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NAB Radio Returns to Philadelphia

NAB Radio Show Preview

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Facility Showcase

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A PRIMEDIA Publication

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REDUNDANCY? We've got that covered too: just add a second WHEATNET and CAT-5 link from each studio and have an AUTOMATIC standby interconnect for the ENTIRE system!

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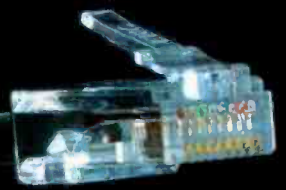

48 CAT-5 PORTS with 128 audio channels (plus embedded control data) per port.
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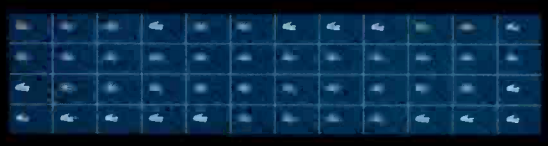

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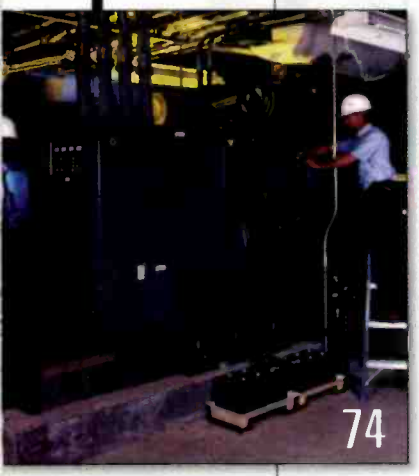
Features



Columns

Departments

ON THE COVER:
The fall convention for radio returns to the East Coast. There's plenty to see, hear and do at the convention and in the host city.
Photo by Rich Dunoff, courtesy of the PCVB.
Cover design by Michael J. Knust.

For football remotes that deliver every heart pounding, bone crunching moment, choose a codec that outperforms the competition. Only Tieline codec options connect over your choice of POTS, ISDN, GSM and soon IP* with just one simple box. Get instant, rock solid connections, incredible wireless or wired audio quality and get your listeners into the game.

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*Audio over IP and wi-fi software module for all Tieline G3 codecs available late 2005.
Compatible with [1]Comrex Matrix, Blue and Vector Codecs. [1]Comrex and associated trademarks are the property of Comrex Corporation

Currents Online

SBE Launches Voluntary Frequency Coordinator Accreditation

The accreditation program is intended to maintain the quality and professionalism of coordination by ensuring consistency of approach and accountability to established standards.

Greater Media Detroit Hosts HD Radio Demo

On Aug. 15, the Detroit media were presented with the details of HD Radio, which included car and home HD Radio receiver demonstrations.

AES Convention Includes Broadcast Events

The Digital Radio Broadcast Forum, now in its 14th year, is the highlight. Other sessions will cover surround sound for digital radio, a celebration of FM's 70th anniversary, and a live audio drama.

BIA Financial Network Acquires Dataworld

The Dataworld products become a part of the BIA data offerings.

APT Appoints Constantine as VP North America Operations

Art Constantine has 30 years of sales experience in pro audio and broadcast with Musicam USA, Modulation Sciences, Fidelipac and Moseley.

Radiosophy Brings Former Gateway Executive Back to South Dakota

Bruce Young is the company's new chief technology officer.

Continental Electronics Makes Management Appointments

Matthew Straeb takes over as director of business development, Don Spragg is hired as the engineering product manager, and Michael Troje assumes the broadcast sales manager role.

Site Features

Reader Feedback

Hear what readers have to say in Reader Feedback. The most recent letters are in the September issue index.

E-mail Newsletters

Stay on top of the latest news with our e-mail newsletters. Radio Currents brings you the headlines every week. Keep up with everything IBOC and DAB with IBOC Update. Get ready for the major conventions with the NAB Radio Update and NAB Insider. Subscribe today.

The Engineer's Notebook

If you're looking for a tip, trick, pinout or other handy reference, turn to the Engineer's Notebook at beradio.com. Likewise, send your tip to us and we'll share it.

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COMREX

RF Engineering

The details of EIA/TIA 222 Rev. G

By John Battison, technical editor, RF

After thousands of hours of committee work the most comprehensive change in the 222 standard since Version D was promulgated nearly 20 years ago has been released for general use. Because of the rapidly increasing global expansion and the ever-expanding integration of American products and standards internationally the committee determined that the new standard shall stand as an example of a state-of-the-art standard internationally and domestically.

Consulting Engineer John Ericsson, P.E., a member of the working group and the editorial committee, provided me with a copy of the nearly 300-page standard. Craig Snyder, president of Sioux Falls Tower and Communications, who was also chairman of the committee, provided a great deal of additional information concerning the activities of his committee, TR14. The final draft was approved in June 2005 and released for general publication in July 2005. The specifications and requirements of the new standard may be employed at this time if desired. However, adherence to the new standard, Revision G, will not become mandatory until Jan. 1, 2006.

Most readers will probably ask if Revision G applies to an existing tower. I'm sure many engineers will be relieved to learn that the answer is generally no, if no changes are to be made to the original load specification and a professional engineer certifies that it will be satisfactory and that there won't be any effect on an existing tower. This requires careful consideration but if new antennas are to be added to an existing tower, which results in changes to its loading beyond its original specification Revision G will probably apply.

What's inside

The new specification's table of contents lists 15 main topics or objectives, each of which may have as many as eight subsections. The topics are:

1 General
2 Loads
3 Analysis
4 Designed strength of structural steel
5 Manufacturing
6 Other structural materials
7 Guy Assemblers
8 Insulators
9 Foundations and Anchorages
10 Protective grounding
11 Obstruction and marking
12 Climbing and working facilities
13 Plans, assembly tolerances and marking
14 Maintenance and condition assessment
15 Existing structures

There are 14 annexes that form procurement and user guidelines. These are intended to help engineers in their procurement of antenna supporting structures and antennas designed in accordance with the new standard. The sections referred to in the annex correspond to sections of the standard that contain an A prefix.

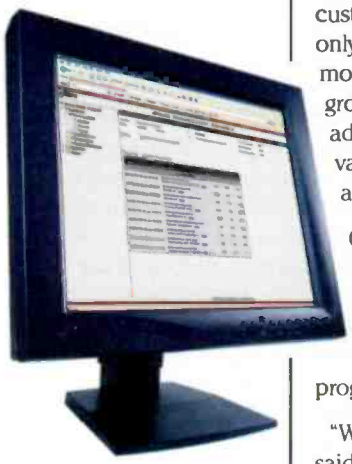
Although the new standard G specifications are comprehensive and have a no-nonsense air about them, they have been written with thought for the engineer and considerations for his design and operational requirements. Default design parameters suitable for the referenced sections are provided and help simplify the procurement specifications for structures. The annexes also provide amplification and clarification

Class	Description
I	Structures that due to height, use or location represent a low hazard to human life and damage to property in the event of failure and used for services that are optional or where a delay in returning the services would be acceptable.
II	Structures that due to height, use or location represent a substantial hazard to human life and damage to property in the event of failure and used for services that may be provided by other means.
III	Structures that due to height, use or location represent a high hazard to human life and damage to property in the event of failure and used primarily for essential communications.

Table 1. The classification of various structures from table 2-1 of the standard.

Shrinking Revenues?

dMarc's new revenue solution gains momentum



RevenueSuite's Online Control Console keeps you informed.

The chase for new revenues has exasperated radio execs for what seems like years, yet some are now starting to see light at the end of the tunnel. RevenueSuite, a newly launched revenue-on-demand program from dMarc is finding revenue streams where none existed before.

Offered exclusively to Scott Studios and Maestro customers, RevenueSuite has been on the market only a few months, yet it is already syndicated into more than 250 stations. That makes it the fastest growing new revenue solution in the industry. An additional several hundred radio stations are in various stages of review and/or pre-installation, according to dMarc management.

One of the early adopters is Nassau Broadcasting Partners, headquartered in Princeton, NJ, and serving multiple markets in the Northeastern U.S. Nassau recently committed all 55 of its market-leading stations to the RevenueSuite program.

"We give RevenueSuite a resounding thumbs up," said Nassau's Senior Vice President of Engineering Tony Gervasi. "It's performing exactlyas dMarc said it would. The best part about it is that we literally set it up, turned it on, and it operated seamlessly with our Scott Studios (SS32) systems, generating revenue. Prior to installing it group-wide, we put it through numerous performance tests. We found that RevenueSuite was easy to install, highly intuitive, hands-free and reliable. Now it's up and running, generating revenues across our network of stations."

Other managers report liking the fact that, once RevenueSuite is installed, it requires virtually no traffic management or operational maintenance. "After you close the logs for the day," said dMarc President Ryan Steelberg, "the RevenueSuite program begins to fill unsold and designated avails automatically without the need for station overhead or local trafficking. You can turn it on, and the system will run autonomously while providing real-time revenue reports and local control through a simple-to-use web-based interface. The RevenueSuite program is made available to any Scott Studios or Maestro enabled station." ■

For more information on RevenueSuite, check out the company's online site at www.dmarc.net.

of many of the specifications. The annex listing follows.

- **A** Procurement and the user guidelines
- **B** U.S. County listings of design criteria
- **C** Wind force on typical antennas
- **D** Twist and sway limitations for microwave antennas
- **E** Guy rupture
- **F** Presumptive soil parameters
- **G** Geotechnical investigations
- **H** Additional corrosion control
- **I** Climber attachment anchorages
- **J** Maintenance and condition assessment
- **K** Measuring guy tensions
- **L** Wind speed confessions
- **M** SI conversion factors
- **N** References

Annex D will certainly be of great interest to engineers who have to take care of STLs. It deals with one of the ever-present problems of tower distortion and twisting and swaying of microwave supports. A specific design criteria map section is included in Appendix 1 and occupies 30 or more pages. Comments on a few of the specifics that apply directly to broadcasting give an idea of the depth of this standard. Broadcast stations are located in many different types of terrain ranging from level and suburban areas to open and up mountain peaks. The effect of wind speed over various types of terrain is covered in depth.

The standard pays a lot of attention to transmission line mounting and the effect of clustering transmission lines, or blocks of transmission lines, on towers. For instance, the effect of transmission line placement is examined in detail.

A matter that is making engineers a little sensitive these days is that of earthquakes. Seismology and the special requirements of

The standard specifications are comprehensive and have a no-nonsense air about them.

antenna and antenna mounting structures in regions of high seismicity are covered in depth, and some of the information may bring comfort to engineers in California.

Structures are classified according to usage, and the classifications are listed in Table 1. Site types are classified and defined, and then run through seven soil profiles ranging from hard rock to soils vulnerable to failure under seismic loading. These are listed in Table 2.

Corrosion, a topic that has long been a subject of argument among broadcast engineers, is fully covered. Structures are required to have hot dip zinc coating, preferably galvanic. All types of corrosion control are also cov-

Multicasting.

It's like trying to fit —

well, you know.

Management has decided to multicast. Which seems like a terrific idea — until you consider just how little bandwidth each channel will get. How will the sound of your station(s) survive these shrinking bitrates? Omnia can help.

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Multicast like you mean it... with Omnia Multicast.

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Site Class	Description of upper 100 feet of soil for the site location
A	Hard rock with 10 feet or less of soil overburden
B	Competent rock with moderate fracturing and weathering with 10 feet or less of soil overburden
C	Dense soil, soft rock or highly fractured and weathered rock
D	Stiff soil
E	Weak soil (excluding site class F)
F	Soils vulnerable to potential failure or collapse under seismic loading

Table 2. Site class definitions from table 2-11 of the standard.

ered in depth. As would be expected guy wires and their fittings receive a lot of attention. The subject of insulators, base and guy, receive adequate coverage. Details of required specific cathodic protection using sacrificial anodes and impressed currents are also well covered.

Well grounded

Another topic that can be a subject of disagreement among radio engineers is grounding. Scope and definition are both covered together with methodology, and connections between various elements are fully discussed and details provided.

Although tower climbing does not normally fall within the purview of station engineers there are always a few daredevils who like to go up towers. These fearless souls will find a lot of interesting reading in section 12 entitled Climbing Facilities. This section provides a surprising amount of information about such things as required safety equipment.

Section 15 Existing Structures addresses the evaluation and modification of existing structures. Reference to this section emphasizes the need to take great care in storing all the drawings and specifications of all the structures associated with a given station. Lack of this information can eventually result in high costs in restudying what has been done and lost.

The creators of 222 Revision G deserve hearty congratulations on the successful delivery of a complete and comprehensive international standard.

E-mail Battison at batcom@bright.net.

FM auction fast approaching

By Harry Martin

The window for short-form applications (FCC Forms 175) closed on Aug. 12 and upfront payments—the FCC's version of an ante—are due by Sept. 30 at 6 p.m. EDT. The auction itself is scheduled to start on Nov. 1.

Veterans of last year's FM auction should be familiar with the format in which the auction is conducted in rounds. In each round a bidder may bid on any of the channels for which the bidder applied on its Form 175 up to the limit of the total upfront payment submitted by the bidder. This time, however, there will be a new twist relative to the bidder activity rule.

In previous broadcast auctions, if a bidder purchased 100 units of eligibility, he was required to use all 100 units during each round or else use a waiver. Auction No. 62 is being adapted to resemble a wireless auction in that 100 percent engagement will not be required in each round.

This change will not affect bidders who intend to compete for only one market and who, therefore, will be submitting only the minimum upfront payment specified for that market. But it is likely to affect the strategies of participants who plan to be bidding in multiple markets. The new activity rule will require 7 percent activity during Stage One and 95 percent activity during Stage Two. The transition from Stage One and Stage Two will take place based on a mathematical formula designed to identify the point in time when the pace of the auction is slowing down. The precise point at which the mandatory activity level will shift will be announced by the Commission as the auction is being conducted.

Let's say that you have submitted an upfront payment entitling you to 100 units of eligibility. During Stage One, only 75 percent of eligibility will need to be used in each round. Thus, if community A's channel has a specified minimum is 50 units and community B's requires 25 units, your upfront payment will allow you to bid on both channels in any given round (because 50 + 25 = 75, which is less than the 100 units you paid for), and still keep the full 100 units. (In previous auctions, you risked losing the 25 points you didn't use.) As a result, if you lose interest in community A and community B, you will still be able to use the full 100 units during subsequent rounds to bid on channels in entirely different communities.

Bidders who already hold attributable interests that preclude them under the multiple ownership rules from owning one of the to-be-auctioned channels may nonetheless still bid for such channels. However, a problem will arise if a bidder in that position wins the channel in question, because the FCC will not grant a construction permit for that channel until the successful bidder has divested the conflicting interest. But someone who wants to "trade up" no longer is precluded from doing so.

