

# Radio™

THE RADIO TECHNOLOGY LEADER

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# Radio™

THE RADIO TECHNOLOGY LEADER

Radio Magazine

[www.beradio.com](http://www.beradio.com)

October 2003 • Volume 9, Number 10

[www.beradio.com](http://www.beradio.com)

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The digital audio workstation is the new center of the production studio. They have brought speed, convenience and a newfound accuracy to radio production.

Cover design by Michael J. Knust.



## TRACKING DOWN THE STORY MIGHT BE HARD. SENDING IT WON'T.

Unfortunately, the places in the world that make news don't always build the best local communications networks. Which can be a bit of a problem for reporters and broadcasters, especially when live transmissions or urgent news updates are demanded. But, fortunately, Inmarsat has the answer. Or rather, a range of them. Our unique network covers almost the entire globe, with an unrivalled record for reliability. And offers a full suite of Inmarsat Global Area Network solutions, including high-speed voice, data and video transmission; web access; e-mail and fax. To find out how we can help make sure your stories get across, just visit our website at [www.inmarsat.com/media](http://www.inmarsat.com/media)

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## Currents Online

Highlights of news items from the past month

### People on the move

- Bill Gould Joins Moseley
- Walt Lowery Joins RF Specialties
- John Bisset Joins Dielectric
- SBE National Election Results Announced
- Burk Appoints New Managers

### Harris Conducts DRM Tests in China

The demonstration, conducted in late August at the SARFT transmitter site outside of Beijing, showed that Harris DX medium-wave radio transmitter systems can be converted quickly easily and cost-effectively.

### Rohn Tower Files for Bankruptcy

The company and five of its direct and indirect subsidiaries have filed voluntary petitions for Chapter 11 relief in the United States Bankruptcy Court for the Southern District of Indiana.

### FCC Forms Approved and Available

The FCC's Office of Management and Budget (OMB) has approved the reactivation of forms 301, 314 and 315.

## Site Features

### 10 Years of Radio Magazine

In addition to the period retrospective in each issue, view the cover gallery and Pick Hits review from *Radio* magazine's past.

### Currents Online Weekly E-mail

Get the headlines delivered to your e-mail box every Monday morning. Subscribe today.

### Applications & Solutions

Looking for articles on a particular subject? The *Radio* magazine website has them organized for you.

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## A great save

The IBOC system, branded HD Radio by its developer, Ibiquity Digital, got a shot in the arm in August when a new audio encoding algorithm tailored for the terrestrial digital system was introduced. The new algorithm, called HDC, was developed jointly with Coding Technologies. Coding Technologies is the creator of Spectral Band Replication (SBR), which enables improved audio quality at extremely low bit-rates. You may know Coding Technologies as the creator of the "Plus" in AAC Plus, the AAC encoding enhancement.

The announcement came at an opportune time. The NRSC had suspended its evaluation of the IBOC system because of the audio quality. It has since reactivated its work. With the ongoing delays with a widespread IBOC rollout, rumors abounded about the future of an IBOC system. For now, the work appears to be moving forward again.

The coding issue has always been a sore spot for IBOC. Lucent's PAC algorithm was showcased as the system to use, but it had always been under fire. It was part of the IBOC mix from the merger between USA Digital Radio and Lucent Digital Radio in 2000. Previously, USADR had used AAC. AAC was also used in the tests that were in the reports submitted to the NRSC. PAC had no track record and no submitted test data to back the claim that it was ready. However, broadcasters knew the score and made their voices heard.

According to Ibiquity, HDC had been under development for some time, which was a well-kept secret. The payoff looks good, as reports from listening demos show that HDC makes the grade overall.

Some demo CDs were made available to NPR personnel for evaluation. I also received a demo CD and was able to play it in several environments, which allowed me to explore the nuances in the system.

The demo CD contains 10 audio source

samples. Each source is presented in seven formats: the original source, FM analog, HDC at 96kb/s, HDC at 64kb/s, AM analog, HDC at 36kb/s and HDC at 20kb/s. Two of the samples are spoken voice (male and female), one is classical, one is a typical promo/commercial and the remaining six are various styles of rock and pop.

The comparison between the source material and FM and AM analog broadcast quality provides a baseline reference to current technology. The analog samples are listenable and have the conventional sound of our current technology. In my own listening tests, which were not blind, I was able to hear differences between some of the encoding schemes, but the differences were not troublesome.

Obviously the highest bit-rate (96kb/s) sounds the best and most like the original. Even with careful listening between the two, it was difficult to tell the difference if I could hear one at all. As I switched to the lower bit-rates, some subtle differences began to appear.

At 64kb/s, I could sometimes hear a slightly metallic edge to the audio, particularly in the high frequencies. The 36kb/s samples had a reduced stereo separation and the high frequencies did not have the same sparkle (slight high-frequency roll off) as the original. At 20kb/s, there was no stereo separation and the high-frequency roll off was more pronounced, but it was still listenable and a marked improvement over current mono AM.

All the differences I detected were subtle. Unless a listener was able to directly compare the original source to the encoded version, I don't think that he would be able to tell a difference. It appears that the Ibiquity team has found a good solution to the audio encoding problem, and I congratulate them on their accomplishment. Now that this major obstacle is out of the way, work can continue in the other areas.



Chriss Scherer, editor  
cscherer@primediabusiness.com

### Find the mic and win

The *Radio* magazine Find the Mic Sweepstakes is back. Find the hidden mic icon on the *Radio* magazine covers of 2003 and you could win a Neumann mic, Sonifex mic preamp or LPB mic boom. Full details are coming in December.

**Send comments to:** E-mail: [beradio@primediabusiness.com](mailto:beradio@primediabusiness.com)  
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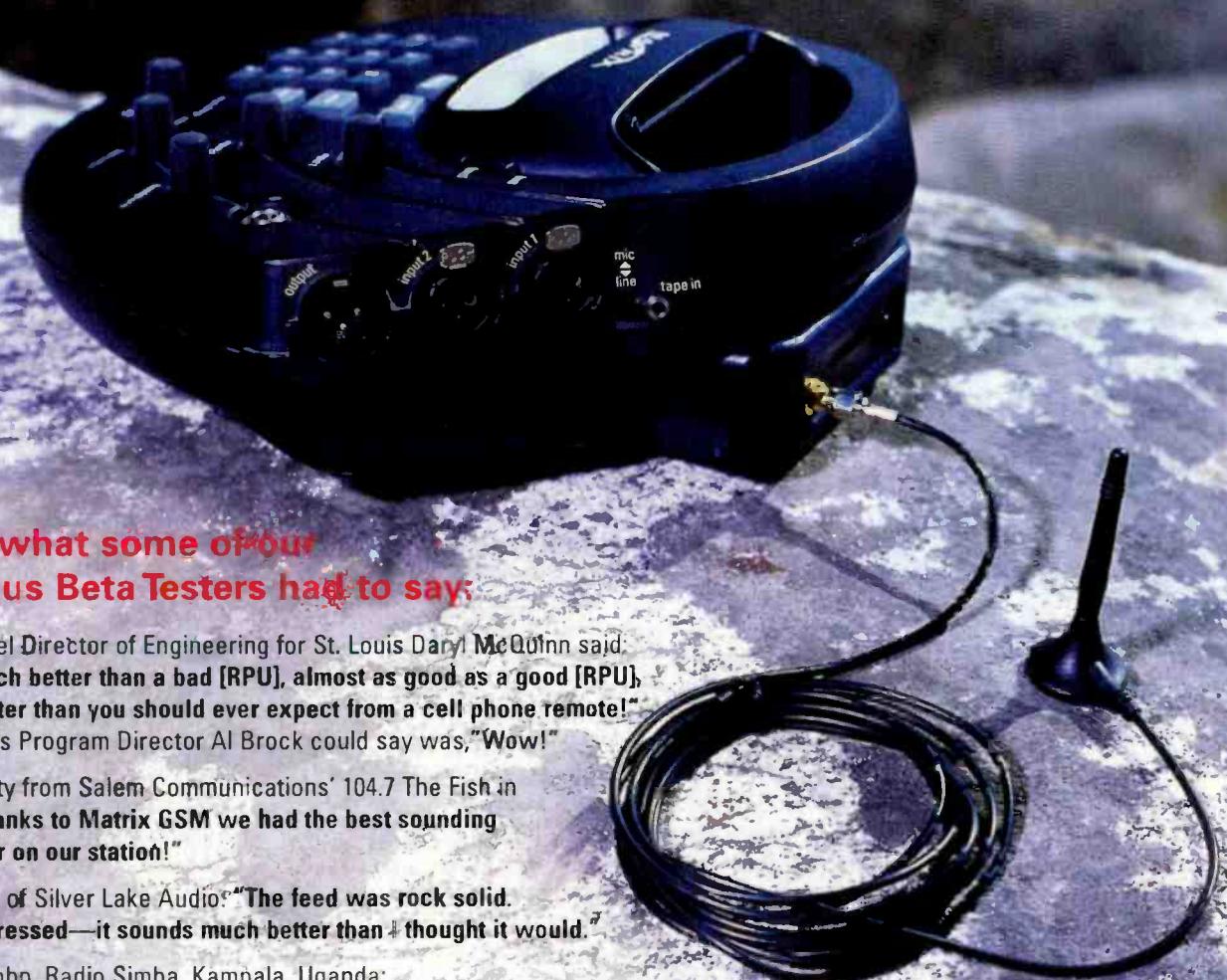
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- New** Remarkably Stable Modem Technology.

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## Here is what some of our numerous Beta Testers had to say:

Clear Channel Director of Engineering for St. Louis Daryl McQuinn said: "Sounds much better than a bad [RPU], almost as good as a good [RPU], and way better than you should ever expect from a cell phone remote!" but all KLOU's Program Director Al Brock could say was, "Wow!"

Shaun Kassity from Salem Communications' 104.7 The Fish in Atlanta: "Thanks to Matrix GSM we had the best sounding remotes ever on our station!"

Steve Kirsch of Silver Lake Audio: "The feed was rock solid. I'm very impressed—it sounds much better than I thought it would."

Collin Mutambo, Radio Simba, Kampala, Uganda: "We are indeed quite impressed."

But our personal favorite, from Jerry Dowd of Jefferson Pilot's WBT in Charlotte, NC: "We hope to keep the betas until you get nasty with threatening letters." Thanks Jerry. We'll take that as a compliment!

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# Managing Technology



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## The value of the subcarrier

By Kevin McNamara, CNE

**T**he FCC originally enacted the Subsidiary Communications Authority (SCA) in 1955. In 1983, the FCC eliminated the licensing requirement for SCAs that subsequently permitted radio stations to use their subcarriers to broadcast essentially anything. Prior to that, they were primarily voice-type services that included reading services, foreign language broadcasts and, lest we forget, the static and hiss laden sounds of the background music services (elevator music). After this ruling, stations could host a variety of new emerging services using not only analog voice information, but also data transmissions. Companies such as Cue Paging and Bonneville Data began to frantically negotiate leasing arrangements with stations in the top 50 markets. In a short time, these companies were broadcasting a variety of subscription-tailored data to end-users. The data included custom news, sports, weather, stock/commodity info and messaging/paging. The value of a subcarrier lease began to climb, particularly to those stations with the largest coverage footprint within their market. Of course, several stations in each market were locked into long-term contracts with the background music services for a fraction of the money offered by the data services.

In 1993, the Radio Broadcast Data System (RBDS) standard was introduced as a means of using the subcarrier to broadcast specific information that permits a receiver to tune stations based on format and provide traffic, program and emergency broadcast information. The receiver manufacturers supported the effort and began to roll-out receivers shortly thereafter. While several stations continue to broadcast RBDS, it doesn't appear to be used to the level for which it was originally intended. Because the individual stations initiate RBDS, it provides no monetary value.

In 2003, most, if not all, of those services are no longer in existence. They have been

replaced by emerging terrestrial services, such as PCS/cellular, that can provide all of a user's information needs within a single pager-type receiver and with a virtually contiguous national footprint. Background music services have moved to satellite-based delivery, where it can also offer a much wider range of content, as well as other data services. Analog reading services still widely use FM subcarriers; however, from a value standpoint, it does not present a significant monetary impact, as these are typically provided by a station free or at minimal cost.

### Alternative data delivery

Wireless data delivery is without doubt the hottest field in telecommunications and the computer industry. The FCC has recognized this and has been continuously working to develop new spectrum that can support this fast growing industry. Let's face it, subcarriers have problems—one-way only transmission, multipath issues, limited bandwidth, signal-to-noise issues, reduced RF footprint (related to the main carrier), poor performance penetrating buildings and a lack of subcarrier-specific receivers. As a practical matter, the SCA is a narrow alternative for the transmission of data.

Value is driven by demand. In the case of a subcarrier, we need to look at alternative delivery methods. As a society, we have grown accustomed to having all of our information readily available in one place. The wireless carriers have generally done a good job responding to this need by integrating voice, messaging and data into a single phone or PDA device.

Additionally, the advent of unlicensed spectrum that can be used for wireless Ethernet transmissions are opening up yet another alternative means to gather information remotely. WiFi hot-spots are continuously becoming available in venues where people eat, relax or otherwise have time to use their laptop computer or any Web-enabled device to send and receive e-mail.

### A new kind of SPOT

If you want to know who is investing money into FM subcarriers, look no further than the computer giant Microsoft. It seems that Bill Gates has a vision to provide a full suite of information to a user's watch using FM subcarriers. Microsoft will create a nationwide subcarrier network called Direct Band that is expected to cover the top 100 metropolitan areas in all 50 states and 13 Canadian cities. The network will use subcarriers from two stations in each city and with an expected throughput of 12kb/s. The software behind this concept is called SPOT, or Smart Personal Objects Technology, which can deliver not only the usual news, sports, weather, traffic and time, but also will permit the user to customize the watch face—definitely something everybody has wanted.



The Microsoft SPOT watch displays subcarrier data from two stations in a market.

# Tieline is the "Clear" choice for POTS, ISDN and Wireless Codecs



**Clark Dixon, Chief Engineer  
Clear Channel Tulsa.**

"We do numerous remotes and have had great success using Tieline codecs. Tielines codecs give us a lot of control we previously didn't have. They are versatile and they perform very well".

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| ■ Entercom                   | ■ Tribune Broadcasting         | ■ Tennessee Titans Radio Network          |
| ■ Talk America Radio Network | ■ Simmons Media                |   |
| ■ Sandusky                   |                                |   |



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Providing data in addition to the audio is a subcarrier function that is being carried over to DAB.



