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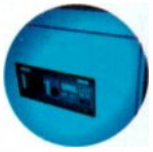

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ON THE COVER:
We look back on the biggest broadcast convention of the year and see the technology, new produts and top technology introductions.
Cover design by Michael J. Knust.

Tieline® TECHNOLOGY

Tieline G3 Vs Telos Xport...

You Decide.

Telos has recently published comparisons between their Xport POTS Codec and the Tieline Commander G1 Codec which has been obsolete since November 2004. Here is a comparison with the current Commander G3.

Tieline Commander G3 Vs Telos Xport

Feature	Tieline Commander G3	Telos Xport
POTS to POTS connection	Yes	No - POTS to ISDN only
POTS Audio Delay	100 Miliseconds	>600 Miliseconds
Maximum POTS Audio Quality	15kHz	15kHz
Low bit rate audio quality over POTS	7kHz as low as 9.6kbps	Telephone quality below 16kbps
15kHz Bi-directional Audio over POTS	Yes	No - 15kHz 1 way only
POTS Compatibility	Yes Comrex/Musicam	No
Intelligent Gain Control	IGC + AGC	AGC
Warranty	2 Years	1 Year
Expansion Ports	2	1
12 Volt DC portable power options	Yes	No
Simultanous duplex Comms and Talkbalk*	Yes	No
Remote Control Talent's audio Inputs	Yes	No
Stereo 15kHz over POTS*	Yes	No
Dual Mono 15khz POTS*	Yes	No
Bonded POTS* Up to 48kbps mono	Yes	No
Audio Over IP Codec to Codec*	Yes	No
Weight	4 lbs	7 lbs
Dimensions	8.5x8.5x2.9 Inches	9.25x12.75x3.5 inches
GSM 7.5kHz Wireless*	Yes	No
ISDN Options	Mono, Stereo, J-Stereo	Mono
ISDN Algorithms	Mpeg Layer 2, G.722, G.711, Tieline Music	AAC+, AAC LD, G.722
15kHz stereo/dual mono over 1 x 64K channel	Yes	No
User Remote Profiles	98	30
Configurable Macro Function Options	Hundreds	No
User configurable program/monitoring/comms	built in 11 x 6 cross point audio router*	No
Split Phones - Monitoring/Comms	Yes	No
List Price per pair **	**$5,750** (2x G3)	**$6,850** (Xport / Xstream)
Link Renegotiation	1 second	5-6 Seconds
Control Inputs and Outputs	2 in 2 out (Exp to 16 in/out)	3
Automatic Failover	Yes - to 15khz POTS 2	Yes - to analogue telephone

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** Refers to base MSRP without ISDN option for POTS Codecs and MSRP for Telos Xstream as of 4/1/2005. The Telos logo, Zephyr, Zephyr Xstream, Zephyr Xport are all registered trademarks of TLS Corporation. © 2004, aacPlus (TM) Coding Technologies. Comrex, Musicam and Telos and associated trademarks are property of their respective owners. Product specifications quoted from the manufacturer's manual listed on the website 5/11/2005 * Requires additional POTS, ISDN, GSM, IP modules for operation.

Currents Online

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

WUSN Chicago Begins Continuous HD Radio Multicast

WUSN-FM launched HD-2 "Chicago's Future Country" on May 12.

Amber Alerts via Cell Phone

Most carriers provide the service. Cell phone users can designate as many as five Zip codes to monitor.

Armstrong Broadcast Plans Continue

On June 11, the anniversary of the first public demonstration of FM radio will be commemorated on 42.8MHz in Alpine, NJ. It will be simulcast on WFDU-FM on 89.1MHz.

FCC Launches E-mail Consumer Information Registry

The expanded e-mail service will deliver customized information about the FCC's actions and related developments in telecommunications and other communications services.

NRSC Submits IBOC Standard to the FCC

On May 18, the NAB and CEA filed the NRSC-5 standard with the FCC.

APT Management Buys Out from SSL

Audio Processing Technology has secured significant equity and debt funding to complete a management buyout from its former owner, Solid State Logic.

Find the mic goes monthly!

Since 1998, *Radio* magazine has placed our mic icon on each cover of *Radio* magazine. At the end of the year we have held a sweepstakes asking you to find all of them and enter to win prizes.

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Site Features

Finding AM Ground Radials

The newest addition to the Engineer's Notebook are tips from two readers with methods for finding buried ground radials. Click on the Engineer's Notebook link under Site Features on the left.

Today in Radio History

Important dates that have shaped radio are available online. These dates are also listed on the the 2005 Radio Industry Calendar.

Currents Online Weekly E-mail

Get the *Radio* magazine headlines delivered to your e-mail box every Monday morning. Subscribe today for the latest radio technology headlines.

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Stay up to date with the source of digital audio broadcasting news and information. The coverage extends to DRM, satellite radio and more. Subscribe today.

The DAB Answer Series is Online

Each quarter, Insight to IBOC covers a specific aspect of digital audio broadcasting. The last installment was in the May issue. The complete content of each issue is available online as well.

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Have a little respect

Every so often a discussion among station engineers arises about the status of the station engineer compared to other station staff members. In many cases, a group laments that engineers are not treated with respect or shown the same level of professionalism that other station personnel see. The arguments are made that engineering is too often seen as a necessary evil by the manager, that engineering only shows expenses while other departments can show revenue, and that the station staff does not understand the importance of the engineering department.

I can agree that the arguments are valid, but unfortunately, the blame is too often placed on the station staff. The blame actually lies with the engineer himself.

The situation where the engineer feels more like a glorified janitor has not been improved by consolidation. The number of engineers at a station has remained the same at best, but more likely it has decreased while the number of stations for which the engineer is responsible has increased. A greater demand on an individual's time requires the task at hand to take a more direct focus. This often results in the engineer spending less time on the human element.

The demands of an engineer's job are different than any other department at the station. The hours can be irregular, and the responsibility ranges from highly technical to in-the-trenches physical.

In the end, respect is not given, it is earned. It is up to each person to earn the respect he deserves. How can you do this? Break the isolation barriers, both real and perceived. An easy first step is to learn to speak the language of the other departments. It's obvious that they won't speak ours. While clarity and accuracy are important, using unfamiliar terms will only lose the audience. Find the balance between too much technical information and not enough. Making the effort to clearly communicate will help.

Dress in the manner that you want to be treated. While it may not be practical for male engineers to wear ties and female engineers to wear dresses, business casual attire is common in most offices today. This lends itself well to the varied tasks of an engineer. While jeans and a t-shirt may be comfortable, a polo shirt and khakis are just as comfortable and look much nicer. When the day's tasks call for something more rugged, dress appropriately. If the staff becomes accustomed to you wearing business casual, they will likely treat you as an associate and not a handyman. They will also take note when you wear something more utilitarian. In this case, the added benefit is that you will be noticed, which fits well with my next point.

Make your accomplishments known. You may know this scenario:

You are hired at a station to fix the shortcomings of the previous engineer. As you repair the problems or replace the equipment, equipment reliability improves dramatically. After a year, the general manager lets you go because everything works so well. In six months—when breakdowns begin—the next engineer blames you for sabotage because of the failures.

The reality is that regular maintenance kept the equipment running. Once you left, that maintenance stopped. The manager let you go because he didn't think that you were needed, because he didn't realize what you did behind the scenes.

Tell the other managers what you are doing. You will need to find the balance between bragging and providing information, and you will need to find the balance between techno-babble and education.

If you are the chief engineer, become a part of the management team if you're not already. This will require some office time to provide reports and keep the staff informed, but the reward will be a greater respect from your peers, which is what you sought all along. Many radio groups have a reputation of treating their engineers well. If your employer does not, take steps to change that.

Chriss Scherer, editor
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Maximized data

By Kevin McNamara

In one respect, the consolidation of facilities we have witnessed over the past 10 years has empowered station engineers to implement some new technologies in a much quicker time frame than it would have otherwise. Consolidation created a need to implement technology; after all, wasn't this about "maximizing resources?" And what better business to leverage technology than one that could conceivably operate entirely over a common infrastructure? At the time, no one really understood all the benefits that would come from these new LAN-based applications and the protocols that were still in the early stages of development. Meanwhile, 802.11, VPN and VoIP were only discussion topics.

Even the smallest stations are able to leverage data technology in their facilities.

The concept of a local area network (LAN) has evolved from a means to share information and files within a single facility to connecting anywhere in the world. The basis of the Internet has been around since the 1940s, primarily being used by the military and academic facilities, but it formed the common backbone to connect users on a global scale. The evolution of the Internet Protocol and Domain Name Services allowed specific addresses for the end user and thus the proliferation of universal e-mail and the Universal Resource Locator (URL), which permitted the association of regular names (for example, www.beradio.com) to the assigned IP addresses.

Data distribution apps

In the old days, we had individual telco lines delivered to the station. Some served the daily business functions, some had a special exchange and were designated as listener call-in lines; in the larger markets, these were also referred to as choke exchanges, which actively limited or choked the amount of calls to the telco switch serving the station to protect the switch from shutting down during times of extremely high traffic, such as when a station runs a contest. You may also remember when equalized toll lines might have been necessary to get program material to and from the station, such as studio-to-transmitter and remotes. Although more limited, some stations also had lines that were used to support off-premise telephone services.

These are four separate applications that constituted a large portion of a station's operating budget, which can now be entirely handled by a single, properly designed data network. In some cases, the monthly recurring costs of maintaining separate telco lines can be completely eliminated through the use of company owned microwave or fiber facilities with the exception of costs associated with connecting to the public switched network. Even the costs associated with maintaining leased T-1 or T-3 lines has dropped dramatically over the past 10 years, particularly as the local Bell Operating Companies are moving towards IP-based switching.

Networks can handle virtually anything that can be encoded into a digital format; obviously this includes audio program material, but let's not forget data acquisition and control functions, such as those required in the operation of a remote transmitter or, perhaps, to allow on-air personnel to control studio functions from a remote location for something as simple as an off-site event or, more importantly, for disaster recovery operations.

VoIP. Voice Over Internet Protocol is beginning to emerge as a viable option to traditional telephone service. The proliferation of high-speed broadband connections to homes and offices has enabled several companies, including local telephone companies, to offer the services to individuals and businesses. The theory is straightforward: voice is digitized into IP packets and subsequently routed, either internally to other phones through a dedicated VoIP server or to a local carrier that provides access to the public switched network; in other words, they provide the dial tone. Because the service uses the Internet, there is virtually no limitation as to the distance or amount of remote facilities that can be interconnected. VoIP-enabled facilities might also be able to give employees access to the company phone system from any place that has a broadband connection, i.e. home, hotel or a remote event.

The cost to implement VoIP is rapidly falling, combined with the potential elimination or reduction of long distance charges, making this worth considering.

VPN. The Virtual Private Network permits remote users to securely access one or more company servers externally as if they were connected directly to the internal network.

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VPN takes advantage of tunneling where non-secure IP data can be encapsulated into a secure IP data stream. With VPN, it is possible to move an entire studio to any location with a broadband connection, assuming that the studio is equipped with a digital audio storage/play system and digitally enabled console. Someone just needs to devise a portable control surface that could be plugged into a laptop and permit remote control of the console.

By implementing VoIP and VPN, it is possible to move the primary operations of a station to anywhere a broadband connection is available. In case of an emergency, wouldn't it be nice to have your servers mirrored in another offsite location?

SAN. The Storage Area Network is the last line of defense in hardening any network. Hardening has several meanings, including sufficient battery and ac generator back-up, as well as using a ring approach to connect various resources. This approach would give the best diversity in the event of a loss of one leg of the data path. To carry this approach one step further, implement a SAN to make data available over multiple servers, preferably servers located in a different physical location. SANs can be interconnected by several protocols, including IP, which give users the flexibility to extend disk backup to anywhere there is access to sufficiently large data pipes. In the case of a broadcast facility, this remote location could include a transmitter site or another company-owned facility in another market.

Wi-fi. Imagine that all of these services can operate without any cables. Many stations are taking advantage of deploying digital microwave systems to connect studios and transmitter sites, but the 802.XX protocol is making it possible to connect virtually any network device wirelessly. The 802.11a standard permitted a max speed of 54Mb/s, but was limited in distance due to its operation at the 5.7GHz frequency range. The 802.11b spec provided a lower overall speed, 11Mb/s, but better range due to its 2.4GHz range. The current spec, 802.11g, provides all the speed and benefits of both 802.11a and b.

An enhanced specification called WiMAX (802.16) will be available by 2007. WiMAX is intended to be a long-range, high-speed wireless protocol intended to be deployed in a "cell" configuration similar to conventional wireless telephone networks and can cover an area from 3m to 10m with data rates of 40Mb/s per channel.

McNamara is president of Applied Wireless, Elkins Park, PA.

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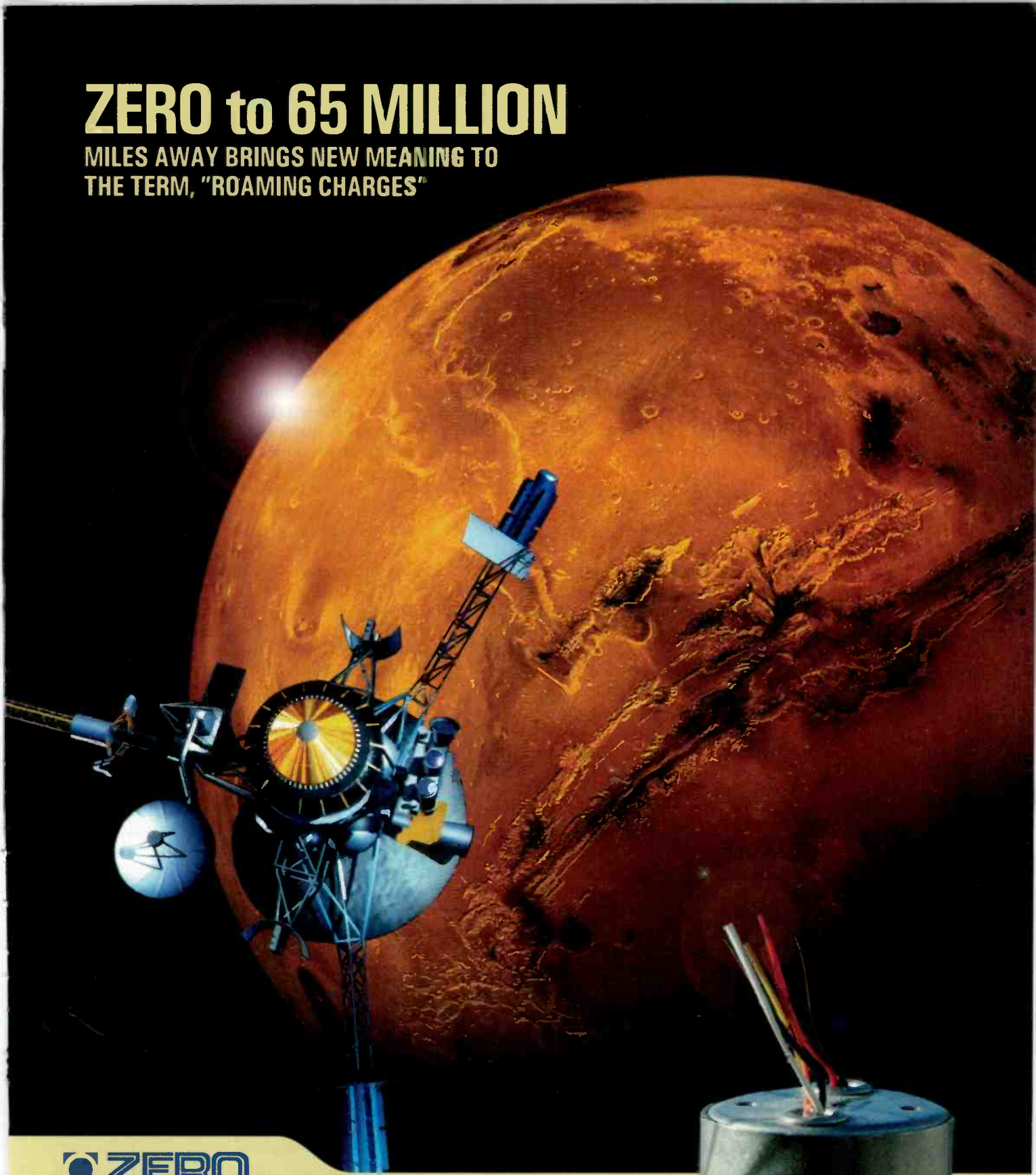

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FCC to auction 173 more FM CPs

By Harry Martin

The FCC has announced that it intends to conduct an auction of 173 FM broadcast construction permits beginning on Nov. 1, 2005. This grouping includes 30 permits that were not sold during the auction held last November and 143 newly available FM allotments. A list of the channels that are up for grabs is posted on the FCC's website, www.fcc.gov. (On the left side of the home page, click "Auctions" and then scroll down to "4/14/2005, Public Notice DA 05-1076.")

