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The Radio Technology Leader
September 2000
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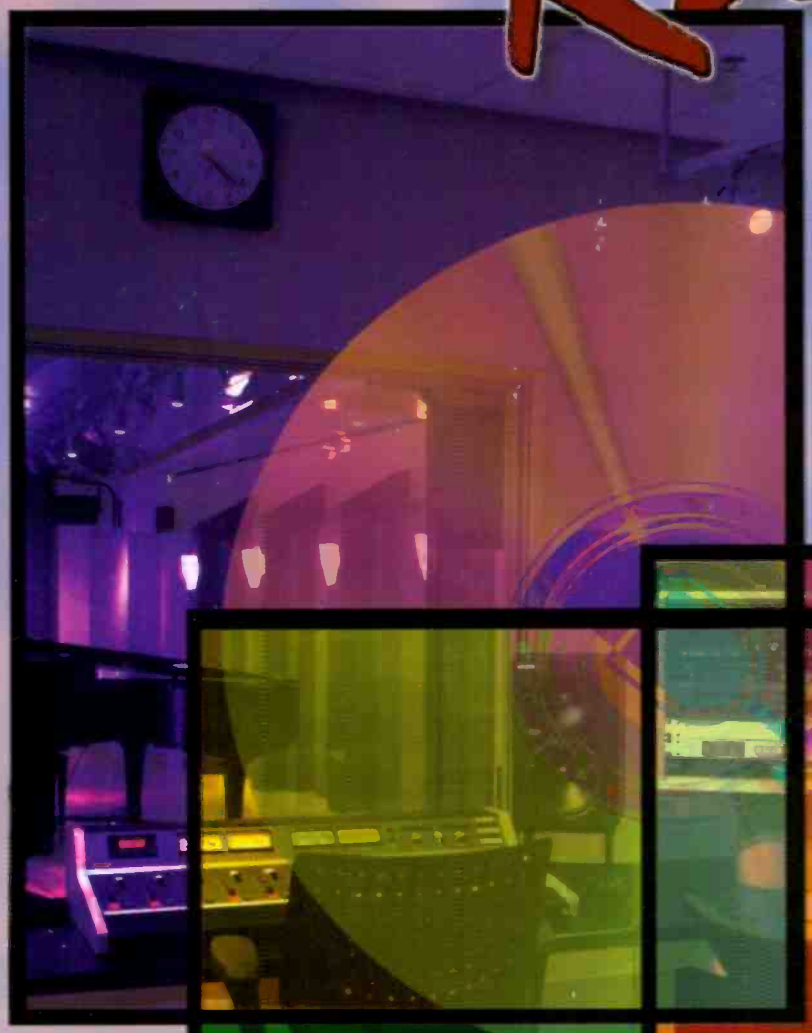
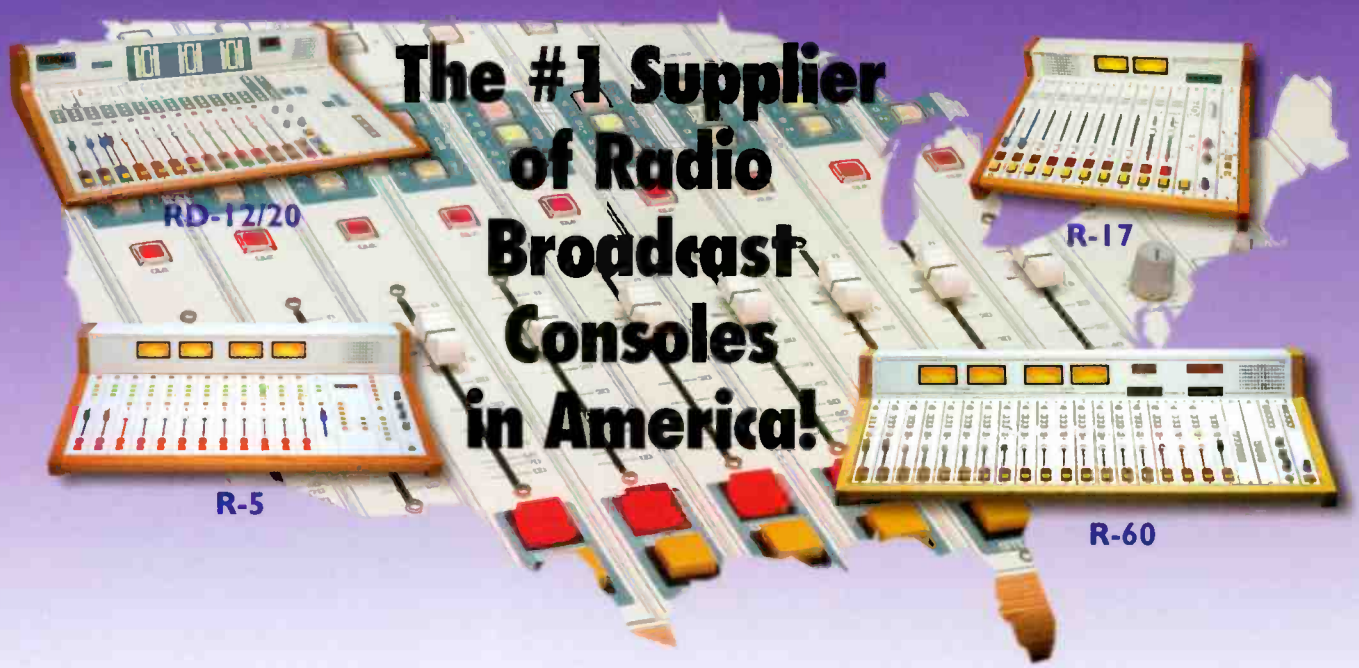