## Traditional data delivery

As an alternative to satellite-delivered data services, Mainstream Wireless markets real-time data delivery via FM subcarrier. The ability to broadcast data to locations that cannot install external receive antennas due to local zoning restrictions is its major advantage. While it sounds like a viable application, the size and form-factor of satellite antennas are becoming almost invisible and it is likely not to trigger jurisdictional reviews, so why not just use the satellite receiver?

A company called C3 Technologies is developing a technology using the FM subcarrier. One such application is called Claricast Digital Wireless Voicemail System. This is a technology that sends subscribers voicemail using FM subcarriers. Here is an interesting application that could prove to be an opportunity for broadcasters. The company is also working on data broadcast applications in the military, homeland defense and public service sectors.

Stratosaudio is another company that is embracing RBDS technology by providing services to create station branding, listener interaction and channel commerce opportunities. The RBDS-ready receiver is the consumer's front end, while a cell phone or Web browser is the back end.

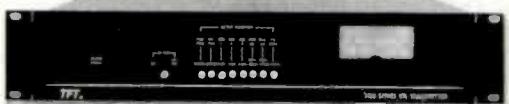
## IBOC and the subcarrier

The advent of digital radio will bring a mixed bag of opportunities and losses for broadcasters. Broadcasters currently leasing the 92kHz subcarrier will likely lose that revenue stream or face the need to replace existing receivers.

Companies such as Impulse Radio will permit broadcasters to leverage the data stream into new forms of business—selling and managing multiple data streams. The applications Impulse Radio uses as examples include: program-associated data, on-demand programming, time-shifting, telematics, commerce, listener interaction, subscription, supplemental audio, messaging, electronic program guide and Emergency Alert System. Think RBDS on steroids and without the subcarrier.

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

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WFMT-Chicago

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**Clint Barrick**  
KOHM  
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## Political Broadcasting 101

By Harry Martin



**W**hether you are in California or Maine, it's election season again. Here is a brief review of applicable laws and regulations governing access to time by political candidates.

• **Right to Access.** The political broadcast rules require stations to provide federal candidates reasonable access to their facilities. State and local candidates do not have the same right of access. Indeed, no station licensee is required to permit the use of its facilities by any legally qualified candidate for state or local public office. However, if a licensee permits any such candidate to use its facilities, it must afford equal opportunities to all other candidates for that office. And that candidate may say whatever he wants because the licensee cannot censor any of a candidate's broadcast material.

• **Qualifying "Uses."** Certain appearances by a candidate do not count as a use of broadcast facilities and do not trigger the equal opportunity requirement. For example, appearances in a bona fide newscast, news interview, news documentary (if the appearance of the candidate is incidental to the presentation of the subject of the documentary), and on-the-spot coverage of bona fide news events do not give rise to equal opportunity obligations.

However, if a candidate's appearance does not fall under any of those exceptions, then the appearance may be what the FCC calls a "use," in which case the door would be opened to all other legally qualified candidates who may want equal time. Once the first use has occurred, a broadcaster must accommodate other legally qualified candidates who request time within a week after the first use.

• **Record Keeping.** Every licensee must keep and permit public inspection of a

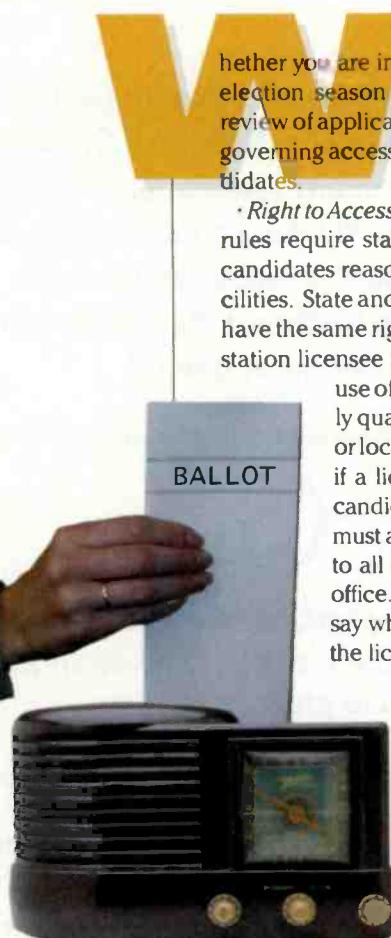
complete record of all requests for broadcast time made by or on behalf of a candidate for public office, together with an appropriate notation showing the disposition made by the licensee of such requests, and the charges made, if any, if the request is granted. Unlike other parts of the public inspection file, the licensee whose main studio is outside its community of license does not have to honor telephone requests for photocopies of the political file.

• **Lowest Unit Charge.** During the 45 days preceding the date of a primary or primary runoff election and during the 60 days preceding the date of a general or special election in which such person is a candidate, a broadcaster cannot charge a legally qualified candidate more than the lowest unit charge of the station for the same class and amount of time for the same period for any ad related to the candidate's campaign. Bonus spots provided to advertisers must be factored into the calculation of lowest unit rate.

• **Special California Issues.** In even a two- or three-candidate race, these rules can be troublesome. Consider California this year, where at last count, there were more than 130 announced candidates for governor. By taking one candidate's spots, stations will open the door to 129 potential equal time requests.

In California there is another perplexing twist: as a technical matter, the current governor who is the subject of the recall election is technically not himself a candidate as far as California is concerned. Does the governor then qualify as a candidate for FCC purposes? The Commission has taken the position in the past that a person who is subject to recall is a candidate under the FCC's rules if the candidates to replace him appear on the same ballot as the recall.

Martin is an attorney with Fletcher, Heald & Hildreth, PLC, Arlington, VA. E-mail [martin@fhhlaw.com](mailto:martin@fhhlaw.com).



### Dateline:

Dec. 1 is the deadline for filing with the FCC the biennial ownership reports, and for the placement of annual EEO reports in the public file, for radio stations in the following states: Alabama, Colorado, Connecticut, Georgia, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota and Vermont.

Dec. 1 also is the deadline for renewal applications for radio stations in Alabama and Georgia.

Prefiling renewal announcements must begin on Dec. 1 for radio stations in Arkansas, Louisiana and Mississippi.

# Logitek Brings Large Console Flexibility

to small workspaces



Remora-10 console at Cache Valley Broadcasting, Logan, UT



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## Possible Remora Configurations

**Remora-4:** four faders with controls for input assignment, monitors, and console functions

**Remora-10 (shown):** addition of six-fader module brings additional mixing capability with another stereo LED meter

**Remora-16:** incorporates Remora-4 base unit with two 6-fader modules

**Remora-22:** incorporates Remora-4 base unit with three 6-fader modules

Logitek  
Console Router Systems

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# Digital Audio Workstations

## The work behind the station

By Chriss Scherer, editor

What was once considered a luxury has become a necessity. Digital audio workstations have proven to be a valuable part of any station's production equipment list. While the power and flexibility of these silent workhorses has increased, the relative costs have declined; a plus for the end user. In addition, the systems have become more specialized. Some are designed for large-scale work; others are designed for fast editing of two tracks. Some started in the professional arena and now offer reduced-feature versions, while some started as high-end consumer applications and have become enhanced along the way. Regardless of the paths they took to become the systems they are today, the variety of features and price points are sure to offer something for everyone.

### Decisions, decisions

Chances are good that your facility already has some kind of digital editing in use. There are some shareware programs available that offer basic functions. It may be that these suit the immediate need. Frequently, once the convenience of a digital system is understood, the demand for more functions, better effects and faster speed quickly follow.

Most DAWs can fit into one of two categories: computer-based and dedicated hardware. The dedicated hardware designs have a computer at their nerve centers, but they are not usually built around a typical computer operating system, such as Windows or Macintosh. Each method has its own unique set of operational characteristics and advantages.

Dedicated hardware systems tend to be self-contained devices, with the transport, editing and storage components built

in. These systems may use an external monitor or have a built-in display. Some may look like computer-based systems, but they do not rely on a host computer for the user interface.

These specialized systems have the advantage of serving a singular purpose. Because they are optimized for a specific function, they tend to be fast and efficient. The proprietary operating system has one major advantage: users will not load games, extra programs and screen savers onto them, saving an extra maintenance call.

The biggest advantage to computer-based systems is that they provide a familiar user interface. Users already familiar with the computer's operating system will feel at home with the same mouse clicks and keyboard shortcuts that they already know.

### Let's talk

Equipment networking is an important consideration for any equipment purchase today, but this is no longer a problem with DAWs, because most are able to connect to other devices in some way. Most now offer a standard communications port, typically Ethernet or USB. The systems that offer some other format can probably be interfaced without excessive trouble.

The networking capability is important to facilities with multiple editing stations. Files and projects can be shared between systems and libraries of sound effects, music beds and often-used material can be accessed as needed. In addition, completed productions can be saved to the on-air playback system in a single step. The system's networking may even support ancillary data relating to the audio file, such as a file name and other pertinent information.



## Resource Guide

A sample of available digital audio workstations.



The Orban Audacy2 has a dedicated analog-feel hardware controller that provides a familiar user interface and transport controls. Units are loaded with Optimod compression, Lexicon reverb and time-fit time compression effects. Multiple units can be networked to central servers or on-air systems via Windows XP. A production import and export feature allows users to condense a complete production into a single file, making it easier for users to bundle all the elements of a multitrack production. It features linear PCM recording with 10 channels and 24-track editing and mixing. Frequently used sound files can be saved to a library for quick retrieval.

[www.orban.com](http://www.orban.com)



Steinberg's **Nuendo 2.0** is a media production system. All program menus are user-configurable, enabling users to hide features not regularly used. The controls for each track can also be configured to each user's way of working. The mixer is user-configurable and can show a variety of display options. The system supports VST and DirectX plug-ins. The software handles MIDI commands and can control and manipulate MIDI devices. It offers unlimited undo/redo as a standard asset. The Edit History window lists all actions made on a project. Track and event actions from other editors over a TCP/IP network are listed as well.

[www.steinberg.net](http://www.steinberg.net)



The Audion Labs **Voxpro PC** is a two-track recorder/editor that can be networked for file sharing. One-button record facilitates operation in any mode. The system can import all popular file formats including MP3, AIFF, WMA and WAV, and it can export in multiple file formats. The control surface provides a jog wheel and transport controls. Unlimited undo and redo levels ease editing. The Voxpro supports an external GPI for machine controls. On the control panel's LCD screen, there are 130 Hot Keys per user available. The system will store as much as 15 hours of stereo or 30 hours of mono recording per 10GB of drive space.

[www.audionlabs.com](http://www.audionlabs.com)



Digigram **Xtrack Audio Suite** (currently on version 4.4) is a full-featured, flexible editor. It features an unlimited number of virtual audio tracks that can be dynamically assigned to inputs and outputs, with unassigned tracks serving as work tracks. Nondestructive editing and processing functions include cut, copy, insert, replace, drag and drop, fill with pattern, adjust to marker, time-stretching, pitch-shifting and track merging. Auto-locate functions allow rapid marking and recall of edit points. A key feature of Xtrack is its ability to create a single sound file in PCM or MPEG format from a multitrack mix, including edits, level automation and track levels.

[www.digigram.com](http://www.digigram.com)

Sony Digital Pictures **Sound Forge 7.0** includes new features such as automated time-based recording, audio threshold record triggering, VU meters for recording and playback, enhanced spectrum analysis tools, DirectX plug-in effects automation, white, pink and brown noise generators, Media Explorer previewing and project file creation. The product will import 15 audio formats and export 17 audio formats. A batch converter facilitates multiple file format conversions. It supports sample rates from 2kHz to 192kHz and 8-bit, 16-bit, 24-bit and 32-bit resolutions. Sony recently purchased the audio editor line from Sonic Foundry.

[www.sonicfoundry.com](http://www.sonicfoundry.com)



The **Sadie Series 5** family offers several configurations, including the PCM4 and PCM8. The PCM4 offers four inputs and four outputs and up to 96kHz/24-bit audio recording. It supports AIFF, WAV and BWF files and DirectX plug-ins. An optional hardware control interface with moving fader mixing is available. Projects can be saved to AIT, DDS, DLT and DVD-RAM. The system fully supports the AES-31 interchange. There are 50 levels of undo, and editing can be done down to the individual sample. Sadie Radia users can upgrade to the Series 5.

[www.sadie.com](http://www.sadie.com)

# Digital Audio Workstations

The SX-1LE from Tascam is based on the SX-1, offering similar features in a scaled-down package. The self-contained system houses the recorder, editor and control surface. It features 100mm touch-sensitive moving faders, automation and simultaneous 16-track hard disk recording at 24-bit resolution. It has 16 mic/line inputs, a 40-channel mix engine, a six-channel stem recorder, a 128-channel MIDI sequencer and an external X VGA output. As many as 999 virtual tracks can be used. The jog/shuttle wheel can scrub audio and MIDI data simultaneously. It includes a 100baseT Ethernet port and expansion slots for 24 more channels of additional analog I/O or digital I/O.

[www.tascam.com](http://www.tascam.com)



Adobe recently acquired Cool Edit from Syntrillium and has renamed it **Audition**. It allows users to record, edit and mix 32-bit files using any sample rate up to 10MHz. All edits are sample-accurate and can be automatically snapped to zero crossings. Short crossfades can be added for pop-free cuts. More than 45 digital signal processing (DSP) tools and effects, mastering and analysis tools and audio restoration features are included. The software also supports third-party DirectX plug-ins. Original, royalty-free, performance-based music loops are available in a wide range of musical styles. Files can be manipulated in an integrated multitrack mixing view or a mono and stereo waveform editing view.

