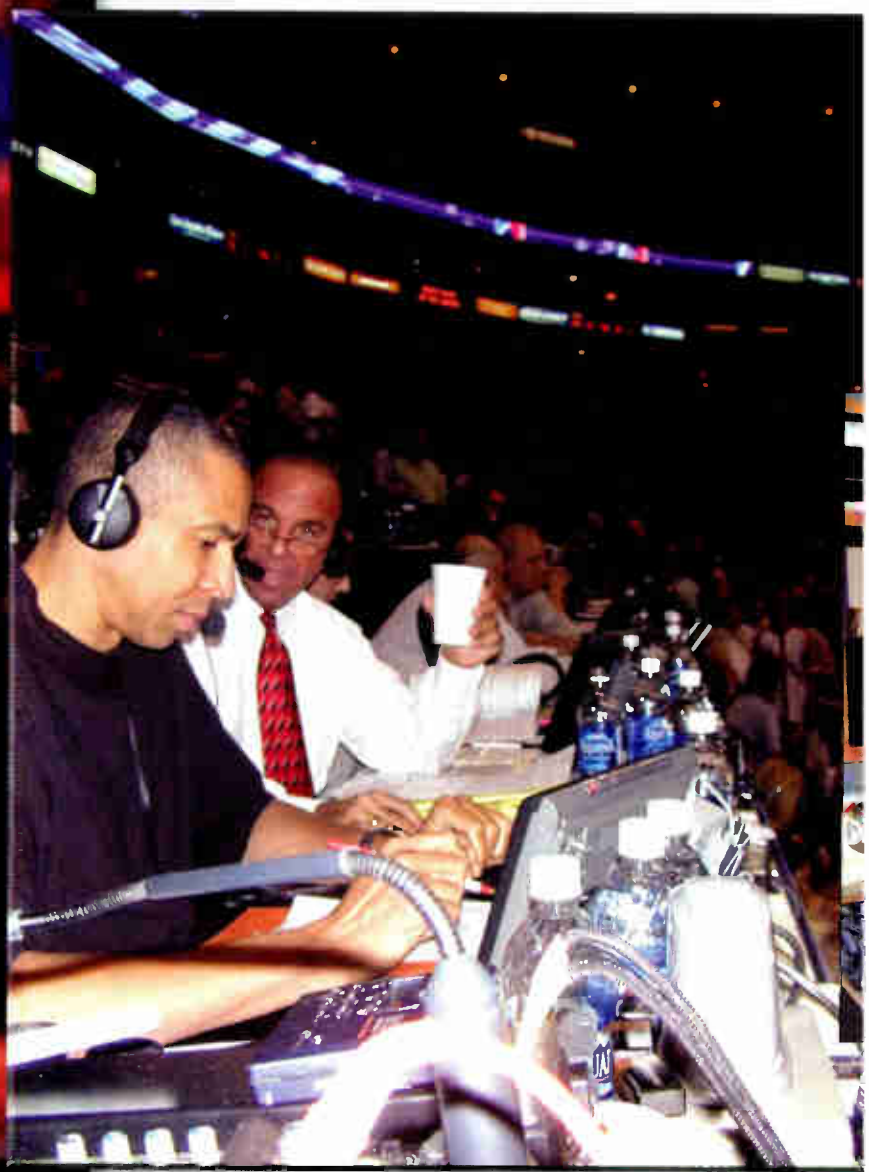
The NBA Finals on

By Stephanie Snyder



Color analyst (and former Laker) Mychal Thompson (left) and play-by-play announcer Joel Meyers (right). Meyers was the play-by-play announcer for the Spurs last season, so this is his second trip in a row to the finals.

Lakers Radio KLAC

World Radio History

It's a remote broadcast, but with a broad reach.

With 22 appearances since they moved from Minneapolis in 1960, the Los Angeles Lakers are no strangers to the NBA finals. The flagship radio station for the Lakers, KLAC-AM 570, is no stranger to NBA broadcasts either, hosting the games for the last 27 years. "The station has had a couple different formats, but the Lakers are the one thing that's remained consistent," said Frank Polak, executive producer of Lakers Radio.

Feeding a network of 16 English-language stations in California, Nevada and New Mexico with a remote broadcast almost every other night during the basketball season, KLAC has honed its process. "We cover the finals the same way we do the pre-season, there are just a few more people around," said Polak.

The remote

The Lakers home radio broadcasts begin from the Chick Hearn announce position, Section 111 of the Staples Center. Unlike most NBA broadcast locations, this one is not courtside, but several rows up in the arena for a better view.

Contractor Mike Dooley serves as the broadcast engineer for the Lakers home games providing all his own remote equipment. From a Mackie 1402 mixer, Dooley runs an eight-channel snake to a patch panel in the wall connecting to the Staples Center main patch room where the Lakers ISDN codecs are housed.

The KLAC Lakers basketball studio.

To provide consistency across the league's radio broadcasts, the NBA requires each team to have two ISDN codecs at the arena and provide ISDN lines for the visiting team. The league provides the hardware at both the arena and the station: a Comrex DXR with an Adtran terminal adapter.

With only one seat at a six-foot table, Dooley's equipment has to be compact. To reduce setup and teardown time, a portable rack unit holds Dooley's headphone amplifier, limiter and wireless mic receiver. A switch box on the mixer allows him to listen in cue on one ear and program on the other. An effects feed from TV provides the crowd noise for the radio broadcast. Mic and headphone feeds run to each announcer's Cough Drop boxes, to which Dooley added a volume control so each can control his own headphone volume.

Not one to take chances, Dooley also brings a consumer-style computer UPS power unit to every game. He learned his lesson one night during the regular season when his

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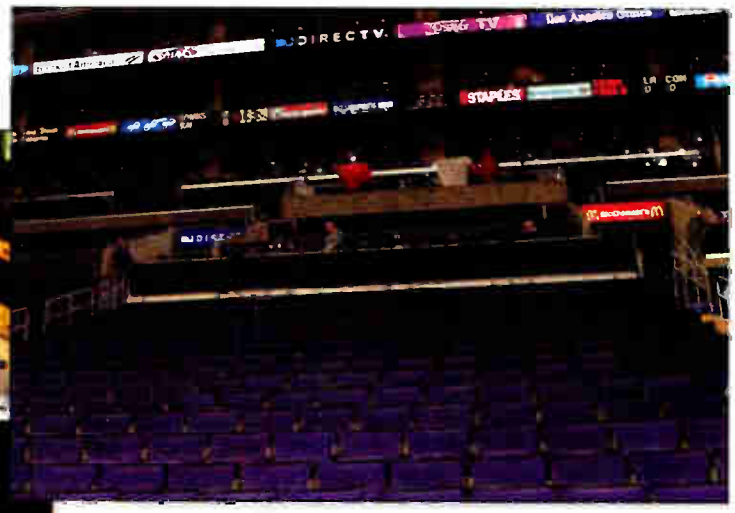
Lakers Radio KLAC

The remote setup at the Staples Center.



The Chick Hearn Broadcast Position at Staples Center.

main ac power was accidentally cut off during the pre-game show. Now, the UPS provides a 15-minute power reserve in case of unexpected outages.