The Commission has not yet established a filing deadline for applications to participate in the auction. The likely time for the filing window will be during late July or early August. The FCC's staff is also likely to impose a freeze on minor modification applications in connection with the auction—so if you have a minor mod in mind, you should act promptly or risk being frozen out until after the auction.

While the Commission's April 14 public notice sought comments on the proposed methodology for conducting the auction, the Commission will likely use the auction procedures outlined in the notice and used in previous auctions. Those procedures appeared to work smoothly during last fall's FM auction.

The proposed procedures include a few changes in the system since the last FM auction as a result of the Commission's having adopted its Integrated Spectrum Auction System ("ISAS"), which is a redesign of the previous auction application and bidding systems. The changes will enhance FCC Form 175 by providing for the input of discrete data elements in place of free-form exhibits and improve the accuracy of submitted Forms 175 through automated data checking.

Let the bidding begin

The Commission plans another simultaneous, multiple-round auction. This means that bidding will remain open on all construction permits until there is no further bidding on any construction permit. In addition, prior to the auction the Commission will require upfront payments that will govern the maximum amount of bidding units that a particular applicant may use during any round. Each FM allotment is assigned a certain number of bidding units, which are the same as the dollar amount of the required opening bid for that construction permit. The amount of bidding units required to bid on a particular construction permit remains constant throughout the auction, regardless of the dollar value to be paid for the permit. But a bidder cannot place a bid for any construction permit for which it does not have sufficient eligibility in terms of bidding units. Bidding eligibility cannot be increased during the actual auction, but it can be decreased if an applicant does not remain sufficiently active.

One change from previous auctions is that the Commission proposes to divide the auction into two stages based on activity level. Stage One is the first part of the auction during which more bidders are actively participating. During Stage One, a bidder wishing to maintain its level of bidding eligibility will be required to be active on construction permits representing at least 75 percent of its current bidding eligibility. During Stage Two, when there are fewer permits for which active bids are being submitted, a bidder will be required to be active on 95 percent of its current bidding eligibility to maintain that eligibility level.

To participate in the upcoming auction, the first step is to check the suitability and availability of transmitter sites within the area where a channel can be located consistent with the FCC's channel spacing and other technical requirements. Several channels won in Auction 37 turned out to present potentially fatal problems due to line-of-sight and other engineering issues that were discovered only after the permittees' bid money had been paid. Local land use restrictions also should be considered before any bids are made. The FCC is selling these permits "as is, where is," and no refunds will be available if an allocation turns out to be marginal or unusable.

Martin is 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 Aug. 1 radio stations in California must file their 2005 renewal applications, biennial ownership reports and EEO program reports with the FCC. The Form 396 (EEO program report) requires the attachment annual EEO public file reports for the 12-month periods ending in July 2004 and July 2005.

Also on Aug. 1 stations in Alaska, Hawaii, Oregon, Washington the Pacific Islands must begin their prefiling renewal announcements.

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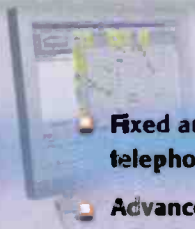

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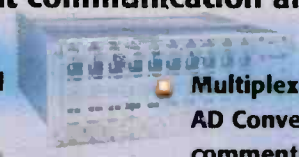

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The annual trek to Las Vegas is behind us, and overall impressions of the convention are positive. As always, the foot traffic on the convention floor was heavier on Monday and Tuesday, but Thursday still saw a reasonable number of people still making their rounds. Conversations with attendees and exhibitors were marked with mostly positive remarks about the success of the show. It appears that broadcasting is on an upswing.

The most frequently asked question on the convention floor sought information on new products being displayed. If you weren't able to make the rounds to every booth, don't worry. We covered it for you. The March and April issues of *Radio* magazine had lots of information about products being unveiled, as did the NAB Insider e-mail newsletter, but they only scratched the surface. On the following pages you'll find details about some of the products that were kept secret until the convention doors opened. You'll also find the top picks of our Pick Hits judges with the 15 top new products at the convention. The *Radio* magazine Pick Hits are the oldest technology awards from the convention, and our panel of judges has excelled in its task to find the best of the best. Because the Pick Hits are limited to 15 products, there are many introductions that do not receive the honor. The Pick Hits are included on the following pages. You can see the list of the judges and the official rules as well.

Because of the scope of convention, it's impossible to include every new product introduction even in the pre- and post-show issues. Look for more great products in the New Products section of upcoming issues, as well as the annual Product Source accompanying the September issue.

Chriss Scherer, editor

The Show NAB2005 in Review

Recognizing Excellence
The Pick Hits of NAB2005

The Pick Awards are the original technology award presented at the NAB convention. First awarded in 1985, the awards recognize innovation in product development with an eye to meeting the practical needs for radio. The winners are selected by a panel of radio professionals who work independently and anonymously to find the top new products introduced at the convention. The panelists met on Wednesday during the convention to make their final selections, which are limited to 15. With so many new products introduced, this can be a difficult task. While their identities are kept secret during the convention, we can tell you who they are now. See the list on page 50.

The Pick Hits judges also follow established guidelines to make their selections. See the rules on page 48.

Compiled by Kari Taylor

NAB2005 Stats:

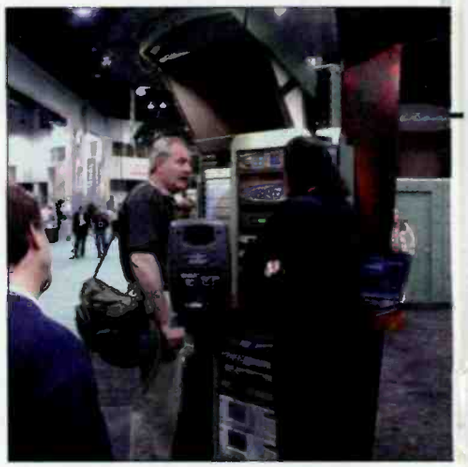
Attendance: 104,427
Exhibitors: 1,400
Show floor area: 819,000 sq. ft.

For comparison, the 2004 convention attracted 97,544 attendees, 1,392 exhibitors and covered 796,000 square feet of exhibit space.

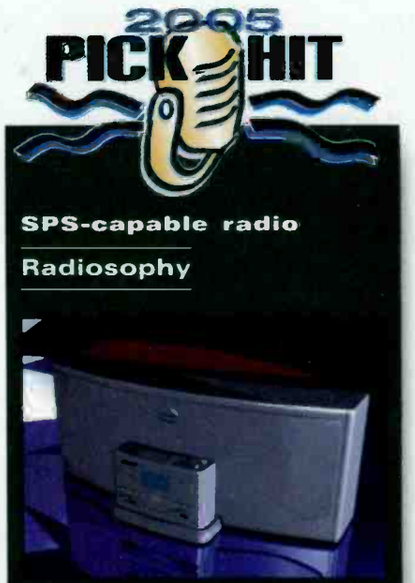
File transfer service
Arrakis

Connected Radio: This service lets stations transfer audio, events, logs and text between multiple stations, station personnel, remotes, program originators and remote talent. 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 that will use the file.

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



Frank Foti (right) of Omnia Audio shows Mark Humphrey of WRTI, Phildelphia the functions of processing for surround sound.



SPS-capable radio

Radiosophy

Multistream: This transportable HD Radio receiver can handle any number of multiple digital streams along with existing HD Radio and analog signals. The removable receiving unit measures less than 6" × 4" and the complete radio is less than 16" × 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

What the judges had to say:

"This HD Radio receiver has hit an affordable price point."

"Units priced like this will help accelerate the HD Radio transition."

177,000,000 LISTENERS ARE WAITING!*

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radi·osophy™
Intelligent Radios™

multistream™ HD

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And get paid for your efforts.

$259
Suggested Retail

Broadcast Partner Program
www.radiosophy.com/getpaid
800-4HD-RADIO
(800-443-7234)

We Know Radio!

* # of listeners in range of HD Radio broadcasts

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HD Radio is a trademark and the HD Radio logo is a registered trademark of iBiquity Digital Corporation.

R1001

2005 PICK HIT

HD Radio monitor

Day Sequerra

M4: Like the M2, the M4 offers a low noise RF front end with built-in preselector and double-balanced mixer. Its low jitter DAC and Class A biased audio output provide playback of HD Radio 96kb/s programming. Synthesized pushbutton tuning for AM and FM bands balanced audio outputs at +4dBV on 3.5mm Eurostyle modular connectors and a multi-function liquid crystal display are all features of this monitor. Ten preset stations per AM and FM band are offered, as well as left- and right-program signal indicators. The unit also features an HD Radio digital to analog program time-alignment monitor.

856-719-9900; fax 856-719-9903; www.daysequerra.com; info@daysequerra.com

What the judges had to say:

"Finally, a rack-mount HD Radio receiver." • "The compact size and affordable price caught my eye."

Tube-final HD Radio transmitter

Continental Electronics

816HD: Building on the success of the 816R series of transmitter, Continental has adapted the transmitter to the 816HD, which is capable of amplifying HD Radio signals. Currently available in power levels up to 35kW, the transmitter uses the same overal 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 status.

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

Several engineers from Cox listen to an update on new products from Belar.

Tomorrow Radio Today.

The DaySequerra M4 HD RadioTuner is the first broadcast quality, **MULTICAST CAPABLE** tuner available.

M4 HD RadioTuner

- SYNTHESIZED, PUSHBUTTON TUNING FOR AM AND FM BANDS
- BALANCED AUDIO OUTPUTS AT +4dBV ON 3.5MM EUROSTYLE MODULAR CONNECTORS
- TRANSFORMER ISOLATED AES3 DIGITAL AUDIO OUTPUT – 5.1 SURROUND CAPABLE
- 10 PRESET STATIONS PER AM AND FM BAND
- DEMODULATED AUDIO PROGRAM PEAK AND SIGNAL PRESENT INDICATORS
- HIGH QUALITY HEADPHONE OUTPUT ON FRONT PANEL
- HD RADIO® TO ANALOG PROGRAM TIME-ALIGNMENT MONITOR

Shipping June 2005

DaySequerra

An ATI Group Company

154 Cooper Rd. S902 ■ W. Berlin, NJ 08091

856-719-9900

www.daysequerra.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 "A" connectors – with Axia your digital audio stays clean and pristine.

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

Put your preamps where your mics are.

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

Put your snake on a diet.

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

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

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

With a little help from our friends.

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

Would you like some control with that?

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

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

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

AXIA
A TELOS COMPANY

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2005 PICK HIT

Audio router controller

Audioarts Engineering

Audioarts Net: The small station router, which is similar to the Wheatnet 4864, features a secure audio network. Eight network ports are standing by for audio inputs and outputs or console interface. The expandable controller features a status indicator LED display and is capable of switching 1,024 channels and control. Via a high-speed network, it can connect studios and operation centers while combining shared resources and wiring in the technical operations center.

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

Digital recorder

AEQ

DR-100: Designed for broadcast journalism field work, this recorder captures sound through the built-in or external mic. The unit uses the same batteries as a Nokia cellular phone. Various file formats can be selected, and audio can be edited on the recorder. Files are transferred via USB. The recorder includes an FM radio with 20 presets.

954-581-7999; fax 954-581-7733

www.aeqbroadcast.com; sales@aeqbroadcast.com

What the judges had to say:

"It's so compact but so versatile."

"The built-in tuner reduces equipment needs in the field."

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Klotz Digital has added to its line of console and router systems.

New RevenueSuite™ from dMarc

After you close the logs, we start selling.

RevenueSuite™ is a new proprietary media solution that continues to generate station revenues even after your regular sales force has left for the day. And only dMarc offers it.

Added to your Scott SS32 or Maestro digital automation systems (which if you don't already have, you should!), RevenueSuite fills any inventory opportunities remaining once your logs are closed. It operates automatically, without administration by your managers, without manual trafficking or management of carts. The only impact to you is new profits added to your bottom line.

Even better, RevenueSuite functions without compromising your local rate card, spot revenue or local sales. In other words, it's a Win-Win-Win for you, your station, and your bottom line.

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www.dmarc.net

RevenueSuite@dMarc.net

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Broadcast console

Sierra Automated Systems

Rubicon SL: The Rubicon SL radio broadcast console control surface was manufactured for the smaller-market station or less demanding studio. Like its bigger brother Rubicon, the SL offers complete integration with the SAS 32KD and the SAS Connected Digital Network, as well as stand-alone operation with the new upgraded Riolink mixer and router.

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

What the judges had to say:

"The smaller size fits into more applications."

"A real space savings is provided by the new metering options."

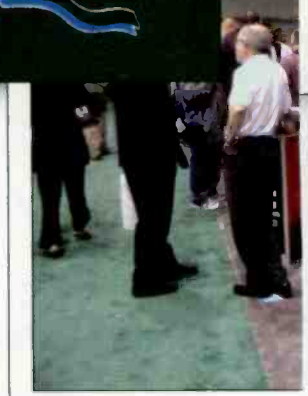
"The slimmer size and simplified controls are great."

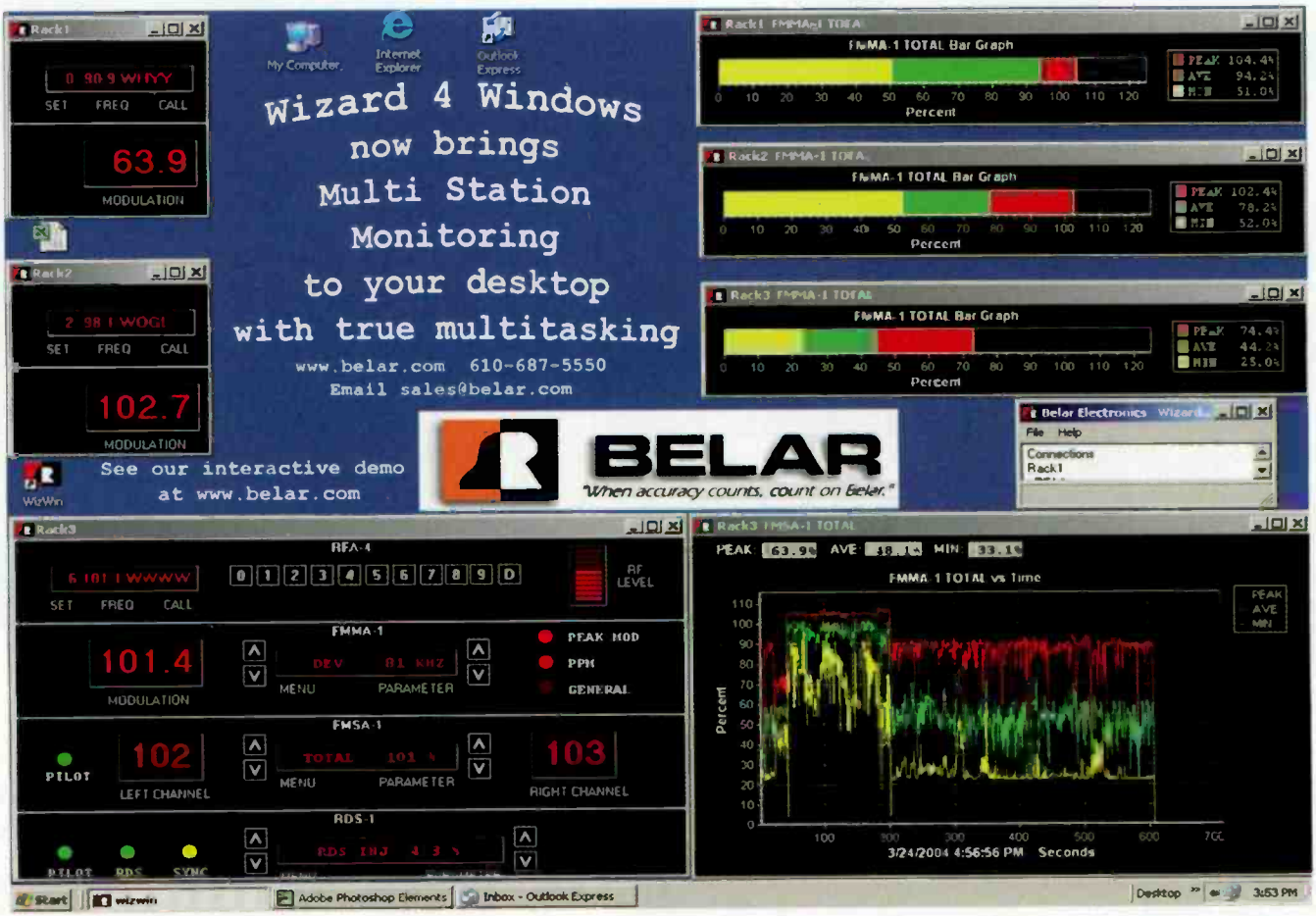
Six-channel audio controller

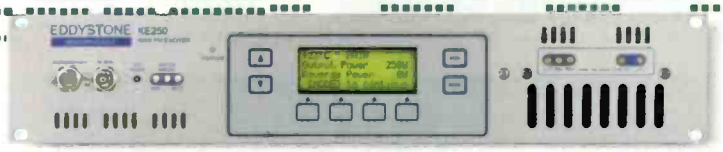
Broadcast Devices

ACS-300: Two versions of this product are available. The ACS-300 accepts six balanced audio channels and on command dim the level of these channels by 10dB, 20dB, 30dB or completely. The ACS-300V provides remote volume control of all channels. The unit offers a muting capability for control rooms that monitor 5.1 audio systems. All audio connections are made via XLR connectors. A 15-pin DB connector provides the control function for dimming or muting by connecting the appropriate pin to ground. Remote status for dim and mute are also provided.