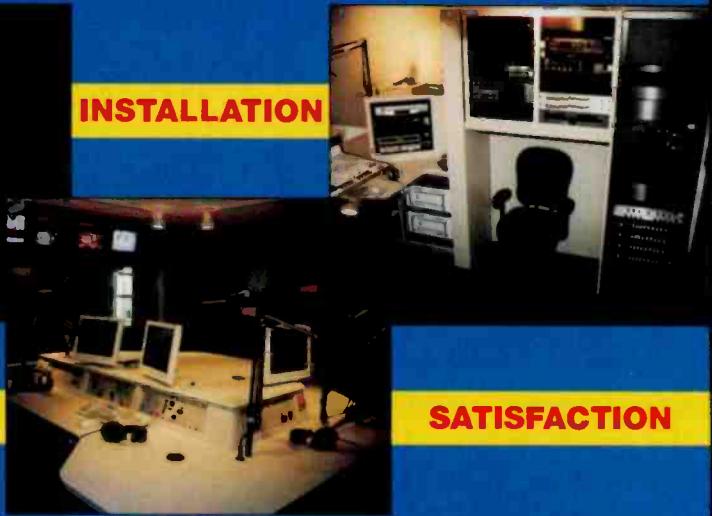
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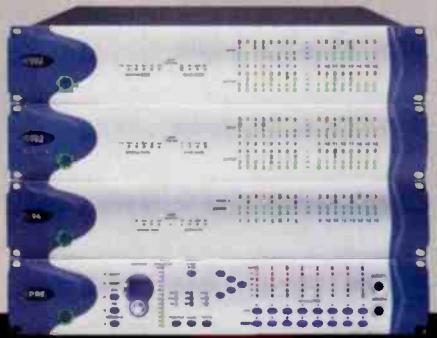
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# Digital Audio Workstations

Digidesign Pro Tools HD offers audio professionals quality and efficiency through an integrated production environment. It is available in three basic configurations: HD 1, HD 2 Accel and HD 3 Accel. Designed for use with a Digidesign-approved PC or Mac, Pro Tools HD system components include the following: Pro Tools TDM software; a Pro Tools HD Core Card; one or two Pro Tools HD Accel cards (with HD 2 Accel or HD 3 Accel, respectively). Each Core system requires at least one Pro Tools HD audio interface, such as a 192 I/O, 192 Digital I/O, 96 I/O or 96i, to handle the input and output (I/O) of audio signals to and from the system. Core systems can be expanded as needs increase.

[www.digidesign.com](http://www.digidesign.com)



The **Dream Satellite** from Fairlight is a 16-, 32- or 48-track digital audio workstation. It is compatible with Fairlight's MFX3plus and QDC-based project formats and provides 96kHz/24-bit audio performance. System sample rates are adjustable in five steps from 32kHz to 96kHz. Four-band parametric equalization can be applied to each clip in a project and set using an interactive screen. Crossfades and fades may be applied to any clips at any time, with a variety of user-defined laws, and all clips have independent real-time level adjustment. All DSP functions are performed in real time, with no rendering required. The Fairlight Medialink audio network provides additional connectivity.

[www.fairlightau.com](http://www.fairlightau.com)



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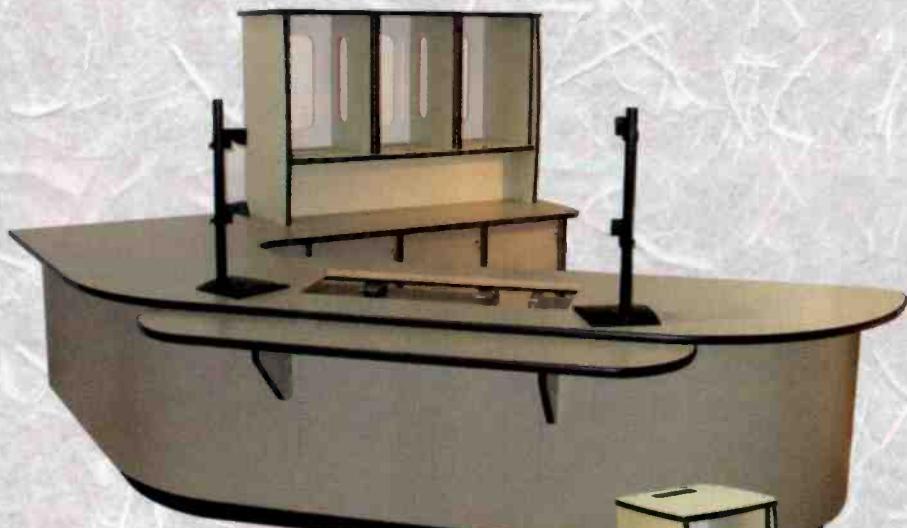
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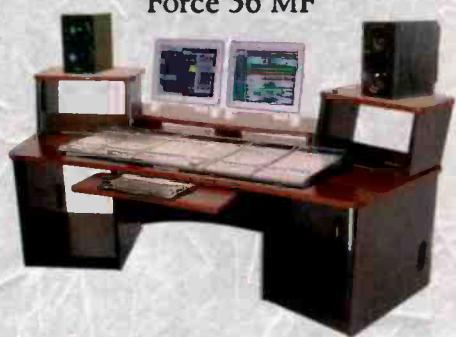
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# Digital Audio Workstations

The Mackie HDR24/96 is non-destructive editor that can lay down eight takes on the same track and then compile them together into a final take. The user can jump to any point in a production in milliseconds and slip, slide and nudge tracks back and forth. The system integrates with Mackie's d8b for extra functionality. It supports 24 tracks and as many as 192 virtual tracks at 48kHz sampling rate. The mouse, keyboard, monitor and 100base-T Ethernet ports are built-in; no external computer is needed. Optional remotes are available from Mackie.



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The 360 Systems Shortcut is a two-track, hard-disk recorder and editor designed for fast editing and playback. The operating controls combine familiar tape machine functions and word processor labeling. The weighted jog wheel provides a simulated tape reel scrub editing, while a waveform display assists with critical editing decisions. One-handed editing is possible because of the grouping of the edit-function keys. Audio clips can be saved and recalled. Hot-Keys can immediately play up to 10 stored audio segments. A file conversion utility allows the unit to share files with other DAWs, and it can read and write WAV, BWF, SD-2 and AIFF file formats.

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# Digital Audio

## Workstations

The Roland VS series of recorders/editors includes the **VS-1824CD**, an 18-track digital recording studio with built-in effects and CD-RW drive. It supports as many as 288 virtual tracks, has a 28-channel automated digital mixing and onboard effects that include dynamics, EQ, guitar amp modeling and microphone modeling. The internal CD-RW allows for easy data backup, creation of audio CDs and direct import of loops into tracks. Additional features include an internal 10GB hard drive, an optional effects expansion board, CD audio capture (file ripping) and an onboard auto-mix function for creating perfect mixes.



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TC Electronic is now shipping Spark 2.8.1. This latest version features support for burning multiple CDs from a single playlist, Audio Units plug-in support for the batch converter and automatic plug-in delay compensation for the playback cursor. In addition, new user settings for the Preferences dialog have been added, as well as preloading-support for Waves' plug-in shell. The edit view features the waveform display with two views for details and overview. Spark runs on Macintosh OS X, requires a G3 300MHz or better with 256MB RAM. A CD burner, Core Audio compatible I/O device and Quick Time 6 are suggested options.

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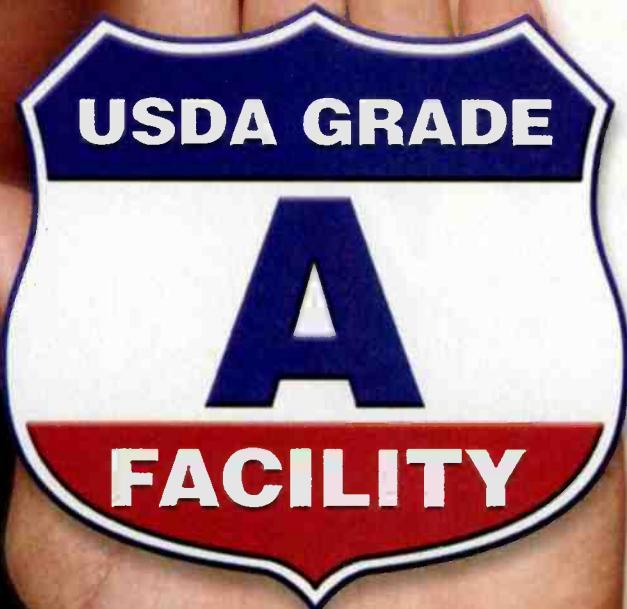
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# PASSING INSPECTION

By David Black



A new seal of approval for the USDA radio facility in Washington

The Broadcast Media and Technology Center's radio news team produces more than 2,000 radio news stories each year, which are accessed by radio stations daily via telephone dial-up service, as well as audio files available to radio stations and the public through the USDA's website. The USDA's radio service includes news, feature and documentary reporting. The service is particularly important to many radio stations in rural areas of the country that do not have a Washington correspondent.

The radio service has always been well supported by broadcasters due to its reports covering issues from food safety to international trade in a non-partisan manner. The Radio Newsline typically has eight to 10 items that are accessible via telephone dial-up and the Internet. There is also a weekly Feature Service, produced by USDA Radio, that includes one documentary, five consumer features and five ag-tape features. These are mailed on CD to 675 radio stations but can also be accessed via the USDA's website. This service has won numerous international and national broadcasting awards.

Several months ago, we evaluated our Washington, D.C., facility. Our team realized that there were several areas in the studio we could improve to provide better service to the studio's users. We began by looking into creating a new talk studio and control room with upgraded equipment, as well as a product that could streamline our distribution of news stories.



The redesigned control room at the USDA.

The first issue the team addressed was the overall condition of the studio, control room and equipment. We use our facility for a number of purposes, including interviews and addresses with Ann M. Veneman, the Secretary of Agriculture. We also produce and distribute official audio for the USDA. Our facility is used by several government offices and departments, such as the Department of Interior. Because of its importance, our facility needs to be in top condition with the most up-to-date equipment. Secretary Veneman believed our old studio was not conducive to interviewing, and she wanted something more comfortable and ergonomically structured.

The USDA wanted to update its communications structure for digital. The ergonomics of the old studio were terrible, so the redesign had to present a more efficient work space that would simplify use. In addition, we wanted to eliminate the obsolete and redundant equipment, increase the accessibility of equipment for maintenance, improve the cosmetic appearance to make the studio more appealing to the staff and visitors, increase the USDA's ability to give presentations and video press conferences and improve the overall system reliability.

One twist for the talk studio is that it serves radio and television needs. It had to be laid out to be amenable to TV camera shots for press conferences.

### Getting started

We chose Harris to remodel the control room and talk studio, and to install the new equipment. Harris began by gutting our current space and removing the old equipment.

After an overall cleaning, the space was painted and carpeted. Because the studio is not a 24/7 facility, the installation was scheduled during off-hour use. For this

installation, security was tighter than would be expected at a traditional office building. The building's security team inspected everything coming in and the installation crew was accompanied around the building.

Custom-designed furniture was built to fit the space exactly. Harris also refurbished the Radiomixer console. The talk studio was integrated with the control room. With the reconstruction, the telephone information services were also improved. We now have an increased capacity for call-ins. In addition, a new radio feature was created for the United States'



View of the equipment rack in the control room.

# PASSING INSPECTION

E-government initiative, where all of our audio is available on the Internet. The reconstructed studio had the features Secretary Veneman was looking for. The studio is now constructed to be more comfortable and conducive to interviews. It has improved lines of sight between the radio show hosts and guests, as well as between the studio and control room.

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**The talk studio was designed with a clean layout.**

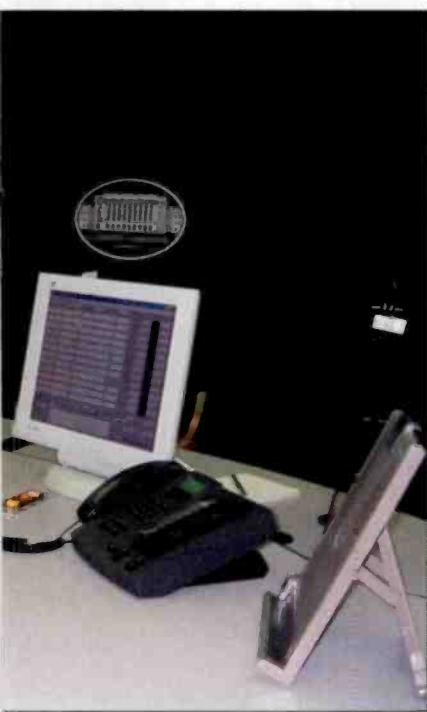
Our second need was to streamline our news distribution process. There is a team of reporters who write articles related to the agricultural business. With the old system, the stories were manually dubbed to analog carts. The USDA needed a tool that would automate the transfer of the audio articles to the telephone system and Web, thereby shortening the process and increasing the amount of information that could be provided.

### **Back to work**

The USDA has three full-time reporters who use cassettes and Minidiscs for field work. Replacement technologies are being considered for the future. Most of the material gathered in the field is from covering Washington events and meetings. When she travels, the USDA Secretary has someone with her to cover events as they occur. The reporters also conduct phone interviews.

Radio stations and the public can call the USDA to listen to feeds, or to listen and ask questions during press conferences and reports.

Efficiency of workflow and the ability to update material easily throughout the day were important. Harris recommended the D.A.V.I.D. system. Loaded audio elements are automatically posted to the website and made available to the dial-in telephone system for remote access. Audio files can



This helps make the variety of guests feel more at ease.

David Black is the director of the USDA's Broadcast Media and Technology Center, Washington, D.C.

be posted in MPEG, Real and WAV formats, as well as in a basic text format. We are now completely tapeless.

There is no formal rack room for the facility. There is a large telephone room with hundreds of phone lines. The servers and computers are in the individual studios.

Initially, we were looking for a small upgrade on the equipment. However, when we saw what new technology was available, we took a giant step. The D.A.V.I.D. system allows us to reach constituents faster with more information. While the team is pleased with the results, the real stamp of approval comes from Secretary Veneman. She has already brought other government officials to show off "her" radio studio.



## EQUIPMENT LIST

D.A.V.I.D. automation systems, installation  
Harris Radioline Furniture  
Harris on-site installation  
Harris World Feed Panel  
LPB silent mic booms  
Refurbished PR&E Radiomixer 20  
Rane HC6 Headphone amplifier  
Sony Minidisk MDS-E12  
Tascam 122MKIII cassette  
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The USDA updates audio files daily at 5 p.m. ET. Listen to the reports by calling 202-720-6776 or accessing the feed through the USDA website at [www.usda.gov](http://www.usda.gov).

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# COUNT EVERY PENNY

By Kari Taylor, associate editor

Frugal or cheap, conservative or tightfisted.

Call it what you like, but keeping track of your money is sound financial advice, especially for those on a budget.

This year's salary survey is intended to help you, the radio industry professional, maintain your income better by providing salary information for various market sizes and job titles.

## Financial Facts

Each year, the *Radio* magazine-exclusive survey is conducted to determine the latest salary trends. In June, e-mailed invitation letters containing a link to a survey were sent to more than 3,700 *Radio* magazine subscribers, who were selected on an *n*th name basis, among radio station and network subscribers.