PRODUCTION
From Studio to Audio

ALSO:
NAB Radio Preview
Tower Maintenance
Networking Basics

From Audioarts...



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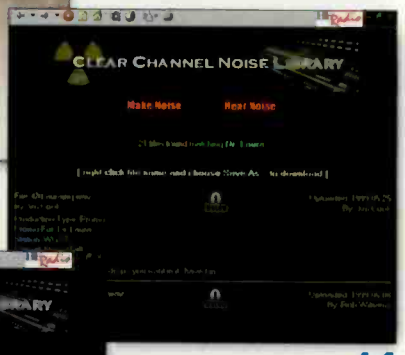
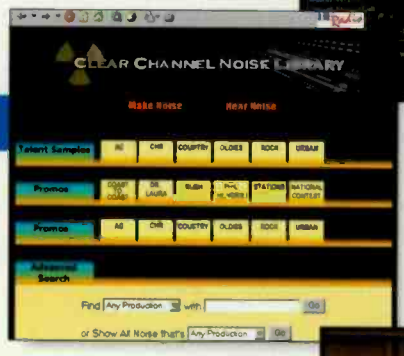
FEATURES



DEPARTMENTS



THE NAB RADIO SHOW

ON THE COVER: The work behind the scenes in production can create some picturesque aural images. Photo of KUOW-FM, Seattle, Courtesy of Russ Berger Design Group and KUOW. Cover treatment and design by Michael J. Knust.

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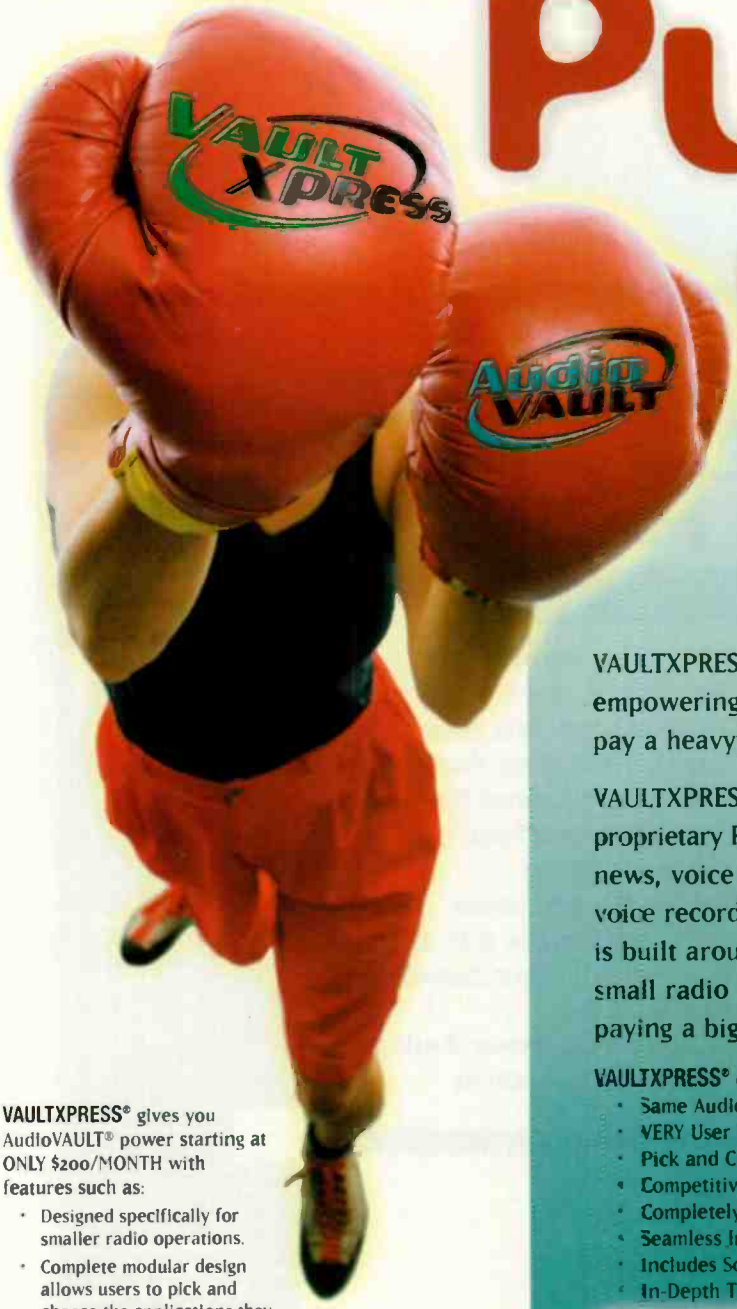