Even after a season of broadcasts, Dooley keeps busy with pre-game set up and monitoring during the game, however, it's the end of the night that really tests his skill.

"The 20 minutes after the last buzzer goes off is the most intense 20 minutes of my week," said Dooley. That is when he is running a post-game show, switching between the locker room and post game press conferences and feeding tape back to the station, all at the same time.

The venue

Opening Oct. 20, 1999, the Staples Center in Los Angeles was designed with broadcasters in mind. Planned to be a state of the art venue when it opened, the building houses 3.87 million feet of broadcast cable, 141,000 feet of fiber, and 500 phone lines.

"This is a high-profile building doing high-profile events, so we wanted it to be media friendly," said Steve Thrap, director of broadcast services at the Staples Center.

The only arena in the country with its own full-time broadcast department, the Staples center has 69 media panels throughout the building, linking all the common locations for camera and radio positions. All panels route to the main patch room where there are nearly 11,000 terminations for audio and video. The centralized location allows Thrap and his engineers to route the audio anywhere in the building. Old fashioned, copper patch cords provide the connections between the locations.

"Copper works, but if it doesn't we can route around it until we get it fixed," said Thrap.

Other arenas and stadiums have internal cabling, but it can be up to engineers to plug in themselves. Staples Center keeps computer records of every visiting team and network's preferences.

"They tell us they are coming and we set it up for them ahead of

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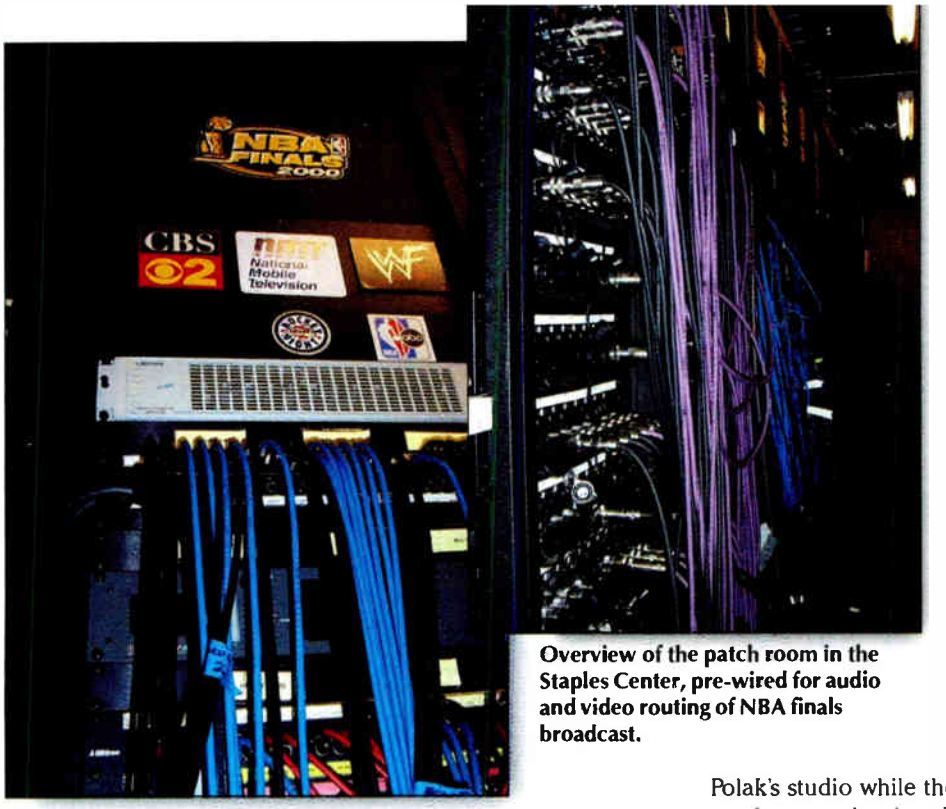

Overview of the patch room in the Staples Center, pre-wired for audio and video routing of NBA finals broadcast.

Audio patch panels in patch room of the Staples Center, wired for a radio broadcast of the WNBA Sparks.

time" said Thrap. During the NBA finals as many as seven radio broadcasts can come out of the arena at once. "It's a snap for them to just plug and play," said Thrap.

The studio

In May 2004, KLAC, part of Clear Channel Radio, Los Angeles moved to new studios in Burbank. John Paoli, chief engineer of KFI, KXTA and KLAC, coordinated the move. (Read the Facility Showcase on Clear Channel LA in the May 2004 issue of *Radio* magazine.)

The Lakers signal from the Staples Center comes into the studio across the ISDN lines and NBA-provided codecs. The codecs are programmed as a local source in the studio, but can be brought in to the Harris Vistamax router, allowing them to be routed to any room in the building. Pre-saved sessions on the Harris BMXD allow the console to recall settings for a variety of shows, taking only seconds to set the console for a Lakers game.

In addition to the signal from the arena, a third ISDN line is used to send a signal to Skyview Satellite Services in Arizona, which uplinks the broadcast for the Lakers Radio Network.

Frank Polak, who began producing the Lakers radio broadcasts 25 seasons ago, works out of a studio and office combination. During the games, the broadcasts originate from Polak's studio while the main KLAC air studio is used as a voice booth. Polak controls all the production elements across a dual-screen Prophet automation system and a talkback system keeps him in touch with the announce team at the arena. Three feeds leave the Lakers' studio, one to the transmitter, the second to the network and the third returns to the arena.

While KLAC is home to the Lakers from October to June, come summer, they don't just leave on vacation. That is when they switch to coverage of the WNBA Los Angeles Sparks broadcasts, following the same process and using the same systems honed for the Lakers.

Snyder is a consultant based in Los Angeles, CA.

Photos provided by Mike Dooley, John Paoli and Stephanie Snyder.

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Sacred Heart Radio

Catholic Radio on a Successful Mission

by Allen J. Singer

World Radio History

Ever since the earliest years of radio broadcasting, even when radio was still in its infancy, religious messages have been available somewhere on the dial. Whether from a dynamic preacher shouting from the pulpit or a more sedate call-in talk show, radio has enabled the spiritual word to be available to listeners all over the world. In the United States alone, listeners have a choice of more than 1,500 stations.

For those who follow the Catholic faith, however, the choices are somewhat limited. About 60 Catholic radio stations dot the airwaves from Cincinnati to Houston. Some of these stations operate out of back rooms of the owners' homes, rebroadcasting EWTN satellite radio. EWTN provides 24-hour Catholic programming for its affiliates: daily Masses, teaching programs, prayers and a variety of call-in talk shows.

Several of the affiliates are run by people who have never worked in broadcasting before. These devoted Catholics believe they were "called in faith" to deliver Catholic teachings over the radio, and their stations are supported by donations and underwriting. It is unusual for a station owner to have broadcasting experience, and even more unusual for the affiliate to offer local programming in addition to the satellite rebroadcast.

Sacred Heart Radio, WNOP 740 AM, in Cincinnati breaks that mold. This station is operated by Bill Levitt, a former radio imaging announcer, production director and general manager, with more than 30 years of broadcasting experience. Known as John Bogart on the air, Levitt nearly single-handedly runs his radio station, delivering 24 hours of programming to Cincinnati's 550,000 Catholic population, as well as streaming online at www.sacredheartradio.com.