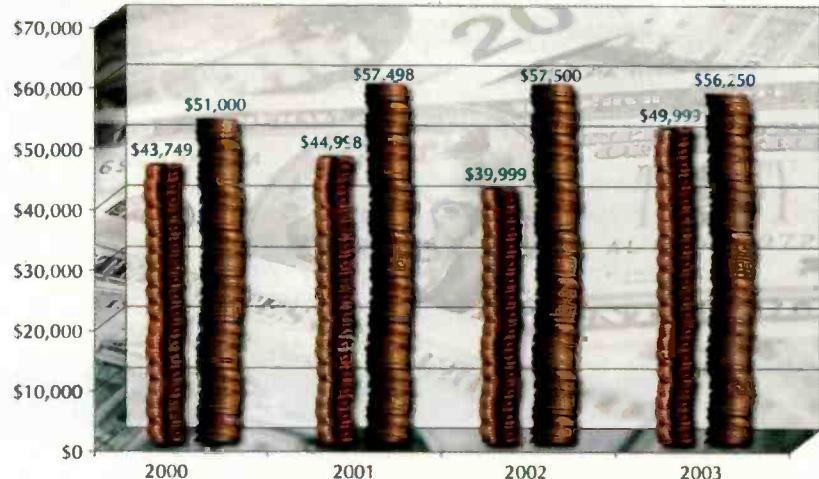
The results of the study are presented by job title group and market rank (Top 50 and Below Top 50). Where appropriate, medians have been presented for numeric responses. The median represents the middle value, or the point where half of the responses lie above and half of the responses lie below the value.

The information gathered in the survey is intended to illustrate broad trends in the industry. Treat the data as a starting point for salary ranges. Factors such as cost of living and the demand for a particular job are also important in determining salary range.

## Estimated Median Salaries for Station Management



Salaries in large markets appear to have decreased slightly in 2003, while there appears to be an increase in small market salaries in 2003.





## Estimated Median Salaries for Staff Engineers



Salaries in both markets appear to have decreased slightly in 2003.

**22**

Number of years the typical respondent has worked in the broadcast engineering industry.

**27.3**

Percentage of station chief engineers who have worked in the broadcast engineering field for 30 or more years.

**9**

Number of years the typical respondent has worked in his or her current position.

**8**

Percentage of VP/GM/station managers who have worked in the broadcast engineering field for less than five years.

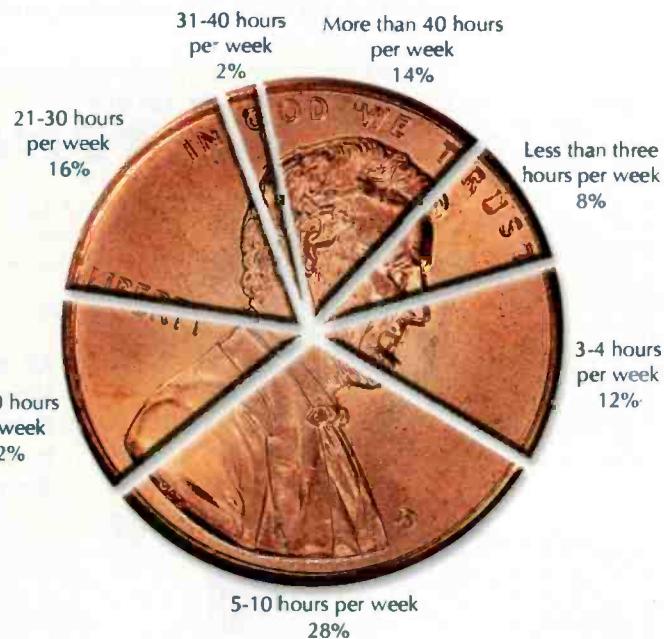
**20.1**

Percentage of respondents in the Top 50 market that have been at their current position for 6 to 9 years.

### What is the average hourly rate for Contract Engineers?



### Number of hours Contract Engineers bill a week



Contract Engineers earn an average hourly rate of \$45 and bill an average of 18 hours per week. Contract engineer respondents are fairly evenly distributed between large and small markets.

# COUNT EVERY PENNY



**Did you receive a salary increase during the past 12 months?**



Less than half of all respondents received salary increases in 2003.

**48.5**

Average age of the typical radio industry respondent.

**16.6**

Percentage of total respondents that are responsible for four to five individual stations (AM or FM).

Salary Increase Percentage	2.0%	2.1%-3.0%	3.1%-4.0%	4.1%-5.0%	5.1%-9.0%	10.0%+
Mkt/Reg Dir/Corp Eng	10.5%	31.6%	21.1%	15.8%	5.3%	15.8%
Station Chief Engineer	21.6%	39.2%	13.7%	17.6%	7.8%	0.0%
Station Staff Eng/Tech	21.4%	39.3%	17.9%	10.7%	0.0%	7.1%
VP/GM/Station Mgrs	4.2%	20.8%	25.0%	25.0%	16.7%	8.3%
Operations Staff/Mgrs	36.4%	9.1%	18.2%	18.2%	9.1%	9.1%
Contract Engineers	14.3%	21.4%	7.1%	7.1%	14.3%	21.4%

Distribution of salary increases by job classification. Of those respondents that received a salary increase in 2003, 21.6 percent of station chief engineers received a 2 percent or less raise, while 21.4 percent of Contract Engineers received a 10 percent or more increase.

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

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# COUNT EVERY PENNY

## Estimated Median Salaries for Staff Engineers by SBE Certification

SBE certification pays off for staff engineers. Staff engineers with SBE certification earned significantly higher salaries than those without SBE certification.



**3** Number of radio stations respondents are personally responsible for (AM or FM) on average.

**18** Percentage of respondents in the Below Top 50 market that have been at their current position for 4-5 years.

**More Info Online -**  
Survey respondents were also asked for feedback about IBOC and its implementation into their radio station. Find out what respondents had to say at [www.beradio.com](http://www.beradio.com).

Copies of the complete survey are available for purchase at \$75 each. Contact Kari Taylor at [ktaylor@primediabusiness.com](mailto:ktaylor@primediabusiness.com) or 913-967-1786 to order a copy.

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# The Best 10 Years of Radio magazine



2000 & 2001

## Time Line

### 2000

- Y2K bug turns out to be a bust.
- The FCC Issues NPRM to establish terrestrial digital radio system.
- The FCC creates LPFM.
- Digital radio makes big splash at CES.
- The FCC rewrites EEO rules.
- The SBE introduces the CBN certification.
- Dot-com businesses boom.
- Ad insertion technology introduced.
- Lucent and USA Digital Merge to form Ibiuity.
- Satellite radio providers launch first satellites.

### 2001

- The FCC is told to rewrite its EEO rules from 2000.
- Dot-com boom goes bust.
- Radiostreaming delivered blow by streaming royalty rates and talent fees.
- CFA antenna tests in the UK are delayed.
- XM Satellite Radio opens its New York offices.
- Arbitron buys RADAR from Statistical Research.
- Ibiuity establishes a broadcast advisory board.
- DRM unveils its system at IFA Berlin.
- Ibiuity conducts listening tests at NAB Radio Show.
- NOA Weather Radio replaces Perfect Paul with new voices.
- Ibiuity supplies final FM test data to NRSC.
- Radio stations are subject to playing royalties for online air play.
- ABC Radio Networks sends DAT/SEDAT transmission.
- Car manufacturers announce plans to offer satellite radios in new vehicles.
- Terrorist attack on New York silences FM and TV stations.
- XM Satellite Radio begins regular service.
- Digital Radio Rollout begins push for DAB in Canada.
- ETSI publishes DRM specifications.
- FCC authorizes software-defined radio receiver development.
- FCC merges Mass Media and Cable Services, creating Media Bureau.
- FCC begins study on ownership rules and radio market definitions.
- NRSC and ITU endorse Ibiuity's FMIBOC.
- Partnership for Public Warning organizes.
- Arbitron PPM completes phase 1 tests.

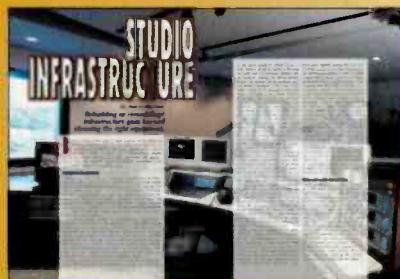
### More online

See the Pick Hits from 2000 and 2001 and a gallery of past covers. Click on the 10 Year logo at [www.beradio.com](http://www.beradio.com).

We continue our retrospective of the past 10 years of *Radio* magazine and look at the years 2000 and 2001. This period saw the peak and rapid decline of the Internet stock craze, as well as the launch of satellite radio. Since our first issue in January 1994, the radio industry has changed in many ways. These installments recall the changes in technology, legislation and our industry in general. Radio is a resilient industry and has forged ahead of all the changes. Through it all, *Radio* magazine has been there, and we'll continue to be there in the years to come.

## You read it in Radio magazine

### Studio infrastructure



Digital audio routing was seeing increased usage, but there were still plenty of analog sources. We detailed cable routing, HVAC, equipment placement, acoustic concerns, equipment access issues and grounding.

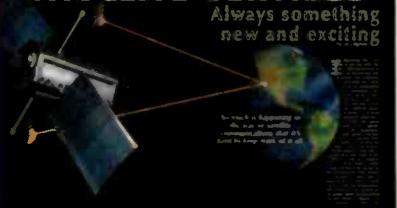
"Digital equipment requires a much different type of grounding system from that which many engineers are used to...that the bandwidth of the ground system is now an issue. For a ground system to be effective, it must maintain a low impedance over a bandwidth from dc to 30MHz."

### Signals from the sky

In the November 2000 issue, we turned our eyes to the sky and investigated the latest in satellite technology. A big change in satellite delivery was about to take place; ABC was preparing to end DATS and SEDAT transmission. At about the same time, Satcom C-5, the home of most radio broadcast satellite programming, was getting ready to be replaced by GE-8. The new satellite change would deliver about twice the power of its predecessor.

And just for good measure, the Starguide system was about to undergo a change for many of its affiliates by upgrading services from Starguide II to Starguide III systems.

### SATELLITE SERVICES



### More signals from the sky



but we took you on an inside tour of both facilities in the November 2000 (Sirius) and October 2001 (XM) issues. (The Facility Showcase article on Sirius received a Bronze award for Editorial Excellence by the American Society of Business Publication Editors.) In the July 2001 cover story, we looked into the technology that makes satellite radio work, including a detailed description of the two orbital methods used by the providers.





Orban/CRL's VP of Product Development, Greg Ogonowski (left), and President, CEO, and Chairman Jay Brentlinger (right), on-board the Orban/CRL Mobile Broadcast Laboratory at the Nebraska Broadcasters Association Convention in Lincoln, NE.

The Orban/CRL Mobile Broadcast Laboratory 2003 USA Tour is in full swing! Orban/CRL President, CEO, and Chairman Jay Brentlinger, sales and marketing personnel, engineers, and the Orban/CRL Tour Crew have made visits to Lincoln, Austin, Kansas City, St. Louis, Minneapolis, Madison, Milwaukee, Chicago, Detroit, the NAB Radio Show in Philadelphia, and the AES convention in New York.

The Orban/CRL Mobile Broadcast Laboratory is a fully equipped 33-foot mobile vehicle that has been converted to permit testing and demonstrations of Orban and CRL products, and to do comparisons with other products. The MBL also carries kiosk rack-mounted displays of Orban/CRL's entire product line. A variety of equipment, including the new Optimod-PC 1100, the Optimod FM 8400HD, and the Opticodecs 7000 and 7400 series ISDN machines, are on board. The MBL offers broadcasters, engineers, technical service managers and owners an opportunity for hands-on demonstrations and a chance for in-depth Q&A sessions with the experts from Orban/CRL.



A full view of the Orban/CRL Mobile Broadcast Laboratory, trailer, and support vehicle.

# The Orban/CRL Mobile Broadcast Laboratory 2003 USA Tour



Orban/CRL President, CEO, Chairman Jay Brentlinger (far right), the Orban/CRL Mobile Broadcast Laboratory Road Crew's James Brentlinger (far lower left) and David Rusch (2nd from right), and the Madison SBE chapter members.



The Orban/CRL Mobile Broadcast Laboratory on display at the Minnesota Society of Broadcast Engineers meeting in Minneapolis.

Many more stops are scheduled for the Orban/CRL Mobile Broadcast Laboratory 2003 USA Tour before year's end. They include:

10/14/2003	Cleveland/NE Ohio SBE	Cleveland, OH
10/15/2003	Cincinnati SBE	Cincinnati, OH
10/20/2003	Kansas Assoc. of Broadcasters	Wichita, KS
10/22/2003	Denver SBE	Denver, CO
10/24/2003	Salt Lake City SBE	Salt Lake City, UT
10/28/2003	Sacramento SBE	Sacramento, CA
10/29/2003	San Francisco SBE	San Francisco, CA
10/30/2003	Fresno SBE	Fresno, CA
11/11/2003	Los Angeles SBE	Los Angeles, CA
11/12/2003	Inland Empire SBE	San Bernardino/Riverside, CA
11/15/2003	Phoenix SBE	Phoenix, AZ

Broadcasters interested in exploring the possibility of appearances in their markets are encouraged to contact David Rusch at 602-438-0888 or drusch@orban.com for more information.

Orban/CRL Systems is the world leader in the design and manufacture of transmission audio processors for broadcasting and the Internet. For more information on Orban and CRL products, contact David Rusch at 602-438-0888; fax 430-785-1031; e-mail drusch@orban.com. Information is also available at [www.orban.com](http://www.orban.com) and [www.crlsystems.com](http://www.crlsystems.com).



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# Field Report

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## DK-Audio MSD100

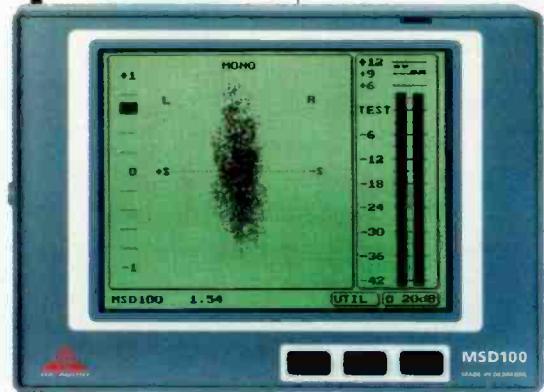
By Mike Callaghan



The idea of using a Lissajous pattern to display stereo separation has been around as long as stereo recording—even to the point where dedicated oscilloscopes were built into audio equipment manufactured by Marantz. Heathkit even offered a stand-alone X-Y display for use with consumer stereo systems. These devices all used CRTs, and they all suffered from dim displays and the potential for burning of the phosphor if the audio went dead.