Payola back on the front burner

Eliot Spitzer, the Attorney General of New York, has attacked the problem of payola and is winning: Sony BMG Music Entertainment, agreed in a settlement to pay more than $10 million and to adopt limitations on its radio-based promotional activities. Sony admitted no wrongdoing.

The conduct addressed by Spitzer includes apparently straightforward pay-for-play arrangements, the provision of cash or goods to station personnel, the use of "independent promoters," and other arrangements by which Sony allegedly sought to manipulate and otherwise influence air play for its records.

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

Dateline:

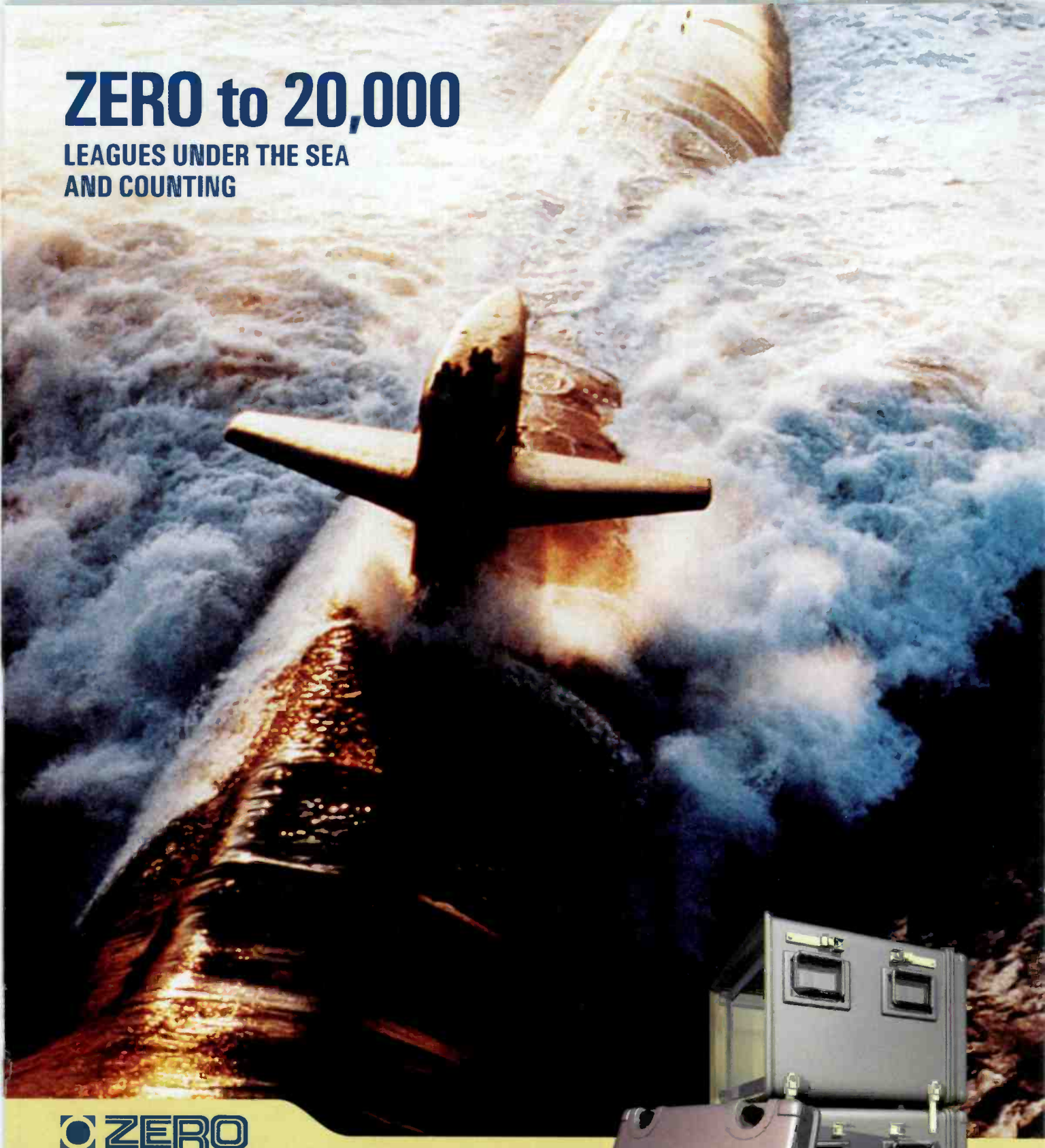
On or before Oct. 3 radio stations in Alaska, Hawaii, Oregon, Washington and the Pacific Islands must file their 2005 renewal applications, biennial ownership reports and EEO program reports.

Oct. 1 is the start date for radio stations in Connecticut, Massachusetts, Maine, New Hampshire, Vermont and Rhode Island to begin their renewal pre-filing announcements in anticipation of filing their renewals on Dec. 1.

Oct. 1 also is the date for radio stations in Florida, Puerto Rico, the Virgin Islands, Iowa and Missouri to place their annual EEO reports in their public files and post them on their websites. The same requirement applies to stations in Alaska, Hawaii, Oregon, Washington and the Pacific Islands who will be submitting their renewals on or before Oct. 3.

ZERO to 20,000

LEAGUES UNDER THE SEA AND COUNTING



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The Radio Show goes back to Philadelphia

The NAB Radio Show makes its return to Philadelphia this year, and Radio magazine has the information you need to get the most out of the convention. We have condensed information about sessions and product introductions into this convenient section, plus we have added a map of the exhibit hall and a directory of the exhibitors. The convention spans three days, and while the convention is much smaller than the NAB convention in the spring, there is still a lot of ground to cover between all the events and exhibits.

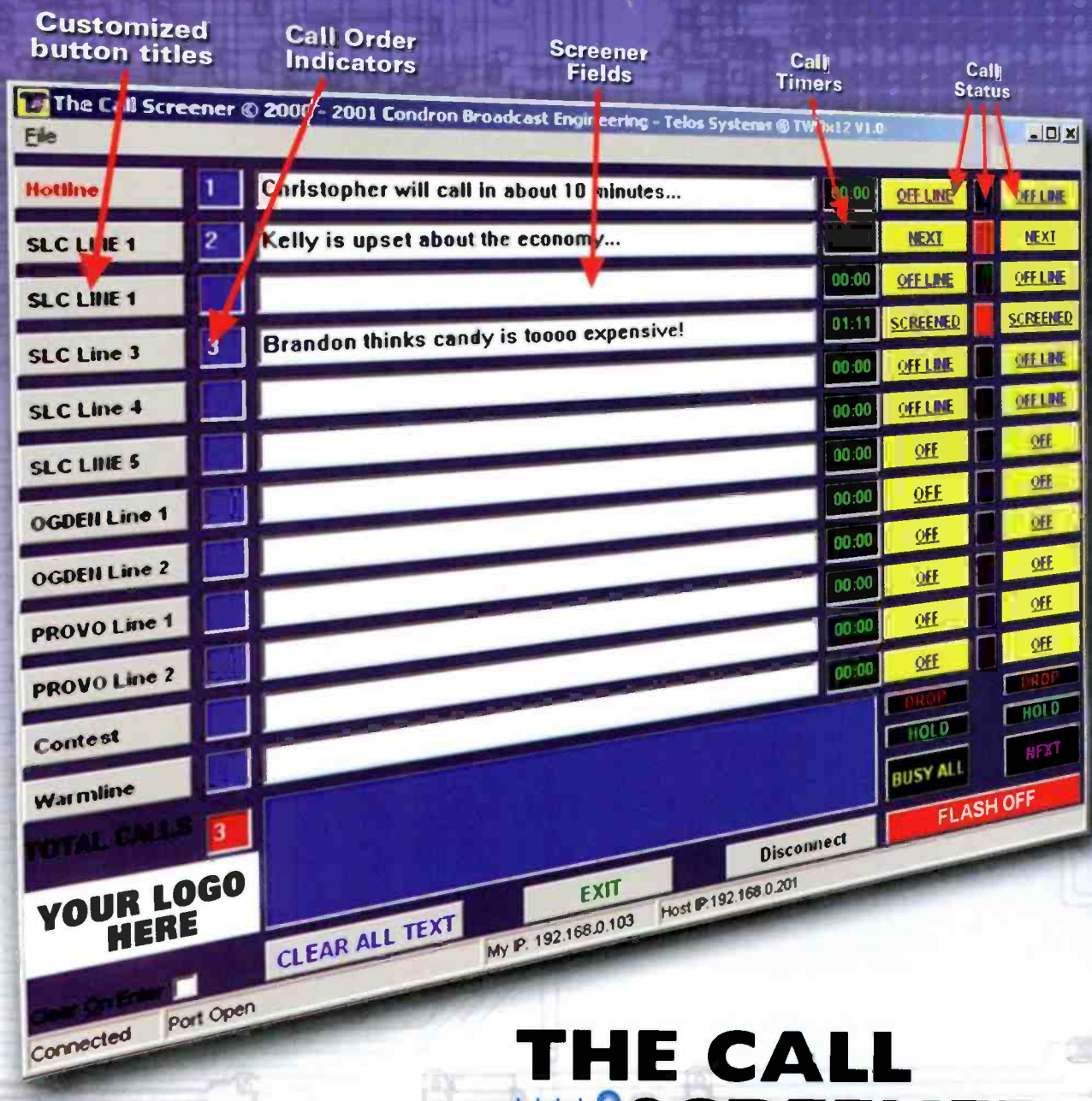
One thing to keep in mind this year is that the exhibit hall hours are different than in years past. See page 34 for the schedule. For a preview on the sessions, turn to page 40. A sneak peek at some of the products from the exhibit floor begin on page 22. You can find your way around with the exhibit hall map on page 44 and the exhibitor listings on page 45.

And if you're looking to stay connected while you're there, you'll find lots of Wi-fi access in Phildelphia. See what I mean on page 41.

— Chriss Scherer, editor

Photo by Gary Bulley, courtesy of the FCVB

The talk show call screening solution that WORKS!



THE CALL SCREENER

Your Talk Show Solution

www.thecallscreener.com

The Radio Show
Product Preview

Feature enhancment
Danagger Audio Works
Booth 112

Plan B Deluxe upgrade: New software features make the Plan B Deluxe capable of local insertions, automatic bypassing and other automated functions. The existing system can be programmed to play user-defined replacement audio when silence is detected on the main program feed. Users can add control elements to a backup playlist to execute commands such as halt playback, bypass silence detection and close relay *n*. Combined with the system's ability to start playback from an external closure or at a specific time of day, the unit can insert local programming during a network break and rejoin the network after the break.

888-892-8346; fax 250-763-2902
www.danagger.com; info@danagger.com

RBDS, HD Radio PAD interface
OMT Technologies
Booth 707

Imediadatacast: The Imediadatacast Module for Imediatouch automation allows a station to send full artist and title information to RBDS and HD Radio encoders. The interface allows Imediatouch users to provide listeners with expanded "now playing" information and customized radio promotion data on FM Radios supporting RBDS encoding.

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

Audio switcher
Audioarts Engineering
Booth 311

Input/Output Center: This audio routing and switching system switches 16x16 stereo signals per switcher. Inputs and outputs can be a combination of analog or digital signals, and it combines 24 logic ports with multiple I/O centers, which may be linked together though AE Net to build a 256x256 mixed signal matrix. The Audioarts I/O Center works with AE Net and Net 75 panels.

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Telephone: (217) 224-9600 • Fax: (217) 224-9607 • E-Mail: bdcast@bdcast.com

The Radio Show Product Preview

Multichannel radio processor
Linear Acoustic
Booth 206

Aeromax-HDFM: This processor incorporates programmable audio processing for a station's analog and digital FM signal paths, in addition to providing separate multiband processing for two supplementary audio channels. The unit also provides 5.1-channel surround-sound encoding via built-in SRS Labs Circle Surround technology. The unit's front-panel display features a spectrum analyzer and a digital oscilloscope display.

888-292-3117; fax 717-735-3612; www.linearacoustic.com; info@linearacoustic.com

HD Radio transmitter
Continental Electronics
Booth 513

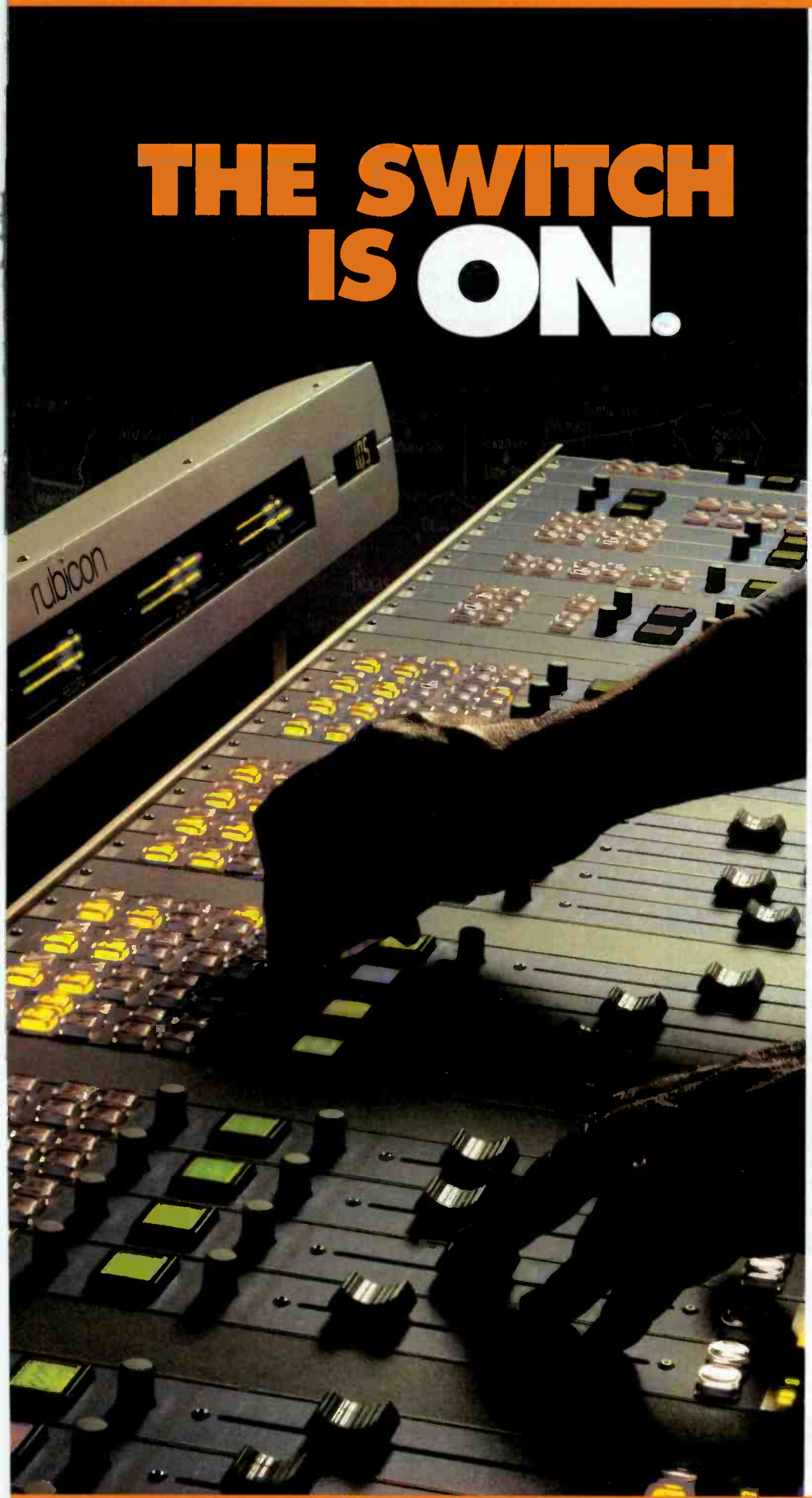
816HD: Building on the 816R series, the 816HD is capable of amplifying HD Radio signals. Currently available in power levels up to 35kW, the transmitter uses the same overall design as the 816R-C series transmitter, except for a 4CX20000E tube final. Additional components are upgraded for the linear amplification, including a linear driver stage. The transmitter efficiency is about 65 percent. Existing 816R-C series transmitters can be upgraded to 816HD operation.