Sacred Heart Radio is unlike most Catholic radio stations. Levitt fills several hours a week with locally produced programs including PSAs, promos, half-hour and full hour discussion shows and interviews, and various seasonal specials. Local bishops, priests and deacons are invited to share their viewpoints on various religion-oriented issues and other current topics. Most importantly, the station relies 100 percent on listener support; there is no underwriting on Sacred Heart Radio. The station is located at Our Lady of the Holy Spirit Center in Norwood, OH, a former seminary turned retreat center and public worship house. The Holy Spirit Center contains meeting halls, offices, dorm rooms and three chapels, with one that can hold more than 500 people. It is here that Sacred Heart Radio has found its home.

Before Catholic programming was introduced on 740 AM in 2001, WNOP broadcast jazz to a small, dedicated audience in Cincinnati. WNOP entered the airwaves in 1948 and over the years became a radio legend in the ears of jazz listeners, and in the eyes of many curious Cincinnatians. Its studios were housed in various locations around Cincinnati, including floating on a small barge (the Jazz Ark) on the Ohio River, playing records while the turntable bobbed up and down. After staying unprofitable for so long, in 1992, the station went to an all-CNN news format, and in 1994 went back to jazz, this time through local marketing agreements. Through the 1990s, revenues had increased at miniscule amounts, and the

The Holy Spirit Center in Norwood, OH, a community that is part of the Cincinnati metro area, houses the studios of WNOP.

World Radio History

Sacred Heart Radio

owner wanted to sell this money-loser. Many potential buyers made offers, promising to keep a jazz format, but the deals always fell through. In 2000 a local Catholic group put in a bid of $550,000 and followed through with a check, paid completely through donations.

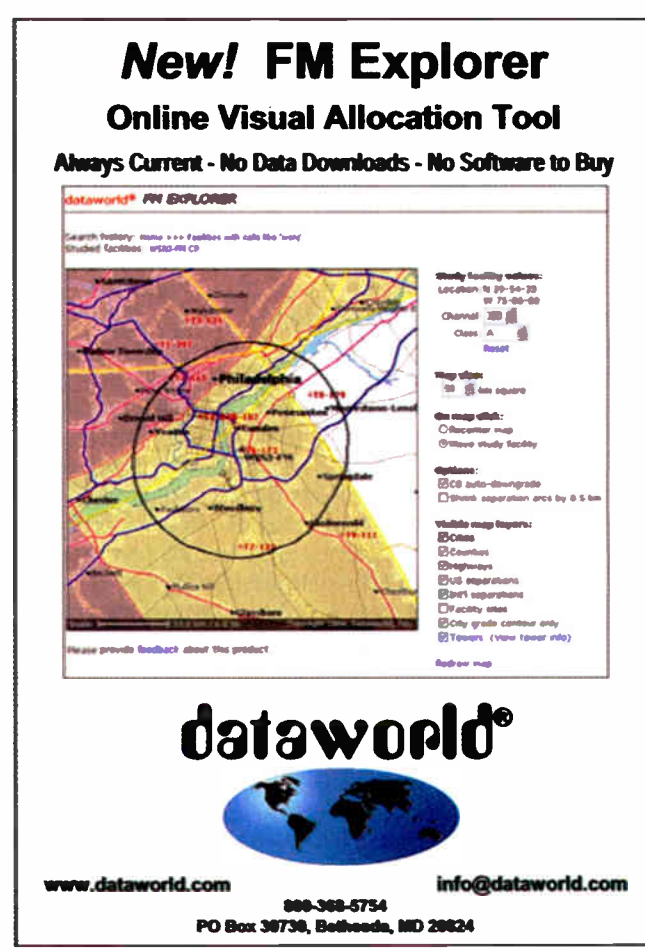
The unassuming lobby of WNOP welcomes visitors to the station.

The board of directors hired Bill Levitt, who located Sacred Heart radio into a former audio production studio in an old office building in Covington, KY. On Jan. 1, 2001, Sacred Heart Radio went on the air broadcasting EWTN mixed with some locally produced material. In the first recorded announcement, Cincinnati Archbishop Daniel Pilarczyk welcomed Sacred Heart Radio as Greater Cincinnati's Catholic radio station. Levitt installed a BSI Wavestation to maintain the 24-hour program as he tended to the duties of running the operation. He soon hired a part-time office manager to handle the fundraising and other bookkeeping.

Since its inception, Sacred Heart Radio has existed solely on donations by listeners, many of whom are on fixed incomes. These small donations add up and help keep the monthly $15,000 budget on track. It boils down to a $20 hourly cost to operate the station, and Sacred Heart Radio always has enough money. It is a 5013C company, non-profit, tax exempt and successful in its mission.

Time for change

Satisfied that the radio station would stay on steady financial footing, Levitt decided to move the station to a new facility. He and the Board of Directors chose some office space in the Holy Spirit Center in Norwood. This old seminary provided the perfect atmosphere to host a Catholic radio station. A location was chosen in the building and blueprints were drawn. Construction required gutting the chosen section and constructing new offices and studios.



World Radio History

Contractors began their work in October 2002. After the studs went up, the engineer ran wires between the studios, terminating to custom-made XLR panels for mic and headphone inputs. Microphones installed in the chapel are mixed down in the station's control room and fed live on the air.

The board estimated that $50,000 would be required to build the new facility. The Holy Spirit Center donated $20,000, and on-air solicitation brought more than $15,000 for construction. An additional $15,000 was raised to cover equipment costs. After just a few months of construction, Sacred Heart Radio was on the air.

The new facility consisted of three studios, a lobby, two offices and storage. The main control room receives audio from EWTN Satellite Radio, brought to the station via a pair of 15KHz phone lines from the receiver at the transmitter site. Audio is routed through the air chain into the BSI Simian (which replaced the Wavestation months before), and also into the console. Simian records various EWTN shows throughout the day; both live satellite and Simian feed the console. Final audio is fed into an Aphex Compeller 320D, which helps level audio coming from two different sources—the Simian and the satellite. The Compeller was chosen for its digital inputs and outputs, for potential future conversion. A pair of 15KHz phone lines carry the audio back to the transmitter site to an Optimod 9200.

On one side of the control room is a talk/interview room containing four microphones. On the other side of the control room is the production studio where Levitt records his promos, IDs and various announcements. Protools is used for all production, as well as a CD library of sound effects and music. Levitt uses the latest technology to help run his station: the remote control software Radman can connect him from any computer in the country via the Internet. A lot of scheduling and maintenance is performed from the computer at Levitt's home.

A Windows XP Professional network links the six computers at Sacred Heart Radio. The BSI Simian computer, which contains five hot swappable SCSI drives, is the main network server. The production rooms contain three workstations, all of which use Protools, and are used for scheduling and graphic design for station newsletters. One computer is dedicated to running the webcast, and one other is used for correspondence with the benefactors. A final one is plugged into the network and is intended as a backup.