Early solid-state audio spectrum instruments used LED matrixes as displays, and resolution was limited by the number of LEDs that could be squeezed into the available area.

The MSD100 series from DK-Audio offers a bright, easily read display of both stereo separation and frequency dispersion. Taking full advantage of LCD technology,



### Performance at a glance

- Small size
- Bright, easy-to-read display
- Displays the most useful audio information
- User-friendly interface
- Durable metal chassis
- Battery or ac operation

the display offers black-on-white as well as white-on-black images. The display brightness is controlled through a setup option and the front-panel buttons.

Three basic models of the display are available. The MSD 100 features analog inputs with unbalanced RCA connectors. The MSD100T/SA offers analog inputs with balanced XLR connectors. The MSD100AES/SA provides digital audio AES-3 inputs

with balanced XLR connectors.

The different models provide a variety of basic functions:

- Phasemeter
- Audio vector oscilloscope
- Level meter with six selectable PPM/VU scales
- Individually selectable input reference levels with an additional 20dB of input gain
- LED overload indicators

The various functions are easily controlled using three buttons on the lower right corner. These select the display function, and allow muting of the left, right or both inputs. They will also increase the input sensitivity by 20dB, and are used to adjust the display brightness, the LCD viewing angle, reference levels, the PPM scales and to invert the black and white in the display.

In the stereo display mode, vertical bar graphs on the right side of the screen show left and right input levels. The ballistics of these bars can be rotated through VU,DIN,two different DMU and three PPM scales. A peak-hold function and individual reference level selections are also available. A pair of discrete red LEDs above the display show when excessive peaks are reached. A vertical bar graph at the left of the stereo displays the average phase relationship between the two audio signals, and indicates mono, stereo or reverse phase on a center zero scale.

The two, more enhanced models of the MSD100 include a pair of frequency spectrum displays; the traditional  $\frac{1}{3}$ -octave bars show the energy distribution of the signal, and a FFT analyzer for more accurate definition.

The  $\frac{1}{3}$ -octave display uses a bank of filters for real-time frequency analysis. This provides a 31-bar display extending from 20Hz to 16kHz. Each bar shows a graphical and numeric visualization of the signal energy present in the specific band.

The FFT function uses a 1,024-band FFT algorithm to display signal content between 44Hz and 20kHz, covering the dynamic range between -70dBu to +10dBu. Rather than wide bars, the display consists of many thin vertical lines offering far greater resolution.

A mounting yoke is supplied with the MSD100, meant to place it on top of a console. Thumbscrews are provided to thread through the yoke into the sides of the chassis.

I elected to use the threaded yoke holes on the sides to mount the display in a rack panel with small angle brackets. The input connections are on the real panel along with the power connection.

At KIIS the unit mounts in the equipment rack adjacent to the processing equipment. It's fed with the de-emphasized left and right output of the off-air modulation monitor. It shows the all-important stereo balance, the channel phase relationships and also reveals when a CD was recorded with excessive clipping. (The ends of the stereo

# The Best Selection TV & Radio antenna systems

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Model	No. Bays	Max. Input Power	Price
MP-1	1	500 W	\$250
MP-2	2	800 W	\$650
MP-3	3	800 W	\$950
MP-4	4	800 W	\$1,250
MP2-4	4	2,000 W	\$1,750
MP3-5	5	3,000 W	\$2,250
MP3-6	6	3,000 W	\$2,700

## FM Low Power Circular Polarization Antennas

Model	No. Bays	Max. Input Power	Price
GP-1	1	1,500 W	\$350
GP-2	2	3,000 W	\$1,350
GP-3	3	4,500 W	\$1,800
GP-4	4	6,000 W	\$2,500
GP-5	5	6,000 W	\$2,900
GP-6	6	8,000 W	\$3,500

## FM Medium Power Circular Polarization Antennas

Model	No. Bays	Max. Input Power	Price
SGP-1	1	3,000 W	\$650
SGP-2	2	6,000 W	\$2,450
SGP-3	3	8,000 W	\$3,500
SGP-4	4	8,000 W	\$4,300
SGP-5	5	8,000 W	\$5,100
SGP-6	6	8,000 W	\$5,900
SGP-6R	6	15,000 W	\$6,500

Please Contact the OMB America  
Sales Department for other  
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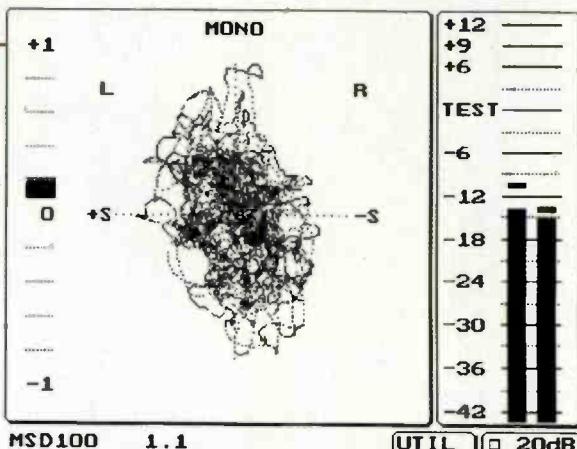
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# Field Report

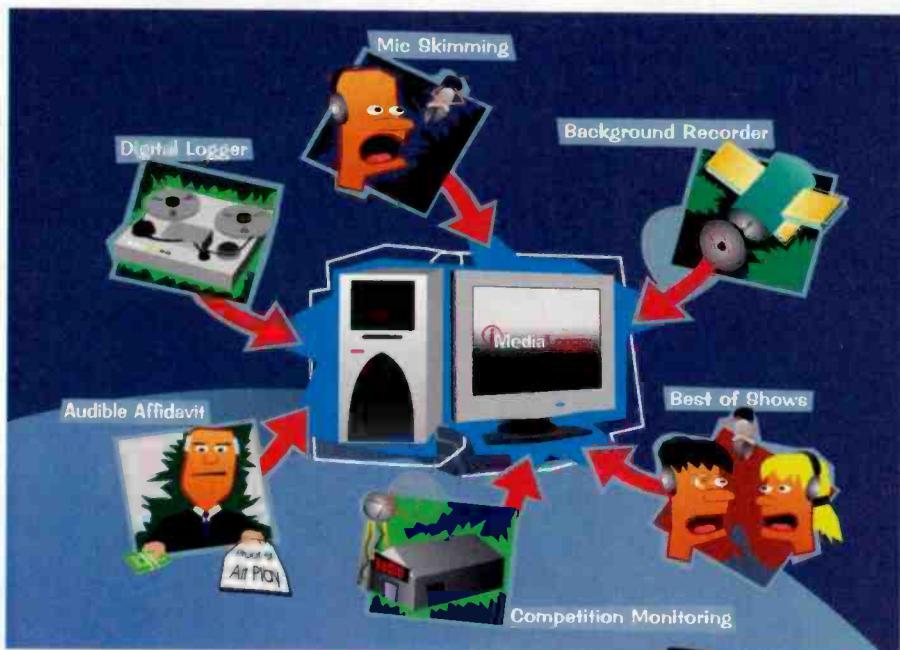
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waveform flatten out into corners.) We can pull these out of the library until they're fixed. When the mic is all that's being used, anything other than a straight line means phasing trouble somewhere in the system. We typically run the left and right channel bargraphs in the VU mode, as that's what we're most used to.

The unit measures 179mm (w) x 129mm



Detail of the unit's screen showing the Lissajous figure and level indication.



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The next time you need to log, skim, or record, save yourself -and your station- plenty of time, money and headaches. With iMediaLogger, you will never have to change a tape again.

(h) x 39mm (d). Power is provided by a 15V wall-wart supply. The unit will operate from 12V to 30V ac or dc, and consumes 6.5W. The finish is an attractive gray and black, and the chassis is rugged and of heavy sheet-metal construction.

Display life in continuous operation is expected to extend well beyond two years. The unit was easy to install and set up. The different modes allow easy checking of what we're transmitting. Channel drop-outs are easily detected, station processing is easier to set up and most of the time it just verifies that everything is running properly. We have found the unit to be a valuable tool for ensuring audio quality throughout the stations.

Callaghan is the chief engineer for KIIS-FM, Los Angeles, and one of two market managers for the Clear Channel stations there.

## DK-Audio

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**Editor's note:** Field Reports are an exclusive Radio magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

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

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

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## Audio TX Multiplex

By Christian Arnaut



very so often, a new product is introduced that makes people ask themselves "Why didn't I think of that?" Products that, at the time they were made available, were revolutionary because they filled a need we did not realize existed. In time, these products evolved from something we didn't know we needed to something we now can't do without. Hard-disk editors, compact interfaces and DTMF-accessible remote control systems are all examples of items introduced during my career that filled such a need. I have one more to add to the list:

### MDO UK's Audio TX Multiplex.

The Audio TX Multiplex application provides the ability to broadcast multiple audio channels over a LAN. A workstation/desktop/routing switcher, if you



### Performance at a glance

- Ease of installation
- Quality audio with basic PC
- Web browser-based client installer
- Efficient use of network resources
- Ability to customize audio settings
- Unlimited number of audio channels

will. The concept is simple. With a single PC with a static IP address installed in a rack room or master control, audio provided as an input can be monitored from any LAN workstation on the network.

As expected, the setup and configuration is accomplished in two parts, the server/encoder and the workstation/decoder. The server can encode one stereo input or two mono channels using a single Sound Blaster card up to 48 stereo inputs, or 96 mono channels using more elaborate multi-channel audio cards. In fact, any combination

of stereo and mono channels can be used, based on individual needs. The user can individually configure each input's sample rate from 16kHz to 48kHz, compression type from linear to MP2 to MP3 and select from various bit rates. The design of the software makes the setup and configuration of the input channels extremely easy. In fact, it wasn't until after I had the system running that I fully read the documentation. The application is virtually self-explanatory.

### System spec

Our test machine was a P4 1.8GHz running a Motu 24 I/O Interface. This interface provides 24 mono analog inputs or 12 stereo inputs or any combination in between. The manufacturer states that a P4 2GHz system is capable of running about 35 mono channels or 25 stereo channels. During the peak of testing we were running 15 inputs (eight mono and seven stereo). On the server's display, a small bar graph displayed the CPU load generated by the application. On our test machine we registered a peak of 51 percent, so you can probably count on needing a powerful PC if more than one 24 I/O is used. However, even at 51 percent we never encountered any audio dropouts while listening.

The efficiency of the streams is another plus. In an effort to minimize the bandwidth impact on a LAN, the Audio TX Multiplex uses multicast technology. This allows the server to transmit a single copy of an audio channel regardless of the number of clients listening. With several clients listening, monitoring our 100Mb/s switch indicated only a minimal impact on network bandwidth. Even when opening a 150MB Power Point presentation across the network, the audio playback was not interrupted.

Moving on to the workstation, I was amazed to see the planning and thought that went into this application. Installation and configuration of the client software is fool proof. Enter the server's IP address into a Web browser and a Web page appears that provides two links. The first installs the client software; the second configures the client with the server's IP address and enters the appropriate IP address. The operation of the client is just as easy. Opening the application provides a small desktop interface about the height of a Windows title bar. It has just enough room for a pull-down list to select the desired channel, audio meter and a slider for volume. If the small desktop interface gets in the way it can be minimized, leaving only the audio.

At this point you're probably asking "What do I use it for?" You would be surprised where this can be useful. For an FM station, you might benefit from having not only your on-air audio, but also that of your closest competitors as well. These, in addition to your production studio's program audio bus, would give program directors the ability to



**The Receiver Bar occupies little space on the desktop. The drop-down provides instant access to available channels.**

monitor your station, sample the station across town or approve daily promos or imaging production without leaving his desk. The sales manager could listen and approve spot production without coming to the studio. A news/talk facility can really exploit the potential uses. In addition to the feeds listed above, think about adding feeds such as NOAA, news feed satellite channels, local TV audio or even a national cable channel's audio. Would your news director benefit from the ability to listen to the news cue feed right in his office? Perhaps your sports director would like to have the ability to listen to a press conference. You can see where the possibilities are almost endless.

It has been said, "simplicity is the hallmark of genius." If so, this application comes close to the level of genius. Its installation and operation is as streamlined as could ever be expected. Yet, its

## Audio TX

P +44 121 256 0200

F +44 121 256 5109

W [www.audiotxmultiplex.com](http://www.audiotxmultiplex.com)

E [sales@audiotx.com](mailto:sales@audiotx.com)

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[www.beradio.com](http://www.beradio.com)

functionality is nearly endless. Now that PCs with speakers are commonplace in the office, Audio TX Multiplex could be a valuable addition to most any broadcast facility, big or small.

*Arnaut is the broadcast IT engineer for WJR, WDVD and WDRQ Radio, Detroit, MI.*



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# Field Report

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## NTI Digilyzer DL1

by Eddie Ciletti



How many times have you connected two pieces of digital equipment together only to end up having bizarre things happen? Or even worse, nothing happen? Luckily, there is the NTI Digilyzer, a digital bloodhound, to sniff out the problem. It is so smart it will even accept an analog signal.

Most digital equipment is woefully lacking in its ability to display why it is unhappy. The Digilyzer can display lack of data compliance, bad cables, bad bits or poor signal quality—any combination of which can contribute to lack of data integrity. Similar to its analog cousin, the Minilyzer, the Digilyzer is a hand-held piece of test equipment with a handful of menus that can display channel status information (three pages), distortion, PPM and RMS metering, a scope and memory to store and recall

### Performance at a glance

- Reads AES3, S/PDIF, TOS-Link and ADAT
- Sampling frequency from 32kHz to 96kHz
- Analyzes multiple digital parameters
- Compact size
- Battery or ac powered
- Built-in monitor speaker
- Event logger

default setups and device status. The unit runs on three AA batteries and includes an external power jack. It also sports an auto shut-off feature.

The unit has XLR, RCA and optical inputs; the latter accepts S/PDIF and ADAT Lightpipe. Any TDIF-to-ADAT converter allows the unit to read Tascam's proprietary digital format, as well. A built-in speaker is quite useful and loud. A stereo headphone mini jack is also included.