800-733-5011; fax 214-381-3250
www.contelec.com; sales@contelec.com

File transfer service
Arrakis
Booth 304

Connected Radio: This service lets stations transfer audio, events, logs and text between multiple stations, remotes, and program originators. The station provides a PC with Internet access at each site and Arrakis does the rest. Files can be transferred by dragging and dropping. The service provides the functions and links for the user. Once files are received, they can automatically be routed to the appropriate destination, regardless of the software or automation system.

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



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Border to border.

Broadcasters in markets large and small are switching to the elegant **Rubicon**™ family of console control surfaces from Sierra Automated Systems.

In return, Rubicon's power, adaptability, and easy-to-use controls are turning on hundreds of DJs, operators, engineers and programmers across America.

Rubicon, and the versatile new **Rubicon SL**, are the primary user interface of a proprietary system of audio routing, mixing, distribution, intercom, IFB, and automation that we call the **Connected Digital Network**™.

Rack mounted 32KD Digital Router/Mixer, RIOLink remote I/O and Rubicon power supply

At the network's hub is the **32KD** digital router/mixer, the proven performer in many hundreds of radio, network, and film installations around the world.

RIOLink remote I/O router/mixer now provides stand-alone or backup mixing in addition to interconnection from the studio to the central 32KD.

To learn more about why so many broadcasters are switching to Rubicon and the Connected Digital Network, give us a call, or drop us an email.

SAS **SIERRA AUTOMATED SYSTEMS**

1.818.840.6749 radio@sasaudio.com

The Radio Show Product Preview

Expansion series
Burk Technology
Booth 502

G-Link G-Bus: The G-Link G-Bus Expansion Series offers a new approach to remote control based on the GSC3000 system. By adding G-Link to a GSC3000 system, users can monitor facility conditions with plug-and-play convenience. G-Link units on display include the models AC-4 and AC-8 power strip controllers for remote management of 120V inputs such as HVAC, lighting and computers. G-Link emphasizes economies of scale by integrating all remote facility monitoring on a single platform and using the same software and Web-based interfaces as the GSC3000.

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

SPS-capable radio
Radiosophy
Booth 303

Multistream: This transportable HD Radio receiver can handle any number of multicast streams along with existing HD Radio and analog signals. The removable receiving unit measures less than 6"x 4"and the complete radio is less than 16" x 7". When broadcasters add a second digital stream, the receiver will allow listeners to receive the additional programming.

605-232-6465; fax 612-435-3380; www.radiosophy.com; info@radiosophy.com

Modular DA and processor
ATI
Booth 819

SYS10K: This modular, rack-mount system accepts a variety of modules to fit particular needs. Distribution amplifiers in a variety of I/O configurations, line amplifiers, mic preamplifiers, metered distribution amps, metered line amps and a compressor/DA are available. The rack unit holds 10 modules and two power supplies. Each plug-in module is supplied with its own applicable connector assembly. The system features headphone jacks on all modules to allow a quick signal check.

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Introducing the **Starlink SL9003T1**

Whether you're rolling out HD Radio™ or planning a studio move, look to the name you've trusted for over forty years to now provide the smart choice in T1 STLs.

The new Moseley Starlink SL9003T1 has all the payload advantages of digital including, bi-directional program audio; Ethernet LAN/WAN extension; transmitter remote control; plus, telephone voice channels delivered over a single T1 link or license-free Spread Spectrum radio.

And consider this, *the Starlink is priced nearly a third less than the competition.*

How can a Moseley Starlink SL9003T1 possess so much capability and still save you money? Just ask our industry-recognized experts Dave Chancey or Bill Gould for the details.

Starlink SL9003T1 Digital STL.

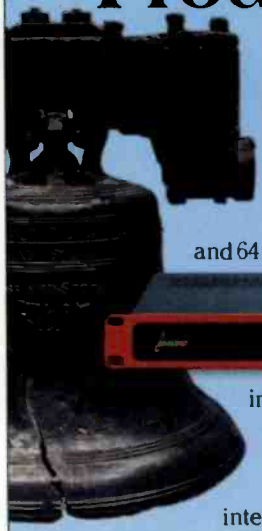
Good choice.

Dave Chancey	805 968 9621
Bill Gould	978 373 6303

Moseley

www.moseleysb.com

The Radio Show Product Preview



Cobranet interface
Audio Science
Booth 118

ASI2416: A modular 1RU Cobranet interface, this interface can be populated with four function-specific modules, allowing as many as 32 channels of analog or AES3 I/O and 64 relay-based GPIO outputs and 64 opto-isolated inputs. Each module features an interchangeable connector portion that may be configured with a pluggable terminal block, Studiohub or a standard 50-pin Centronics connector interface compatible with Audio Science's sound cards. The ASI2416 base unit features 16 channels of Cobranet I/O and a Texas Instruments 32-bit floating point DSP that allows switching/mixing and broadcast-specific features such as tone decoding. A graphics display on the unit's front panel displays peak meters and network status. This device may be operated in a tethered mode, whereby it is connected directly to an ASI6416 Cobranet sound card with an Ethernet crossover cable.

302-324-5333; fax 302-738-9434; www.audioscience.com; sales@audioscience.com

Audio, data studio system
Broadcast Electronics

Booth 319

Audiovault, Sonixtream Integration: This studio system integrates text and audio for on-air audio, over-the-Internet, HD Radio and RBDS data activities. The integration eliminates the redundant effort to provide the data across the various media. The system integrates the Audiovault version 9.0 digital audio system with the Sonixtream streaming media management software and Now Playing software that generates song title, artist, and other text for display on FM RBDS and HD Radio tuners.

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

IBOC monitor
Audemat-Aztec

Booth 116

Goldeneagle HD: This equipment monitors the quality and continuity of HD Radio and FM signals as well as PAD and RBDS data. An embedded spectrum analyzer is available as an option to monitor the power of the sidebands and other parameters. The monitor features an embedded Web server and SMTP server for alarm notification as well as a touchpad on the front panel. When installed at the transmitter site it can also be used as a remote control unit by adding 16 digital inputs, 16 metering channels and 16 relay outputs.

305-249-3110; fax 305-249-3113
www.audemat-aztec.com; contact@audemat-aztec.com

NEW Digilink Satellite Automation...

ONLY $100 PER MONTH

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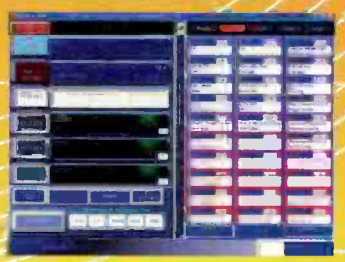

Xtreme 'SOFTWARE'
powerful Windows PC software for live air, automation, scheduling, and production

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Xtreme is a complete solution for live & automated On Air Radio systems. Pay one very low monthly fee, and we do the rest. We supply the audio hardware, software, and support, while all that you supply is the PC. Without a large initial equipment investment there is no financial risk or capital expense; the old automation system can be upgraded out of current operating costs. With free system configuration and training you receive the help you need to make a smooth transition to the new system. With free hardware replacement, ongoing repairs are worry free. Free telephone support helps train new staff, and free software upgrades means you have the latest product features at no cost. The only hardware that is not included is the PC computer and we can help you with that too... also for free.

The 'Bridge' hardware ...

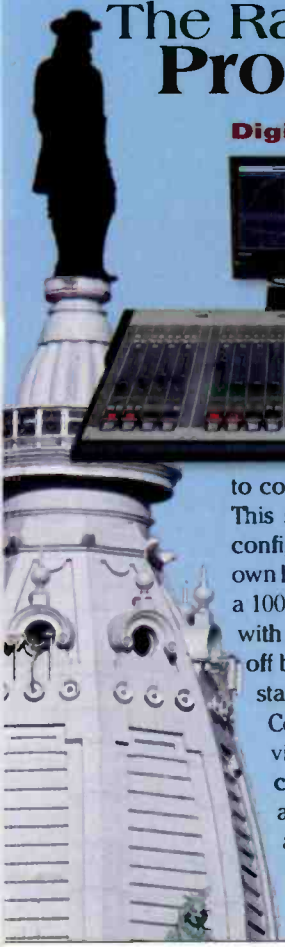
supplied by Arrakis contains the audio sound cards, routing switchers, and control logic so that the PC requires NO special hardware or setup. This means that the PC can be off-the-shelf, and unmodified so that it is easily serviced locally. The Xtreme 'Solutions' program is per workstation for complete redundancy and backup. Imagine an AM/FM combo with production room for only $300 per month. With more than 15 years of automation experience and thousands of Arrakis automation systems in the field around the world, Arrakis can provide you with the solution that meets BOTH your business AND technology needs.

Xtreme 'HARDWARE'
a 16 x 3 stereo routing switcher, dual PC sound cards, & control logic

...the risk free automation system
XTREME~digilink

970-461-0730 **www.arrakis-systems.com** ***now shipping !!!*** **Arrakis**

The Radio Show Product Preview

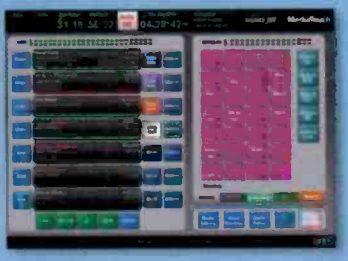


Digital on-air console
Klotz Digital
Booth 813

Aeon: Measuring about 1"thick, the Aeon features a modular control surface that allows flexible console layouts and studio set up. The console offers graphic configuration software that allows individual users to configure the system to fit their requirements. This surface is available in 8-, 12- and 16-fader configurations. Each four-fader module is in its own housing. Each channel strip is equipped with a 100mm fader and a clear alphanumeric display with 16 digits in two lines, as well as large on and off buttons and free assignable routing keys and status indication LEDs. The Monitor-DSP-Master Control module offers access to DSP functions via rotary encoders and large displays. It comprises central bus assignment, 20 assignable push-buttons for monitor sources and 10 assignable function buttons.

678-966-9900; fax 678-966-9903
www.klotzdigital.com; sales@klotzdigital.com

Automation system
OMT Technologies
Booth 707



Imediatouch 2.6: This version has new features. The Non-Stop Broadcasting Auto-Failover hardware safeguard covers the station when there is a server problem. The update also includes improved satellite show recording for delayed playback, auto trim to fine-tune recordings quickly, auto resume to start the backup machine where the main server left off, a project editor to create shows from multiple cuts, expanded Cart Chunk Tag support and new production features. In addition, the on-screen display has been updated with a new look.

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

Virtual Newsroom
Burli Software
Booth 120

Virtual newsroom: This application links workstations across the world to facilitate sharing of information. To send a story or file to a different location, a user clicks on the story and drags and drops it onto the name of the remote location. Users can search of a remote bureau, read assignments from home or remote locations and grab clips from the archive remotely. Replication can automatically share data with connected newsrooms without manual intervention, which allows multiple locations to be set up on a mini-network.

604-684-3140; fax 604-684-4160; www.burli.com; info@burli.com

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.

With a little help from our friends.

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

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

Would you like some control with that?

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

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

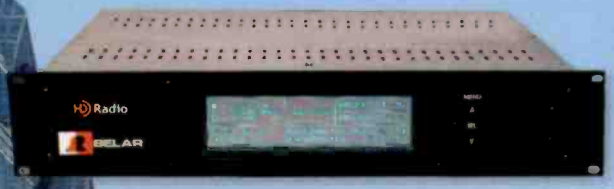
"This sounds expensive." Just the opposite, really. Axia saves money by eliminating distribution amps, line selectors, sound cards, patch bays, multi-pair cables, and tons of discrete wiring — not to mention the installation and maintenance time you'll recover. And those are just side benefits: our hardware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

AXIA
A TELOS COMPANY

The Radio Show Product Preview

Station monitoring
Belar
Booth 106

HD Radio Monitor: This 2RU monitor decodes and analyzes AM and FM IBOC signals. The frequency-agile front end can accept signals off the air or through a high-level input for use at the transmitter. The graphic display shows the measured results of the signal and will include basic spectrum analysis. Level metering is displayed as horizontal bar graphs in percent with a user-selectable dBFS level used as the reference. Capability to display SIS data, quality of service information, MPS data and bit-error data are standard. An RS-232 serial and RJ-45 Ethernet connection are included.



610-687-5550; fax 610-687-2686
www.belar.com; sales@belar.com

Solid-state FM transmitters
Armstrong Transmitter
Booth 402

FM Series B: The 4kW to 20kW solid-state FM transmitters are comprised of self-contained 2kW solid-state amplifiers with redundant power supplies (three per amplifier) and complete status for individual amplifiers. The transmitters feature VSWR foldback and protection, optional CD-quality exciter and remote control capability. The transmitters are compatible with HD Radio. Each transmitter stands 22.25"W x 33"D. The 4kW and 6kW models stand 48" tall. The 8kW and 10kW models stand 76" tall.