Equipment List

- AKG K240 Studio headphones
- Aphex Compellor 320D
- BSI Simian
- DBX 2031 EQ
- DBX 266XL compressors
- DBX 286A mic processor
- Digidesign Protools
- Event Project Studio 5 speakers
- Gorman-Redlich EAS-1
- Mackie SR 24-4
- Mackie VLZ 1202
- Orban 9200
- Shure SM-7B mics
- Tascam CD-A500 CD/cassette deck

World Radio History

Sacred Heart Radio

Levitt runs the station by himself, with part-time help from the engineer and an office manager. Simian keeps the station automated 24 hours, and Levitt continues to produce and air local material mixed with EWTN's programming, broadcasting at a 1,000W daytime, and 30W nighttime. A Canadian station plagues Sacred Heart's nighttime signal, and at 30W, it can be difficult to receive the station depending on the part of town the listener is in.

Levitt is addressing this issue, which has been problematic for many years. He hired the engineering firm Khanna and Guill to conduct studies on how they could increase their daytime power. On-air solicitations ask listeners to help support this new—and expensive—venture, and donations arrive daily to help pay for the upgrade to 2.5kW. After completion, and the purchase of a new transmitter among other equipment, the station's listening area will expand east, west and south, increasing listenership while completely protecting the Canadian station.

Bill Levitt in the control room taking care of the day's business.

Sacred Heart Radio is unique. It is a stark reminder to the broadcasting community that without listeners, the station cannot exist, unlike the popular thinking among the large radio conglomerates. Catholic listeners appreciate Sacred Heart Radio for its national and local content, and Bill Levitt delivers a good product with professional voicework and production. The end result is a station that stays interesting and informative, a standout from other faith-based radio stations. And although the fans of the old WNOP sorely miss their jazz music and favorite personalities, a new, even larger and more dedicated audience has embraced this station, continually supporting it, and bringing the Catholic message into their homes 24 hours a day.

Singer is a freelance writer and former radio engineer based in Cincinnati.

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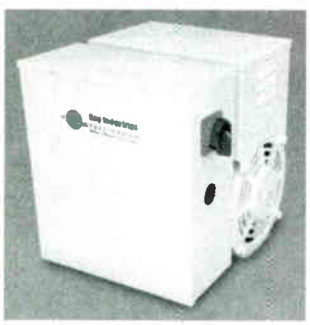

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World Radio History

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Navigating New Waters Together

Thursday / October 7

Group Executive Session

Group Executives Include:

Judy Ellis
Citadel Communications Corporation

Chesley Maddox-Dorsey
Access.1 Communications

Mark Mays
Clear Channel Worldwide

Peter Smyth
Greater Media Inc.

Co-Moderators:

Jay Mitchell
Small Market Radio Newsletter

Tom Taylor
Inside Radio

Friday / October 8

Breakfast with Charlie Cook

Sponsored by: RBC Capital Markets

Charlie Cook
Political Analyst

Friday / October 8

Radio Luncheon

NAB National Radio Award Recipient

Clarke Brown

Jefferson-Pilot Communications

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October 6-8, 2004

Manchester Grand Hyatt, San Diego, CA

visit www.nab.org/conventions/radioshow

World Radio History

NAB Radio Product Preview

By Kari Taylor, associate editor

www.beradio.com

On-air control surface
Wheatstone
Booth 500

Generation 8: This control surface offers four faders dedicated to call-in segments to provide an interface to four callers or remotes, each with independent caller feed, independent fader feed, user-selectable talkback communication and adjacent channel linking. A dedicated LCD display screen keeps the operator informed and in control. One CAT-5 wire conveys all the control from this surface to Wheatstone's Bridge Router.

Any system audio source (inputs or mixes) is available to any console fader or monitor pot (source visibility software controlled). Set destinations for mixes, aux sends and mix-munis feeds to anywhere in the facility. The surface can store and name switch and fader settings for each operator's task and recall them by spinning an encoder and hitting a take button.

252-638-7000; fax 252-637-1285
www.wheatstone.com; sales@wheatstone.com

Modular automation system
Prophet Systems
Booth 709

Nexgen 101: The software runs a single radio station and is based on the Nexgen software. Users buy only what they need, and add features as the station grows or the budget allows. Start with the core software, which includes the ability to process a log, then add modules to grow the system functionality as needs change.

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

Audio control surface
Sierra Automated Systems
Booth 812

Rubicon: A stand-alone control surface, the Rubicon integrates into the SAS 32KD digital audio network for mixing, switching, level control and effects. Modular, customizable and fully programmable, this control surface is for a medium- or large- market facility. Each module features four program bus assignments and four effects/auxilliary sends. A VU/Peak LED meter bridge with a clock and a timer or a VGA monitor show metering.

818-840-6749; fax 818-840-6751
www.sasaudio.com; sales@sasaudio.com

RF components dealer
RF Parts
Booth 1312

Online catalog: A worldwide distributor for 34 years, RF Parts has released an expansion of its online catalog at www.rfparts.com. The catalog provides a listing of product information, product applications and product ordering with the company's secure ordering system. The catalog lists a complete line of power tubes for broadcast, industrial and communications, including Eimac, Amperex, Taylor, Svetlana, RFP and Econco brands along with a full range of sockets through 20kW.

800-737-2787; fax 760-744-1943; www.rfparts.com; rfp@rfparts.com

FM antenna for IBOC
ERI-Electronics Research
Booth 700

Dual-feed IBOC antenna: This dual-input, side-mounted FM antenna is designed for FM IBOC applications and is capable of transmitting the analog and digital FM signals without requiring a high loss hybrid combiner or the use of a circulator to attain the required isolation between the digital and analog transmitters. The antenna is a dual-input antenna design that excites all radiating elements with analog and digital signals. The antenna allows the use of a single antenna while eliminating the combining loss as is present in the 10dB hybrid combining method and it is able to achieve 1.05:1 VSWR for analog and digital inputs. It can achieve in excess of 30dB isolation between analog and digital inputs without using an isolator/circulator.

812-925-6000; fax 812-925-4030; www.ERIinc.com; sales@ERIinc.com

Internet voice tracker
Scott Studios
Booth 705

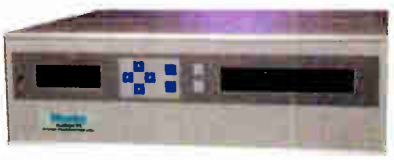
Voice Tracker: This system allows jocks to record air shifts from anywhere with an Internet connection, Windows computer and microphone. When used with Scott's SS32, times and current temperatures can air. Voice Tracker via Internet requires an Internet music server at the station to send compressed song heads and tails, in WMA format, to the announcer's headphones. It can automatically virus scan and place the recorded voice tracks in the air studio. Stations choose how many songs per hour an announcer is allowed to change for timing, or whether he must follow the log exactly.

800-SCOTT-77; fax 972-620-8811
www.scottstudios.com; info@scottstudios.com

World Radio History

Digital STL/TSL system
Moseley Associates
Booth 1404

Starlink 9003T1: This digital STL/TSL system for T1 circuits features new LAN connectivity for transmitting Ethernet to and from the transmitter site to support datacasting for HD Radio and RDS song title and artist data. A new six-port multiplexer and built-in CSU allows combining of these data channels with the program audio for direct connection to a T1 circuit making external interfacing equipment unnecessary. This system allows stations to transition the STL portion of their air chains to digital for IBOC. The T1 unit transports linear uncompressed stereo program channels at either 44.1 or 32kHz digital sample rates. Both AES/EBU digital and analog inputs and outputs and a serial data channel are built into the system. The SL9003T1 combines program audio with voice channels for telephones and data channels for communications and control for bidirectional transport over a single digital T1/E1 line, microwave radio or license-free 5.8GHz link.