CH. STAT.	TOS	CH. STAT.	TOS
44099.49 Hz	88201.56 Hz		
OPTICAL	OPTICAL		
■ CONSUMER	■ PROFESSIONAL		
■ LINEAR PCM	■ LINEAR PCM		
■ FS=44.1kHz	■ LOCK NO ID		
■ ACC:LVL3	■ FS NO ID		
■ VARIPITCH	■ FS=1.000		

Figure 1. Half of page one (of three) channel-status pages comparing the output of a Technics CD player (left) to an early version of the Alesis Masterlink. The screen highlight is for clarity.

Technics CD player (left) to an early version of the Alesis Masterlink. The screen highlight is for clarity.

In this snapshot, the Masterlink is also transmitting at 88.2kHz, but not at the time of the DAT trouble. By not setting the sample-rate flag, the Masterlink did not comply with the specification, a problem that was remedied in later production units.

CH. STAT.	TOS	CH. STAT.	TOS
44099.59 Hz	88201.56 Hz		
OPTICAL	OPTICAL		
■ ALGN NO ID	■ RELBY:YYYY		
■ NO REF SIG	■ CRC FAULT		
■ TIME 00 00 00 00 HEX			
■ SMPLE 00 00 00 00 HEX			
■ FROM	TO		

Figure 2. Page two of the Digilyzer's three-channel status pages.

gle to the right of OPTICAL (optical) is clear, indicating good data. In Figure 2 (from a PCM R500), the rectangle is solid black, indicating bad data, which was not bad enough to mute the audio.

The Digilyzer is a powerful tool if you know where to look. Whether the data is good, bad or out of compliance, the unit



### EOA = excitement on arrival

As soon as the Digilyzer arrived, I used it to analyze three puzzling situations. A Tascam DAT recorder pretended to go into record but did not actually put anything on tape. Cleaning the machine's heads yielded nothing, until I realized that the unit's analog recording function was fine. I never thought to question the Alesis Masterlink that was feeding it until I substituted a Panasonic DAT deck, which balked at being in record and locked up until the power was cycled.

Equipment manufacturers are inconsistent in their implementation of digital-communications protocol. In the two DAT examples, both decks expected the sample-rate status flag to concur with the transmitted sample rate. Figure 1 shows a side-by-side comparison of a Technics CD player (left) and the Masterlink, respective examples of consumer and professional formats.

Note the "FS no ID," which indicates that the sample-rate flag had not been set. In

### Heads up

In another instance, the AES output of a Sony PCM R500 did not transmit a clean signal, thus wreaking havoc with a CD burner but not causing an immediate, obvious error with other equipment. In Figure 1 the rectangle to the right of OPTICAL (optical) is clear, indicating good data. In Figure 2 (from a PCM R500), the rectangle is solid black, indicating bad data, which was not bad enough to mute the audio.



Figure 3. The display showing a bit-depth of 16 bits. For a 24-bit signal, the left-most (LSB) boxes would not be empty.

is tolerant and does its best to translate audio that other devices will not. Tolerance is good only if it doesn't lure us into a false sense of data security. In conjunction with the NTI Minirator or any low-distortion oscillator, the Digilyzer can measure distortion and provide a clue as to the cause of the problem.

### Creating the tests

For most of the tests, the Digilyzer was a destination on a digital router, hence the optical indication on the display, even though many sources were tested.

Note also that the number in the center square on Figure 2 indicates the page number. There are three pages to check channel status, plus a bit-status page.

With additional reading (via manual and online) and testing, the unit becomes an even more valuable tool. It doesn't blare warning tones and can't do more than flash a warning on the appropriate page, so some problems might not be obvious if you don't know where to look. The signal-quality rectangle, pointed out earlier, is an easy indicator of a problem

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that may be diagnosed on another page.

The Digilyzer saves time and speculation. From 16 bits to 24 bits, 32kHz to 96kHz, the Digilyzer tells you the good, the bad and the ugly.

Ciletti is president of Manhattan Sound Technicians in Saint Paul, MN. Contact him through [www.tangible-technology.com](http://www.tangible-technology.com).



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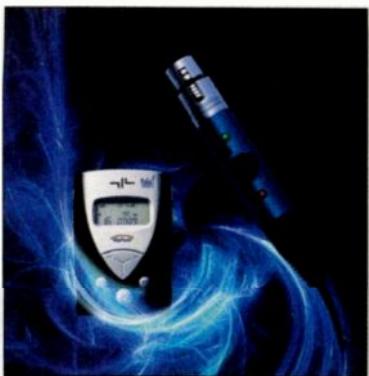
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# New Products

By Kari Taylor, associate editor

www.beradio.com

## Mic accessory



### Maycom Audio Systems

Micube: This high-end pre-amp fits directly in a XLR dynamic mic. It gives a line-out for every recorder (MP-3, DAT, MD, CASS), creating a convenient hookup.

+31 481 453466  
fax +31 481 375988  
[www.maycom.nl](http://www.maycom.nl)  
[sales@maycom.nl](mailto:sales@maycom.nl)

## Digital audio recorder/player

### Henry Engineering

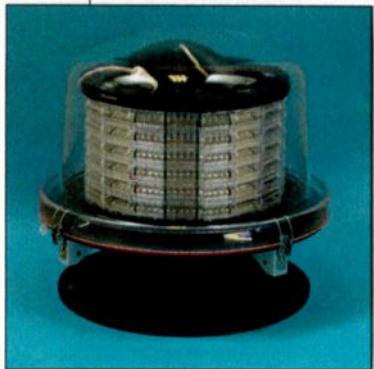


Digistor-MP: This solid-state MPEG digital audio recorder/player stores as much as 20 minutes of audio with 15kHz bandwidth. The unit can store as many as 99 messages, which can be accessed via GPI or RS-232 protocol. This product is useful for broadcast station network news delay, IDs, spot inserts, SAP channel ID and sound effects. MPEG files can be downloaded from a PC for stand-alone playback.

626-355-3656; fax 626-355-0077  
[www.henryeng.com](http://www.henryeng.com); [info@henryeng.com](mailto:info@henryeng.com)

## LED tower beacon

### Dialight



### Low-profile L864

This low-profile, LED-based flashing red beacon marks obstacles that pose hazards to aircraft navigation. Measuring just 19.89" high, the new light is ETL certified to FAA AC NO: (150/5345-43E) and compliant with Canadian Aviation Regulation (CAR 621.19) and ICAO (Annex 14, July 1990). Designed to replace 300mm incandescent obstruction lighting fixtures, it mounts onto standard bolt patterns, interfacing easily into existing or new installations. The flashing red beacon incorporates high-flux LEDs that use 90 percent less energy and last years longer than incandescent lights. It dissipates heat for optimum LED performance, and a unique lens design provides 360-degree visibility. The new light can be operated in flashing or steady-state mode and creates no troublesome EMI/RFI. The beacon features a weather- and corrosion-resistant lamp assembly and housing to resist shock and vibration.

800-835-2870; fax 732-751-5778; [www.dialight.com](http://www.dialight.com); [info@dialight.com](mailto:info@dialight.com)

## Active PA loudspeaker

### Mackie

SRM350: Benefiting from Mackie Active loudspeaker technology, the two-way, bi-amplified loudspeaker is capable of 121dB output with a built-in 165W LF amplifier and a 30W HF amplifier. This product boosts key low-end frequencies as volume levels are reduced to create a well-balanced output at any level. Driver configuration for the loudspeaker includes a single 10-inch LF woofer and a 1-inch HF driver. A waveguide horn and direct radiating woofer allows it to deliver wide and even sound dispersion. The lightweight, high-impact plastic enclosure design is useful for PA and floor monitor applications, as well as being easy to transport with comfortable handles on one side and on top.

800-898-3211; fax 425-487-4337  
[www.mackie.com](http://www.mackie.com); [productinfo@mackie.com](mailto:productinfo@mackie.com)



## Data patchbay

### Switchcraft

NPB 556: With the increased need to route audio data within a facility, the NPB 556 provides a familiar patchbay feel to accommodate various uses. This unit's switching normals simplify and reduce installation labor time to minutes with only a slotted screwdriver. The system offers 96 Bantam TT style jacks in a wide range of configurations. It is available in 1, 1.5 and 2RU heights. This unit uses AES/EBU wiring for complete digital compatibility. Nickel-plated, brass sleeves reduce wear and increase reliability. Gold-plated switching contacts reduce contact resistance. It is housed in a lightweight anodized aluminum frame and is available in a wide range of back panel options, including unwired versions with cable tray or cable tie bars.

773-792-2700; fax 773-792-2129  
[www.switchcraft.com](http://www.switchcraft.com); [sales@switchcraft.com](mailto:sales@switchcraft.com)

### Rack-mount mixer

#### SPL - Sound Performance Lab

Grapevine KeyMix 6: This compact mixer offers nine inputs, three stereo and three mono outputs, a mic preamp, an insert loop plus monitor and main outputs. Potential applications include uses as a remote broadcast mixer, studio submixer or news room/dub station mixer. It features an internal power supply with ground lift switch, high-quality potentiometers and switches, a double-sided PCB for durability and reliability and a rugged metal casing. The mic channel can supply 48V phantom power. Line-level I/O is on 1/4" TRS jacks. The separate mix outputs are ideal for creating and mixing mix-minus feeds and a PA feed at remotes.

866-4SPL-USA; fax 805-435-7455

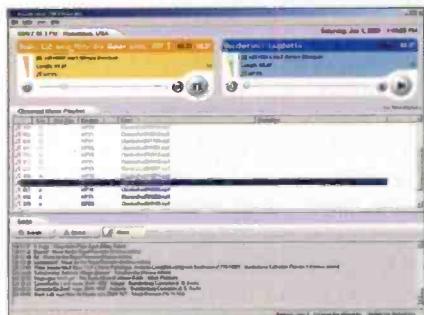
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#### Automation

#### and scheduling bundle

#### Freelance Media Services

Radio Automation 24/7 Software Suite: The software suite consists of two main programs: Broadcaster and Scheduler. Together, these programs provide flexibility and control managing audio events and program elements. The Scheduler program provides a single, easy-to-use interface for managing program elements



and audio events. The user can create broadcast playlists, music rotations and event sequences. With Cartchunk traffic data tags and ID3 info tags, the software can save audio cut information tags directly to the audio files without the need of separate databases. Broadcaster handles all of the automation functions from audio playback to external hardware control, event logging and EAS logging. Once program elements are created and setup in Scheduler, the Broadcaster program will integrate each broadcast playlist into an on-air product using auto-dueling, voice-tracking, and audio mixing based on user-defined settings and properties.

856-912-0676; [www.freelancemedia.us](http://www.freelancemedia.us)  
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An advertisement for Continental Electronics (CTE). The background features a large, stylized red, white, and blue logo on the left and a photograph of a large industrial building complex on the right. The text "GREAT COMPANY", "EXCELLENT PEOPLE", and "CELEBRATED PRODUCTS" is displayed in large, bold, yellow letters. At the bottom, the text "IDT Continental Electronics INTEGRATED DEFENSE" is written, along with the phone number "800.733.5011" and the website "www.contelec.com".

IDT Continental Electronics  
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800.733.5011 [www.contelec.com](http://www.contelec.com)

The CTE logo, which consists of a stylized 'C' and 'E' intertwined with a globe graphic.

# New Products

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## Cobranet optical relay

### Whirlwind

DLS1: The DLS1 transmits the Ethernet and Cobranet protocols easily, economically, safely and securely over an infrared laser beam. Its 2GB bandwidth has the capacity for transmitting and receiving large amounts of data, including hundreds of channels of Cobranet audio in real time. These units use standard Gigabit fiber optic input and output. No additional software or hardware configurations are necessary. While not intended to totally replace structured cable, its implementation into a hybrid copper and fiber delivery system can reduce costs associated with construction labor, conduit, termination and other hardwired systems issues. The resulting bi-directional network allows signal transmission with add/drop points at any location and can provide fail-safe redundancy.

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## Audio playback utility

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Xplay: Having been updated, this Windows-based audio playback utility now supports Apt-X .DAF files. An audio playback utility for DCS and Maestro systems, it now supports Apt-X audio playback in addition to linear and MPEG-II audio files. The software can be used to play back audio files created using Computer Concepts' audio delivery systems from any 32-bit Windows work station equipped with a standard sound card and access to the audio inventory, typically via an Audio Central Plus (ACP) server.

952-949-9450; fax 952-949-9448

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### Turtable Vestax

PDX-2300: Representing the next generation of the PDX-2000, this turntable is aimed at the modern DJ and the vinyl connoisseur. A digital readout allows precision pitch adjustment with ±50 percent pitch control on a fader plus an additional ±10 percent with a fine pitch control.

516-333-9100; fax 516-333-9108; [www.vestax.com](http://www.vestax.com)

### Tower monitoring Towerswitch

Lift-Notes: The Lift-Notes system is designed for tall tower elevators and helps reduce liability and insurance premiums. It provides safety and operating information to passengers and optionally permits the tower owner to restrict elevator operation until all safety and warning messages are played.

561-482-7334; [www.towerswitch.com](http://www.towerswitch.com); [sales@towerswitch.com](mailto:sales@towerswitch.com)

### Four-channel mixer

#### Rolls Corporation

MX124: This stereo field mixer has four balanced XLR inputs each with switchable phantom power and low-cut switches, and two



transformer-balanced XLR outputs each with a rear-panel output level control. Each microphone channel has a pan and level control. Front-panel stereo 1/4" headphone and 3.5mm headphone outputs are also provided. The unit operates on two 9V alkaline batteries, or an optional Rolls PS27 dc power supply. LEDs indicate power presence and audio clipping.