315-673-1269; fax 315-673-9972; www.armstrongtx.com; sales@armstrongtx.com

Show Floor Hours

Sept. 21	Sept. 22	Sept. 23
5 p.m. to 8 p.m.	8:30 a.m. to 3 p.m.	8:30 a.m. to 3 p.m.

The opening reception will be held from 5 p.m. to 7 p.m. on the show floor on Sept. 21. An exhibit hall lunch will be held from noon to 1:30 p.m. on Sept. 22.

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AEON

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- ✚GUI based Autoconfig Setup Tool

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Including surface, audio engine and audio platform

AEON - the latest innovation from the market leader

actual height
mm inch
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20
15 1/2
10
5

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KLOTZ DIGITAL

The Radio Show Product Preview

Audio over IP manager
Harris-Intraplex
Booth 519

Netxpress: Able to send multiple services over one IP connection while allowing an operator to control and monitor the entire

operation from a central area, the system is able to transmit multiple audio streams in multiple formats, LAN data and BX/PABX telephone communications. This unit provides a high-speed bus to enable features, and a multi-channel E1/T-1 bus that integrates with existing Intraplex E1/T-1 modules to provide a gradual transition to an IP infrastructure. Individual channel modules can be turned on or off during any application using a Web browser or SNMP network manager.

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

Logger
Prophet Systems Innovations
Booth 619

Digilogger: This audio logging and digital archiving program allows the user to retain as much of the station's audio as needed using compressed or non-compressed audio formats. The logger is expandable, allowing recording from one to 16 sources simultaneously (mono or stereo) when used with the ASI8702 tuner card. Audio can be stored at multiple bit-rates per recording channel. Recording lengths and times are user-configurable, and the unit can be configured to work with most analog or digital audio sources, including automation systems, satellite receivers and switchers. VU metering allows the user to monitor the current status of the recording.

877-774-1010; fax 368-284-4181; www.prophetsys.com; sales@prophetsys.com

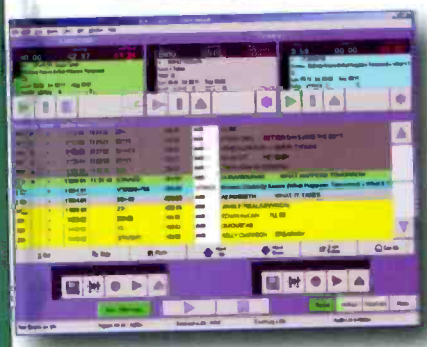
Audio codec/mixer
Musicam USA
Booth 200

Roadstar: Based on the Netstar IP and ISDN digital audio codec, this product is housed in a compact, portable enclosure with protective elements for controls, cables and connectors. Each input can be switched for mic, line or unbalanced operation. The codec can send and receive via IP and ISDN

732-739-5600; fax 732-739-1818; www.musicamusa.com; sales@musicamusa.com

BSI - not just radio automation!

Simian

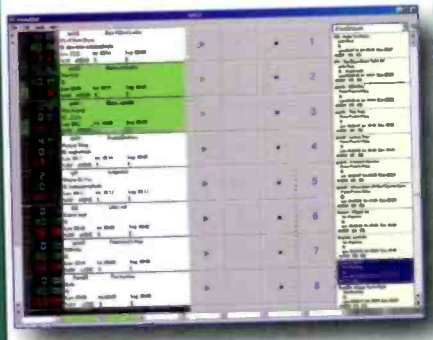


Power Digital Automation.

Stinger

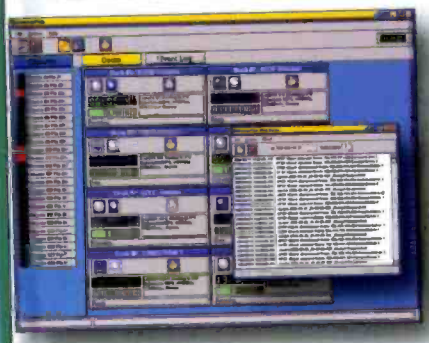
Instant Access Rapid Fire Audio.

WaveCart



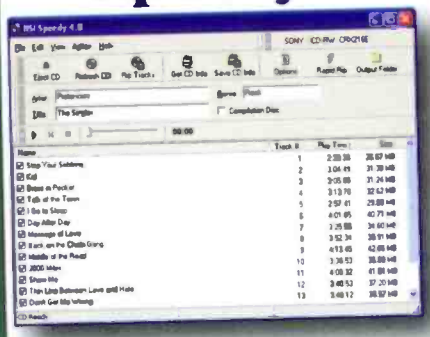
Cart Machine Replacement.

SkimmerPlus



Audio Logging and Skimming.

Speedy



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Fax: 541-338-8656
www.bsiusa.com info@bsiusa.com

BSI

The Radio Show
Insight on Sessions

Friday, September 23

10:30 a.m. to 11:45 a.m.

Regulatory Hot Topics: LPFM and FM Streamlining

This summer, the FCC again looked at LPFM and its technical and ownership aspects. The Commission also began a proceeding to streamline the FM allotment procedure.

1:45 p.m. to 3 p.m.

Profiting from New Technology: Ideas from Around the World

The adoption of digital technology will open new revenue streams for terrestrial broadcasters, but there's even more money to be made in the convergence of radio with other emerging technologies. Several radio operators share their successes in profiting from the new technologies.

Outside the convention

Several exhibitors plan tutorials and seminars separate from the NAB's convention schedule. Broadcast Electronics will hold an HD Radio Seminar on Sept. 21 at the Philadelphia Marriott. The main point of discussion will be second-generation deployment issues: multicasting and data. The seminar is free, but registration is required. E-mail HDR@bdcast.com to register.

HIGHER DEFINITION

Introducing Optimod-FM 8500

Orban's new flagship and the next step beyond the 8400, the new, all-digital 8500 offers major improvements: twice the sample rate, twice the DSP horsepower, and built-in HD Radio®/digital radio/netcast processing with 20 kHz bandwidth.

The 8500's competitive sound takes 8400 version 3.0 sonics to the next level. The 8500 will import and run any 8400 preset, so anyone with carefully customized 8400 user presets can upgrade to the 8500 without missing a beat. For HD Radio broadcasters, a built-in, defeatable 8-second analog-channel delay lets you use the 8500's built-in stereo generator and patented "Half-Cosine Interpolation" composite limiter to maintain full loudness on your analog channel.

All processing structures have about 4 milliseconds less delay, making headphone monitoring even easier for talent. For the most critical off-air monitoring requirements, you can even use one of the new "ultra-low latency" presets with only 3 milliseconds of delay.

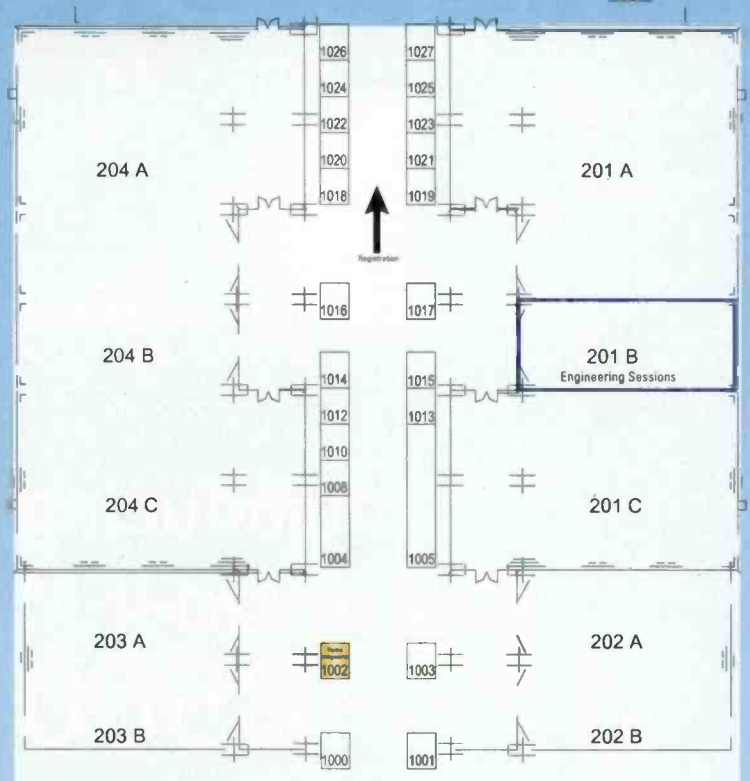
Ethernet is now built-in. Of course, you can also control the 8500 via modem, serial connection, GPI, external RS-232-interfaced automation, or internal clock-based automation with Internet time sync—the 8500 is always easy to integrate into your facility, regardless of complexity. And we've retained the 8400's famous ease-of-use that makes it easy for you to brand your sound by creating your own custom presets—even if you're not an audio processing expert.

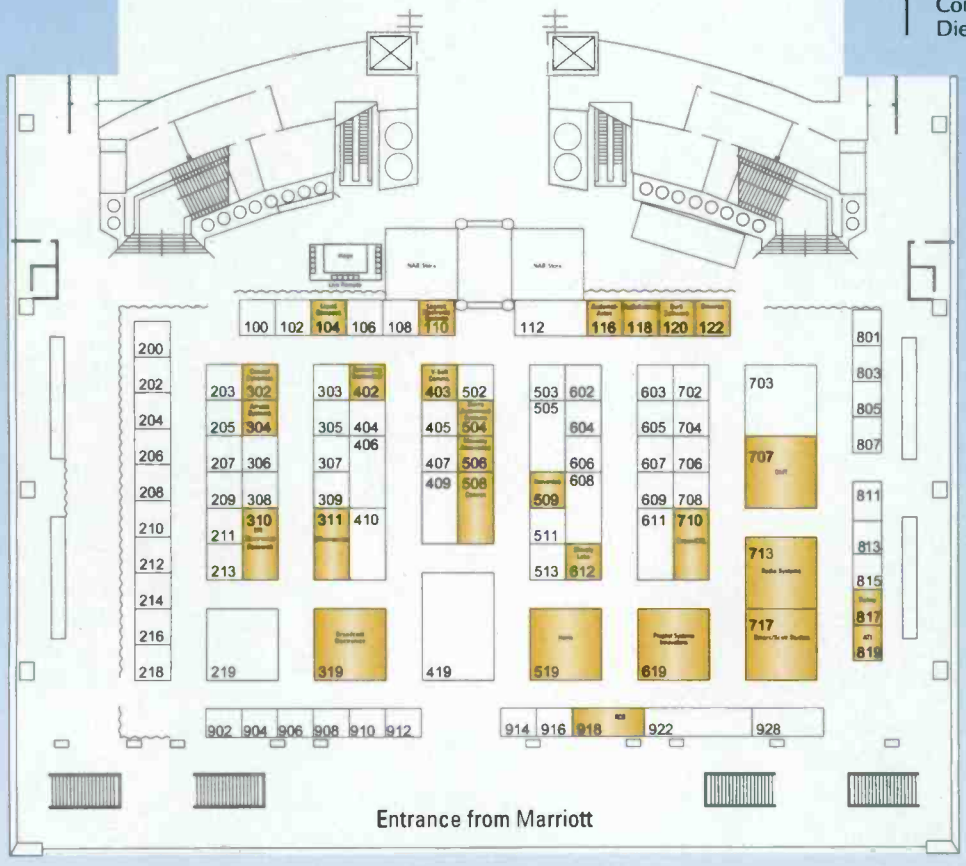
Ready for higher definition?

No matter what your audio processing challenges may be, Optimod-FM 8500 is ready when you are.

orban crl www.orban.com

The Radio Show
Hall Map





Issue advertisers are higlighted in red

The Radio Show Exhibitor List

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Wirecad	213
Wireready	916

Information current as of Aug. 23

The new Radio
Millenium Digit
has many pluse
+ even more mi

Pluses (+)
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on any input with
full simultaneous
analog and digital outputs

Minuses (-)
10 fully configurable
analog and digital
mix-minus outputs

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601 Heron Drive Logan Township, NJ 08085
phone: 856-467-8000 fax: 856-467-3044
www.radiosystems.com
or any Radio Systems dealer

Making the Final Cut

By Gary Eskow

Software- or hardware-based, KVM or controller, networked or stand-alone: today's digital audio workstations offer lots of choices.

Although many digital audio workstation manufacturers initially geared their product lines towards the music and audio for video markets, the relevance of this technology to radio production has become apparent. Many of the features that full-blown DAWs offer—midi implementation and the ability to import video files, for example—may not reference the needs of the radio marketplace. Other features, however, have become essential. In the fast-paced world of radio production, what do you need to know about DAWs, and how do you squeeze the most out of their assets?

At the typical radio station, people holding a variety of job titles will have input when it comes to creating a station's image spots and promos. Larger stations may have an imaging director (or several), whose full-time job is to direct and advance the identity of the station. Copywriters, producers and even the jocks themselves may be involved in the creation of a spot. How important is it that they become knowledgeable about how digital audio is recorded, manipulated and delivered?

Very important, according to Rob Chickering, engineering manager for Susquehanna Radio's Dallas stations. "Our production process takes place on multiple levels," said Chickering. "We need a DAW that can be tailored to the technical capabilities of different users."

After considering a variety of platforms, Chickering outfitted Susquehanna's Dallas stations with Nuendo workstations, which run on off-the-shelf Dell Precision computers. Also in line are RME Hammerfall 9652 I/O cards and Yamaha 01V96 consoles.

Like most radio production users, Chickering's staff typically produces spots with 30 or more tracks. Keeping track of multiple clips, and being able to label the routing structure within a DAW is critically important.

"I like the clarity of Nuendo's Audio Pool," said Chickering. The Nuendo also lets the user label routing assignments. Is this feature important to you? If so, make sure the DAW you're considering buying includes it.

Experience counts

If users with differing levels of experience with audio technology will be using your platform, purchase a DAW that can be understood by everyone, or tailored to suit the needs of a variety of operators. Using several of Nuendo's templates as starting points, Chickering

created skins designed to accommodate the skills of individual staff members, including several imaging directors who are more knowledgeable about audio technology than many others, and producers who can do more, including apply effects, tweak the equalization of individual tracks and normalize (adjust the output level for maximum impact) the final mix. Do you routinely incorporate audio material collected from outside sources? If so, working on a DAW that can import a variety of file formats, including AIFF, Broadcast WAV (BWF) and MP3, is vital.

All of the DAWs on the market can load a clip, scrub through it and non-destructively choose the bits wanted in the assembly of the final spot. Typically, the front end of all these software applications includes a transport section modeled on the controls of a tape recorder. Each one, however, has a different feel. Adobe's Audition, one of the most popular digital audio workstations among radio users, allows the user to load multiple tracks of audio, scrub and create clips from longer audio elements. The newest version of this application (1.5) includes a timeline that can stretch a clip to fit the exact requirement of a spot. Other applications include this feature as well. How do they handle this function—specifically, which alters the quality of a clip the least—and can you make a price and performance determination between them?