805-968-9621; fax 805-685-9638
www.moseleysb.com; info@moseleysb.com

RF station monitor
Coaxial Dynamics
Booth 1502

81095: This microprocessor-controlled, rack-mounted Watchman monitor/alarm measures and displays forward and reflected power simultaneously in 50Ω transmission systems. Using LCD displays, it also provides direct reading of VSWR. It is compatible with the company's series of 7/8" to 6 1/8" line sections and will accept elements from less than 5W to 100kW full scale from 2MHz to 2.3GHz. Installation consists of the Watchman, a dual-socket line section and two elements for monitoring. The Watchman is supplied with two 25' dc cable assemblies for connection to the line section and a 6' ac power cord. An audible single tone alarm will indicate a system/transmitter malfunction. Relay contacts are provided for remote alarm and reset switching.

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World Radio History

RBDS encoder
Burk Technology
Booth 1505

RDS Master: Audemat-Aztec and Burk Technology have introduced an RDS encoder powered by Audemat-Aztec's FMB80. The FMB80 is capable of scrolling song titles and artist information on any kind of RDS receiver using the scrolling PS feature. Communication with the automation software and configuration are simplified with serial and TCP/IP ports. The FMB80 has an embedded Web server and supports HTTP,TELNET, UDP and TCP protocols. Firmware upgrades can be flashed remotely using the FTP site.

800-255-8090; fax 978-486-0081
www.burk.com; control@burk.com

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AM transmitter
Nautel
Booth 1410

J1000: The Jazz J1000 is a 1kW AM transmitter in a 19" rack mount package. It uses direct digital synthesis (DDS) technology to produce logic-level RF drive and modulation encoding. Ultra linear extended band performance supports HD Radio and DRM digital transmission formats. Control and monitoring is provided through a software-driven 240 x 64 graphic LCD display in conjunction with a diagnostic flow diagram. The redundant modular design has two complete and independent 500W wideband power modules comprising high efficiency RF amplifier, modulator, switch mode power supply and integral ventilation fan. The transmitter has provisions for six preset RF power levels.

207-947-8200; fax 207-947-3693
www.nautel.com; info@nautel.com

Product Showcase

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Sine Systems, INC
615.228.3500
more information: www.sinesystems.com

50kW AM transmitter
Broadcast Electronics
Booth 702

4MX 50: The 50kW AM transmitter is based on a patent-pending modulation design and is about half the size of comparable models. The transmitter is IBOC and DRM compatible. Notable features include PA modules that can be accessed from the front of the transmitter, lift-off rear panels to provide access to power supplies and all ac connections, nighttime power capability as low as 250W, 15" XGA GUI for operation and diagnostics that are also available via IP, and power factor greater than 0.98.

217-224-9600; fax 217-224-9607
www.bdcast.com; bdcast@bdcast.com

World Radio History

Digital console
Radio Systems
Booth 1110

Millenium Digital: This console provides analog or digital inputs on every channel, 32-bit resolution, sample rate conversion on every input and CRT companion metering/timer and set-up display. All the outputs are available in analog or AES/EBU digital format and the console offers 10 extra auxiliary output busses. The system also features 10 fully programmable mix-minus outputs and a serial RS-232 interface.

856-467-8000; fax 856-467-3044; www.radiosystems.com; sales@radiosystems.com

Field strength meter
Audemat-Aztec
Booth 1710

Navigator 007: This portable FM field strength meter offers built-in modulation metering, stereo pilot monitor and RBDS monitor. It is delivered with an external GPS

receiver for mobile RF survey on a single FM station. While driving, RF readings and GPS coordinates are recorded on a laptop. After the campaign, results can be viewed as a text file or can be exported to mapping or predictive software. The unit is accessed with any terminal program software. The unit includes a carrying case, with 115/230Vac power supply and vehicle power supply.

305-692-7555; fax 305-682-2233
www.audemat-aztec.com; contact@audemat-aztec.com

Solid-state
FM transmitters
DRS
Broadcast Technology
Booth 1306

Continental 815D5 and 815HD5: The new line of FM solid-state transmitters, beginning with the 815D5 and the 815HD5, is a 5kW solid state FM line with an RF combining and splitting system designed to withstand as much as three times its operating RF requirements to ensure long-term, reliable service in harsh and often time abusive loads. This transmitter line wields a unique combiner system that ensures that the most RF possible gets to the output in the event of single or multiple amplifier module failure. The 815 series includes 24.5" (12RU) of user-available 19" wide rack space and built in ancillary equipment power outlets. This area is located in a non-interlocked area and accessible from the front or rear.

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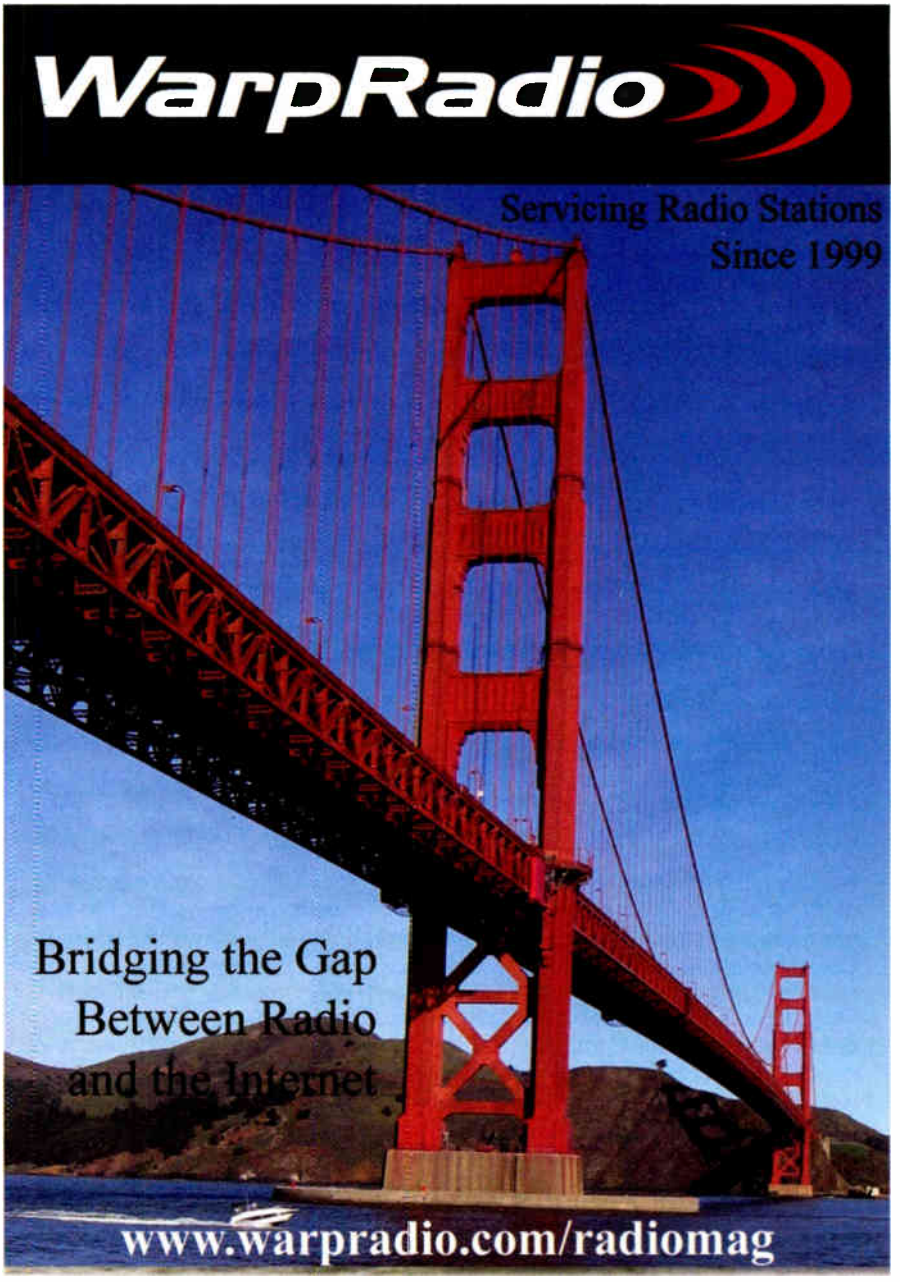