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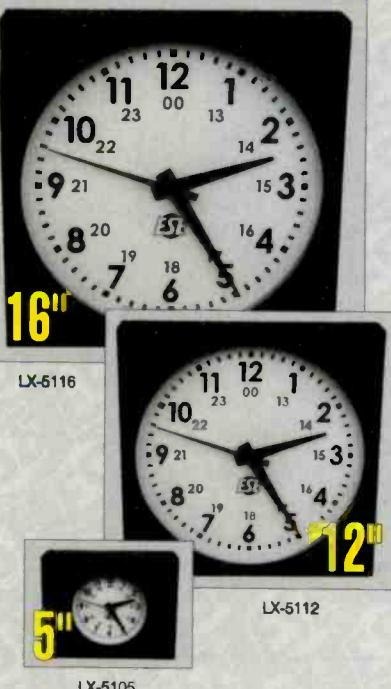
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## New Products

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### Workstation

#### Omnirax

Force 36: Sound and sight lines are optimized for comfortable extended sessions with this workstation. The design's wrap-around curves enhance the look of any recording environment. It is available in a choice of melamine laminate colors, as well as in black melamine laminate combined with acajou mahogany, maple or grey slate Formica desk and riser surfaces. The workstation has two 12-space rack bays below the desk surface for peripherals. A fully adjustable keyboard and mouse shelf is included, which attaches to the underside of the desk. The complete unit is mounted on heavy-duty casters for mobility and easy cabling. Its work surface can support most table-top mixers or an array of small-format control surfaces. The three-level curved riser above the rear of the desk is wide enough for numerous monitors and speakers, and features four rack bays. Two outer four-space rack bays are ergonomically set at an angle, which provides sightlines and easy access to the equipment placed in them. The tops of these rack bays provide placement for Near Field Speakers. In the center are two two-space rack bays with a generous shelf above, large enough for most dual video-monitor configurations.



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### Coaxial cable

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Flexline: The coaxial cable is available in  $7/8"$  through  $6\frac{1}{8}$ " line sizes and features patented precision-fitted connectors. Now users have an alternative to rigid transmission line for installations on crowded towers, broadband systems or any other situation in which flexible transmission line is advantageous. Oxygen-free copper and polyethylene are used to make these coaxial cables. No recycled materials are used.



800-341-9678; fax 207-655-7120  
[www.dielectric.com](http://www.dielectric.com); [dcsales@dielectric.com](mailto:dcsales@dielectric.com)

### Satellite control software

#### Andrew

Earth Station Management Software: This software provides real-time network and earth station equipment management, monitoring and control. Users can operate networks or stations and set up schedules and programmable events. The software also allows users to lower their system operating costs by being able to combine operations into one location for the most efficient use of resources. The comprehensive monitoring and reporting capability provides event calendars, maintenance logs and status reports. Using these reports, the system operator can remotely detect and analyze device conditions so that preventative action can be taken before a problematic event results in equipment failure and network downtime. The software has an Intuitive Graphical User Interface for displaying network and equipment configurations. The software requires Microsoft Windows 2000 or Windows NT operating system.

800-DIAL-4-RF; fax 708-349-5444

[www.andrew.com](http://www.andrew.com); [rose.wolski@andrew.com](mailto:rose.wolski@andrew.com)

## Digital audio switch Broadcast Devices



tuate a switch automatically. The unit features automatic and manual mode switching. It features four outputs that can drive AES-compatible digital audio loads. The unit also features a 24-bit digital-to-analog converter with professional balanced 4dBm left/right output. There is also a front panel headphone output for confidence monitoring. The digital I/O can be ordered with XLR, S/PDIF or optical interface. Status indicators include complete error status with memory, sample rate indication, position status and mode status. All functions can be actuated by a front-panel push button or remote control.

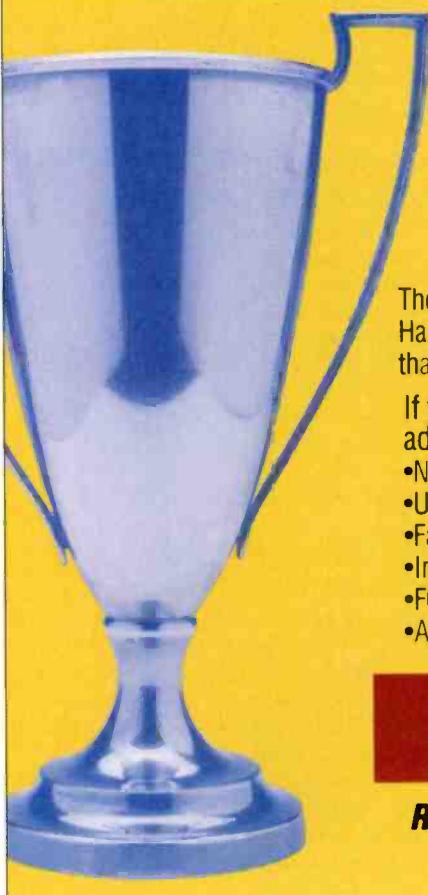
914-737-5032; fax 914-736-6916; [broadcast-devices.com/](http://broadcast-devices.com/); [sales@broadcast-devices.com](mailto:sales@broadcast-devices.com)

## Sample rate converter Kramer Electronics

FC-2000: A bi-directional broadcast-quality audio-format transcoder and digital sample-rate converter. The converter inputs are analog on XLRs, AES/EBU, S/PDIF and Optical digital, with similar outputs. All outputs are simultaneously available for each selected input format. Digital input scan rate is automatically detected, and the user can change output scan rates between 32kHz and 96kHz. The machine can be genlocked to an internal reference, or to the AES/EBU incoming signal or even to a video reference. The unit is housed in a rugged, 1RU enclosure.

888-275-6311; fax 908-735-0515

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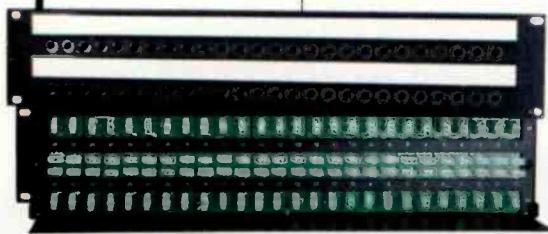
\* *Radio* magazine has received three ASBPE awards for outstanding editorial content, one ASBPE award for artistic design and one Ozzie award for artistic design.

# New Products

www.beradio.com

## Quick-switch normalling patchbays Audio Accessories

**Shorti series:** The Shorti series delivers flexibility of the Quick-switch normalling system. The company has taken the standard 2 x 48 x 2RU, 0.172" mini patchbay and brought the tip, ring and sleeve of each jack out to individual three-pin EDAC connectors. Then it's mounted on the rear of a 3" deep Shorti box, with a cabling support tray behind for bundling incoming cables. The Quick-switch normalling pod allows the user to set the individual normals on a per jack-pair basis. This enables the user to full-normal, half-normal or non-normal individual bused grounds on a per-row basis. The Quick-switch has also been incorporated into the line of 1/4" long-frame Shortis. This 2 x 26 x 1RU 1/4" long-frame MAXI patchbay has the tip ring and sleeve of each jack brought out to individual three-pin EDAC connectors. It's mounted on the rear of a 4" deep Shorti box, with a cabling support tray behind for bundling incoming cables.



The normalling pod is unique because all the individual normals can be set on a per jack-pair basis. By positioning the shunts to the proper locations, the user can select full-normal, half-normal, non-normal or grounds vertically strapped.

603-446-3335; fax 603-446-7543

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## Upgrades and Updates

### Digigram Adds More Linux Support

Digigram has released a Linux driver under open source licensing for its Mixart 8 and Mixart 8 AES/EBU multichannel sound cards. The driver follows the most advanced audio standard for Linux called ALSA (Advanced Linux Sound Architecture) and is available for download at [www.alsa-project.org](http://www.alsa-project.org).

In March 2003, Digigram released a Linux driver for its VX222, VXpocket v2 and VXpocket 440 sound cards.

[www.digigram.com](http://www.digigram.com)

### Tascam Ships FW-1884

Designed by Tascam and Frontier Design Group, the FW-1884 uses the Firewire high-speed data transfer protocol. The unit features an 18-channel audio interface, eight mic preamps, 4x4 MIDI interface and flexible editing and mixing controls.

[www.tascam.com](http://www.tascam.com)

### Audioscience Adds Low-rate MP3 to 6000 Series

Audioscience has added Low Sample Rate Format (LSF) MP3 support to its range of ASI6000 audio adapters. Also known as MPEG-2 and MPEG-2.5 Layer 3, the LSF formats support MP3 encoding and decoding at sample rates of 8, 11.025, 12, 16, 22.050 and 24kHz and bit rates of 8kb/s to 160kb/s. All signal processing is done on the adapter's DSP. Low sample rate MP3 is available free of charge through driver update v2.82, available from the Audioscience website.

[www.audioscience.com](http://www.audioscience.com)

### Orban Updates Digital Audio Manual

Orban has released the 2003 edition of *Maintaining Audio Quality in the Broadcast Facility*. The revised edition is available for free download from the Orban website. This edition has more material about digital than previous editions, and it debunks some common digital audio myths.

This version uses some of the enhanced functions of Adobe Acrobat 6, but previous version of Acrobat Reader will be able to view the material.

[www.orban.com](http://www.orban.com)

## Digital audio editor

### Sony Pictures Digital Networks

Sound Forge 7.0: This software includes many features and enhancements, such as: automated time-based recording; audio threshold record triggering; VU meters for recording and playback; enhanced spectrum analysis tools; DirectX plug-in effects automation; white, pink and brown noise generators; Media Explorer previewing; and project file creation. The software is used for production in recording studios, post production facilities, broadcast and media complexes, home studios, radio stations and training facilities. The application includes an extensive set of customizable processes, effects and tools for manipulating audio, creating streaming media and also offers support for a wide range of file import and export options for most industry formats.

877-783-7987; [www.soundforge.com](http://www.soundforge.com)

## A/D converter

### Behringer

SRC2496: The successor to the SRC2000, this converter enables the user to transfer digital audio signals between devices with different sample rates, formats or interfaces, disable SCMS for 1:1 digital copies and remove dropouts or jitter from digital media. Simultaneously operable outputs offer splitter functionality. The 24-bit/96kHz compatible converter now offers high-quality 24-bit/96kHz A/D-D/A conversion. Format conversion between AES/EBU and S/PDIF (coaxial or optical) is provided with high-quality signal output with 16-, 20- or 24-bit resolution. Universal sample rate synchronization is done via word clock or digital input. XLR, RCA and optical outputs are simultaneously operational with separately selectable inputs, turning this unit into a digital patchbay.

877-672-0816; fax 425-673-7647

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# New Products

[www.beradio.com](http://www.beradio.com)

## Wireless data link Moseley Associates

**Max-link:** Consisting of the Max-Link IDU and the AB-Access wireless data radio, the IDU is a full duplex packetizer for up to eight E1/T1 highways that can operate in E1 or T1 mode, and whose individual 64kb/s channels can be ATM cell networked to a composite ATM 25 port. The IDU connects to the all-outdoor AB-Access radio by use of a regular CAT-5 cable. The two units can



be up to 150' apart. Features of this product include a license exempt wireless link, rapid ROI, split IDU/ODU architecture, switchable ATM or IP interfaces and it is fast and easy to deploy.

805-968-9621; fax 805-685-9638

[www.moseleysb.com](http://www.moseleysb.com); [info@moseleysb.com](mailto:info@moseleysb.com)

## Optical disc duplicator Primera Technology

**Composermax:** This high-volume, four-drive CD/DVD duplicator automatically records and prints as many as 400 discs per job at fast 32x recording speeds. This automated CD-R/DVD-R duplication system is designed for high-volume production environments. Advanced robotics are used to pick and place discs into two or four recordable drives. After discs are recorded they are transported into individual 100-disc output bins. The entire process is automatic and no operator intervention is necessary after a job has been started. Discs can also be transported to an optional, built-in ink-jet or thermal transfer optical disc printer or full-color printing with up to 2400 dpi print resolution.

800-797-2772; fax 763-475-6677

[www.primera.com](http://www.primera.com); [sales@primera.com](mailto:sales@primera.com)



## Truthful



### Get an Instant Air Sound Upgrade - with the Benchmark DAC1

If your station is analog, you must play your CDs and spots from digital players through their internal DACs. Frankly, what happens in that conversion process is not a pretty picture! Jitter from transports, power supplies, and in-between electronics, phase modulates the audio, producing non-signal related sidebands. The digital filters found in converter chips, intended to prevent aliasing, are insufficient for their job.

The DAC1 eliminates jitter and the resulting low frequency mud. It provides digital filters that yield total freedom from aliasing resulting in phenomenal clarity.

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800-645-1061

## Compact digital console

**Studer**



On-Air 500: Offer-

ing six channel faders, two master faders and an integrated input router, this console offers the utmost flexibility to the operator. Important information like source label, output bus assignment, clean feed and talkback activation, equalizer and dynamics operation is displayed in the channel display of the fader strip, thus leading to easy operation and a fast learning curve. The console is equipped with two 30-segment LED stereo bar graph meters, each including an additional phase correlator. Two timers and a PFL loudspeaker are also provided. Signal processing includes a three band equalizer and dynamics functions like compression, limiting and gating. These are topped with a Lexicon effects processor making the console a versatile production tool. The console features an integrated power supply with the possibility of 24Vdc operation for mobile applications. The unit can be operated in a first-level power supply redundancy mode by powering it with ac line voltage and simultaneously with a 24Vdc source.

416-510-1347; fax 416-510-1294

[www.studer.ch](http://www.studer.ch); [sales@studer.ch](mailto:sales@studer.ch)

## Amplifier line

**Crown Audio**

CTs series: The series is comprised of six amplifiers: the two-channel CTs 600, 1200, 2000 and 3000, four-channel CTs 4200 and eight-channel CTs 8200. Every CTs amplifier uniquely provides a choice of direct constant voltage outputs (70V and, on four models, 100V) and low impedance outputs (8Ω, 4Ω and, on four models, 2Ω), while increased output power at every impedance improves system headroom at practical power steps. Each CTs series amplifier is housed in low-profile, all-steel 2RU frame, except for the CTs 8200, which features a 3RU chassis. Furthermore, two-channel models feature a shallow rack depth of 14", while multichannel models are only 16.25" deep. CTs amplifiers feature protection circuitry, including a new ac line voltage monitor that protects the amplifier by shutting it down in the event of an over- or under-voltage condition, and then flashes the blue power indicator light for quick troubleshooting.

800-342-6939; fax 219-294-8250

[www.crownaudio.com](http://www.crownaudio.com); [mamiller@crownintl.com](mailto:mamiller@crownintl.com)

## Stereo switcher

**Broadcast Tools**

ACS 8.2: This router accommodates eight stereo inputs, two stereo and two monaural outputs. All eight inputs assigned to output one may be faded up, down or dimmed. Inputs assigned to output two are only switched on or off. The front panel is equipped with push buttons for sensors, PIP and power. It may be configured for three switching modes. The mix mode allows the mixing of any or all inputs to any or all outputs. The overlap mode can overlap any two inputs to an output. The duration of the overlap may be set in increments of  $\frac{1}{10}$  of a second, with a maximum of 9.9 seconds. The interlock mode immediately connects a selected input while the previous input is immediately disconnected. Features include eight open collector status outputs, eight SPDT relays, dual silence sensors with SPDT relays, power-up selection of inputs to outputs, fade attenuation and speed is user programmable.