Adobe Audition 1.5 ships with more than 5,000 royalty-free loops, and this library could be a deal maker for the user who builds music beds. In addition to the full audio tracks, all of the loops come as elements as well. Start out with a bass line, add drums at the mid-point, save the screaming guitar for the outro, and you may be golden.

When DAWs (with Pro Tools at the forefront) began to eclipse traditional multi-track tape recorders and hardware consoles in recording studios, the generally accepted thought was that physical faders would never disappear. Producers were simply too much in love with the tactile pleasure of turning knobs and sliding faders up and down. As it turns out, however, many producers have adapted to the mouse. Although hardware controllers are popular with many users, they are not ubiquitous in recording studios and audio post suites.

Do you need a controller? Charlie Brown of Audion Labs says that almost all users who purchase Audion Labs' Voxpro DAW

also buy the company's control panel.

"Is it necessary?" asks Brown. "No. As a matter of fact, the help menu has a resizable, graphic of a computer keyboard with all the editing commands labeled, and rollovers describing the function the various icons represent. In some cases folks input commands only via the keyboard."

The 360 Systems Short Cut is a hardware-based, two-track system in a desktop package. The controller surface is the user interface. While there is a microprocessor and hard drive inside, it does not feel like a computer, which some users may like.

A dedicated controller is an available option for many systems.

Other manufacturers, such as Tascam, Roland and Korg produce hardware-based systems that include a mixer, recorder and some effects in one package.

Being connected

Does your station need to gang multiple DAWs into a network? If so, studying how different applications handle networking—or if they have this capability at all—is vital. Voxpro, for example, can export multiple files at one time to any DAW that sits on a LAN. Voxpro 4.0 also has an auto-import feature that scans a designated directory every 30 seconds. Any data that has been dropped into this directory—traffic and weather reports, for example—is automatically made available.

Do you need a DAW that supports Cart Chunk? Some systems don't support Cart Chunk, but instead rely on their own proprietary chunk. By default, this application converts all incoming data to its own internal format (44.1kHz, 16-bit), but this setting can be disabled. Once again, how you handle multiple formats, on both the import and export side is critically important. More and more common, for example, is the delivery of voice over tracks as MP3 files directly from the talent's home studio. Only several years ago, the use of ISDN lines was considered the ultimate in futuristic transmission of this type of audio data. We'll leave the discussion of the degradation of the public's appreciation of audio quality caused by the introduction of the MP3 for another day, and focus on the practical reality: no local radio station wants to foot the bills associated with ISDN when MP3s can be recorded and delivered for almost no cost. Make sure your DAW can convert these files, or handle multiple file formats at one time, if you're working with MP3s.

Mirroring the production values that can be found on CDs and in videos, radio spots are becoming increasingly sophisticated. How

much effort do you want to put into applying effects to your audio tracks? Faster computers and remarkably affordable software effects have made it possible for almost any user to assemble the tools that can polish (or pound) your clips. Many software processors come in Direct X and VST formats—but not all. This last statement presupposes, of course, that you're working on a PC and not a Mac. If you're in love with a particular effect, but it only ships as a VST plug-in, don't assume that your DAW can use it.

Although hardware work stations still have their champions, among them those who feel that they are more crash resistant than software DAWs running on standard computers, the trend clearly favors the technology profiled in this piece. Simply purchasing a set of disks and installing them on your computer is not enough, however. If you're considering bringing audio production in house, you'll need to ask the kinds of questions we've covered in this article, and make an educated decision when it's time to plunk down your boss's hard-earned bucks.

Eskow is a freelance technology writer in New Jersey, and contributing editor to Radio *magazine's sister publication* Mix *magazine.*

Resource Guide

A sample of manufacturers of DAWs and accessories.

360 Systems
818-991-0360
www.360systems.com

Acoustica
559-692-2224
www.acoustica.com

Adobe Systems
800-833-6687
www.adobe.com

Audion Laboratories
206-842-5202
www.audionlabs.com

Bias
800-775-2427
www.bias-inc.com

Digidesign
800-333-2137
www.digidesign.com

Digigram
703-875-9100
www.digigram.com

Digital Audio Research
+44 1707 665000
www.dar.uk.com

Digital Juke Box
740-282-SOFT
www.digitaljukebox.com

Korg
631-390-6500
www.korg.com

Mackie
800-898-3211
www.mackie.com

Merging Technologies
858-675-9703
www.merging.com

Netia Digital Audio
866-638-4222
www.netia.net

Otari
800-877-0577
www.otari.com

Roland
800-542-2307
www.rolandus.com

Sadie
615-327-1140
www.sadie.com

SAW Studio
...
www.sawstudio.com

Sonic Desktop Software
800-454-1900
www.smartsound.com

Sonic Solutions
800-225-1656
www.sonic.com

Sony Electronics
800-686-SONY
www.sony.com/proaudio

Steinberg
818-993-4161
www.us.steinberg.net

Studer
818-920-3212
www.studer.ch

Tascam/Teac Professional
323-726-0303
www.tascam.com

TC Electronic
818-665-4900
www.tcelectronic.com

Waves
865-546-6115
www.waves.com

Yamaha
714-522-9000
www.yamaha.com/proaudio

Resource Guide Special

Manufacturers of sound cards and computer audio interfaces.

Antex Electronics
800-338-4231
www.antex.com

Audio Science
302-324-5333
www.audioscience.com

Axia Audio
216-241-7225
www.axiaaudio.com

Creative Labs
800-998-1000
www.americas.creative.com

Digigram
703-875-9100
www.digigram.com

Digital Audio Labs
612-559-9098
www.digitalaudio.com

Edirol
360-594-4273
www.edirol.com

Lynx Studio Technology
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www.lynxstudio.com

Sydec Audio Engineering
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Jay Goldman, Technical Director
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FACILITY SHOWCASE

WXPN procures a place in Philly

From Victorian mansion to contemporary construction

By Jay Goldman

After operating for more than 30 years out of a Victorian mansion built in 1875, WXPN, the radio station of the University of Pennsylvania, moved into a new, custom-built facility in September 2004. After searching for the right location and building for more than three years, Vinnie Curren, then the general manager of WXPN, located the Hajoca Building. Located between the edge of the University of Pennsylvania campus and center city Philadelphia, this building appeared to be the ideal spot for the radio station as well as for World Café Live, a for-profit performance venue and restaurant that attracts musical performances and artists often heard on WXPN's AAA format.

The performance venues, an upstairs café that seats about 100 and World Café Live Downstairs, which seats about 300 in dinner-theater style or in a 700-seat theater, are both wired into the radio station's technical operations center, allowing live concerts on the air or for multi-track recording for later broadcast. This building also gives us the space to combine our on-air and production facilities with our business office, membership and underwriting departments, which had been operating out of another building several blocks away.

The concept of the partnership between WXPN and World Café Live was the brainchild of Hal Real, president of Real Entertainment. He approached Curren about six years ago with the idea.

Old location

New location

Finding a home

Several locations were considered before deciding on the Hajoca building, a former plumbing warehouse that had been gutted, leaving a 100' x 200' shell. The building was stripped to the bare walls, including excavating the floor, and then rebuilt from the ground up. The WXPN studios occupy half of the lower level, making soundproofing easier, because the studio concrete floor is poured right on ground level. The concrete slab is cut between studio walls to eliminate transmission of vibration and all the studio walls are double or triple thick. The performance studio has a floating floor and is totally a room-in-a-room.

One of the challenges faced during the construction was providing enough sound isolation between the north wall of the performance studio and the mechanical

room housing the air-handling units for the entire building on the other side of the wall. With a triple-thick block wall and spring/shock mounted air-handling units, there are no noise transmission problems.

Another challenge arose when it came time to relocate our NPR satellite dish. Although the roof of the building gave us a perfect, unobstructed view of the southern sky, the trussed roof construction did not allow for the weight and wind load requirements of a 3.8 meter C-band dish. There wasn't any place to mount the dish on the ground next to the building, so we decided to place it on the roof of the University of Pennsylvania Skating Rink across the street, and connect to the studio using Force Fiber L-Band-to-fiber converters and fiber optic cable run under the street.

The control rooms have similar layouts. This is control room B.

The news studio looks into the control rooms and serves as an interview space as well.

The action plan

I designed the radio station facility using the Radio Systems CAT-5 Studio Hub wiring system. This allows flexibility for configuring signal routing, as well as routing audio to the offices upstairs using the Ethernet infrastructure already in place. The console and routing system is a Logitek engine and worksurface system. We

Maia Sharp performs with her band in the performance studio.

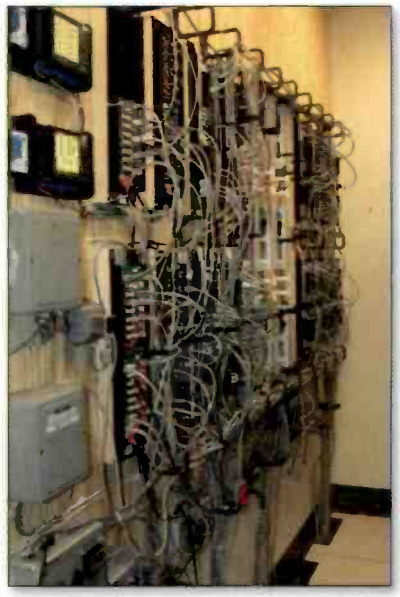
The technical operations center houses six racks.

already had one Logitek Roc-10 worksurface and engine, which we installed when we upgraded the on-air control room in the old building in 2002. I expanded on this system and now we have four DJ-style control rooms, three using Numix worksurfaces and one using the Roc-10 worksurface brought over from the old facility, one news studio and control room using a Remora 4 worksurface and one 200 square-foot, bare-bones studio used for small groups that play live on the air.

There is also a 900 square-foot performance studio and an accompanying multitrack control room. Multitrack mixing is possible with a Yamaha PM1-D digital multitrack console, as well as a Yamaha O2R brought over from the old building. Multitrack sessions are recorded to Tascam MX2424 hard drive recorders with backups to DVD.

The technical operation center has six equipment racks, housing our RCS automation system, several file servers, a Logitek engine that serves as a central router, our TFT 911 EAS system, NPR demods, RF distribution equipment, master clock system, the I/O and central processing for the Yamaha PM-1D mixing desk, as well as a Rariton Paragon 16 port KVM/monitor workstation and QC equipment, including a Dorrough audio test set and an off-air receiver. The technical operations center (TOC) also houses our Ethernet router and patching and Nortel digital telephone KSU. The telephone system is wired with all ports on RJ45 patch panels, which makes moving telephones from one location to another extremely easy, without having to move wires on punch blocks.

The studio installation was turn-keyed by Radio Systems, who handled all the equipment ordering and delivery, system design and documentation as well as installation, testing and training. The studio furniture was designed and installed by Studio Technology.



Studiohub was used for all the equipment interconnections.

We kept our existing Harris CD Link 950MHz STL, which is on the roof of a 26-story student residence next door to our old building and shoots to our tower, which is about five miles away. After trying unsuccessfully to use 5.8GHz spread spectrum microwave to make the one-mile jump from the new building, we settled on a fiber-optic link, using Fibox equipment. The microwave path we were attempting looked good, but there was too much RFI getting across campus. We also have a transmitter in Harrisburg, PA, which is fed by T-1, using a Musicam Prima LT and Adtran terminal adapter.

All the equipment racks in the TOC and critical on-air equipment have local UPSs and we have a 75kVA diesel generator and automatic transfer switch, which powers the studio complex as well as a 1.5-ton backup air conditioning unit that cools TOC

and the on-air control room. We gave it a real world test last month when an underground power cable failed and the building lost power at about 4 a.m. The generator took over and kept us on the air for about six hours until power was restored.

After being in the new facility for 11 months now, I don't think I would do much differently. We've already produced many world-class recordings from our performance space. Workflow is far better than ever before and the bands that come to our studio no longer have to carry their equipment up three flights of stairs.

Goldman is chief engineer of WXPN, Philadelphia.

Equipment list

On Air

Air Corp 500PH
Denon DN961FA CD
Electro-Voice RE-20
Enberg BA12 system
Logitek Audio Engines with Numix, ROC-10 and Remora 4 worksurfaces
Radio Systems CT2002 system w/GPS
Raritan Paragon
RCS Master Control v15
Studio Hub
Studio Technology custom cabinets
Tannoy Reveal
Telos One + One, One x Six, Zephyr Xstream
TFT 911

Recording Studio

Countryman Type 85 direct boxes
Dell Poweredge 2650 & 4400
Furman HDS16
Genelec 1031, Genelec 8030a
HHB Burnit Plus
JBL EON15P
SAW32
Sony PCM R700
Syntrillium Cool Edit Pro
Tascam MX2424SE
Whirlwind 24-channel snake/splitter
Yamaha NS10, PM-1D, O2R

Processors

Avalon AD 2022 mic preamp
Universal Audio 1176N
UREI LA4

Mics

AKG C414B, D112
Crown GLM100
Neumann KM 184, TLM 103
Sennheiser e604
Shure Beta 58, SM81

Focus

the technology behind WXPN

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Radio Systems StudioHub+

StudioHub+, the complete CAT-5 facility wiring solution from Radio Systems, is the wiring backbone chosen by the University of Pennsylvania's WXPN for its brand new full facility build-out.

Based on IT-standard CAT-5 cable, StudioHub+ simplifies facility wiring by converting the myriad of audio and remote control connectors into reliable, economical RJ-45 connectors. StudioHub+ also employs DC-Link, a phantom power system that is carried on every CAT-5 wire to power remote devices such as headphone and mic amps, intercom systems and router controllers.

StudioHub+ is the wiring solution for virtually every console digital delivery system, and source device in use today. For a true end-to-end plug-and-play wiring system, capable of carrying analog, digital, GPI or Ethernet signals, StudioHub+ is the time-saving, future-proof, innovative answer.

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RCS World Class Support

Your station is always just seconds away from a wide-awake technical support staffer at work, at their desk, ready to assist you every day of the year with Master Control™ studio automation, Selector® music scheduling, or any of our products. With 22 offices worldwide, the sun never sets on RCS support. On average, callers to support are on hold for 25 seconds or less, even on holidays. Master Control systems are personally installed by our highly-qualified, veteran radio engineers, then supported by dozens of experienced radio people with successful careers in radio engineering and/or programming, coupled with plenty of RCS product training to help you make your station sound as unique as you want it to be.