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Tip of the Week

Hints, tricks and tips that you can use.

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BE Radio's September issue online

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Future delivery

Are you tired of hearing all the arguments about Napster and its clones? I am too, but this column isn't about litigation against a company that provides a gateway for file exchange. I am more interested in what this method of delivery presents for the future.

The wave that Napster has begun is a glimpse at how music distribution will be in the days to come. The record labels don't like it because of the lack of security. MP3 files have no security features at all. A file can be copied over and over. A watermark can be added, but that doesn't prevent someone from copying it.

I own several hundred CDs (and a few albums, too). I personally would rather own an uncompressed (or lossless compression) version of a song than a heavily bit-reduced version. While the MP3 format can sound very good, chances are that the version available through a service like Napster was ripped off by someone that did not have the highest quality software. It's also possible that this version has other artifacts that have been introduced – intentional or not.

Currently, I can get my own copy of a song by either buying the CD that was created by the record company or I can download it through Napster. Let's examine the second option.

First, I need a computer with a reasonably fast Internet connection. A 56k modem will work, but if I am serious about downloads, I will probably need a DSL or other high-capacity connection. Add to this enough hard disk storage capacity to store all this material and some method of archiving it, probably a CD writer. (The CD writer affords the additional advantage of playing my choices almost anywhere at any time.) Add a good supply of blank CDs. If I want to listen to a variety of my MP3 files on a daily basis, I will also need a portable MP3 player. Have you been keeping a tab on this equipment list so far? The hardware and peripherals alone will cost close to $3,000 plus any monthly fees for Internet access.

After this equipment outlay, I still need to spend a considerable amount of time locating the MP3 files and verifying that the quality is acceptable. Then I will spend more time storing and organizing these files, downloading them into my MP3 player and burning them to a CD.

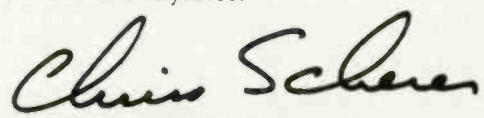
This sounds like too much work to me for mediocre quality. I would rather buy several hundred CDs for the same price and very little additional time.

All this being said, the new model for music distribution will likely be based on something similar to the Napster idea. The difference is that record labels would provide this service directly and maintain the quality control of the recordings. I would rather see them use a lossless compression or linear file format, but that may come in time.

Many of the uncertainties can be controlled or eliminated if the record companies take the lead. I can make a secure purchase online and then download the entire album, artwork, liner notes and other information. If I'm in a hurry, I can select the option to download the heavily compressed but still listenable versions first and then let the long download happen overnight.

Based on the average cost of a CD vs. the number of tracks, the price point per track would be around $2 per song. If the price per song is reduced slightly, there is a cost incentive to purchase online. The record company actually comes out ahead because there are no packaging costs and possibly reduced distribution costs. (The distribution costs are spent on computers and not on trucks). If the price per song were lowered to $1 each, the cost savings to the listener would be easy to see.

Add to this a file format that has the security features record companies need to prevent piracy with high-quality audio and there won't be a need to run to the local record store anymore.



Chriss Scherer, editor
chriss_scherer@intertec.com

On the Road

Chriss will moderate part of the Digital Facilities Certification Workshop at the NAB Radio Show at 4 p.m. Thursday, September 22 in room 102. The session will cover computer networks in the radio station.

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Tower maintenance

By Kirk Harnack

Tower maintenance may not rank up there with your top 10 engineering duties: It's costly and time-consuming. Tower work is usually contracted, so engineers must rely on the honesty and integrity of the tower inspector. Moreover, we do not often realize immediate benefits from tower inspections, so they may be viewed as just another expense.

Certainly, however, good tower maintenance saves broadcasters from more costly repairs and lost airtime. Maintenance can even save the tower itself from early failure. The number of problems discovered and repaired on tower checkups often reveals the value of regular tower inspections.