877-250-5575; fax 360-854-9479

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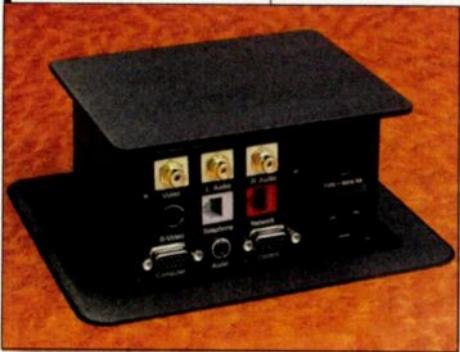
# New Products

www.beradio.com

## Tabletop Interconnect box

**Altinex**

PNP402 Pop 'N Plug: This device provides access to multimedia input connections on two sides when needed, and hides them when not needed. This unit comes standard with both sides filled with the most commonly used connections for presentation and computer connectivity. However, it can be completely customized with a variety of data or A/V connectors before shipment. Using a tower-type construction with pneumatic suspension and a mechanical latching mechanism, the product can pop up into a raised position to provide access to input plates, or it can be lowered flush into the table when not in use. Connectors are available on each side of the unit.



Custom configuration is possible by choosing alternate connectors for the standard faceplate, or filling six slots on each side with sectional plates. A variety of sectional plate connector configurations are available to populate this unit, including 15-pin HD (VGA-style) connectors, standard A/V connectors, international powersockets, and a variety of snap-in port connectors that can be used in the dual snap-in port sectional plate. Ideal for temporary studio connections and external feed panels in a studio.

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## Algorithm creator

**Eventide**



Reverb 2016: Dedicated controls and menu-free operation in a state-of-the-art, single rack space, roadworthy chassis are all features of this product. The system recreates the original reverb algorithms of the Eventide SP2016 Stereo Room, Room Reverb and High Density Plate, as well as new enhanced versions of each algorithm designed to take advantage of additional processing power, yielding higher reflection density. The user interface is optimized for the studio and for front-of-house applications. It also features a new, enhanced version of each of the originals, which shares the basic structure of the originals but with more complex early reflections, higher density and finer control of the parameters.

201-641-1200; fax 201-641-1640

[www.eventide.com](http://www.eventide.com); [postmaster@eventide.com](mailto:postmaster@eventide.com)

## Compressor/Limiter

**PreSonus Audio Electronics**



CL44: This four-channel compressor/limiter combines analog circuitry with the latest in DSP sidechain technology. The traditional compressor feature set is expanded to include a separate brickwall limiter, compander and high-pass sidechain filter, making it useful with digital recording and live applications. A shared threshold potentiometer allows the compressor and compander to work in tandem to maintain complete control over wide variations in signal level. The high-pass filter for the sidechain operates completely in the digital domain from 20Hz to 20kHz. An optical mode gives the CL44 the ability to emulate the dynamics curves found in vintage optical limiters. Adjacent channel linking furthers the flexibility of the CL44. Features include a +4/-10 audio level select switch, sidechain insert, balanced XLR I/O and a single TRS unbalanced I/O for each channel.

800-750-0323; fax 225-926-8347

[www.presonus.com](http://www.presonus.com); [presonus@presonus.com](mailto:presonus@presonus.com)

## Internet newsroom link

**Burli Software**

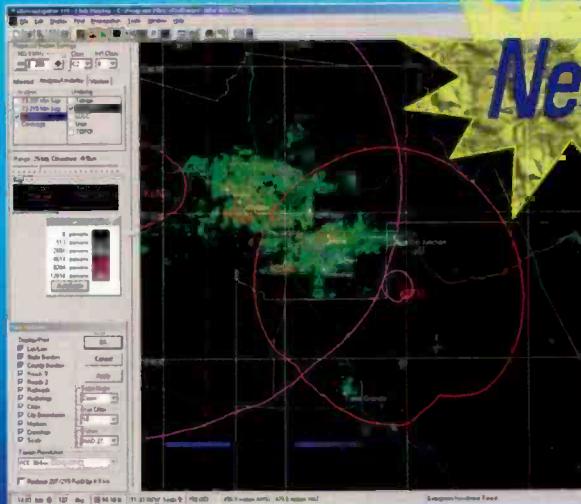
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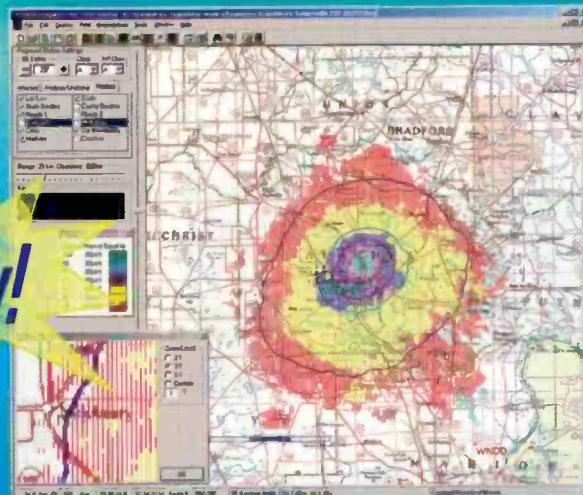
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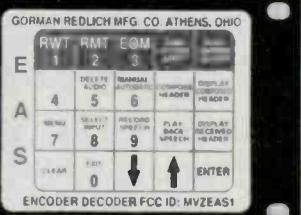
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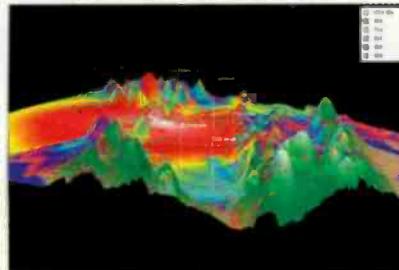
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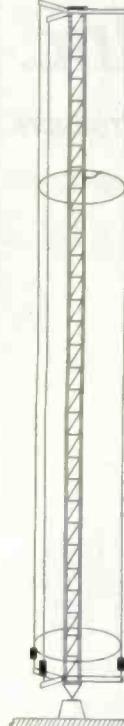
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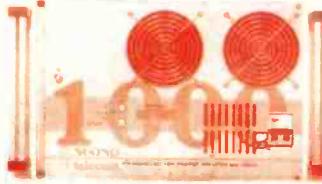
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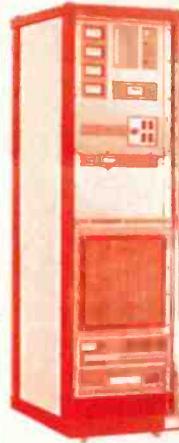
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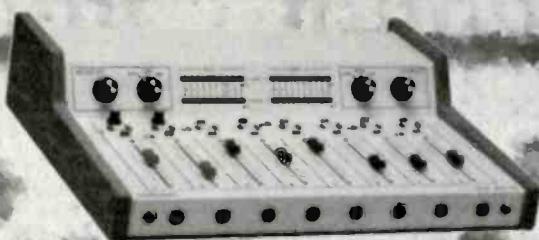
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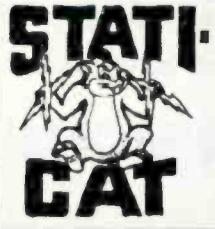
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## Contributor Pro-file

Meet the professionals who write for *Radio*.  
This month: **Field Report**, page 42.



**Christian Arnaut**  
*Broadcast IT*  
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Arnaut got his start in radio in 1988 after graduating from the Specs Howard School of Broadcast Arts. Since then, he has worked for more than 30 stations as a staff engineer, chief engineer or maintenance contractor. His personal goal has always been to continue learning new technologies, and he was afforded this opportunity when he was promoted to his current position. He now focuses on digital audio systems and developing new ways to apply new technologies to his stations' facilities.

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## Shaping radio today and tomorrow

By Kari Taylor, associate editor



### Do you remember?

Designed specifically for broadcast production, the Fostex Foundation 2000LS random access recorder/editor featured the



speed, ease of use and audio quality of its predecessor, the Foundation 2000.

The Foundation 2000LS offered a dedicated user interface with touch-screen display, real-time operation, event-based

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In an ad from our September 1994 issue, the unit was touted by one user as having "audio scrubbing is so clean, you'll swear you're rocking reels." This piece of equipment was advertised as costing less than \$15,000 in the Fall of 1994.

In the mid-90s, digital editing technology was still in an infant stage. Dedicated workstations, such as the Foundation 2000LS, were leading the way because PC-based systems did not yet have the horsepower to provide an affordable system. Also, many users were still attached to reel-to-reel editing mentalities and preferred the familiar controller interface.

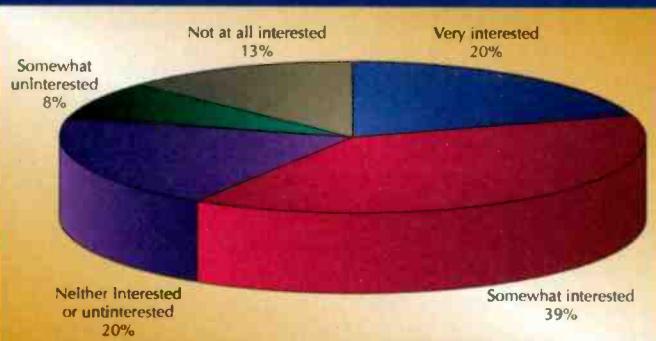
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### Consumer Acceptance of Digital Radio

**How interested are you in an automobile digital radio that provides CD-quality sound and the ability to display information if the cost of the digital radio was included in your monthly car payment?**



Sample base: 1,118 men and women with an even age, gender and income distribution.

Source: eBrain Market Research - Digital and Satellite Radio Mini Study - March 2003

In January 1922, Bamberger's Department Store in Newark, NJ, decided to create a radio station as an indirect promotional gimmick for the store. The idea was to help sell the new wireless radio sets the store stocked.

The store got a license for the station from the Federal Wireless Commission in Washington, DC. It received a license for WOR to operate on 360 meters, powered by a 250W transmitter. With this power, the station could broadcast for several hundred miles. The studio and transmitter were located in the Bamberger's department store.

On Feb. 22, 1922, the station went on the air. On April 6, 1922, the transmitter was moved to the roof. Two 65-foot masts linked by an eight-wire antenna also improved operations. The staff functioned as engineers and air personalities and, in between, the staff sold radios.

Today, WOR is one of the active proponents of IBOC.

Source: WOR Radio: *The First Sixty Years, 1922 - 1982.*

# WHEATSTONE D-4000

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## DIGITAL AUDIO CONSOLE

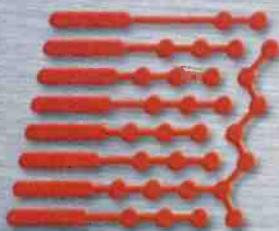


**Based on the technical architecture of our popular D-5000, this new D-Series console is totally modular, offering features to satisfy the most demanding engineers—but at a lower price point than its predecessors.**

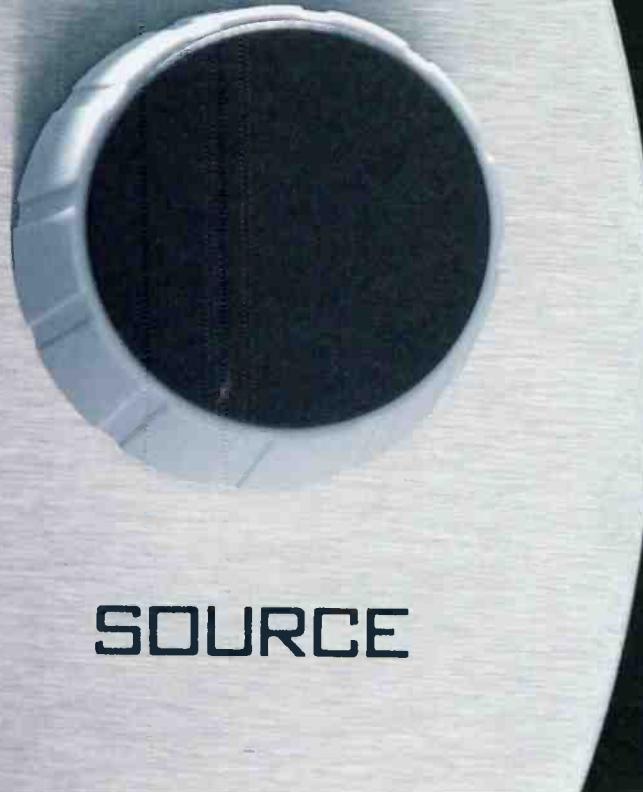
- Hot-swap design
- Four stereo mix buses
- Six pointer-style true VU meters
- Any mix of digital and analog inputs
- AES and balanced analog outputs
- Choice of master clock rates
- Up to 4 mix-minus outputs using SPD-4000 phone remote modules
- 24 bit A-to-D conversion on analog inputs
- A/B source switching with fully independent logic and machine control
- Mode selection on stereo inputs
- Low profile drop-through fader design
- Multiple studio outputs with talkback interrupt

Wheatstone has more digital audio experience than most of our competition combined. The D-4000 is a truly high performance, reliable console that will make your transition to digital a pleasure. Benefit from our expertise—**CHOOSE WHEATSTONE**—the Digital Audio Leaders!

 **Wheatstone**



# AUDIOARTS



Martini 2

SOURCE

## ADR-32

### DIGITAL AUDIO ROUTER

SOURCE

## GET BIG ROUTER FEATURES ON A SMALL ROUTER BUDGET!

Based on WHEATSTONE's highly acclaimed BRIDGE TECHNOLOGY, the new AUDIOARTS ENGINEERING ADR-32 brings your studio trouble free mixed signal switching. You can choose from a combination of AES digital (with 24-bit SRCs) or 24-bit A-to-D input cards as well as a combination of analog and digital output cards to help keep this system future-proof. Since all signals are routed entirely in the digital domain, crosstalk is eliminated. The ADR has a built-in monitor speaker (w/level control and external output) and supports both 485 and Ethernet hardware controllers. It comes with WHEATSTONE's highly acclaimed X-Point software that lets you configure, protect and integrate the system with our own consoles and third party automation systems.

BENEFIT from our extensive technology base; choose the Audioarts ADR-32 from Wheatstone—the digital audio leaders!



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