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Radio Systems CT-2002

WXPN radio selected bright, big, accurate Radio Systems CT-2002 digital timers for all its new studios and control rooms. Not only do the displays synchronize via a roof-mounted GPS receiver for dead-on accuracy, but each unit also functions as a stand-alone clock, or up or down timer with infrared remote control.

- Simultaneous clock/up-timer on all models
- All units may function as a remote timer or clock display
- High Intensity 0.56" and 2.3" LED displays
- Thin, desktop, wall, rack-mount and 12" analog displays available
- Reliable, RF-immune RS-485 serial data interface
- GPS, SMPTE & OCXO reference options
- Local & parallel remote control
- I/R remote control for down timing and special programming set-up

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In tune with Detuning

By Joe L. Bellis, CPBE

With the proliferation of new tower construction, AM stations need to take a proactive approach to eliminating sources of reradiaton.

As the cellular and wireless business has matured, the tower construction fervor has subsided. Where construction of an average of one to two hundred towers per month was common for several years, new construction of only a few towers per year is now typical for most cellular operators. Additionally, many of the start-up cellular companies have been consolidated into a few major carriers. The current construction phase consists of repairs or modifications to the existing sites and construction of fill-in sites.

This is great news for AM broadcasters because that the constant barrage of new towers that affected a station's coverage is over. Or is it?

As the existing cellular tower systems and sites age, the installed detuning systems lose their effectiveness. The cellular operators have engineers and technicians well versed in cellular systems but, in general, they have no concept of AM system operation. To the cell operator, there are no indications that the detuning system is no longer work properly.

I randomly selected inspections of 118 detuned sites around the United States that are owned or leased by various cellular licensees or tower owners. The inspections were completed within the past six years. The detuning systems were manufactured by several reputable companies that provide such equipment. The age of the installed detuning systems ranged from two years to 12 years.

In each case, the site was inspected as a result of modifications to the tower or as a result of another carrier being collocated on the tower, except in eight cases that were prompted by complaints from a radio station affected by the site.

The statistics

Only 25 percent (30 sites) of the inspected sites were found to be in compliance and appropriately detuned. Seventy-five percent (88 sites) of the inspected systems were found to be defective due to mechanical modifications and problems of the tower site or the detuning systems were simply out of adjustment. Thirty-four percent (40 sites) had defective network components or were found to be using components that were beyond the tuning range needed for that system to be properly detuned. Three percent (four sites) were found to be improperly installed so that they had never functioned as a detuning system.

In almost all cases, the wireless licensees and or tower owners believed they were in compliance and properly detuned simply because the sites had a detuning apparatus.

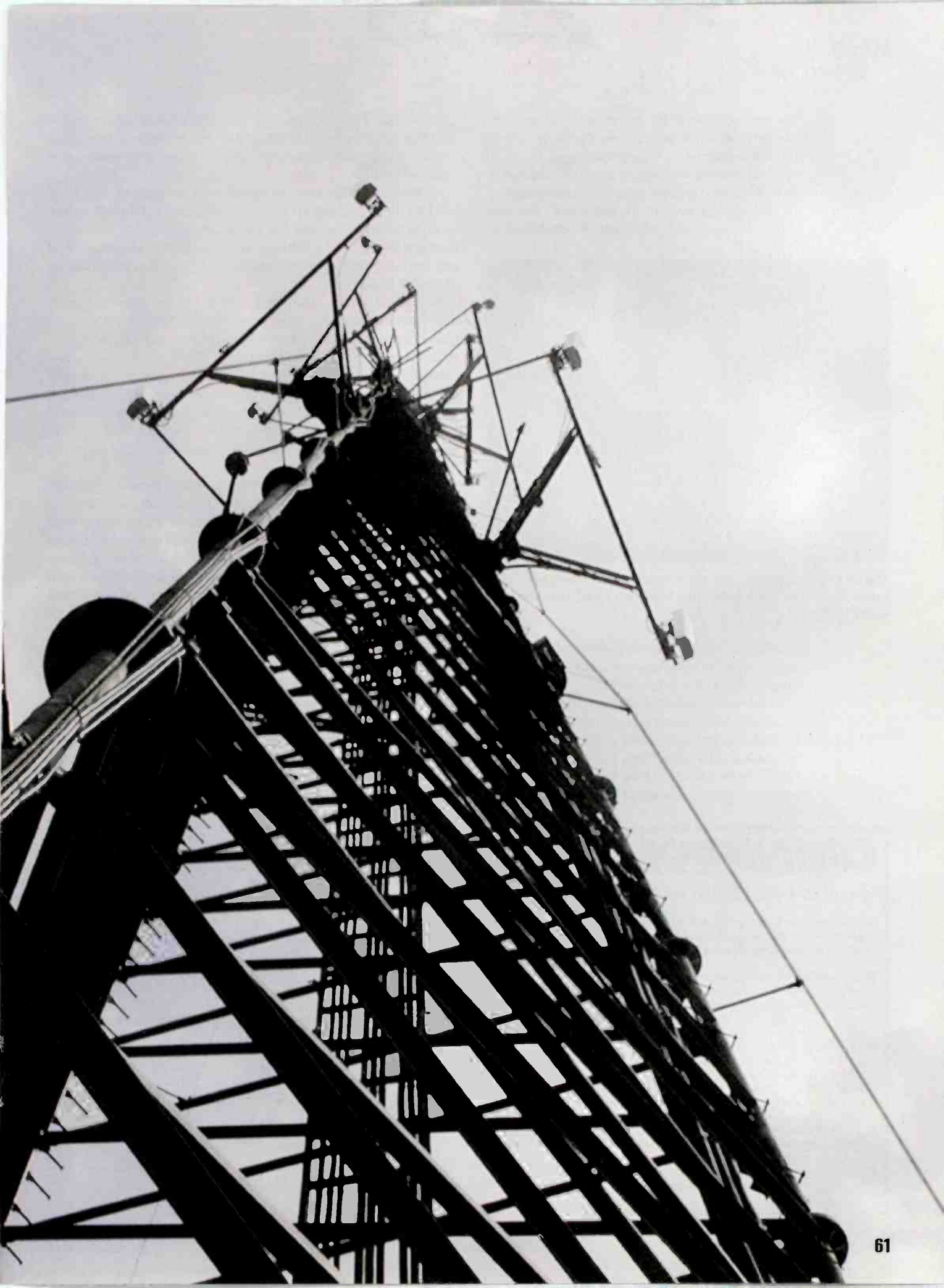
Even more amazing, only eight (6.8 percent) sites were inspected because of radio station complaints. Yet, in about 50 percent of the inspected sites, the stations' signals were seriously affected.

Governing FCC rules

The FCC Media Bureau and its predecessor branches have historically afforded considerable protections to the coverage patterns of standard broadcast licensees. The FCC created a detailed procedure for broadcasters to follow concerning interference and pattern distortions caused by additional licensed structures within 0.8km of a non-directional licensee or within 3.2km of a directional licensee in 73.1692 and frequently invoked that rule with construction permits. The rule requires impedance measurements of the affected antenna system and partial proof of performance antenna measurements as set forth in 73.154, and detailed antenna proof measurements for the non-directional antennas. The measurements are required to be filed with the FCC either prior to or simultaneously with the permittee's application for station license.

Unfortunately for AM broadcasters, other bureaus of the FCC were not so concerned.

As cellular towers began to proliferate, the interference to broadcast antenna systems became apparent. AM broadcasters sought redress from the FCC. Following complaints, the FCC issued several opinions



concerning sites and the related applications from specific complaints, but no particular rule governed all common carrier and wireless licensees. The wireless and cellular licensees continued to build towers for their systems without regard for interference to the AM broadcast systems. Finally, the FCC Common Carrier Branch (now the Wireless Telecommunications Bureau) codified the opinions into 22.371. This rule, or a form of it, has now been incorporated into virtually every branch of the FCC.

The fold wires and feed ring are shorted to this monopole tower. Typical for monopole towers, this occurred after the tower settled.

The rule states the Public Mobile Service licensee is responsible for "measures to correct disturbance of the AM station antenna pattern which [sic] causes operation outside of the radiation parameters specified by the FCC for the AM station, if the disturbance occurred as a result of the construction or modification."

It states that if the construction or modification is located within 1km of a non-directional AM station or within 3km of a directional AM station, the station must be notified prior to the construction and modification.

It further states that "measurements must be made to determine whether the construction or modification affected the AM station antenna pattern" and that the Public Mobile Service licensee is responsible for the installation and continued maintenance of any detuning apparatus necessary to restore proper performance of the AM station array.

Much to the dismay of AM broadcasters, the rule does not specify definitive measurement procedures as in 73.1692. However, it requires measurements to prove the disturbance does not affect the station beyond the station's control.

Of greater interest to the AM broadcaster, the rule does not specify grandfathering of existing sites prior to the rulemaking. Thus, all wireless sites are covered under the rule. The obvious exception is the case when the AM antenna system is constructed after the wireless site installation. Then the burden of detuning falls on the AM broadcaster.

FCC rule 73.1692 requires the broadcaster to show the antenna system operating within its licensed parameters regardless of the affect of the construction or modifications. It is concerned with operating parameter deviations and variances to licensed values prior to and following the construction/modifications and requires the licensee or permittee to correct the antenna system faults and variations accordingly, whether the faults or variations are caused by the construction and modifications or not.

The wireless rule, 22.371, is only concerned that the affect of the construction and modifications will not adversely affect the station's coverage and operating parameters. It is not concerned that the station is operating at variance or deviation, except when the variance or deviation is caused by the construction and modifications.

Detuning in broadcasting

Historically in broadcast applications, detuning was simply the process of sectionalizing the reradiator into smaller segments that were inefficient radiators. This technique is readily seen in

insulated guy wires. A guy wire has insulators at the tower attachment point and at the guy anchor point. Additional insulators are inserted along the guy wire at intervals of 0.10 wavelength or less of the station frequency so that the guy wires are inefficient radiators. Any remaining residual reradiation is considered inconsequential.

Series-fed towers in arrays typically float as an open circuit across the base insulator. In some cases, parallel resonant networks are used across the base insulator to enhance the isolation and further reduce residual current flow across the open circuit. This technique effectively sectionalizes the tower from the rest of the antenna system.

In addition to settling, regular tower wear, such as this broken stand-off insulator and loose safety cable, can affect the performance of a detuning system.

When a tower needs to be broken into smaller sections and insulators are too expensive or mechanically unstable, a cage assembly is used. The cage assembly consists of three or more fold wires that are equally spaced around the tower. The fold wires are attached to the tower at the top of the cage assembly and run parallel to the tower with appropriate insulators. They are then joined together at the desired point of sectionalization, remaining insulated, to form an open circuit. The fold wires are nominally set to be 0.15 to 0.20 wavelength long. The fold wires may be made that length physically or electrically, by the use of shorting stubs to the tower at the desired length.

A network that provides a variable capacitance is attached between the open end of the cage assembly and the tower. It is adjusted to electrically lengthen the fold wires to an exact quarter-wavelength, creating a high impedance point at the open end. Generally, a sample loop is placed near the impedance point on the tower to adjust the variable capacitor and verify that the current is minimized. The cage assembly and the tower form a transmission line.

In some cases, sectionalization is used on towers that are too tall to be an efficient radiator at the AM frequency. The objective is to sectionalize the tower so that the main excited portion of the tower becomes an efficient radiator. Cage assemblies are generally employed for this purpose. Often the consultant will place another engineer at a particular distance, usually one mile from the antenna, with a field strength meter and a

wavelength long that is grounded.

Grounded, one-quarter wavelength structures and ungrounded one-half wavelength structures have the greatest potential as reradiators. Fortunately, few structures of one-half wavelength or taller are ungrounded. Generally, the majority of the reradiators that require detuning will be grounded structures that have heights that fall between one-eighth wavelength and one-half wavelength tall.

Distant detuning

With sectionalization, the objective is to impede or stop the current flow along a single conductor that is generally fed from one source at a point along the structure. Sectionalization effectively creates an open circuit to that current flow along the structure.

In detuning, the objective is to cancel the resultant field of the induced current within a particular structure. To develop the equal and opposing fields within the structure and detuning section the current must be maintained. This is readily accomplished because the structure is excited along its entire length, as if there were a series of generators or signal sources at every point along the structure.

The cage assembly is used in a similar manner as in the sectionalization process with the cage assembly wires forming parallel conductors to the structure.

This radio station has a row of nearby detuned wireless towers. With regular maintenance to the detuning networks, this directional array remains stable.

The detuning section forms a closed-loop circuit.

The current is induced into the structure, flows across the cage assembly attachment point and down the cage assembly to a network returning to the structure. The network adjusts the current to a point that the field of the cage assembly is equal in magnitude to the field of the structure thereby canceling the fields. The fields are about 180 degrees out of phase with each other because of the mechanical configuration of the structure to the cage assembly being equally spaced and parallel to the structure.

The similarity between the sectionalization process and the detuning process make them appear identical, but they are not. The subtle difference is more apparent when viewed out-of-the-box.

Sectionalization is effective when used over a low-loss ground system with systems generally fed from a single current source. The sectionalization presents a high impedance point to the unwanted signal. The detuning process has no effective ground return (only lossey earth), is fed along its entire length and must maintain the induced current to cancel the resultant fields.

As the detuning system is adjusted to the point of sectionalization, the earth losses are removed. The incident source signal excites the structure and the cage wires in phase because the source is much greater than the opposing fields. The resultant reradiated field increases. As the system is further adjusted, the magnitude of the opposing field in the cage wires approaches the magnitude of the field of the structure and the resultant reradiated field is cancelled.

Measuring detuning system effectiveness

An antenna partial proof does not prove the effectiveness of a detuning system. The antenna partial proof only proves the instant antenna pattern compared to the last known pattern analysis, either by full proof or partial proof, and is dependent on the instant operating parameters of the station and other environments beyond the control of the station.

If the reradiating structure is constructed in the immediate near field of the antenna system, the operating parameters will change because of the mutual coupling between the structure and the elements of the antenna

system. As the reradiating structure is appropriately detuned, the mutual coupling will be eliminated and the operating parameters will return to their pre-construction values. Adjustments to the array, due to the influence of the reradiating structure, generally are not required. Sectionalization in this case is not appropriate detuning. The residual reradiation level of the sectionalized structure will require some adjustment to the array, which changes the operating parameters.

If the reradiating structure is beyond the immediate near field of the station and if a proof radial lies through or nearly through the reradiating structure site, the radial measurements may or may not reflect the localized influence of the reradiator. This ambiguity occurs because the reradiated signal is vectorally added to the ambient signal.