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







High-power FM exciter
Eddystone Broadcast

XE250: The XE series of exciters has a new addition: the XE250.

The full-featured 250W broadcast FM exciter that is also suited for use as a low-power, stand-alone transmitter. It uses an updated, highly linear modulator for quality sound without overshoot. The exciter features a comprehensive LCD-based interface for all parameter settings and display. It provides N+1 compatibility with system control, settings and monitoring via RS-232 or TCP/IP. The TCP/IP feature also allows remote control, setting and monitoring of the exciter and transmitter via any Java-enabled Web browser. The quick-view LEDs show status information, including system normal, mute and modulation alarm.

+44 1789 768878; fax +44 1789 400630; www.eddystone-broadcast.com; sales@eddystone-broadcast.com

The Dmarc booth was busy with activity on Monday afternoon.

Frequency coordination software
Society of Broadcast Engineers

SBE Toolbox: Provided free of charge to SBE and affiliated frequency coordinators, this software uses a runtime version of Filemaker Pro so no additional software is required. The software will allow the user to import records used in the SBE's previous DOS-based software. It automatically calculates distance and bearing from latitude and longitude, has automatic e-mail and letter writing features and wireless mic and IFB tables built in. The software can be used for regular day-to-day local coordination as well as event coordination purposes.

317-846-9000; fax 317-846-9120; www.sbe.org

40 Years as the World Leaders for Vacuum Capacitors

Since 1965, COMET has been manufacturing high quality fixed and variable vacuum capacitors for broadcast applications.

Our commitment to superior product quality and customer service has enabled close cooperation with leading international companies in the RF industry.

COMET vacuum capacitors are utilized in various applications in broadcasting, from medium- and short-wave broadcast and communications transmitters to antenna tuning units or couplers in avionics and mobile equipment. Our fixed and variable capacitors are proven the world over...

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www.comet.ch

COMET

Voice processor

Aphex Systems

230: Features of this voice processor include a reflected plate amplifier tube mic preamp, an easy-rider compressor, a logic-assisted gate, a split band de-esser and an aural exciter. The processor offers +4dBu and -10dBV outputs, as well as 24-bit/96kHz A/D AES, S/PDIF and optical outputs. It also features a low-jitter word clock output, word clock input and a cough switch (soft mute).

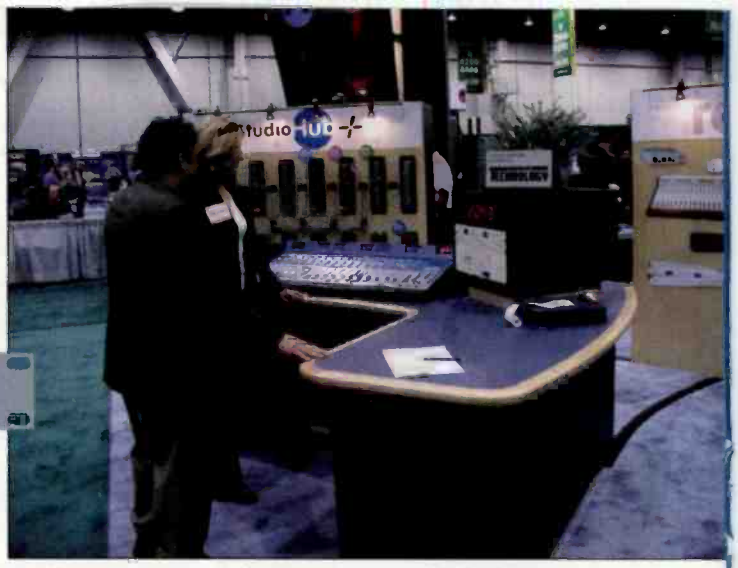
818-767-2929; fax 818-767-2641

www.aphex.com; sales@aphex.com

What the judges had to say:

"Incredibly affordable."

"Lots of power in a small package."



Studio Technologies shared booth space with Radio Systems again this year. Vince Fiola of Studio Technologies discusses various features of his products.

Music scheduling system

Prophet Systems

Musicgen Pro: Musicgen Pro is a music scheduling system built for the Windows operating system. The unit features customized reporting capabilities, scheduling flexibility including non-musical events, single and enhanced hourly stack scheduling and automatic history reconciliation. The system is compatible with most automation systems, and offers an automatic software update feature.

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

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NEW Digilink Satellite Automation...

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now shipping !!!

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

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

No down payment
Return at any time
Free Factory training
Free Hardware support
Free Telephone support
Free Software upgrades
Free Hardware upgrades
Free PC and Network setup

the XTREME *'Solutions'* program

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 risk free automation system
XTREME~digilink

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

Audio router controller
Wheatstone

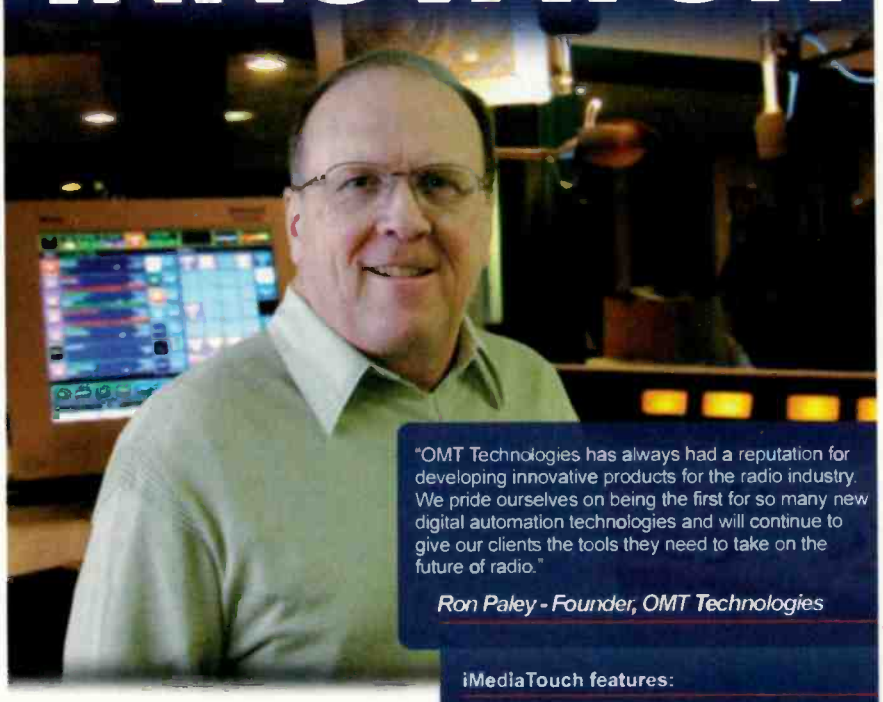
Wheatnet 4864: The new central switch for all Bridge routing systems, this controller offers 48 ports with each supporting 128 channels of audio inputs and outputs plus control data. Two 4864 units will provide auto-failover redundancy for the Bridge system. Onboard X-Y controllers provide rack room source/destination control and operators have access to all crosspoint metering and monitoring.

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

Marsh Gooch of Tascam demonstrates new CD playback and multi-tracking editing packages to *Radio* magazine's Kari Taylor.

Looking for a new Digital Audio System? Why not try the

INNOVATOR



"OMT Technologies has always had a reputation for developing innovative products for the radio industry. We pride ourselves on being the first for so many new digital automation technologies and will continue to give our clients the tools they need to take on the future of radio."

Ron Paley - Founder, OMT Technologies

iMediaTouch features:

- Non-proprietary hardware, use any audio card, any PC
- Supports MP2, MP3, PCM, WMA and Dolby AC3!
- Live Assist, Satellite or Full Automation
- Complete website integration with XML or HTML output
- On-Air Promo builder for on the fly promos
- CD Ripper and complete production tools for automation
- On-Air studio or Production studio Voicetracking
- On-Air Phone bit editor with full production capabilities
- RDS & HD Radio ready

iMediaTouch

Broadcast Automation Software

Innovation has been the trademark for OMT since 1984, with an impressive list industry firsts that have set the stage for the future of broadcast solutions.

From being the only true non-proprietary broadcast automation system, to our #1 selling digital logger and our award winning internet streaming software, our iMedia product lines provide innovative choices for your radio group or station.

Find out why over 1000 radio stations and the top consumer music providers all chose OMT products.

omt technologies The Original. The Standard. The Innovator.

To find out more, call us Toll Free 888 665 0501 or visit www.imediatouch.com

2005 PICK HIT

USB audio interface
Digigram

UAX220: This USB audio interface was specifically designed for broadcast and pro audio applications. Supplied in a 17cm x 22cm bag, the unit features two balanced analog inputs and two

balanced analog outputs on Neutrik XLRs, 24-bit/48kHz resolution, a dynamic range greater than 103dB (A-weighted) and a ¼-inch headphone output. Once connected to a USB port on a computer (Windows 2000 and XP, Mac OS X, Linux), the unit is automatically recognized as a USB audio-compliant device without needing additional drivers. External power is not required.

703-875-9100; fax 703-875-9161

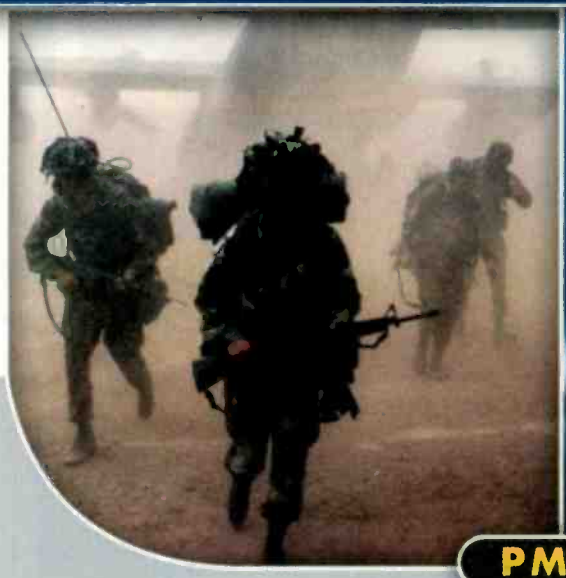
www.digigram.com; input@digigram.com

What the judges had to say:

"Full-size connectors make this a robust unit. No more broken connectors."

"The audio controls on the unit make changes easier than accessing software."

Breaking News
in the **Palm of Your Hand**



PMD660

The Marantz Professional PMD660 is the first compact solid-state recorder that fits in the palm of your hand. When breaking news hits you need to know that you have a professional hand-held recorder that will provide high quality digital audio and quickly get the "big stories" to the newsroom! Virtual Track Mode (VTM) and Copy Segment features allow on-board editing so you can record in the field, edit the file and send directly to the station to hit the next newscast!

- 4 hours of uncompressed 48k .wav recording on 2 g g card
- USB direct download
- 4 hour battery life (alkaline, NiCAD, NiMH)
- XLR inputs with 48v phantom power
- One-touch record with 2 second audio cache
- On-board editing with Mark Segment for transfer of customized audio files
- Virtual Track Mode (VTM) allows easy playback of customized marked points of recording
- EDL markings during record or playback
- No moving parts / no maintenance
- Two Built-in Stereo mics
- Optional RC600 Remote Control available

2005 PICK HIT Radio

THE RADIO TECHNOLOGY LEADER

marantz
PROFESSIONAL

D&M Professional

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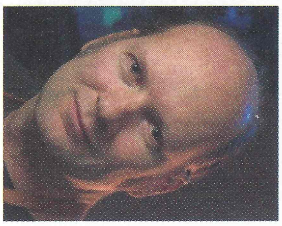


Dave Hill is justifiably renowned in the audio recording business for more than twenty years of exceptional design engineering. When it comes to mic processors, compressors, digital signal processors or enhancing "lifeless" digital audio, Dave has developed solutions that receive industry-wide acclaim.

Check out "fat Content" at www.cranesong.com

is your station production fat enough ?

Signature Series

Audio Answers: 715 398 3627

CRANE SONG LTD.

Digital audio leveler

Translantech Sound

Ariane Sequel: Like its analog predecessor, the Ariane Sequel features the company's sum-and-difference processing. The audio processing path is fully digital, not a hybrid analog/digital design. It provides independent two-channel and stereo-linked modes, protection limiting, input and output level metering, TCP/IP and RS-232 remote control and software upgrade capability. Adapting the Ariane leveler concept to a digital system was the result of Translantech's partnership with Broadcast Warehouse.

2005 PICK HIT

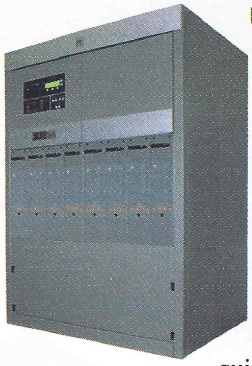
212-222-0330; www.translantech.com; david@translantech.com

What the judges had to say:

"The analog idea was good, but creating it digitally is better."

"The extensive metering is impressive, and the ability to split modes of mono, stereo and matrix is useful."

With so much to see, it's common to see people stop in their tracks to take in an exhibit.



Digital transmitter

Nautel

XR50: As the fourth generation of Nautel 50kW AM transmitters, this modular HD Radio/DRM digital transmitter offers power modules that are hot-pluggable and can be removed and replaced without an interruption in transmission. For greater redundancy, the transmitter comes with a standby DDS exciter section including a modulation encoder with automatic changeover. It requires no manual tuning or adjustment, even with antenna mismatch corresponding to 1.5:1 VSWR at 50kW with 100 percent modulation.

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

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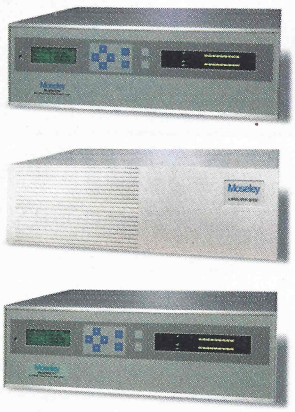
My challenge is to make the right STL choice for today, as well as for tomorrow.

With Moseley, it's no problem.

Check out their **Starlink SL9003Q-2SLAN**, the first STL to provide AES digital audio and Ethernet data over the traditional 950 MHz band.



Or add a bi-directional Ethernet LAN extension and serial data link to a new or existing STL with the license-free 900 MHz **Lanlink 900D**.