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Indecency Processor

No, this product doesn't remove naughty words, but if you do run a profanity delay or simply have a buildup of digital latency, talent can't listen to the processed air signal. Instead, their feed is probably direct from the console. Compared to the air sound, this can seem weak, dull and lifeless.

Our Model 255 Triband Spectral Loading™ processor has zero delay and can deliver a dense, tight, and punchy 'broadcast' sound to headphones and control room speakers... a sound you can't achieve with a general-purpose "utility compressor." Other 255 applications include the program feed to telephone hybrids and IFB processing.

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Model 255 – $2100

Visit www.inovon.com for full technical details

NAB Radio

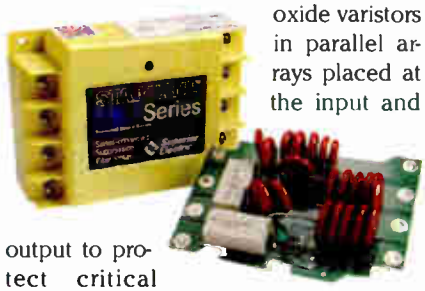
Audio engine and consoles
Logitek
Booth 100

Digital console enhancements: Several enhancements have been introduced for the Logitek digital consoles including a two-stage talk show delay, silence-sense capability, EQ and dynamics processing, input metering on every fader and compression metering on faders where activated. The Optical STL is available as part of the Logitek Audio Engine and offers 64 channels of bidirectional audio to be sent as far as 10 miles without data loss or compression. The system also provides intercom functionality that can operate as a stand-alone system or as part of a Logitek digital console. Other enhancements include a full X-Y router, mixed analog and digital I/O, multiple mix-minus buses, IP and multisite operation, and physical and virtual controllers.

800-231-5870; fax 713-664-4479
www.logitekaudio.com; info@logitekaudio.com

Surge suppressor
Superior Electric
Booth 303

Stabiline TB1: The unit protects against damaging electrical disturbances, high frequency noise and high energy disturbances. Available in two sizes: 20A/ 45kA or 40A/65kA ratings. TB1 models use metal oxide varistors in parallel arrays placed at the input and output to protect critical loads from high-energy transient damage. They also use UL-recognized inductors and X and Y capacitors to filter error-producing high-frequency noise. Single-phase 120, 220 and 277Vac types provide three modes of protection. Split-phase 120/240 and two of three phase types provide six modes of protection.



800-787-3532; fax 860-582-3784
www.superiorelectric.com; info@superiorelectric.com

World Radio History

Product Preview

Production music
Westar Music
Booth 203

Music library: This company provides production music for broadcast, corporate video and multimedia use. Westar offers production library music in seven primary categories: Sports and Corporate; Rock, Dance and Pop; Jazz and Blues; Easy Listening; Country and Western; Drama and Film Scores; and Specialty Music. Within each category are many music genres and

styles. The website also offers resources to play audio demos for every CD and order a copy of a demo package, get a listing of the complete contents of its audio demo by CD number, track and title view its CD master list in order by CD number, and use the electronic cue sheet templates and music reporting information.

866-463-0100; fax 905-886-6800
www.westarmusic.com
info@westarmusic.com

Stand-alone automation system
Arrakis
Booth 606

Champion: This on-air workstation combines the company's Digilink Xtreme software and the Champ-6 workstation hardware. It features an embedded PC and audio playback system in a fanless unit. It has four stereo sound cards built in with play and record, analog and digital audio I/O and logic control for all four audio channels. It is Windows XP OS compatible with built-in networking for audio and schedule interfacing.

970-461-0730; fax 970-663-1010
www.arrakis-systems.com
sales@arrakis-systems.com

World Radio History

Studio telephone access center
Comrex
Booth 1005

STAC6 and STAC12: These Studio Telephone Access Centers (STAC) for listener lines, talk shows and call-in segments incorporate two digital telephone hybrids handling up to four callers. It is offered in six and 12 phone line versions with the ability to upgrade in the field. The accompanying control surface supports unique producer and screener configurations. IP-based call screening and control is embedded, enabling operation from almost anywhere. Other unique features include auto-attendant and support of as many as four control surfaces.

800-237-1776; fax 978-784-1717
www.comrex.com; info@comrex.com

Audio processor
Orban
Booth 413

Optimod-FM 2300: Key new features of this processor include stereo enhancement, built-in Ethernet and RS232 serial connectivity, full-featured remote control through any Windows 2000 or XP PC, standard AES/EBU digital input/output, Orban's half-cosine interpolation composite limiter and a multiplex power controller for countries required to meet the ITU-R BS412 standard. The 2300 is targeted to small- and medium-market broadcasters as well as non-commercial and educational broadcasters. Supplied in a compact, 1RU chassis, the processor offers a processing chain that includes a stereo enhancer, AGC, equalizer, program-adaptive high frequency enhancer, two-band compressor/limiter, distortion-canceling clipper, overshoot compensator and stereo encoder with composite limiting. The main clippers and overshoot compensator operate at 256kHz sample rate and are anti-aliased.

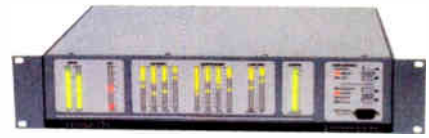
510-351-3500; fax 510-351-0500; www.orban.com; custserv@orban.com

Radio automation system
D.A.V.I.D.
Booth 1512

Digasystem Latitude Edition: The Latitude Edition is a scalable platform with network capabilities designed for the demands of small to medium-size broadcasters. The basic version consists of three complete preconfigured workstations and a server with all of the software modules required for editing, organizing, scheduling and playing programming. Latitude can be upgraded by 20 options to add and customize additional features such as Web applications, automation, file transfer or import modules for a wide range of applications. Expansion with additional workstations or an update to the full version of a Digasystem installation is possible at any time.