While similar to partial-proof measurements, proof-type measurements made immediately prior to and immediately following the construction and detuning of a structure serve only to indicate the distortion or deviation effect, if any, caused by the reradiation level of the detuned structure. These measurements provide a baseline and a comparison for pre- and post-analysis and do not reflect the actual station pattern condition. Any similarity of these measurements to the actual partial proof measurements of the station for pattern analysis is purely coincidental.

Near-field measurements

Appropriately made near-field measurements at the base of the reradiating structure accurately gauge the reradiation from the structure relative to the ambient field intensity of the station being protected.

The measurement points required to implement this approach are laid out along a line beginning at the center of the structure and proceeding outward at a bearing of 90° from the structure to the center array coordinates of the radio station. This quadrature radial generally extends outward to a distance of 200' to 300' from the center of the structure. Marks are made at regular intervals beginning as close to the structure as possible and offset corrections are made to ensure that each point is at a 90° vector between the structure and the station. The field intensity meter is placed over each point. The meter is aligned directly on the structure and a reading of the reradiated signal is taken. The meter is turned 90° and a reading of the incident field from the station is taken. Measurements are made at each point along the quadrature radial in the non-detuned mode and the detuned mode. The data is corrected for near-field effects, tabulated and graphed. Thus, the structure reradiation and the detuned reradiation are accurately determined. The detuned reradiation level is directly compared to the minimum signal level of the array to determine the affect to the station. The effectiveness of the detuning system is the calculated difference between the structure reradiation level and the detuned reradiation level expressed in decibels.

A monitor point along the quadrature radial will serve as a valid means to determine the operational condition of the detuning system in the same manner that a monitor point for the station array.

This two-tower array measured considerable variations in its field reading tests.

Joe Bellis, PhD, was the owner/president of RMF Associates, Cape Girardeau, MO, when he prepared this article. He died July 29, 2005. He was a member of the SBE, the IEEE and the NARTE. In his career, Bellis authored many articles and papers on RF transmission, radio and electronic colling systems and radio propagation and communications in desert environments.

The 1st annual

2004 Radio Innovative Product Reader's Choice AWARD

WINNER

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

Manufacturers submitted products in several categories, and the winners were selected through an online form by you, the *Radio* magazine reader. The results were tallied at the end of February, and the winners were presented with their awards at NAB2005. Over the next few months, we will profile each of these winning products.

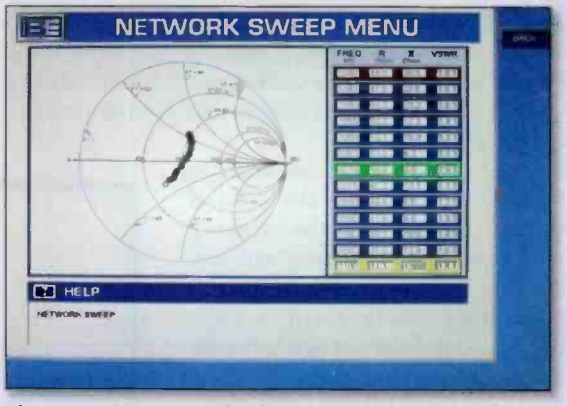
The 2005 Innovative Product Award entries will be listed in the *Radio* magazine 2006 Buyers Guide, which will be released in December.

Transmission

Broadcast Electronics 4MX 50

This 50kW transmitter is based on a patent-pending modulation design and is about half the size of models of comparable power levels. The transmitter is IBOC and DRM compatible. The PA modules can be accessed from the front of the transmitter, while lift-off rear panels provide access to power supplies and all ac connections. The 32 power amp modules each have their own power supply. The power level can be adjusted from 250W to 55kW.

The 4M Modulation used in the transmitter is a modulation design incorporating zero-voltage switching and modulated RF duty cycle providing a typical efficiency of 88 percent. There are other differences between the 4MX design and traditional designs.



The operating screen displays a control menu and provides several diagnostic tools.

In 4M Modulation, the amplitude of the filtered output carrier is determined by calculating the coefficient of the first term of the Fourier expansion of the waveform presented to the combiner transformer. This is different from the waveform produced by filtering a PWM signal, where the amplitude of the filtered-output carrier is a linear function.

In a PWM transmitter, the modulator uses a duty-cycle modulated waveform to create a dc voltage proportional to the audio input signal. This audio-modulated dc is then sent to the PA to product the final AM signal. In a digital transmitter, each PA is turned on and off to produce amplitude modulation. Many PAs are required for modulation. In a 4MX transmitter, the duty cycle of the RF waveform is modulated directly, without the use of a modulator and only requires one PA to produce modulation.

■

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

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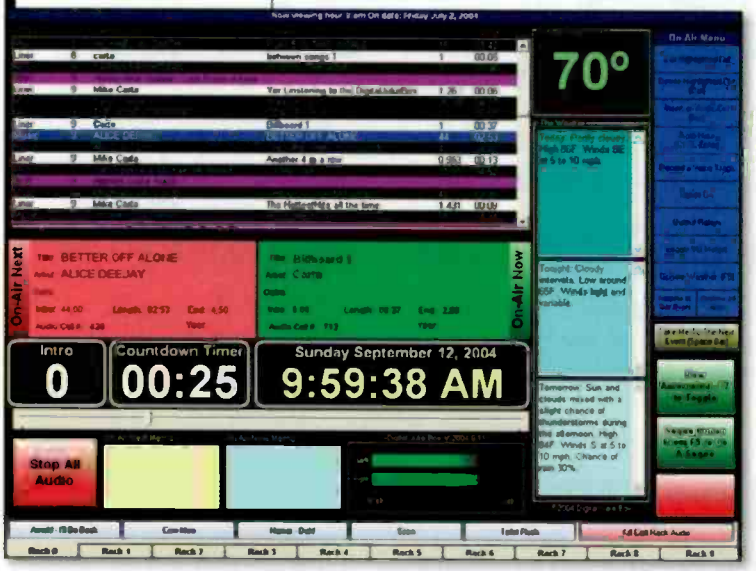
Genuine APHEX

Digital Juke Box

By C.C. Singer

When choosing an automation system for a radio station, you consider several factors. At the top of most programmers' and engineers' lists, you'll find ease of use and reliability. After all, in this line of work you never know when you will need to train someone new on the software and equipment, and the term "automation" can make some program directors cringe at the thought of a software malfunction resulting in a less-than-perfect output of events.



Performance at a glance

Simple installation
Free offsite data backup
20,000 audio cuts database
Imports MP2, MP3, WAV or OGG

As with all software programs, this automation system when first released had issues that needed to be resolved and updates to be installed. I have spent the past nine months using this system and am satisfied with the results of the most recent version available.

We have the Digital Juke Box installed on one on-air system and two production systems. In most instances, I can update all three via the Internet in less than three minutes.

The software can be installed from the website or CD-ROM in minutes. When the Digital Juke Box is first loaded, a 30-day demo screen appears. During this period, the program operates the same as a fully functional unlocked program.

I recommend that users have an Internet connection to take advantage of the power-up screens and Internet shortcut buttons, which provide a number of conveniences to the user including maintaining an offsite data backup for free on the company's FTP server.

What's inside

The system features an audio cuts database where you can maintain as many as 20,000 audio cuts including music, commercial spots, liners, jingles and other audio cuts.

Each audio cut has an edit tab, which the properties of any audio cut to be edited, such as audio type, music, jingles, commercials and news. The software also allows any audio cut to be assigned a daypart by selecting the desired hours for weekdays, Saturdays and Sundays. Audio cuts can be searched by file number, category, artist or title.

The software can import audio cuts with MP2, MP3, WAV or OGG file extensions individually or in bulk into the audio cuts database. Each audio cut has variable introduction and ending settings, which allows for perfect voice tracking.

Voice tracking with the Digital Juke Box is a piece of cake with adjustable ducking level and ramp up time. When first introduced to the voice tracking function I was amazed. If all the intro times are correct, the simplicity of this option is astounding. Click a button to start recording, and if the minimum talk time instructions on the screen are followed, the perfect voice track is created. I had a few updates that required logs to be rescheduled for the voice track to operate properly again, but the tech support staff walked me through the process to resolve the issues.

When recording a voice track, an information box displays previous artist, next artist, approximate time the voice track will play, VU meters and a talk time tip that displays how many long the voice track should be for the perfect fit.

On the screen

The on-air screen displays the song playing now and the next event to air with a large, easy-to-read current time clock, countdown timer for the current event and an introduction countdown clock. Audio cuts are deleted and inserted with shortcut keys or the mouse.

Events are easily inserted or deleted from the production or on-air system, and the changes made take place immediately. The system can also provide data for song

burn or burn directly. After having been burned myself so many times before with other programs, I always selected the second option and it never failed. The status window showing the testing status and the burn status including the same against each track as it goes along, makes you fully aware of the whole process as it happens.

When ripping CDs, files can be copied and burned in several ways. Files can be saved as MP3, OGG, WAV or WMA. The percentage status for tracks ripped is indicated against each track as it progresses. At the bottom of the window is the player feature that shows the track details and tack length.

Burning CDs was a breeze with the Acoustica, however there were some minor glitches I found that I couldn't find a way around. On most of my burns, I noticed a click sound between tracks. It was more pronounced when the tracks were separated by a few seconds. I tried increasing the silence between tracks and by manually increasing the trim start and trim end but without success. When you cross-fade the tracks the sound is less audible but it still exists. After an e-mail to the programmers, I was informed that Version 4 should not have this problem. I reloaded the program and still faced the same issue. Since then Acoustica has created a newer version, version 4.01, which is available for download on its website and should correct this problem.

Another issue I had with the rip section of the program was its inability to copy faded tracks correctly. It tended to get confused about where the track ended and where the next track started. When I tried to rip a CD that I had just burned using the fading features, the program lost its ability to duplicate the master. The program popped up messages informing me that the tracks may be incomplete and proceeded to hesitate where to begin and end.

Again, Acoustica said the newest version should not have this problem.

The string of awards the Acoustica MP3 CD burning is accumulating shows that the program is worth its price. It is easy to use, user-friendly, and you learn the features quickly the first time you use it and there is hardly any need to use the help menu, which only goes to prove the transparency and strength of the program.

I have now upgraded to a Dell P4 Dimension 4700 and have left all the standard burning software that came with the machine by the wayside. I will continue to use the Acoustica MP3 CD burning software until someone can come up with a program that would make recording my vinyl albums onto my now-forgotten Nakamichi three-head cassette deck seem like rocket science.

DeSouza is an audio freelancer and writer in Toronto.

Acoustica

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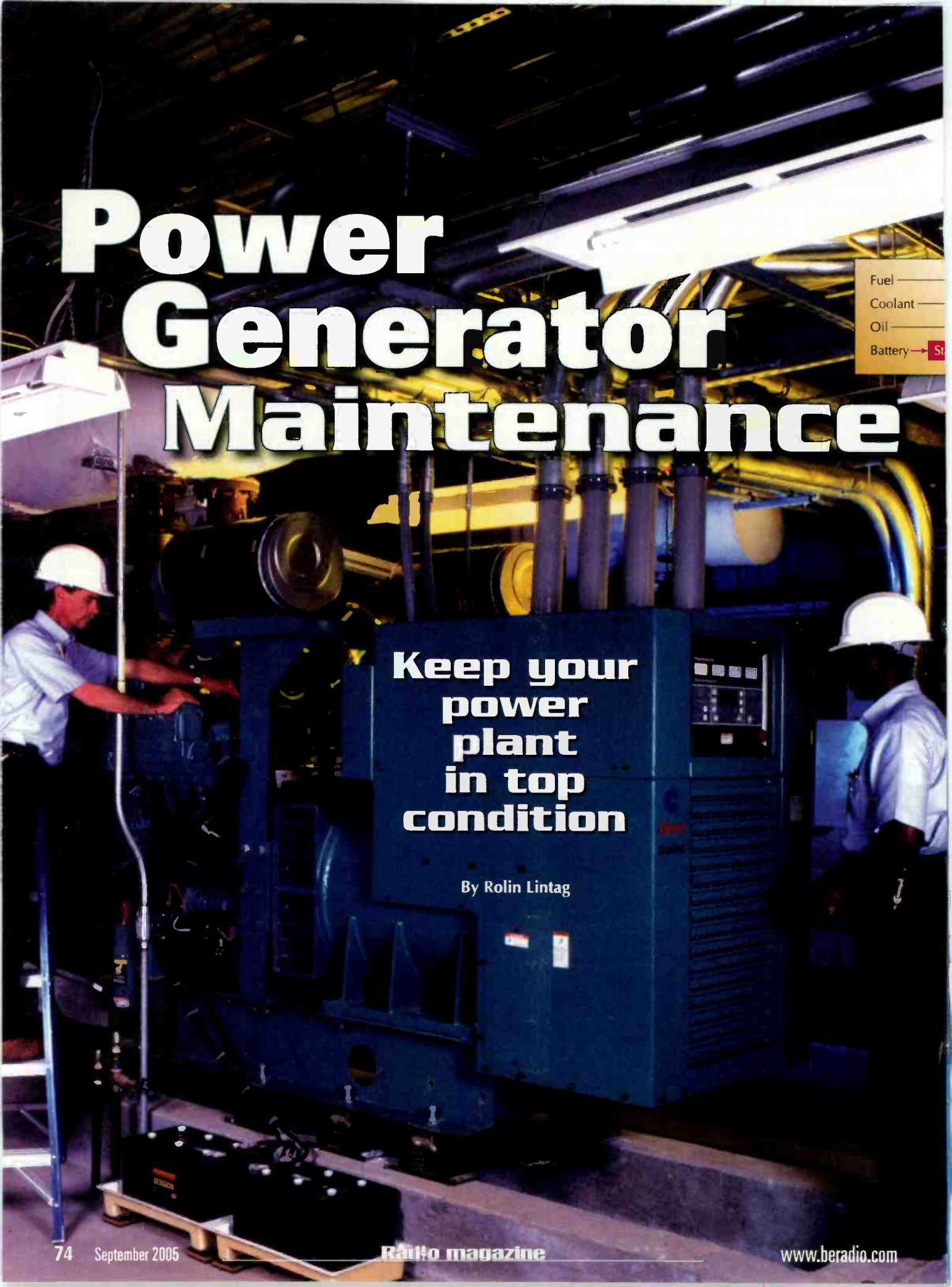
These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

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

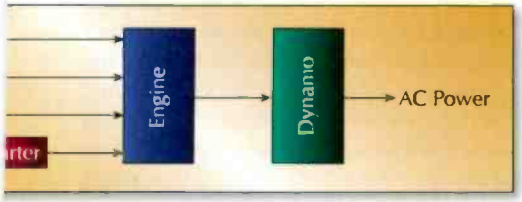


Power Generator Maintenance

Keep your power plant in top condition

By Rolin Lintag

The power generator (genset) used for broadcast facilities should be treated as an integral part of the broadcast system as far as maintenance is concerned. It is easy to take it for granted until the ac mains fail and the back-up power has failed to get the station back on the air. Implementing an effective preventive maintenance program on the genset system will prevent unpleasant surprises.