For T1 lines or license-free 5.8 GHz links, the **Starlink SL9003T1** STL/TSL transports bi-directional AES digital audio, Ethernet LAN extension, remote control, and telephones.

Your best connection to the future is a smart STL choice today. Take it from me, Moseley will insure that your station is ready for HD Radio and the new digital services of tomorrow.

Give the digital STL experts at Moseley a call for more details.

Moseley

Dave Chancey 805 968 9621
Bill Gould 978 373 6303
www.moseleysb.com

Combiners are an important element in many IBOC systems, and Shively was ready to explain the technology.

HD Radio importer, exporter & exciter

Harris

Flexstar HDI-100, HDE-100 & exciter: The Flexstar HDI-100 data importer and HDE-100 program exporter can broadcast supplemental audio and implement data services, maximizing available bandwidth within the transmission chain. The HDI-100 importer accepts all advanced application services, including supplemental audio program streams. The HDE-100 exporter multiplexes the data leaving the importer with a station main program channel and feeds all the data as one bit stream to an HD Radio exciter. The Flexstar exciter is HD Radio-ready and provides the capability to adjust the phase of the output for split-level combining applications.

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

2005 PICK HIT

What the judges had to say:

"I like the phase-adjustment capability that is built into the exciter, which is well suited for split-level combining."

"This removes the need for the separate box for audio control and bypass."

Digital FM exciter

Bext

DXP 50: A fully digital FM exciter with dual DSP processors, this exciter fits in 2RU and offers S/N exceeding 100dB, stereo separation better than 80dB and THD 0.001 percent. Like all Bext FM exciters, the DXP 50 is frequency agile and directly programmable.

619-239-8462; fax 619-239-8474

www.bext.com; sales@bext.com

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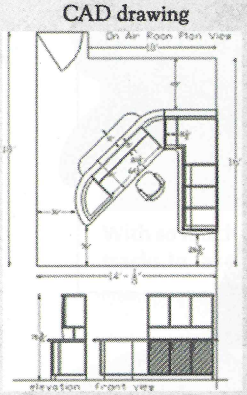
CAD drawing



CAD rendering

KFRC San Francisco

KOIT San Francisco

Entravision Showcase Studio
Los Angeles, California

Across a town or across a continent. Full-time, temporary, or transportable. To reach faraway affiliates, connect distant stations, cover hard-to-reach areas. We cover the U.S., Mexico, and the Caribbean with reliable, low-cost solutions, maximum flexibility, and expert engineering support 24/7. Wherever you want us, whenever you need us. Call NPR Satellite Services at 202.513.2626, or visit www.nprss.org/beradio.

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2005 PICK HIT

HD Radio monitor

Day Sequerra

M2: The M2 offers over-sampling 24-bit/96kHz DAC combined with the proprietary Class A-biased audio output circuitry that provides transparent and dynamic audio. The high resolution, peak and hold 50-segment LED meters indicate the RF carrier modulation percent and audio modulation in decibels. The M2 uses a multi-function display for tuning and other station information. The monitor also includes alarms for over-modulation, loss of audio and loss of carrier. All tuner functions can be monitored and controlled remotely via an optional PC interface.

856-719-9900; fax 856-719-9903
www.daysequerra.com; info@daysequerra.com

What the judges had to say:

"It provides a great deal of monitoring power."

"With SPS built-in, plus the modularity, it will not become obsolete."

Product Showcase

Model TTI-2 Time • Temperature • ID Delivery

- time and temperature delivery for automation
- 60 seconds of user recordable storage
- programable self-triggering mode option *new feature!*
- professional male announcer voice
- temperature in Fahrenheit or Celcius
- battery backed AC synchronized clock

innovative solutions

Sine Systems, inc

615.228.3500
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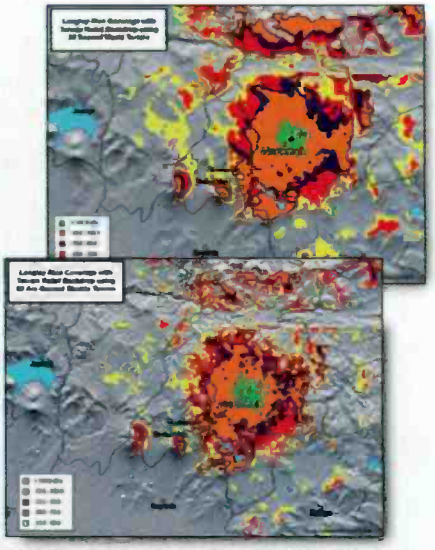
Terrain database

V-Soft Communications



Shuttle Radar Topography Mission: This terrain database is a three arc-second database for the United States, Mexico, Central and South America, the Caribbean and the lower two-thirds of Canada. The lower image shows the enhanced resolution compared to previous data. An elevation dataset for locations outside of the United States, the database is a real-world interferometric scan, so it includes buildings that may appear along with the topography. The SRTM is a joint project between the National Geospatial Intellegence Agency and the National Aeronautical and Space Administration. The data was collected using interferometry by the Space Shuttle Endeavour during February of 2000.

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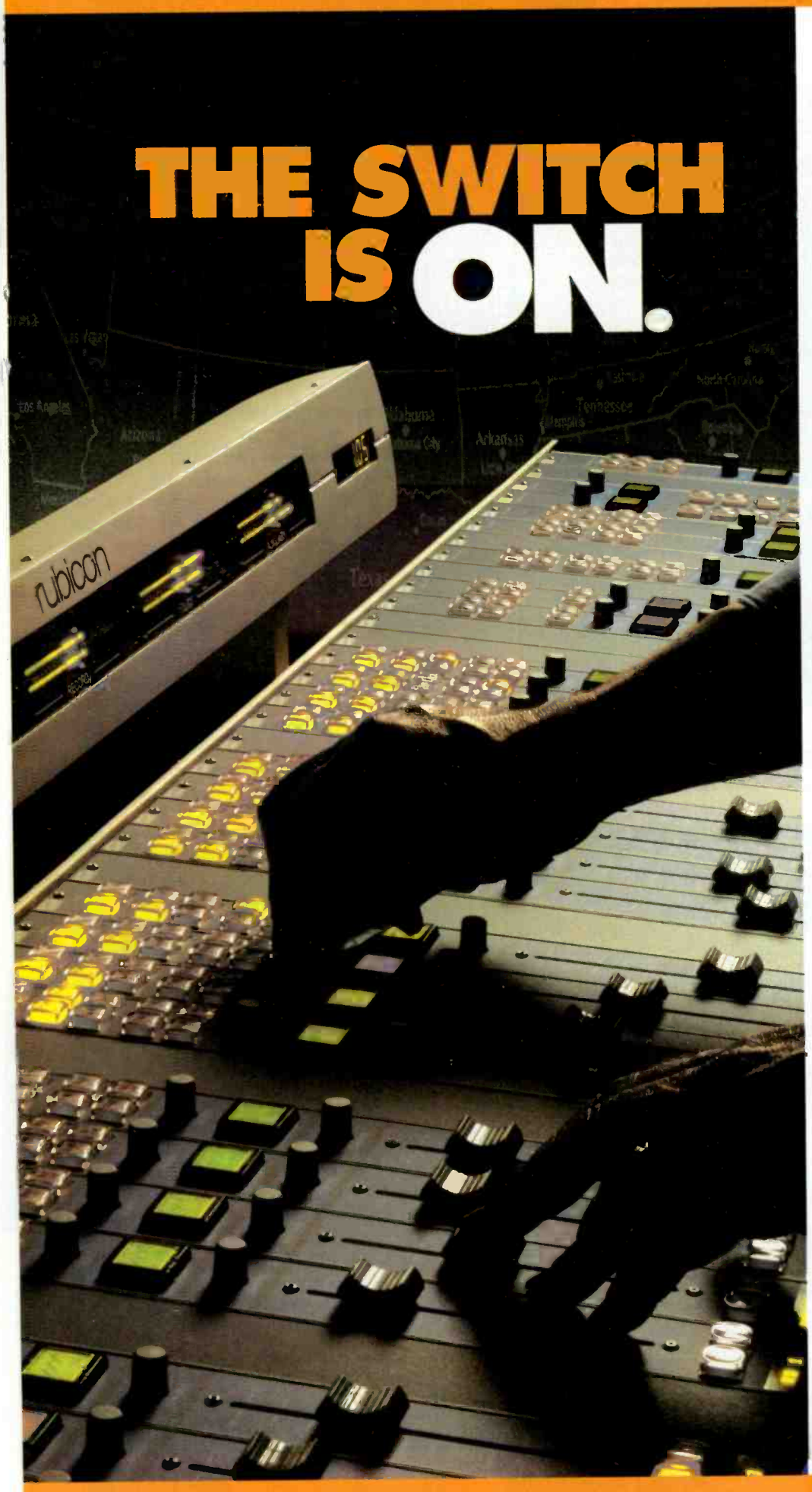


Coast to coast.
Border to border.

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

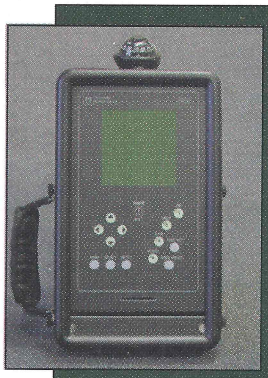
At the network's hub is the **32KD** digital router/mixer, the proven performer in many hundreds of radio, network, and film installations around the world.

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



AM field intensity meter

Potomac Instruments

PI 4100: This meter measures electromagnetic field strength in the 520kHz to 5.1MHz frequency spectrum. This instrument combines a radio frequency voltmeter,a calibrated,shielded loop antenna, an internal GPS receiver, an internal calibration source and data acquisition hardware and software in a package weighing less than 3kg. Features of the meter include a 116dB dynamic range tuned RF voltmeter, digitally synthesized tuning in 1kHz increments and a spectrum display to facilitate various compliance measurements (field strength, harmonic level and spectrum occupancy). The unit's data acquisition software and PC interface enable the collection, analysis and e-distribution of current field measurements.

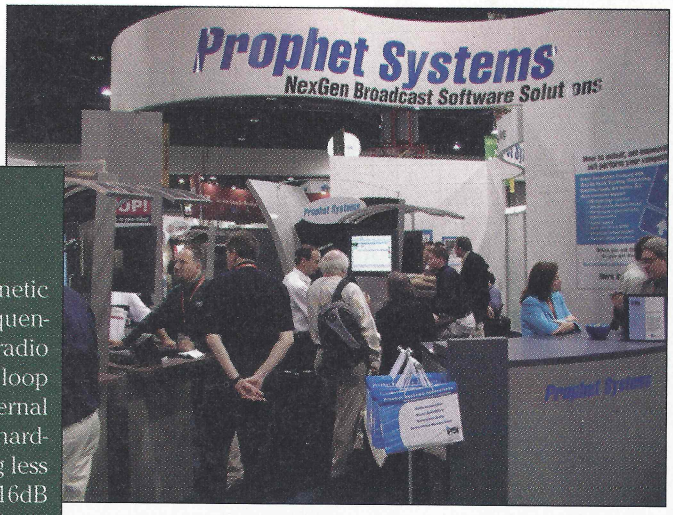
301-589-2662; fax 301-589-2665; www.pi-usa.com; sales@pi-usa.com

2005 PICK HIT

What the judges had to say:

"The lightweight and better package is great."

"The display is clear and easy to read."



Prophet Systems drew a large crowd quickly on Monday morning.

Control surface

Axia Audio

Element: The control surface features four program busses, four aux send busses, dedicated talk and preview functions on each channel, one-touch record and monitor sections and 32 mix-minus outputs. The system works in conjunction with the Axia Studio Mix Engine, an Intel-based mixing platform running real-time Linux. A standard SVGA LCD monitor displays all metering, clock timer, status and options info. This radio console can be configured to run stereo audio or discrete 5.1 surround programming.

216-241-7225; www.axiaaudio.com; inquiry@axiaaudio.com

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Leading POTS Codecs Compared.

	Comrex Matrix	Tieline Commander	Zephyr Xport
Audio Bandwidth @ 24 kbps @ 19 kbps	14 kHz 11.2 kHz	15 kHz 9 kHz	**15 kHz** **15 kHz**
Direct Internet Software Updates	No	No	**Yes, via Ethernet port**
Digital PC Audio Input	No	No	**Yes, via Ethernet port and supplied driver**
Audio Metering (XMIT/RCV)	Transmit only	One-at-a-time	**Simultaneous**
Audio Processing	None	Simple AGC	**Digital multi-band AGC with look-ahead limiter by Omnia**
Remote Control	No	RS-232 and dedicated computer	**Ethernet via Web browser**
Auto Dial Storage	19 Numbers	50 Numbers	**100 Numbers**
Frequently-Used Settings Storage	none	none	**30**
Standards-based POTS Codec	No - Proprietary	No - Proprietary	**Yes - aacPlus (MPEG HEAAC)**
Transmit-Receive Quality Display	No	Yes	**Yes**
Contact Closures	2	2	**3**
Display Resolution	120x32 LCD	120x32 LCD	**128x64 LCD**
Analog Cell Phone Interface	Optional	Standard	**Standard**
Mixer Inputs	1 mic, 1 mic / line	2 mic / line	**1 mic, 1 line**
Phantom Power	No	No	**Yes - 12 volt**
Automatic Voice-Grade Backup	No	No	**Yes**
Power Supply	External	External	**Internal auto-switching**
Local Mix Audio Outputs Headphone Line Level	 Yes Yes	 Yes No	 **Yes** **Yes**
Direct Receive Audio Output	No	Yes	**Yes**
Uses ISDN at the Studio Side for More Reliable Connections	No	No	**Yes - your Zephyr Xstream becomes universal POTS and ISDN codec.**
Available ISDN Option	$850.00 (adds MPEG L3 & G.722)	$850.00 (adds G.722)	**$495.00 (adds G.722 & state-of-the-art AAC-LD for high fidelity and low delay)**
List Price:*	$3,700.00	$3,650.00	**$2,495.00**

The world's most advanced POTS codec
is also the world's lowest priced POTS codec.

Telos
AUDIO | NETWORKS

* Refers to base MSRP without ISDN option as of 5/1/04. The Telos logo, Zephyr, Zephyr Xstream, Zephyr Xport are all registered trademarks of TLS Corporation, © 2004. aacPlus (TM) Coding Technologies. Comrex, Tieline and associated trademarks are property of their respective owners. Product spefications quoted from manufacturer's most current published documentation at time of printing.

and here...

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

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

StudioHub+ is here...

and here...

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

and here...

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

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

and here...

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

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

and here...

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

WIP News Talk Radio
Philadelphia,PA
StudioHub+
connects SAS Rubicon surfaces and 32KD switcher with BE AudioVault in 8 studios.

StudioHub+

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

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phone: (856) 467-8000 Fax:(856) 467-3044
www.radiosystems.com

The Ibiquity booth included this vehicle with a demonstration of HD Radio multicast.

Audio codec
Comrex

Access: The BRIC technology (Broadcast Reliable Internet Codec) in this codec enables broadcasters to use a variety of commonly available Internet access points to broadcast real-time audio. The unit uses widely available wired circuits like DSL, cable, POTS and frame relay as well as wireless circuits such as Wi-fi, 1XRTT, Edge and 3G data networks. The codec is available in rack mount and portable units. Capable of providing voice quality connections over IP connections, the codec also offers a stereo mode that optimizes performance when used on managed data networks.

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

What the judges had to say:

2005 PICK HIT

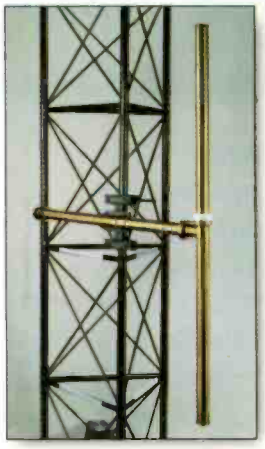
"This has great flexibility for a wide range of uses."

"The extensive compatibility with various paths is ideal."