703-396-4900; fax 703-396-4939
www.digasystem.com; info@digasystem.com

Digital FM processor
Inovonics
Booth 302



Omega_FM: A largely software-based digital on-air processor/generator, Omega_FM offers a short and direct program signal path that keeps latency at a minimum. The user interface includes a no-menu front panel setup that suits a variety of applications, or allows any PC to be connected for control over all processing parameters.

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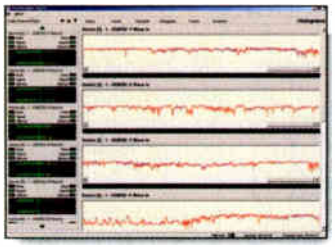
World Radio History

Digital logging device



Mediatouch
Booth 613

Imedia Logger: Ideal for time shifting, delayed broadcast, logging or skimming, this software can auto record without spots. This program can record 12 audio sources simultaneously, and each workstation can record 12 stereo sources at the same time. Users can record four streams from each audio source using multiple compression formats and recording qualities. This system uses MPEG 1 Layer 1, 2 and 3, PCM, Windows Media Audio and Real Audio files.

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Data importer, exporter

Harris
Booth 902

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Desk surface

Omnirax
Booth 1707

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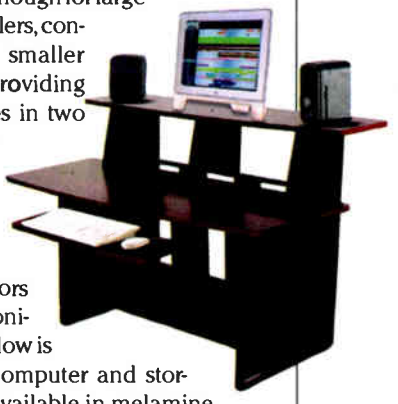

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Pike & Fischer
Booth 101

Web services: A subsidiary of The Bureau of National Affairs, this company has launched three legal reference services on the Web for cable, broadcasting and wireless professionals. The services, Cable TV Regulation, Broadcast Regulation and Wireless Telecommunications Regulation, offer subscribers desktop access to current FCC rules and regulatory information critical for industry compliance. Communications executives can quickly access current and proposed rules as well as all regulatory mandates issued by the FCC.

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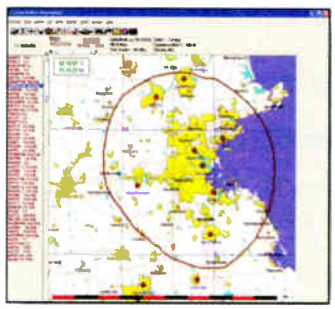
FM allocation program
V-Soft Communications
Booth 1109



FM Commander: The program uses a new mapping engine compatible with V-Soft's Probe 3 and AM-Pro polygon-based mapping databases. Some of the new features include the ability to automatically design directional antenna patterns with one click of the mouse, the ability to overlay population centroids, airports, towers and AM stations, interactive labeling and terrain profile graphing. The USGS National Elevation Dataset (NED) 30-meter database can be used with Probe 3, Terrain-3D and Plot Path.

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SMS short codes: The SMS short code 22022 and other short codes open a new avenue of messaging to and from radio station listeners. The codes allow a simple way to get instant input from the thousands of mobile phone users. The CSCA initiative of late 2003 was an agreement among the major telephone service providers in the United States to follow a common short code five-digit standard for allocating numbers across all carriers. This means broadcast contesting can be set for all mobile phones instead of just one carrier.

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The fall convention solution

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have read several comments in trade publications that advocate making changes to the location or structure of the Radio/Audio hall at the Spring NAB convention in Las Vegas. One credible idea came from Neil Glassman.

While I understand and appreciate what Neil wants to accomplish by moving the Radio/Audio (R/A) Hall into what is now the South Hall, I feel that it is a bandage on a hemorrhage.

When the R/A section was located in the South Hall, many exhibitors in the R/A section complained that it was not big enough to efficiently house all of the vendors who wanted to exhibit there.

In time, the R/A section was bounced around the convention center and even reduced in size—despite the desire of more R/A manufactures wanting to exhibit—because of the demands of the large TV exhibitors.

We complained to deaf ears. It was obvious that those with the gold would rule this show; the gold of the huge prices the TV folks were willing to pay.

More often than not, small R/A companies were pushed into the fringes and found themselves like desert islands, drowning in an ocean of huge TV displays, being passed by the masses of TV attendees marching through. Foot traffic yes; foot traffic of quality, no!

Dealing with the problem

While it is an option to take a space equal in size to the present R/A hall in the middle of the South Hall as Neil suggests, the move would most likely alienate the NAB's largest exhibitors. It would force some out of the TV conclave and into the North Hall.

And the change wouldn't solve the R/A Hall problem. We would continue to bleed

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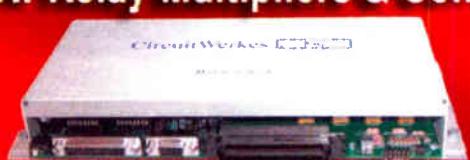

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as the R/A-related domestic attendance continues to shrink.

There would be no room to grow, with again the great potential to be shrunk back to the North Hall or drowned by the huge TV exhibits.

The NAB's Radio Committee needs to face the reality of the changing marketplace. They need to allow the convention department to eliminate the Fall Radio Show and consolidate it with the Spring Show making a single Radio Show a part of the spring convention.

Eliminating the fall show would infuse the R/A hall with more qualified attendees, as this would combine the large international attendee base of the spring show with all of the potential domestic radio attendees in Las Vegas.

The NAB would double the floor traffic in the R/A hall, which would help the R/A exhibitors not only justify the huge expense of attending the show, but it would also help the radio industry by getting the best and most creative minds together at one show.

These opinions are my own and do not in any way reflect the position or opinion of my employer or fellow employees at Armstrong Transmitter.

Ernie Belanger
sales and marketing manager
Armstrong Transmitter

Watching big brother

Chriss' August Viewpoint on logging requirements takes us down another slippery slope. During Watergate President Nixon believed the tapes would exonerate him, but instead had the opposite effect.

I believe it places a burden on some if not all broadcasters who will (if enacted) have to maintain another function of their broadcast outlet.

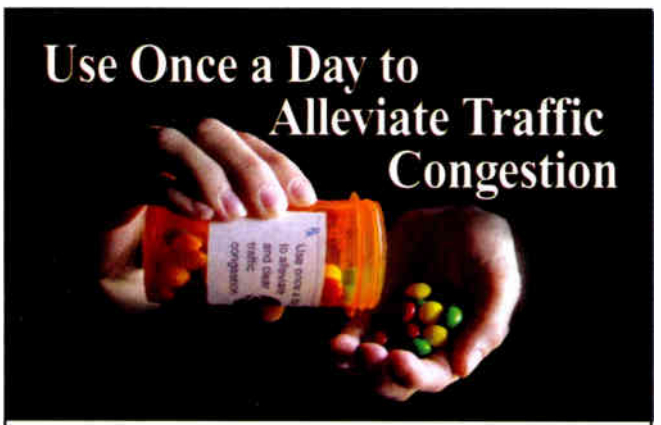
If it's a violation of community indecency values, let the petitions begin. Maybe the recordings would justify a broadcaster's position, but why would it allow such an incriminating device in a case. Public outcry over the incidency at last year's Super Bowl showed the indignation of viewers. Radio has the same watch dog.