The basic elements of a generator.

A genset system can be divided into two major parts: the dynamo that produces the electricity and the engine that moves it.

A well-protected dynamo will rarely experience operational problems unless a catastrophic event burns the windings or loses one of the phases. Aside from monitoring the presence of all three phase voltages and current, there is not much on-site maintenance on the dynamo that can be done by station personnel.

The engine, however, is a machine that requires more attention on a regular basis. There are several parameters to be observed and prerequisites to be satisfied to ensure that the engine will operate as expected. Just like maintaining a car, there are basic checks that need to be done to ensure that it will start when called for and keep on running as needed.

Systems check

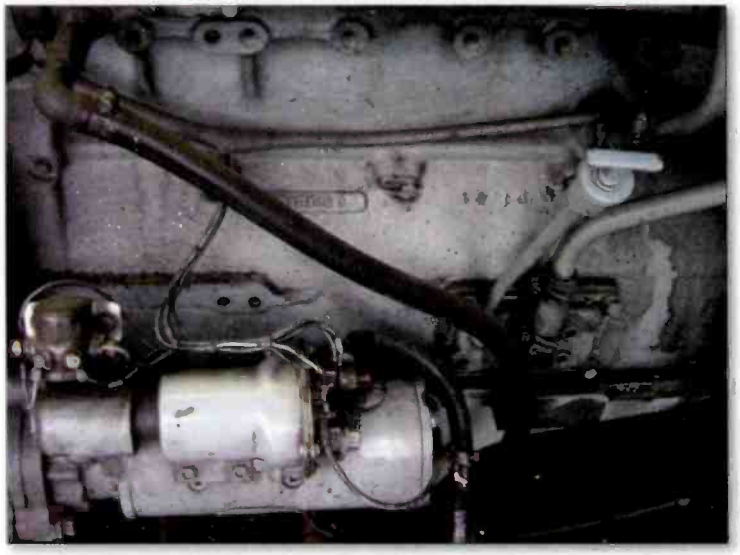
The engine requires proper and adequate cooling when in operation. Big engines, like those used to supply power to broadcast facilities, use air and water (glycol mixture) cooling. Adequate air should be present so as not to choke the genset while in operation. This means that air openings

The battery connections, electrolyte and charger are simple items to check.

Power Generator Maintenance

of the genset building are clear (louvers are open during operation) and that the air filter of the engine is not clogged. Installing an air-filter restriction indicator will facilitate inspection of the health of the air filter.

The water coolant, usually a mixture of automotive glycol and water, should be at the correct level prior to genset operation. Because it is usually hard to determine the coolant level without opening the pressure valve on top of the radiator, it is best to install a sight glass for a quick inspection. Also,



Check all hoses and connections for leaks and cracks.

ensure that the coolant being used has the right freezing point for the geographic location. Check the glycol freezing point before winter comes and act accordingly. Also check the water hoses for the radiator for cracks or loose connections due to the steam temperatures they must endure during operation. It is best to inspect these on a regular basis because steam leaks can deplete the radiator of its coolant after hours of operation.

Big engines require a starter motor to initiate operation. This starter motor requires the dc voltage supplied by the battery to run. Make sure that the battery can indeed make the starter motor run. This means that the proper battery should be in place and that it is regularly checked for its output voltage and ability to provide the required current. Take note that a battery may show the right voltage but its output is severely limited if there is a weak cell due to lack of electrolyte or damaged electrodes. A symptom of this is a drop in voltage under load. Similar symptoms will show also if the terminal connections are loose or corroded. Any checks performed on the battery should first determine if the terminal connections are intact and that the wires used are continuous. Check the battery charger as well to ensure that it is properly charging the battery. Although maintenance-free sealed batteries are best to use, the common lead acid batteries can do the job at a lesser price. Check the health and level of the electrolyte for lead acid types on a regular basis.

Check the fluids

The life of the engine can be severely shortened by lack of proper lubricating oil. Ensure that there is enough oil in the engine before operating it, taking note of the manufacturer's recommendations about oil and filter change and monitoring. This is one of the reasons why an hour meter is necessary to log the hours of operation of the engine. Properly reseat or reseal the cap of the oil dipstick after each inspection. This precaution prevents oil spillage during operation.

Make sure that the fuel filter is replaced according to manufacturer's recommendation. Inspect the fuel lines for leaks and employ qualified personnel to do repairs as needed. This is more critical natural gas is used. Checks for leaks can be as simple as spraying soap water on pipe connections and watching for bubbles from escaping gas. Ice shields protecting fuel pipes should also be inspected before winter comes. Off course, you want to make sure that fuel is replaced when needed so regular checks on the fuel tank capacity should form part of the inspections.

Suggested maintenance schedule

This suggested schedule serves as an example. The final schedule for your installation may vary, and it's a good idea to have the schedule reviewed by the genset manufacturer or dealer to include factors that are appropriate to your genset model, size and age of the unit.

An hour meter is useful to keep detailed records of genset maintenance.

Daily:

- Check fuel tank and record hour-meter reading. Refill fuel tank as needed.
- Inspect building interior for cleanliness and any oil spills. Clean or repair as needed.

Weekly

- Check the battery terminal connections for corrosion and looseness. Check for integrity of wire connections from the battery to the starter connections.
- Check the coolant level on the radiator. Refill as necessary.
- Check the engine oil for proper level and refill as necessary. Replace oil and filter as per manufacturer's recommendation.
- Check the fuel connections for leaks (for gas fuel). Get qualified personnel for immediate repair.
- Verify that the battery charger is working as expected.
- Test load operate the generator for preparedness. Record all front panel parameters. Verify that operation shows proper voltage regulation and frequency.

Monthly:

- Check battery voltage with a DMM and record readings.
- Check electrolyte level and specific gravity. Take appropriate action as needed (for lead-acid battery only).
- Check the air filter. Replace as necessary.
- Check water hoses for cracks or leaks and replace as necessary.

Annually:

- Load bank testing, compression and timing checks by qualified manufacturer's representative.

Lintag is an RF engineer for Victory Television Network in Little Rock, AR.

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Find the mic winner
July issue

Congratulations to

Eric Goldberg

of Clear Channel in Toledo/Defiance, OH.
His name was drawn from the correct entries for the July issue. He won the A-designs ATTY.

The mic icon was inside the lava lamp.

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Contributor Pro-file

Meet the professionals who write for Radio magazine.
This month: Field Report, page 70.

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Program Director, Chief Engineer
WQOS
Mount Pleasant, MI

Singer is a 20-year veteran of the live music profession as a lead guitarist and lead singer. He has held positions as a DJ, writer and producer and program director. Currently, he holds the titles of program director, chief engineer and all day on-air personality.

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Written by radio professionals
Written for radio professionals

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Sign Off

By Kari Taylor, associate editor

www.beradio.com

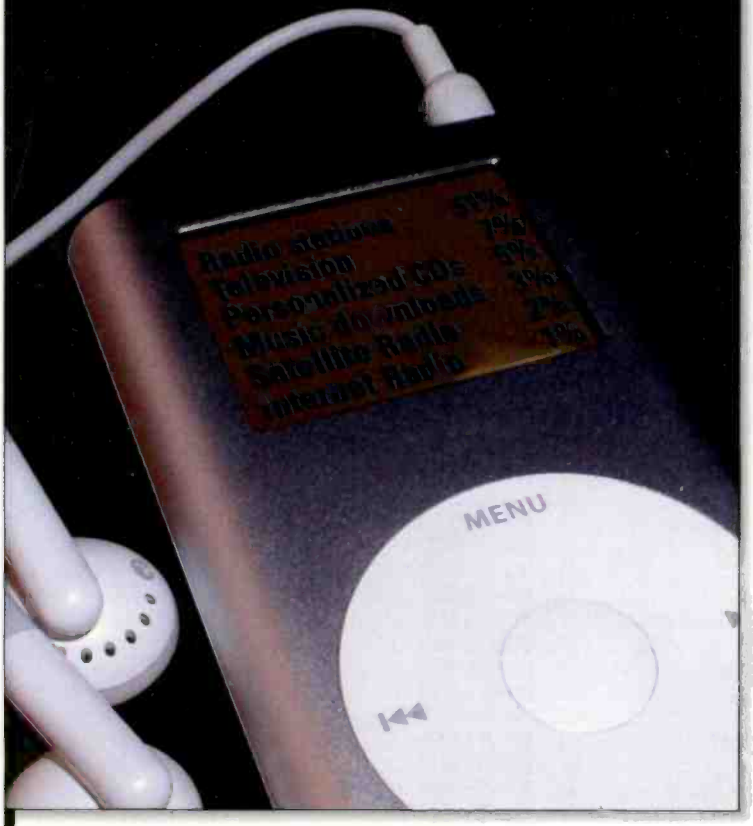
Do you remember?

The Pro-Deejay from Broadcast Equipment and Supply Co. was an in-studio or remote broadcast production system. For sale around 1974, the unit included two Russco three-speed 12" turntables with sync motors, two Shure M44-7 pickup cartridges, a Sennheiser HD-414 lightweight headphone, a Shure M67 mic mixer, a Shure M675 production master and more.

The M67 offered four low-impedance microphone inputs or three microphone and one 600Ω line inputs. The M67 also provided a built-in 1kHz tone oscillator. A cue and monitor amplifier was built-in on the M675. The M67 and M675 operated on 110Vac or a self-contained battery pack with automatic switchover in case of ac line failure.

Sample and Hold

What is your primary source for listening to music?



Source: Paragon Media Strategies, August 2005.
Numbers may not add up to 100% due to rounding.

That was then

This photo, taken by Station Engineer Bill Parker in 1952, is of the WHKC control room in Columbus, OH. Shown in the photo is a custom-built console by the United Broadcasting Company. The console featured five monitor amplifier outputs that were mounted separately in relay racks. Four program monitor speakers were mounted, just out of view in the photo, overhead in a cabinet. The nine control knobs across the top of the console are (from left to right) program master, channels one and two; monitor volume controls 1 through 5; and program master, channels three and four. Channel selection was possible by the push keys just above the faders. These faders were made by Tech Lab and were type BT214, bridged tee configuration with 600Ω in and out at 2dB per step. A microswitch was situated in the bottom of each fader and actuated as the knob was turned on to actuate the speaker mute and on-air lights.

Photo courtesy of John Harmer.

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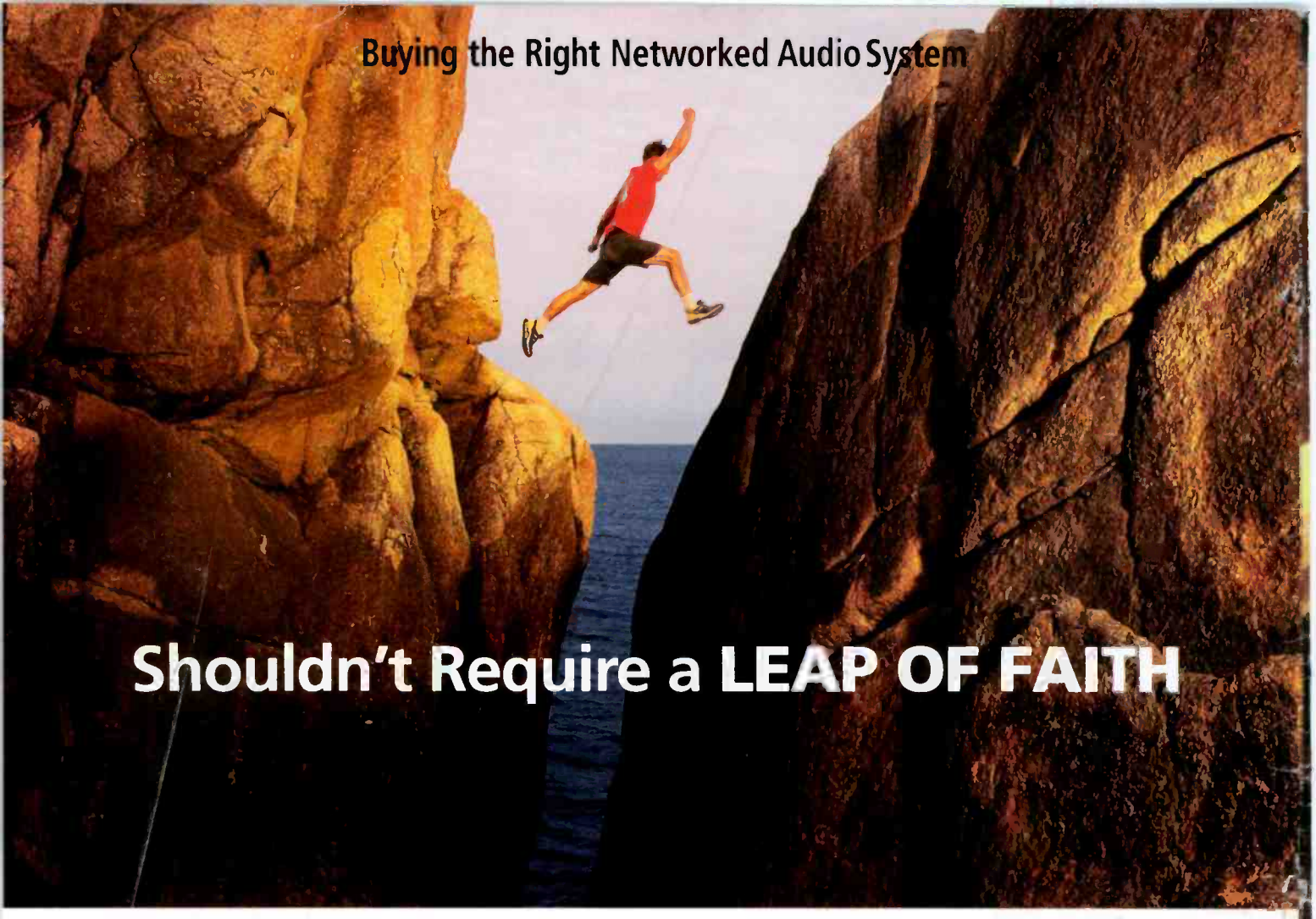

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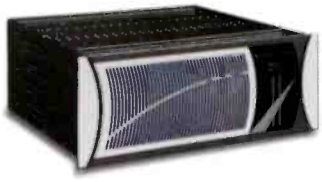

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