Telephone interface
Circuitwerkes

Mictel: This is a portable field amplifier with telco, cellular and line level outputs with an internal limiter. The unit provides outputs for a telephone handset, cellular phone or balanced line level at up to +10dBm. Audio inputs are from phone handset, cell phone or balanced line. The unit operates 36 hours on two 9V alkaline batteries. Other features include active, balanced, mic/line input; long life potentiometers and VCA control of send audio; and a user-switchable, internal limiter that prevents clipping. The unit also features external power input with silent, auto-switching battery backup, and individual gain controls for send, receive and headphone levels.

352-335-6555; fax 352-380-0230; www.circuitwerkes.com; info@circuitwerkes.com



Portable FM antenna
Armstrong Transmitter

FMA-2VBP: This broadband antenna breaks apart for easy transport and sets up in moments. The unit is packaged in a standard hard shell shotgun case for shipping. Multiple bay versions with branch-fed harness and power divider are available. The antenna features 2kW per bay input power capability, 7/8" input to each bay, broadband 88MHz to 108MHz range and a heavy-duty brass construction.

315-673-1269; fax 315-673-9972

www.armstrongtx.com; sales@armstrongtx.com

Broadcast power monitor
Bird Electronic

BPM-E & BPM-E7: This system offers users more options in how they measure, monitor and protect their RF transmission systems. Its RF test port enables users to verify spectral compliance for many applications including IBOC. Features of this system include alarm detection and notification, instant e-mail alerts, remote power/VSWR monitoring and administration, RF test port, access to historical data through data logging, and a small footprint for minimal rack space.

440-519-2062; fax 440-248-3790

www.bird-electronic.com; sales@bird-electronic.com

What the judges had to say:

2005 PICK HIT

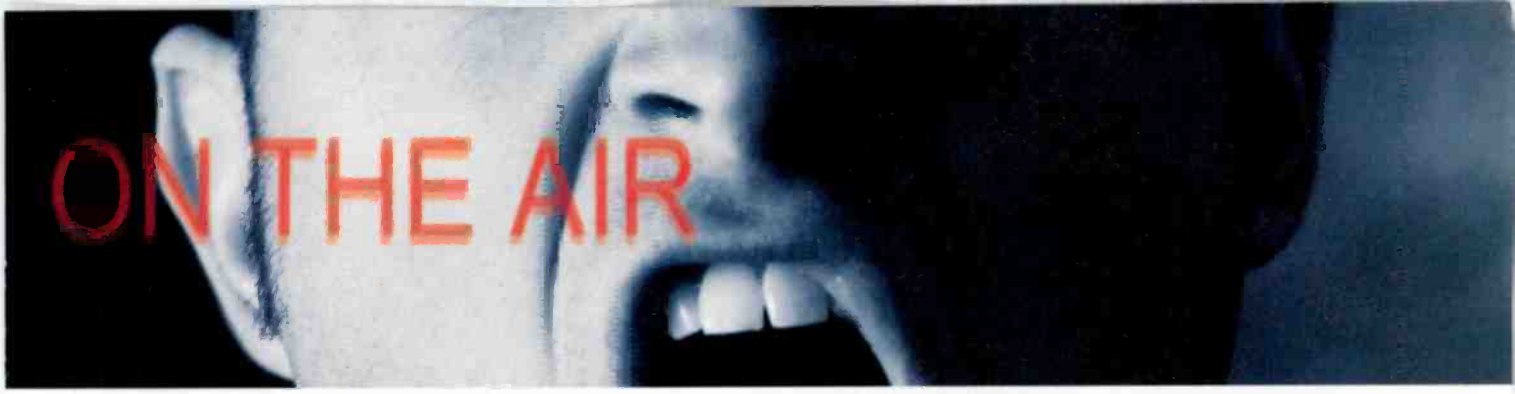
"This is an ideal system to monitor digital transmissions."

"Eliminating the sampling slugs is a real step forward."

Digital on-air console
Harris

PR&E Stereomixer Digital: The newest member of the Vistamax family of products, this all-digital console is designed for smaller markets or larger installations that need a mixer for smaller studio use. Available in a 4RU or a 15"×15" table-top package, the console supports four analog inputs, three digital inputs, two stereo analog and digital program outputs, as well as mix-minus, monitor and headphone outputs. It also features LED metering like the BMX Digital and RMX Digital.

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



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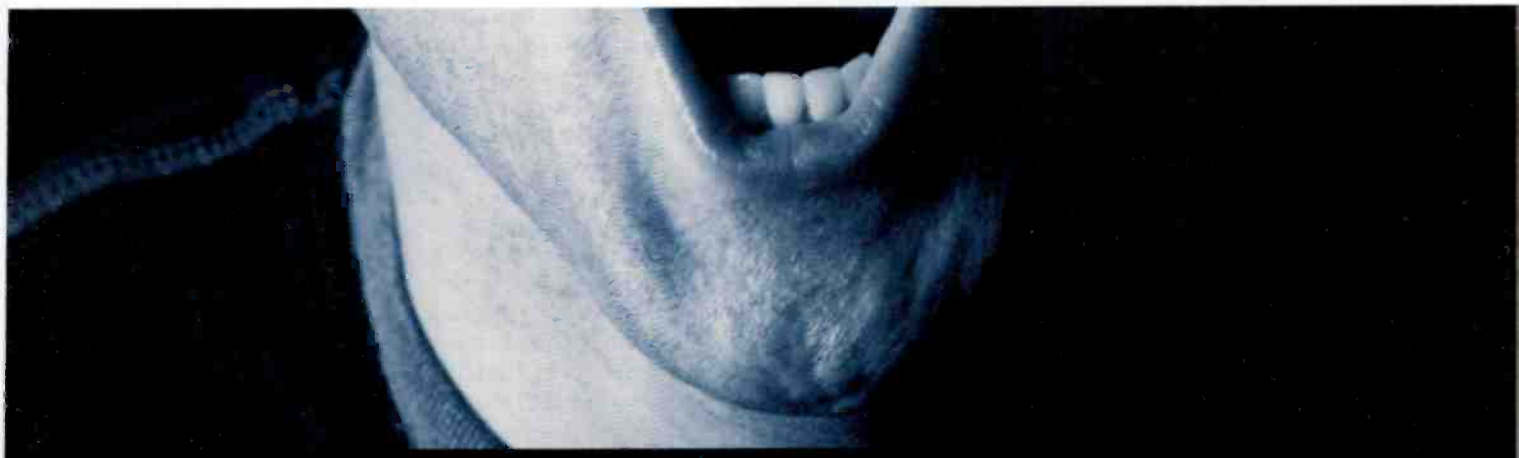

SOME WORDS SHOULD BE OBSCENE AND NOT HEARD

Eventide Broadcast Delays are designed to keep profanity off your air, and angry listeners, embarrassed advertisers, and the FCC off your back. We invented the obscenity delay and have a solution for stations large and small that provides up to 80 seconds of the highest quality revenue and license-protecting delay

Our new HD compatible BD600, 24-bit delay, comes standard with AES/EBU, and provides up to 30 seconds of memory — twice as much as other delays. There are fully adjustable Delay and Dump functions, and a Sneeze function which "edits" audio entering the delay, allowing the host to sneeze, cough, or make a short comment without being heard on air.

The BD600 offers two different methods of delay build-up and reduction: Eventide's catch-up and catch-down system, and an exclusive fast-entry-and-exit feature which allows starting a broadcast with the delay already built up to a safe amount and ending it with a rapid reduction of delay.

For HD, the BD600 offers MicroPrecision Delay™ mode which allows up to 10 seconds of delay to be adjusted in real time in 100 nanosecond increments. This is useful for synchronizing analog and digital signals while on-air, without audible artifacts, to maintain a seamless user experience.

Whatever your size, whatever your format, you can't expect to protect the integrity of your air and the foundation of your business without an Eventide Broadcast Delay in your rack.

Eventide®

HD COMPATIBLE

Eventide is a registered trademark and MicroPrecision Delay is a trademark of Eventide Inc. ©2005 Eventide Inc.

The Harris Vistamax Control Center captured the attention of this crowd.

50kW AM transmitter

Broadcast Electronics

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

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

What the judges had to say:

"The modulation technique is innovative, and the amplifier efficiency is amazing."

"I like that each module has its own power supply."

HD Radio on-air processor

Omnia Audio

EXI Series: The EXI processors add new tools for HD Radio broadcasts. An on-board diversity delay method and an advanced clipper design help eliminate intermodulation distortion (IMD). The diversity delay capability moves the audio delay required to match the analog and HD Radio signal paths from the exciter to the audio processor. This simplifies the audio path and eliminates a failure point in the audio chain. The Lo IMD Clipper featured in the processor reduces the IMD that is created when using moderate to aggressive clipping to create competitive loudness.

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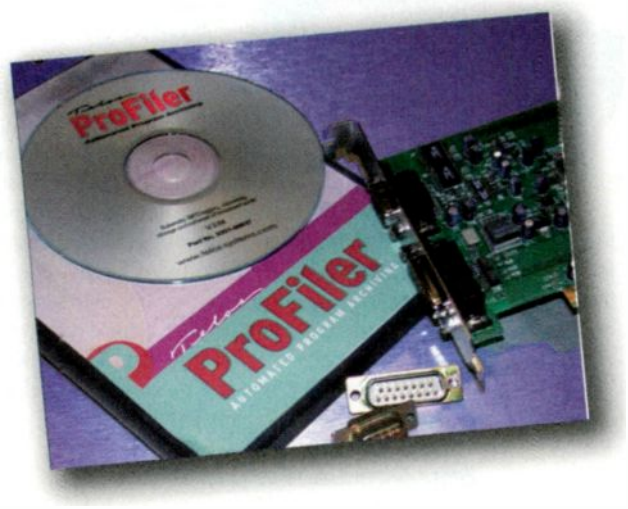
BSI

Telos ProFiler:

More Than Just A Logger...

A Programming Tool



Telos

216-241-7225
www.telos-systems.com

Telos ProFiler **is the efficient, cost effective way to automatically log your radio station's program audio and/or your competitors simultaneously using industry-standard MP3 audio compression technology. Configure it once, and ProFiler runs unattended, making time-annotated MP3 files for space efficient digital recordings of your station's audio.**

Archived audio can be auditioned locally or remotely via LAN, WAN or the Internet. Perfect for group PDs, consultants, or others who need to monitor program content. Files are stored in easy-to-retrieve, time stamped 15-minute blocks. Segments can be posted to a station website for post-broadcast internet listening or e-mailed as audio files for content review or spot confirmation for clients. Adjustable bitrate allows for broadcast quality archiving for "best of" programming.

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Two Channel Audio Logger:
$2,195 for an integrated System complete with Intel P-4-800 computer, 250MB hard drive, flat panel display, and Profiler Sound Card/Software. NOTE- Multiple channel loggers and custom PC configurations available. Call for details.

The Radio Hall as it looked just as the first attendees were allowed inside.

Portable recorder

Marantz

PMD660: Featuring a built-in condenser microphone with automatic level control, one-touch digital recording to Compact Flash cards, on-board editing with mark segment, a virtual track mode for playback and instant audio access to the preset marked points, the recorder is a solid-state media recorder with one-touch digital recording. It can record for four hours running on four standard AA batteries. Uncompressed WAV files can be recorded at 44.1kHz or 48kHz, and MP3 files can be recorded in mono at 64kb/s or in stereo at 128kb/s.

630-741-0330; fax 630-741-0652; www.d-mpro.com; info@d-mpro.com

What the judges had to say:

"The XLR connectors are perfect for broadcast use."

"The recording presets will reduce recording errors."

Computer sound card

Audio Science

ASI6044: Replacing the ASI4344, this audio adapter provides multiple streams of MPEG Layer 3 playback and record. The sound card also provides four balanced stereo outputs, four balanced stereo inputs, four record streams and eight play streams. As well as MP3, other format choices include MPEG Layer 2, Dolby AC2 playback and linear PCM. The analog circuitry uses 24-bit oversampling converters to deliver more than 100dB of dynamic range with THD+N better than 0.002 percent. The adapter supports MRX and TSX technology. MRX enables playback, recording and digital mixing of multiple audio streams of any sample rate.

302-324-5333; fax 302-738-9434

www.audioscience.com; sales@audioscience.com

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- highest quality materials
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- precision crafted
- professional features
- many options available

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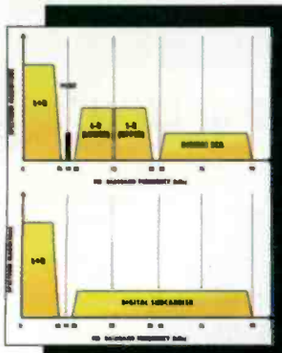

Radio encoder

Digital Radio Express

FM Extra: This encoder enables broadcasting of multiple digital signals on an existing FM carrier with flexible architecture that can use any available SCA carrier space. The unit offers expandable bandwidth, riding on up to 99kHz of baseband on standard FM exciters. It will work on IBOC stations or non-IBOC stations. The unit is capable of more than 128kb/s. The encoder can also be used to broadcast true discrete 5.1 surround sound, equivalent to Dolby Digital 5.1, and can broadcast multiple independent audio streams to provide multi-channel programming.

408-956-8707; fax 408-956-8748; www.dreinc.com; contact@dreinc.com

What the judges had to say:

2005 PICK HIT

"The audio quality is impressive."

"The compatibility with HD Radio offers some interesting possibilities."

Portable HD Radio monitor

Audemat-Aztec

Navigator HD: This compact monitor allows engineers to conduct field surveys and on-site monitoring of a station's complete FM and HD Radio signal. The frequency-agile unit measures analog (RF, modulation, audio, pilot, RBDS) and HD Radio parameters (QI, C/N, DA, DAAI, SIS ID). The unit accessed with Windows-based PC software and includes a GPS receiver for mobile measurements. Measurements can be read from the front panel or stored on a PC. Data can be exported into third-party programs such as Mappoint for automatic mapping of signal parameters. It includes one headphone jack to verify tuning, plus multiplex and auxiliary connectors for custom applications. A calibrated FM antenna is included. Every data point and system setting can be accessed from a connected computer.

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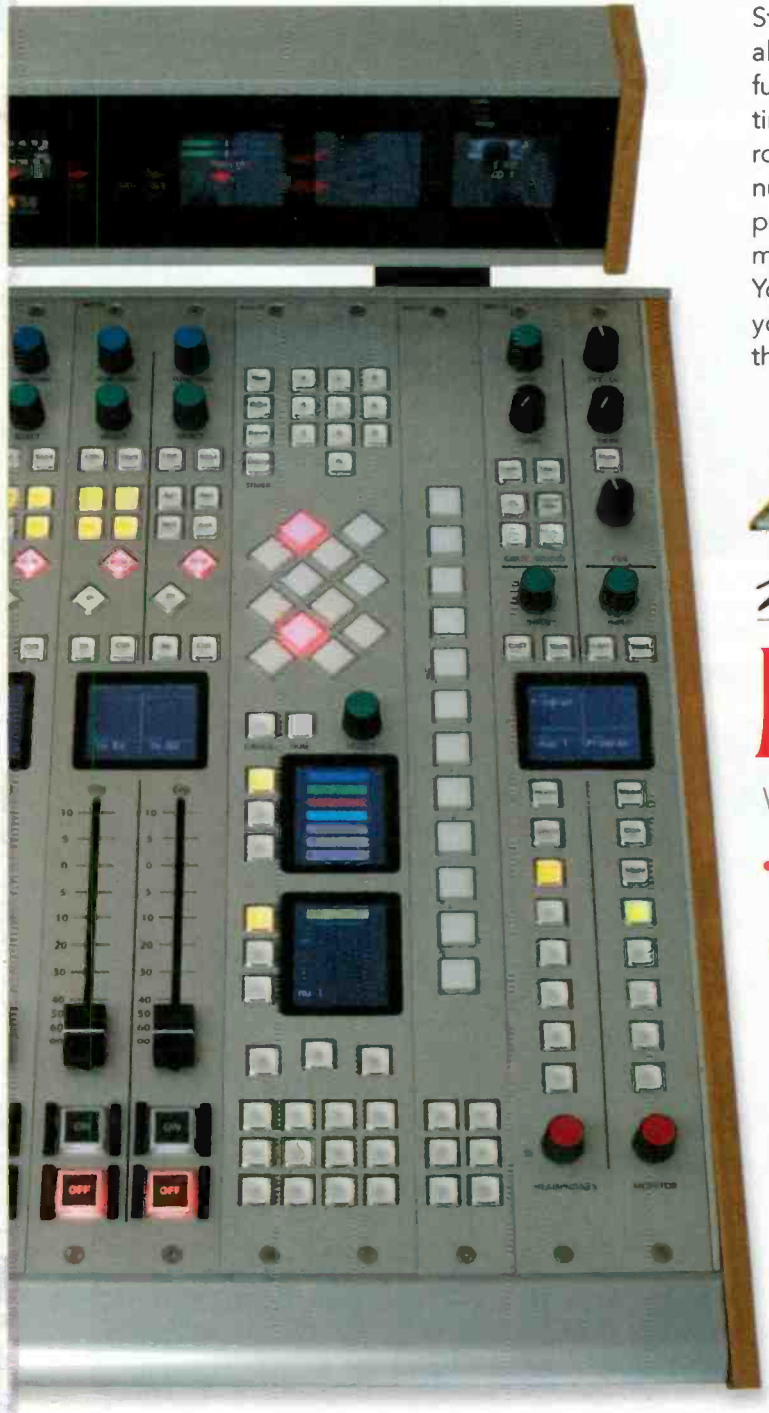
Audio ingest system

Pocketrec

Pocket Backend Server-Enterprise Edition: This system enables clustering for an ingest system and thereby provides the redundancy to ensure consistent operations. The technology also includes processing for an unlimited number of delivery chains. This package manages the content created and edited on the Pocketrec and transmitted via Pockettrans to the Pocket Backend Server. The server processes and distributes all data, audio, text, metadata and images directly into a radio automation system via export agents that are already available for most major radio automation systems.