Our satellite friends at XM and Sirius have a loophole because they are not affected by the potential rulemaking. Case in point: Opie and Anthony begin on XM in October.

Dick Tyler
retired ABC Radio network engineer
Burlington, NJ

comments?
radio@primediabusiness.com

Radio Gallery



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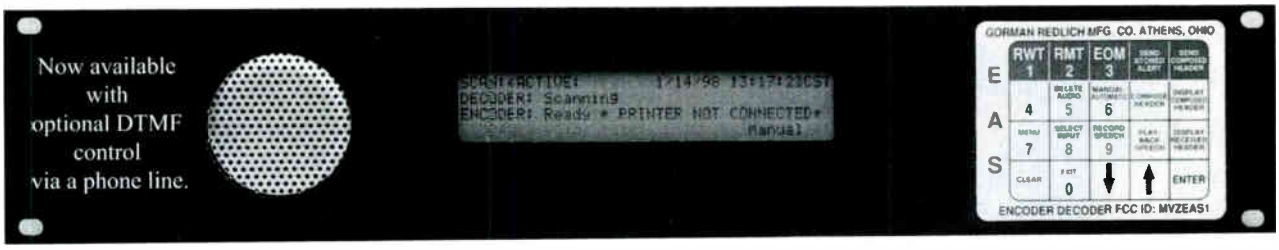

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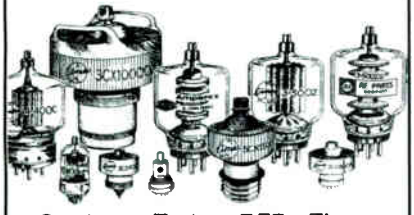

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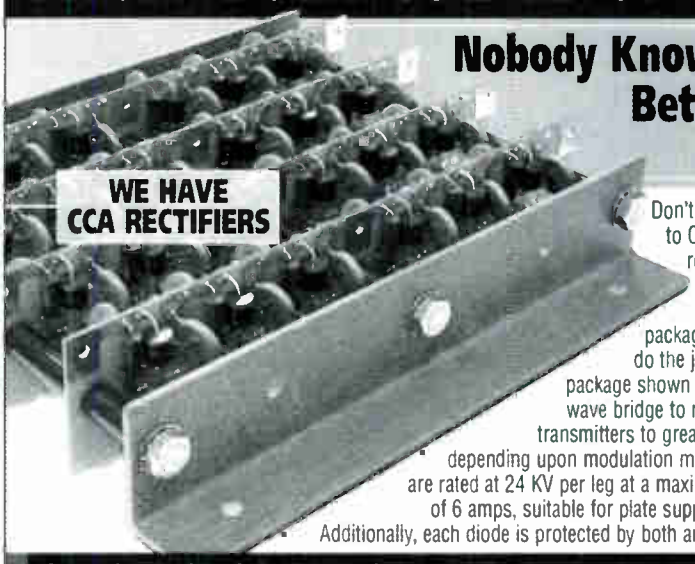

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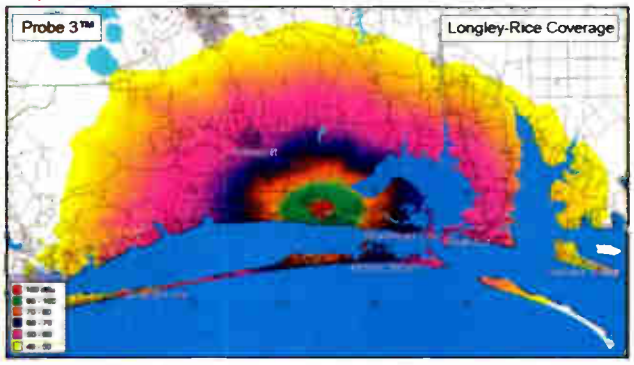

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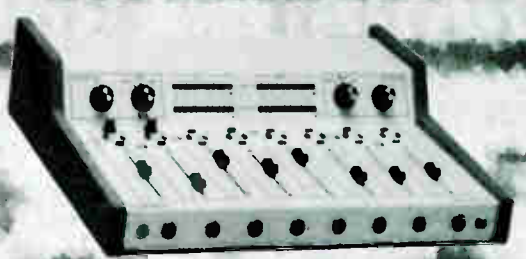

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month: Managing Technology, page 10.

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Elkins Park, PA

The technical consultant on management and computer technology, McNamara has more than 30 years of broadcast experience. He is the former director of engineering for the Beasely Broadcast Group, and he also held the positions of chief engineer at stations in Boston, Philadelphia and Washington, DC. His career has provided him with extensive broadcast facility design and construction experience. He has also presented papers at the NAB and NAB Radio conventions. He holds an Amateur Radio Advanced class license, he is a Certified Netware Engineer, and he is a member of the SBE and the IEEE.

Radio
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

Radio, Volume 10, Number 9, ISSN 1542-0620 is published monthly and mailed free to qualified recipients by PRIMEDIA Business Magazines & Media Inc, 9800 Metcalf, Overland Park, KS 66212-2216 (primediabusiness.com). Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canadian Post Publications Mail Agreement No. 40597023. Canada return address: DP Global Mail, 4960-2 Walker Road, Windsor, ON N9A 6J3. Additional resources, including subscription request forms and an editorial calendar are available online at beradio.com. To order single copies call 866-505-7173 or 402-505-7173.

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World Radio History

Sign Off

By Kari Taylor, associate editor

www.beradio.com

Do you remember?

With the active interest in on-air indecency, we looked through the archives and found an early entrant in the solid-state profanity delay arena.

In 1982, the Comex Systems Bleepmate 675 profanity delay provided six seconds of 7.5kHz bandwidth delay. The unity-gain device offered 72dB of dynamic range and selectable three-second or six-second delay modes. The unit was designed for conventional rack mounting and required 2RU. Distortion was less than one percent THD at 0dBm output with a maximum output of +12dBm and a frequency response maintained within ±1dB out of 5kHz with the -3dB point at 7.5kHz.

That was then

In this 1955 photo, Dick Brewer of WDLB-AM 1490 in Atlantic City, NJ, reads a commercial using an RCA 77-DX mic feeding an RCA BC-2B Consolette console. The WLDB studio was located on the 11th floor of the Senator Hotel in Atlantic City, NJ.

Featured in a 1955 article in the *RCA Broadcast News*, the station was outfitted almost completely with RCA equipment.

The RCA BC-2B Consolette was designed for use in small stations. One outstanding feature of the console was the mic preamps, which RCA used in other equipment. The tube preamp is still admired for its tonal qualities. The Consolette had eight pots and a master level control.

Sample and Hold

70 percent of media users consume more than one medium at a time.

While listening to the radio:

53.7% are online

46.9% are reading a newspaper

17.7% are watching TV

Source: www.Trendwatching.com.

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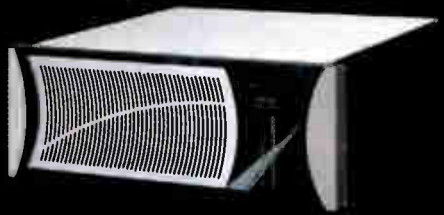

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