571-218-7766; fax 703-281-1074
www.pocketrec.com; hardware@pocketrec.com

How to build the perfect console.



Start with a flexible routing system that can accommodate all of your facility's audio distribution, along with intercom functions, EQ and dynamics processing, profanity delays, timers, and more. Next, select the right frame size for the router's control surface. Populate the frame with the number of faders you want, along with programmable pushbuttons, countup/countdown timer controls, and meter bridge with extra graphic displays. The result? Your console, exactly as you want it, with the functionality your talent craves and a sleek design that complements the studio perfectly.

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Logitek
Console Router Systems

NAB2005 Pick Hits Rules

1. Products must be new and not shown at a previous NAB Spring Convention. In some cases, distinguishing a new product from a modified older one is difficult. For "Pick Hits" purposes, a new product is one with a new model number or designation.

2. Products must have some positive impact on the intended user's everyday work. Judges search for equipment intended for use on a regular basis. Products should provide new solutions to common problems.

3. Products must offer substantial improvement over previous technology. Unique circuit architecture need not be included, but some new approach or application must be involved in the product's design.

4. The price of the product must be within reach of its intended users. The judges seek products appropriate to a wide range of facilities.

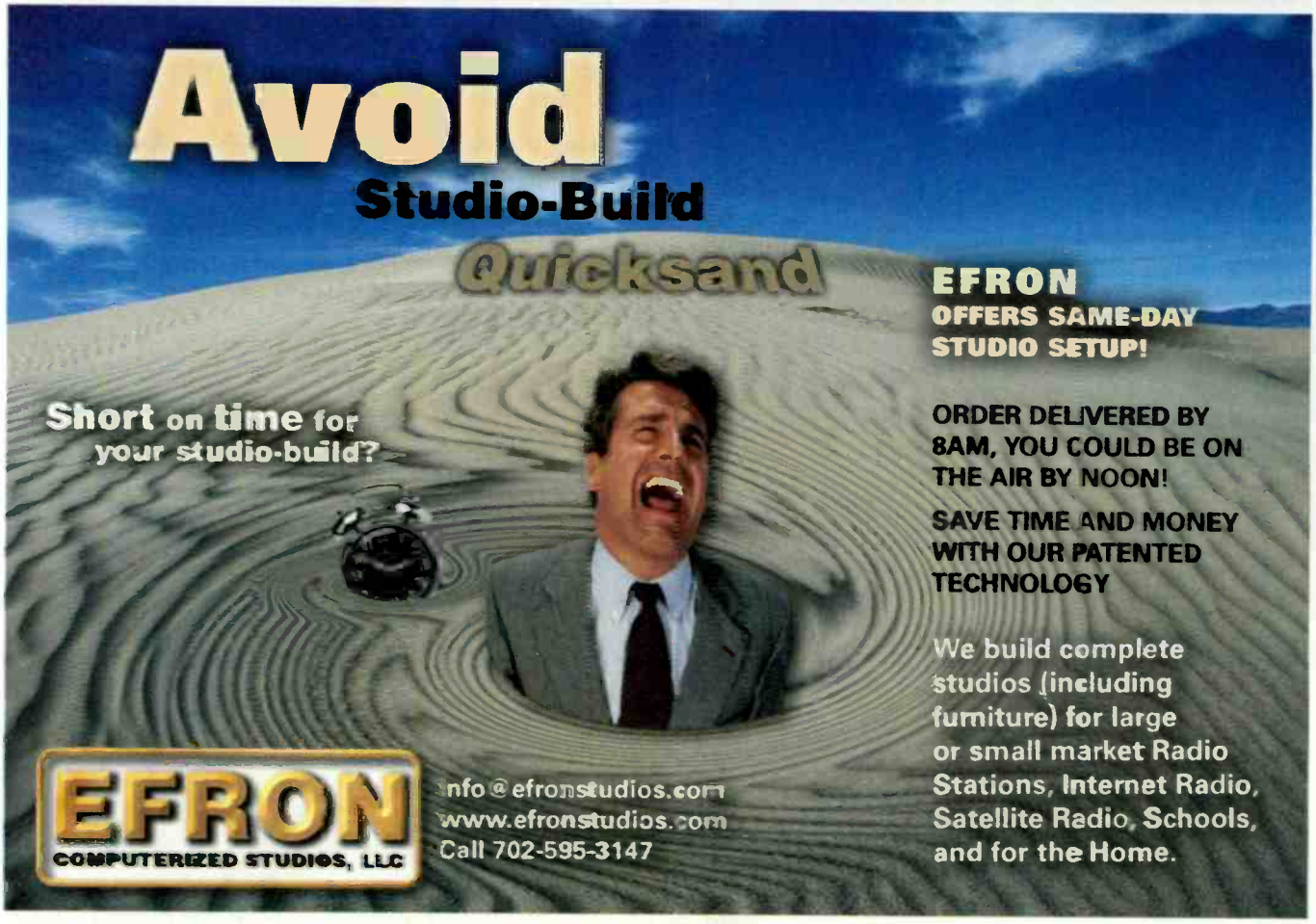
5. The products must be available for purchase within the 2005 calendar year. Equipment must be on display on the show floor, currently (or imminently) in production, and some type of product literature *must* be available. Judges take the exhibitor's word on availability dates. Products demonstrated in private showings do not qualify.

6. The Pick Hits judges operate independently from one another and remain anonymous to everyone including other Judges until the selection meeting. This ensures that the products chosen are truly representative of the industry, that the judges were not persuaded in any way, and that the entire selection process was fair as possible. The Judge's identities are published in the June 2005 issue.

7. The editorial staff of *Radio* magazine serves only as a moderator during the final selection process and has no influence or decision in determining the winners.

Unlike other awards given at the convention, Radio magazine has clearly defined rules that are used to establish the winners. Radio magazine believes that ambiguous criteria, such as making the judges simply say "oh, nifty," is ridiculous.

Surrounded by sound, surrounded by glass: Neural Audio lets the curious test its "terrarium" sound booth in the Harris exhibit in the Central Hall.



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Facility management system
Statmon Technologies

Axess: A scaleable network-based remote control and real time monitoring system, Axess provides system operators and engineers with accessibility to a SQL database; automatic RAS dial-up and dial on-demand; enhanced security with enhanced 128-bit encryption safeguards; an event viewer in crystal reports format; and SCL and OVI improvements. Using Internet Protocol, this system allows operators to monitor and control devices and equipment (sensors, RF controls, HVAC systems, security alarms, tower lights) including single or multiple transmitters at a site or multiple sites in different locations. The system is Web-enabled, has SNMP capability and serial device plug-ins that reduce installation and configuration time, powerful logging and alarm notification features and automated EAS functions.

310-440-8053; fax 310-278-6585; www.statmon.com; info@statmon.com

FM receiver, translator
Inovonics

Model 631: This equipment is the second generation of frequency-agile, digitally tuned receivers for FM translator and other critical off-air reception applications. Featuring menu-driven access of display and function selections, the translator provides a switchable IF bandwidth to help solve difficult adjacent-signal problems and readouts of signal strength and multipath distortion to aid antenna alignment. Selectable options and alarms may be remotely controlled or monitored and high-resolution bar graph readouts provide indications of incoming RF and MPX/stereo audio levels.

800-733-0552; fax 831-458-0554
www.inovon.com; info@inovon.com

Analog stereo matrix switcher
Broadcast Tools

ADMS 44.22: The ADMS 44.22 is a four input stereo AES and four input stereo analog matrix switcher with two independent stereo analog and AES outputs in a 1RU profile. Each input is equipped with a three band EQ, five types of filters and a leveler function. Any or all of the inputs may be mixed, faded, dimmed to either or both output pairs. Additional features include selectable stereo VU meters; headphone amplifier; powered monitor output; 16 x 16 GPIO port and RS-232/USB port. The switcher is also equipped with an expansion port allowing a second unit to be added, increasing the inputs to 16.

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

Frank Grundstein waxes enthusiastic about the new Logitek console surface and control software.

Pick Hits Judges

Bud Aiello, CBNT
Director of Engineering Technology
National Public Radio
Washington, DC

Gordon Carter, CPBE
Chief Engineer
WFMT
Chicago

Bill Croghan, CPBE
Chief Engineer
Lotus Broadcasting
Las Vegas

Steve Fluker
Director of Engineering
Cox Radio, Orlando
Orlando, FL

Gary Kline, CSRE CBNT
Corporate Director of Engineering
Cumulus Media
Atlanta

Kent Kramer, CBRE
Director of Engineering
Radiovisa
Los Angeles

Mike McBride
Chief Engineer, Wichita Operations
Journal Broadcast Group
Wichita, KS

Marshall Rice
Engineering Director
Bonneville International
St. Louis

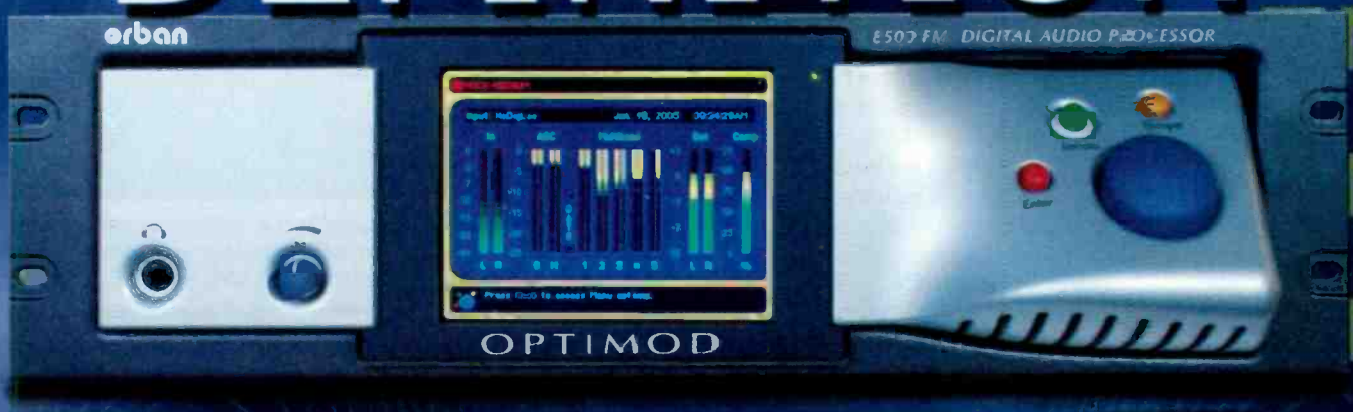
Barry Thomas, CPBE CBNT
Vice President of Engineering
Westwood One Radio Networks
New York

Current monitor
Pulizzi Engineering

TPC2976: This new current monitoring and power control system is a 19" rack-mount control panel with two individual current meters. The power draw of each piece of equipment can be individually monitored on the front panel current meters. This allows the user to accurately identify power draw without external meters. This can prevent equipment downtime by ensuring proper system loading. The unit also features an on/off/start switch and emergency power off switch. The start switch uses a latching circuit that prevents the equipment from automatically restarting after a power outage. The red EPO button can easily be pressed in an emergency situation, placing the equipment in a safe shutdown. The unit is 1.75"H x 7"D. The unit features an all-steel enclosure. The standard model features a 120V,20A power input with a derated output of 16A. The front panel includes a 20A supplementary circuit protector.

800-870-2248; fax 714-641-9062; www.pulizzi.com; sales@pulizzi.com

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.

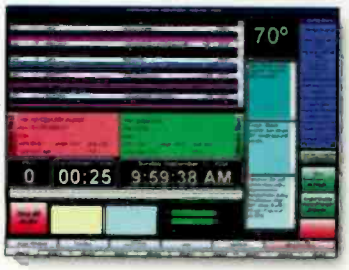
Ethernet is now built-in. Of course, you can also control the 8500 via modem, serial connection, GPI, external RS-232-interfaced automation, or internal clock-based automation with Internet time sync—the 8500 is always easy to integrate into your facility, regardless of complexity. And we've retained 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

NAB2005



Automation software
Digital Juke Box

Digital Juke Box: The software runs on Windows XP and supports MP2, MP3, WAV and Ogg files. It can operate in full automation, live assist modes, satellite or any combination of the three. There are 50 instant-fire hot buttons for cart emulation. The included music scheduler can build logs and playlists. All audio and data files are always safely backed up the production system. The software offers built-in digital editing, voice tracking, time and temperature announcing and on-screen weather updated twice an hour automatically from weather.com. It uses off the shelf computers and any windows sound card.

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

Muhammad Ali's boxing-daughter Laila (second from left) was a star attraction in a live sportstalk broadcast at the Efron Computerized Studios booth in the North Hall.

Monitor, control translators
Airsis

Translator Monitor 2000: This product allows the user to monitor and control translators in remote towers via satellite and the Internet. From a desktop, users can monitor and manage the translator network, get alerts of impending failures and send commands to fix problems. Users can also change the alert thresholds or event triggers from a Web-enabled PC. The monitor is a plug-and-play solution consisting of the hardware monitor and AirsisVision, the company's Web-based management service. It provides the near real-time monitoring, alerting and report of the translators.

619-585-0435; fax 619-585-0474; www.airsis.com

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Broadcast CD player
Tascam

CD-601MKII: With its comprehensive remote control and flexible monitoring and playback options, users can select between online play (on the air) and monitor play (pre-listen), controlling whether CD playback reaches the on-air mixer or the monitoring device. The optional RC-601MKII remote control allows frame-accurate search using the jog wheel, direct location using numerical keys, index searches or flash starts. The player can save as many as 10 cue points per CD, controlled directly using the Flash Start function. Pitch control, auto cue with five threshold levels, auto read and CD text are also features of this product.

323-726-0303; fax 323-727-7635; www.tascam.com; tascamlit@tascam.com

Noise-canceling headphones
AKG

K 28NC: The entire K 28NC package—miniature folding headphone, noise reduction filter with clip, airplane and stereo adapters—fits in a carrying case a little larger than a pair of sunglasses. The headphones employ acoustic and electronic systems to reduce ambient noise. The closed-back earphones help isolate the wearer from noisy environments. Electronic circuitry uses subminiature microphones integrated in the earphone shells to pick up low-frequency ambient noise such as jet engine roar. The active noise reduction filter reverses the polarity of the noise signal, generating an exact image. The noise and its opposite reach the ear simultaneously, canceling each other out while leaving the music or soundtrack virtually untouched.

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

Router display software
Logitek

Vscreen: This software is a PC application for the company's console router systems. Vscreen allows users to design custom operator interfaces consisting of faders, meters, buttons and graphics in any desired configuration. Users configure the software application with drag and drop. Starting with a blank screen, console and router control elements are pulled onto the screen and placed where desired. Any combination of faders, meters, control buttons and custom graphics can be placed on the screen.

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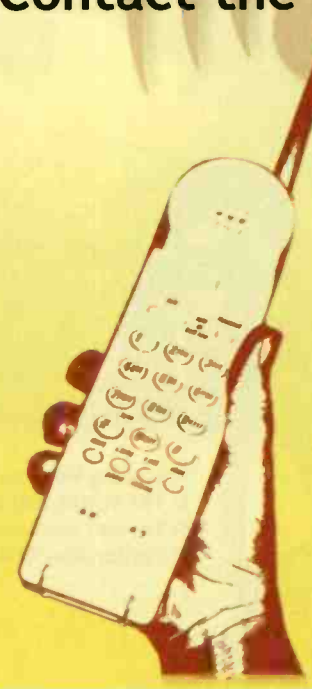

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WMET

1) Looking into master control from as you enter.
2) The WMET talk studio comfortably seats six people.
3) The call screen booth is at the rear of master control.
4) Production Director Jim Cuddy works in main production.

Bigger is Better

By Allen J. Singer

WMET-AM finds the space it needs in Washington

How can seven employees get their work done in a radio station that is so small, there is literally no room for them to do their work? With great difficulty. This is the problem that plagued tiny talk-station 1160-AM, WMET in Gaithersburg, MD. The lack of space in its 700 square-foot suite built in the early '90s had become such a nuisance its sales staff and station manager had no choice but to work from home. WMET contained enough room for only an on-air studio and production room. And located inside the production room were the kitchen, a waiting room and the station's only office. There was no room for staff, no room for more than two people participating in a talk show and no room for any kind of expansion.

Somewhat a rarity even in the 1990s, WMET was owned by one person; when it was built, the station really did not need much room. Its format was talk radio, and its staff was minimal. By the end of the decade, the equipment in use included aging Tascam reel decks, consumer-grade minidisk and cassette decks, a BTSG automation system, and surprisingly, no cart machines. But what made matters worse was that quite a few engineers had traversed the hallways over the '90s, resulting in poor wire labeling and minimal planning. Setting equipment levels and troubleshooting problems were nearly impossible.

Changes abound

IDT Capitol, a telecom, entertainment and technology company, bought WMET in 2001. With a large budget and full support from its new ownership, management made immediate plans to move the station out of its hole in Gaithersburg and into a brand new showcase studio 20 miles away in downtown Washington DC. A larger facility and close proximity to the nation's capital would allow WMET better access to guests from the government and other national offices. And if WMET was going to successfully obtain the business it needed to survive, the station required a larger physical area for its proposed increase of offices and personnel. IDT owned some office space in a suitable building just seven blocks from the White House.

The downtown site was deemed perfect for a new facility and IDT gave them the keys. Working with management and fellow staff members, Chief Engineer Brian Rose surveyed the available 6,000 square-foot office space and created floor plans with CAD. He designed the facility around the talk studio, selectable via router in the three different studios. This setup offers flexibility for live programs and prerecording shows to be aired later. The offices wrap around the studio, designed so support staff could be more closely involved in on-air operations.

Management hired OTJ Architects of Washington, DC, to translate Rose's drawings into blueprints, and local general contractor Corbett Construction went to work in December 2003. In three months the

Equipment List

Acoustics First 1014 Acoustikits
Airtools 6100 delay
Behringer HA4400 headphone amplifiers
Electro-Voice RE27 ND microphones
Focusrite OctoPre and Voicemaster mic processing
Furman MS2AD1 confidence monitors
Furman PL-Plus power conditioners
JBL 4410 monitors
LPB Silent Mic Boom microphone booms
Mackie HR824 powered studio monitors
M-Audio BX8 powered studio monitors
OMT Adcast, Logger, LogTools, Oplog32 and Production
QSC CX 2 amplifiers
Sennheiser headphones
Shure KSM27
Sony CDP-12 CD players and MDS E-10 Minidisc
Telos 2x12 phone system w/ Assistant Producer
Telos Zephyr
Tieline POTS and ISDN codecs
Wheatstone Bridge router, D-16 console and D-8000 console

Bigger Is Better

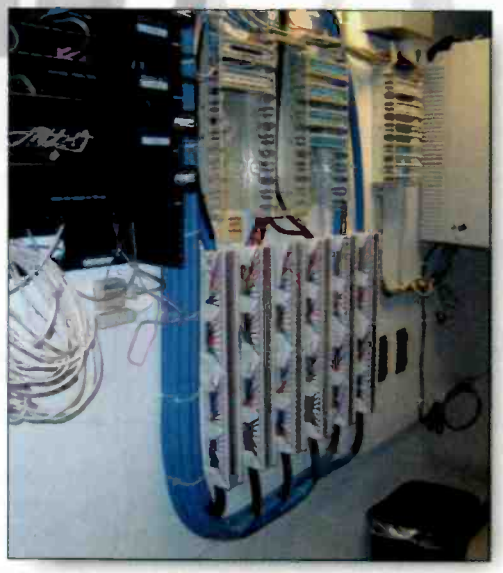
shell of the facility was built. Through the next few months, Rose and two contract-engineering companies installed the studios and equipment. During this time, the furniture was brought in and offices were equipped. At any given time, they had between five and 30 people working depending on the day and the task.

Overall, the project went smoothly except for a problem with the HVAC system. The rack room and studio needed more cooling than the building could handle, so they had to install three additional units totaling 15 tons of cooling for the studio area. Some materials used in this construction had to be custom-built, which caused them to get behind schedule. The HVAC now includes two separate units for the studio and office spaces with an additional five-ton cooler just for the rack room. Also, the station had a slightly bumpy ride during the switchover in November 2004 due to telecom issues with its T-1 line and the PRI service for the phone system. Once those problems were ironed out, WMET went fully live from Washington, DC.

Flexibility first

The new WMET facility consists of a main on-air control room, a talk studio usable by any studio, two production rooms and a rack room. All studios and their support rooms including mechanical and electrical take up about 2,000 square feet. Combinations of sound-dampening materials were used in the studio walls. Acoustics First 1014 Acoustikits were installed as wall treatments. Inside the walls are a vinyl barrier between two sheets of sheetrock and the walls are covered with Acoustics First wall fabric. WMET now enjoys sound isolation like it never could have had before.

All of the studios received new equipment; nothing from the old facility was salvaged. A Wheatstone Bridge Router with 112 inputs and 128 outputs was installed to carry the analog and digital audio throughout the complex on traditional snake cable. Unlike other modern installations, at WMET CAT-5 cable only carries control signals—no audio. A custom-built patch bay for all router inputs and outputs on XLR was located in the studios and rack room. An OMT Imediatouch automation system was installed. This system includes the Oplog32 On-Air, Production, Logger, Adcast and Log Tools modules. It was chosen for its past performance at Liberty Broadcasting. CBSI was chosen to handle traffic.



The audio, control and telephone cross connect blocks are on the wall behind the racks.

The main control room contains a new Wheatstone D-8000 console, chosen for its similarities to the analog consoles the staff was familiar with, but containing advanced features and capabilities

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needed for running the station's talk format. Wheatstone D-16 consoles were installed in the production studios, which gives staff the flexibility of digital but functionality of an analog console. Because the consoles can share audio and closures, the necessary audio sources, including satellite and station program feeds, were placed into each of the control rooms. Otherwise, production rooms contain everything they need, except one production room contains an additional microphone for host or voice talent. An added green room looks through the main control room into the talk studio, and the call screen booth has a line-of-sight and IFB to the board-operator and host.

A Harris Intraplex frame with a full T-1 takes the program audio to the transmitter site located in Gaithersburg. The T-1 carries digital and analog audio to the transmitter site, and includes six channels of satellite audio brought back from the satellite dish at the transmitter site. Four channels of serial data also ride on the T-1 line, as well as an extension of the studio LAN.

The rack room houses the servers, audio router and other equipment.

When the facility was finished during the winter of 2004, the staff moved in. It wasted no time acclimating to the new router system and digital workstations located on operations staff desks. Although the project took a little longer than planned, the end result is an efficient, more productive work environment. The studios and offices are eight times larger than their old, cramped facility, and the staff of 25 is having no trouble finding elbow room. Using their new studios and new equipment, the locally produced shows sound much different, and their on-air product has a noticeably fuller sound than before. Aside from the usual tweaking and adjusting of software templates, the new production and automation software is working great. Station breaks and show elements fit together much cleaner now, and station imaging shows prominent improvement.

Coming in the spring of 2005, WMET will add a voice booth and another production room for spot and imaging production. And with its increase of power to 50,000W in the summer of 2004, the station's signal now reaches from Richmond, VA, to Baltimore, MD, with access to millions of new listeners. WMET promises to blend "substance and style" to deliver serious radio to its DC audience. The station's mission is much easier now that the staff doesn't have to worry about doing their jobs in the kitchen. The only thing they'll miss from their Gaithersburg location is the luxury of having the refrigerator at arm's length while they work on production.

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

Facility Focus
the technology behind WMET

What is the Facility Focus?

The Facility Focus provides an up-close look at the technology in use at the facilities featured in *Radio* magazine Facility Showcase articles. The highlighted manufacturers are leaders in the industry, and the Facility Focus allows them to showcase their products and services.

Turn to the Facility Focus for the insight on today's leading products and services in use in the top radio facilities.

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Heil Sound PR-30 and PR-40

By Tim Wright

Clear Channel Chicago was recently given the opportunity to review a couple of new microphones from Heil Sound. In case you haven't heard of the new kid on the block (the company refers to itself as the new sheriff in town), Heil Sound has been making microphones and accessories for the communications and amateur radio market for a number of years. Recently, the company moved into the broadcast market with a series of classic look-alike microphones. In fact, we purchased the Heritage model microphone a year ago for photo shoots for our oldies station. It looks just like the microphone used by Elvis in the 1950s.

The latest offerings for the broadcast market are the PR-40 and PR-30 dynamic microphones. Designed for performance without the associated cost, the economy version, the PR-30 boasts a frequency response from 40Hz to 18kHz, while the PR-40 lowers that bottom end to 28Hz. Both microphones are an end-fire design with a cardiod pattern. According to Bob Heil of Heil Sound, the microphones were designed to perform like a condenser microphone, but without the phantom power requirements. This makes them an ideal choice for field recordings.

PR-40

Performance at a glance - PR-40

Copper-wound dynamic
Neodymium magnet structure
Steel case
600Ω impedance
XLR Connector
Internal humbucking coil
-53.9 dB output at 1kHz
1.5" diameter low mass aluminum dynamic element
Frequency response from 28Hz to 18kHz
Weighs 1.2lb with optional shock mount

In an A/B comparison using my voice, I can hear little difference between the two microphones. I made the comparison without microphone processing, and monitored myself with headphones. As with most dynamic cardioid microphones, there is a bit of a proximity effect when working the microphone closely. A quick test of off-axis response showed excellent rejection of unwanted sounds.

Birds of a feather

The PR-40 is by far the more robust of the two microphones, and should stand up well in a tough broadcast environment. It compares favorably in all aspects to the well-known brand of broadcast mics that the industry has accepted as a de facto standard, except that it costs one-third as much. It even fits in the shock mount designed for that other microphone. Heil Sound also sells shock mounts designed specifically for its microphones. The SM-3 fits the PR 40 and the SM-2 is designed for the PR 30.

The PR-30 feels lightweight compared to its big brother, but that is not all bad if it is going to be used for field recording. Performance was as expected, and for the price was exceptional.

Because I lack the golden ears possessed by several of our production directors, I passed the PR 40 microphone along for their review.

Bill Cochran, creative services director of WNUA had a chance to work with the PR-40. He noted that it provides ample warmth and more than enough crispness. While his mic processor was set to work with the mics he regularly uses, he found that he could achieve satisfying results with the Heil. Because it is a dynamic mic, he thought of using one for the station's occasional remote location recording. He could grab a recorder and a Heil mic and be ready to roll with audio that won't require a lot of tweaking when it's complete.

The production director of our three urban stations also put them through some paces, and was pleased with the results. Once again and as was expected, the settings on the mic processor had to be adjusted. He observed that it could not handle really high sound pressure levels, like the

high-end German-made mic he uses at home, but he quickly noted that the Heil mics don't have the same German price tag either.

A fellow employee suggested that it would be really cool if these microphones could be modeled by the software mic modeling companies. This would make a solidly built, good sounding, yet inexpensive microphone even more desirable to the home studio user. Through the software filters it could be made to sound just like that high-end German microphone, or many others for that matter.

The bottom line: for the money, this is an excellent microphone.

Wright is senior studio engineer at the Clear Channel stations in Chicago.

Heil Sound

P	618-257-3000
F	618-257-3001
W	www.heilsound.com
E	info@heilsound.com

Performance at a glance - PR-30

Dynamic mic with Neodymium magnet
Steel case
600Ω impedance
Internal humbucking coil
-52.9dB output at 1kHz
1.5" diameter dynamic element
Frequency response from 40Hz to 18kHz
Weighs 15 oz.

PR-30

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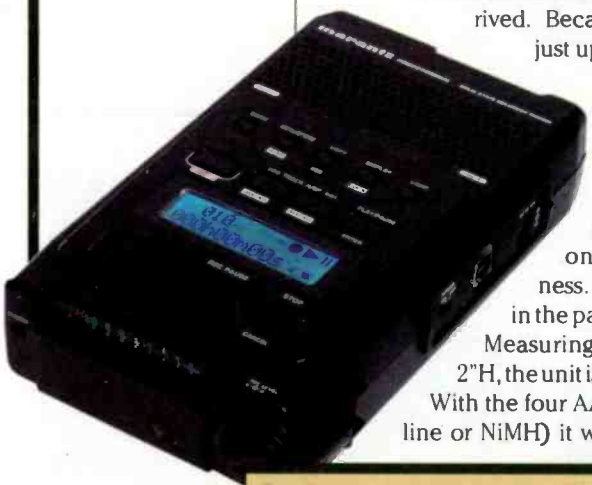
Marantz PMD660

By Chris English

When I learned that Marantz was releasing a new all-digital recorder, I was excited by the advertisements. It looked to me to be the smallest recorder to date, and if the features the ad proclaimed were true, it would make this new breed of recorder a must-have. So, after a week of drooling over the ad, you can imagine my surprise when my GM told me he was thinking of purchasing two new recorders. When he asked me if I had any ideas, I jumped on the opportunity to get my hands on the new unit.

We placed our order, and within a few weeks the first of the shipments arrived. Because the dealer is just up the road, we really were one of the first broadcast stations to use the unit.



Marantz did not disappoint on the compactness. The PMD660 fits in the palm of your hand. Measuring 7"L × 4.5"W × 2"H, the unit is highly portable. With the four AA batteries (alkaline or NiMH) it weighs in around two pounds.

Performance at a glance

- Compact size
- Long recording times
- Dual XLR mic jacks
- Built-in stereo mics
- Line in/out via 1/8" stereo jacks
- ALC gain control

Included in the North America kit is a carry strap, ac adapter, RCA 1/8" Y adapter, securing screws to lock the Compact Flash card inside, a 64MB Compact Flash memory card and a USB cable.

The PMD660, like a good number of units on the market today, uses Compact Flash memory cards to store the digital audio. The amount of record time depends on the size of the card used. The unit will accept any card size. We had just more than 11 minutes of recording on the included 64MB card using the mono PCM 44.1kHz setting. It can be set to record in mono or stereo audio, and at 44.1kHz or 48kHz rates in MP3 or WAV formats. Files can be accessed directly by an audio editor but needs no software to move files to a PC.

The unit includes two XLR mic inputs (L/R), stereo line in and out on dual 1/8" jacks and phantom power. The audio we recorded in the field for use in commercials was studio quality. The internal stereo mics worked surprisingly well, and, while not necessarily my first choice for interview recording, for a conference room table it can't be beat.

The recorder also includes an eight-stage LED VU meter that can be customized through the menu options, as can the manual and automatic stereo level control. The ALC works well, however, the VU display will sometimes show an excessive level even though the audio level does not exceed the limits. The first time we tried it, I immediately put the audio into the computer to listen. It looked good and sounded even better.

Easy to follow

One of the features I like about the unit is the menu hierarchy. With a quick read of the manual you can access all the menu items and customize the recorder to suit your needs. Some of the options include the ability to quickly select one of three presets, and settings for input, output, recording format and channel, prerecord and silence skip.

The prerecord feature buffers two seconds of audio while the recorder is in record pause. This is handy for users who like to grab the mic and start talking even before the unit is actually rolling. The silent skip feature does just that. When the audio falls below a preset level, the unit pauses recording, saving memory.

I found the ability to manually or automatically mark sections of the recording useful, and the backlit display makes it easy to read in any light. Markers can be set during a recording for Virtual Track edits. This can save time in the production room on long-form projects. The backlight on the LCD display has a classy blue glow to it.

The unit includes a USB port. The supplied USB cable connects to a computer, so that when the unit is in disk mode it will appear as a disk drive.

High marks

There are few negatives about the recorder, but I do have some concerns. The small speaker that is built into the unit performs as expected. It's not spectacular, and because of its size has a limited frequency response, but, for reviewing a take in the field, it does the job.

This is an all-digital unit, so gone are the days when I could

The connector panel on the PMD660.

order more pinch rollers or heads. Any repairs to the main unit itself would probably have to be made by Marantz or one of its authorized repair houses. My other concern is the headphone jack. Unlike some other digital recorders, the jack built into the PMD660 is 1/8" stereo. Although I haven't had any problems so far, I've seen too many instances in other units where the 1/8" jack fails and has to be repaired. I'm a fan of 1/4" headphone jacks on recorders, but because of the compact size of the unit, maybe a compromise had to be made.

Overall, the Marantz PMD660 is a great recorder, and a good value for the money. Whether you're recording interviews, commercials, news bytes or three-hour full-mixed concerts, it does the job exceptionally well, and is ready to go right out of the box.

English is chief engineer at WVLG-AM in The Villages, FL.

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Comrex BRIC

By Tom Hartnett

Broadcast Reliable Internet Codec (BRIC) technology has been under development by Comrex for some time. It holds the promise of a new and flexible way to deliver high-quality live remote broadcast audio over a variety of IP-based networks like DSL, cable modems, high-speed cellular and 802.11x (Wi-fi). It's the latter that is especially exciting, given the widespread deployment of hotspots in an increasing number of restaurants, bookstores, airports and other easily accessible locations.

To the Comrex engineering staff, the theory that BRICs would prove useful over Wi-fi was sound, but too often the real world leaves theory lacking. So on March 30, 2005, an unseasonably warm and sunny New England day, the engineering team set forth boldly to test BRIC on as many publicly available hotspots as possible.

The prototype system used for the field tests on public hotspots. The apparatus was carried in a laptop bag to hide its omnious appearance.

The final hardware for the Access codec (the first codec to truly be a BRIC) was still underway so we used a prototype system. Because the package resembles a typical incendiary device, and not desiring to alarm to public or the authorities with our testing, we placed the system in a laptop bag, which could be left discretely at our feet while the system was remote controlled by a harmless-looking laptop.

Getting started

Our first stop was Panera Bread Company in Chelmsford, MA, a popular coffee shop that has become the world's largest free Internet provider, with 537 stores offering unsecured Wi-fi access. Because we had limited battery power, we were pleased to have found a cherished table near an ac outlet.

Once we had ordered our coffee and pastries we prepared to connect to a public Wi-fi with BRIC for the first time in history. We had visions of Alexander Graham Bell at that moment his telephone first came alive, having spilled his drink and beckoned Mr. Watson for help over the invention. But our excitement was soon muted when we found that our wireless access card couldn't connect to the Panera access point. Inquiries about the health of the Wi-fi network among the baristas and bakers met with the expected quizzical looks and shrugs.

We decided as a last-ditch effort that a new Wi-fi card was in order. Luckily, the chosen Panera was adjacent to a Wal-Mart, retailer of all things useful and otherwise. I found the computer section of the giant store, and obtained the required hardware easily.

The replacement card did the trick and we were soon happily connected to the Panera Bread network. We connected to another prototype BRIC located at the Comrex lab, (which was wired in an analog loopback configuration) and sent audio across the link in full duplex. Our chosen audio source was a book-on-CD playing from a CD-walkman. So it was that day that the first sounds transmitted over this breakthrough technology were from *Harry Potter and the Goblet of Fire*.

The two key factors in using the public Internet for real-time audio are stability and latency. The nature of BRIC is that audio is broken into packets and sent off into the ether in hopes they will arrive at their destination quickly and in

What's a BRIC?

The telephone network is undergoing dramatic changes. As the popularity of voice-over-IP (VoIP) and broadband Internet explodes, telephone companies are finding significant cost savings in converting their networks away from the traditional circuit-switched data format to packet-based formats. This has profound implications for users of ISDN and POTS codecs, because in the coming years it may be difficult for telco networks to support these devices.

Meanwhile, a lot of work is being done to make voice transmission reliable over the public Internet. Although most systems only support telephone-quality audio, the coding algorithms used are quite resilient to the congestion problems that plague the Internet.

Broadcast Reliable Internet Codec (BRIC) borrows this resiliency from the VoIP world and blends it into wideband, low delay, broadcast-ready hardware. Wideband mono and stereo coding algorithms are supported. BRIC allows remote broadcasts to be generated from virtually any location where an Internet link can be established, whether wired or wireless. BRIC allows full-duplex transmission over cable, DSL, Wi-fi, dial-up and the increasing number of 3G cellular services becoming available.

Allowing backwards compatibility to legacy POTS codecs, BRIC provides a natural evolution allowing broadcasters to leverage the Internet for remote broadcasts while maintaining the ease-of-use and reliability they've come to expect from ISDN and POTS.

reasonable order. The only way to compensate for packets that are received late is to add a buffer at the input to the decoder, so that all packets will be received and ordered before decoding. The size of this buffer dictates the overall time delay of a particular link. Therefore it's important to find the sweet spot on these networks, balancing acceptable packet loss with reasonable delay.

At Panera we found that a solid connection was possible with a one-way audio delay of about 150ms. This put the delay in the same order of magnitude as a POTS codec, which seems workable for broadcasters. Optimism ensued as we headed toward our next destination.

Just up the road a few miles was the business district of Nashua, NH. Located on the state line, and benefiting from the lack of a sales tax, this area is a retail mecca. It also blossoms with wireless access points, we found out as we cruised the main throughway. Our laptop lit up with dozens of Wi-fi networks; some secure, but many wide open. Our destination was Borders Books, whose café includes a T-Mobile-provided hotspot. T-Mobile sports

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a subscription model, and we were taken aback a bit at paying $6 to $10 (based on package chosen) for our one-time test. But regular users get a better deal. The T-mobile connection was solid at a similar 150ms delay setting.

We made a quick stop at a nearby Starbucks, which also supplies Wi-fi via T-mobile. Because this network had already been tested, we made a quick attempt to connect via the car. But shortly after we got our system booted and signal acquired, the caffeine took its toll as one of our engineers moved the laptop bag slightly the wrong way and dislodged the battery connector, killing power to the system. Rather than reboot and reconnect we went in search of a different network to try. Next stop: McDonalds.

Powered by a company called Wayport (which also provides access in many airports and hotels), the McDonald's Wi-fi network is perhaps the most ubiquitous. But our engineers rebelled against actually going in (vegetarians make lousy alpha testers) and we were relegated to the parking lot. Things went smoothly this time, however, and we were soon running our first mobile test. Delay and stability were reasonable on this link, as we could achieve solid performance with only slightly over 100ms latency. We tooled around the parking area a bit and lost our signal only when a large delivery truck passed between us and the restaurant. We found traffic able to block Wi-fi quite effectively. We thought the $4 daypass charge to use the network was still high, but a Wayport subscription could bring this cost down.

We lost the sounds of Harry Pottter as we re-entered the highway, but we continued on toward the UPS store where we tested their publicly available access point. Flush with our McDonalds success we opted to try it from the car, which worked quite well at the 250ms delay setting. This was the highest latency we found, and may have had more to do with the fact that we were parked 100 feet from the storefront than anything else. The UPS store access was also pay per use but had the advantage of allowing charges to a range of other Wi-fi subscription services, so if you already have an account elsewhere you can simply input that information to gain access.

A second network appeared on our laptop as available during this test. The ID shown on our laptop was simply "JT" but it was fairly strong throughout the area. We pinpointed the signal as coming from a local car dealer's parking lot. We surmised they offered free wireless to

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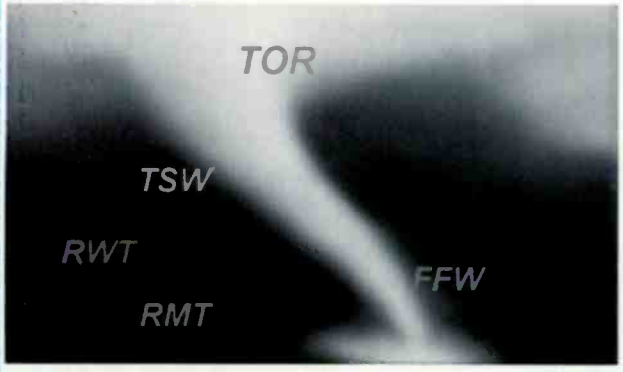

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The test crew on the road and searching for the next hotspot.

customers waiting for repairs. Because car dealers are popular sites for remote broadcasts we felt it our duty to run the test. We caught a few odd glances from the occasional salesman in the lot, but managed to secure a reliable connection with about 200ms delay.

Discrete snooping

We continued on sniffing commercial and residential areas alike, and found several wide open, accessible Wi-fi networks. With wireless routers costing less than $50, the number of systems online wasn't a surprise as much as the lack of security. It's not rocket science to set these routers so they can't be easily piggybacked. I suggested strongly that we resist the temptation to piggyback on any banks or law offices we found. But our laptop battery soon ran down anyway and we had to pack in our wireless adventure.

It should be noted that piggybacking on an unsecured private wireless network is probably deemed illegal in most jurisdictions, although the illegality of doing so without intent to hack anything really hasn't been tested in court. But this really shouldn't be necessary anyway, because legal public Wi-fi is now so widespread. And with the advent of BRIC, all these now become points of origin for remote broadcasts, news and sports with high-fidelity, full-duplex sound and reasonably low delay.

Hartnett is technical director of Comrex, Devens, MA.

New Products

By Kari Taylor, associate editor

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Solid-state recorder
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ARES-BB+: This device records PCM linear (BWF) files that are compatible with any PC or Mac without the need for additional software in the computer. Individual takes can be erased, even in the middle of the card, without deleting to the end as was previously necessary. The installation of a software option allows the machines to also record in the MPEG compressed mode

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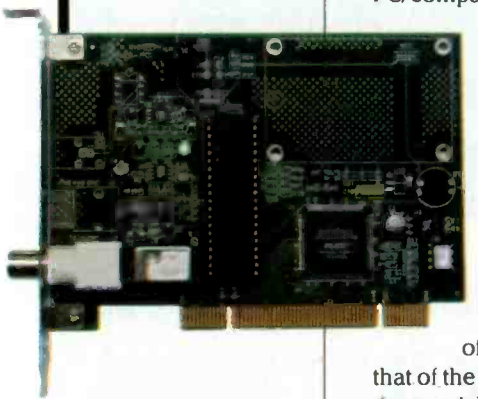

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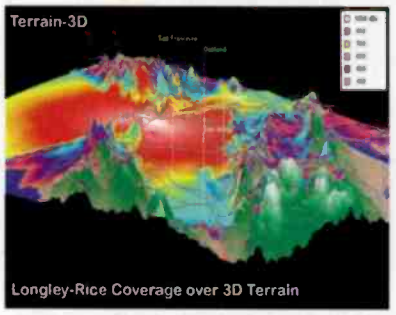

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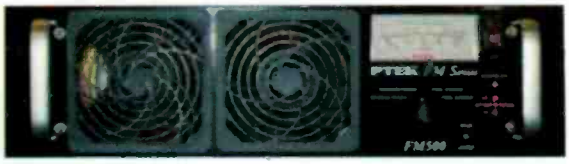

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Technical Editor, RF – John Battison, P.E., *batcom@bright.net*
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Meet the professionals who write for *Radio* magazine.
This month: Field Report, page 60.

Chris English
Chief Engineer
WVLG-AM
The Villages, FL

English began his career in TV engineering for about a year, then turned to radio where he has been working ever since. He plans to take his SBE Certified Broadcast Radio Engineer exam this August. English also serves as a location reporter and producer for WVLG. Before that he was morning host on WOCA-AM Newstalk 1370 in Ocala, FL.

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By Kari Taylor, associate editor

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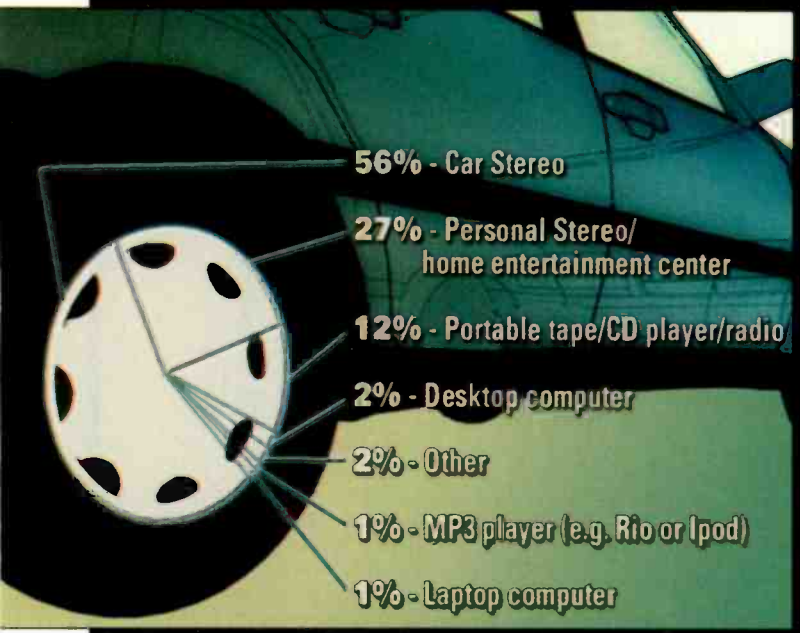
That was then

In 1949, WTIC-AM, Hartford, CT, purchased three Magnecorder stationary tape recorders plus one portable unit. One of these can be seen in this photo in the rack on the left. Al Jackson, an engineer for the station at that time, is checking a transcription disk, which was also used extensively at that time. A microscope was used to ensure that the cut groove was at the proper depth and sufficiently separated from the adjacent cut. The audio console to the right set the level feeding the transcription recorder. In the foreground is a turntable typical of those used to play the transcription disks.

Sample and Hold

Listening habits

What is the single device on which you listen to music the most frequently?



Base: U.S. households
Source: Forrester's Consumer Technographics, June 2004 North American Study. Numbers may add up to more than 100 due to rounding.

Do you remember?

Twenty-two years ago the Otari MTR-10 Series production recorders were available in four formats: 1/4" full-track, 1/4" two channel, 1/2" two channel and 1/2" four channel. Each version provided three-speed

operation with individual equalization and bias, two master bias presets and controlled wind for library spooling. The units offered back timing, an on-board test oscillator, user-adjustable phase compensation and speed display in percentages or IPS. The recorders featured ±20 percent varispeed and an optional 10-memory locator. The recorder's frequency response was 50Hz to 20kHz, ±0.5dB and it offered a signal-to-noise ratio of 75dB.

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Our Generation-5 provides your operators with a straightforward traditional control surface coupled with all the benefits of digital technology. It gives you the flexibility of system-wide source, mix and destination control (any signal any*where*), a powerful mix-minus section and a complete event store, name and recall system. One wire from this surface can control THOUSANDS of wires in your technical operations center.

And while the G-5 *feels* like an analog console, its DSP-based mixing engine keeps your digital sources digital while converting analog sources to switched digital, eliminating crosstalk and noise. It can furnish remote and telcom functionality on any input fader without fear of feedback—a real plus in back-to-back daily operations. Its built-in graphic displays keep operators on top of things with just a glance. And since the entire system is software based, you can accommodate any format with a press of a button.

Like all our Generation Series consoles, the G-5 has complete failsafe options available, such as automatic fail-over DSP and CPU cards and redundant power supplies. We can even provide scheduling software and studio mounted satellite cages that can be configured to mix independently from your main routing system.

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