Tower inspections may require coordination with other tenants.

How often should a tower be inspected? Inspecting towers every 12 to 24 months is considered wise. It is common for insurance policies to dictate regular inspections at 12-month intervals.

It is also good engineering practice to get a tower checked after a significant storm, especially if damage on the ground indicates that there may be damage overhead. Look for changes in VSWR on transmitting antennas, an increase in nitrogen or dry-air usage and post-storm tower lamp failures. Also, listen to the tower for coax lines slapping in the wind. These conditions warrant a closer look upstairs.

The tower inspection

Each tower site is unique and presents its own set of challenges during a thorough inspection. A station can get more for its inspection dollar by making the job easier for the tower climber.

Make sure the site is accessible, keys are available and work properly, and other site users are notified for power-reduction coordination, if necessary. Often overlooked, guy anchors are critical to the tower's integrity. Clear the area around each guy anchor prior to inspections.

Look for the following items during a tower inspection.

Tower plumb. A tower typically exhibits one or more physical changes during its first year. Guy wire stretching and even slight shifts in the ground will cause slack in the guys and variations in the tower's plumb. Some tower-erection firms recommend that a new tower be checked for plumb and guy tension one year after construction and that subsequent inspections be scheduled if any significant corrections are needed.

Guy tension. Tower plumb and guy tension are closely related. It is possible, however, for a tower to be plumb while some or all guys are too taught or too slack. Tests to determine proper guy tension include the use of a shunt-type dynamometer, the transit intercept method, the vibration method and the tension dynamometer method. The tower manufacturer will often have a preferred method for determining guy tension. Ask your tower inspector to use that method and show you the results.

Proper paint. Tower paint near the bottom of a tower is easy to see, but the care that goes into painting the lowest orange and white bands does not always make it to the top. Have the tower inspector check for differences in paint quality and alert you to any deficiencies.

Bolts and hardware. Missing or loose hardware is common, especially at higher points on the tower. Some tower crews have been known to skimp on hardware and fasteners where they will not be noticed right away. Coax, conduit and other vertical runs need the same or even greater attachment frequency up high where the wind is greater. It is important to check for loose or missing tower bolts, lock washers, guy attachment hardware, and other critical fasteners and parts.

Guy termination. Guy termination failures, rusted hardware, improperly installed preforms and ice damage to preforms all carry responsibility for tower collapses. These problems are relatively easy to spot and correct during routine inspections.

Turnbuckles should be inspected not only for corrosion but also for the presence of safety wires. Make sure adjacent turnbuckles are not rubbing and chafing against each other or other guy wires or hardware.

Guy anchor points are often choked with weeds and vines. Clear these and other obstacles out of the way. Commercial vegetation killers will knock down weeds quickly. A longer-lasting choice, if suitable for use in your area, is a "soil sterilizer." These keep vegetation under control for up to three years. The guy anchor itself should be checked for rust, cracks or bends in the steel. It is also

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helpful to carefully dig away a few inches of soil to inspect the anchor below the normal soil level. Corrosion, especially that caused by galvanic action, can cause severe weakness here.

Transmission line and antenna integrity. Supporting the transmission lines and antennas is the sole function of most towers. Check all lines and antennas one foot at a time for leaks, dents, lightning damage, bullet holes and damage from fallen ice.

Remember to check for the presence of basic hardware and accessories. Coax runs should have proper hoisting grips installed at recommended intervals to hold their weight. Proper coax grounding kits are often overlooked at installation, so check for these and install them if they are missing. Rigid transmission lines require copious amounts of hardware along their runs. Make sure you and your tower inspector know what hanger parts must be present and what condition is acceptable.

What is legal and what is prudent for tower grounding are usually two different things. Without specifying a particular grounding scheme, a typical tower is likely to have just two or three solid copper wires leading from the tower base to a couple of ground rods. Although this scheme may satisfy the electrical code, it is not prudent for broadcasters interested in protecting their tower and transmitter assets.

Keep vegetation around a tower under control. Before the tree in this photo was cut, the guy wire had been pushed several feet from its correct position.

Safety

Before completing a periodic tower inspection, examine those items relating to safety — both employee and public safety.

Most towers are fenced in some way, thanks to the FCC Rules, insurance-policy requirements or even local jurisdictional ordinances. For AM towers, the Rules require "an effective, locked fence." Keeping fences in good shape is important.

Towers are felled each year by trucks, tractors and backhoes running into guy anchors or snagging the lowest guy wire. These items need protection from such vehicles. Fencing, concrete barriers and bright markings should be used wherever vehicles or heavy equipment could be operated nearby.

Kirk Harnack, BE Radio's consultant on contract engineering, is president of Harnack Enginering, Cleveland, MS.

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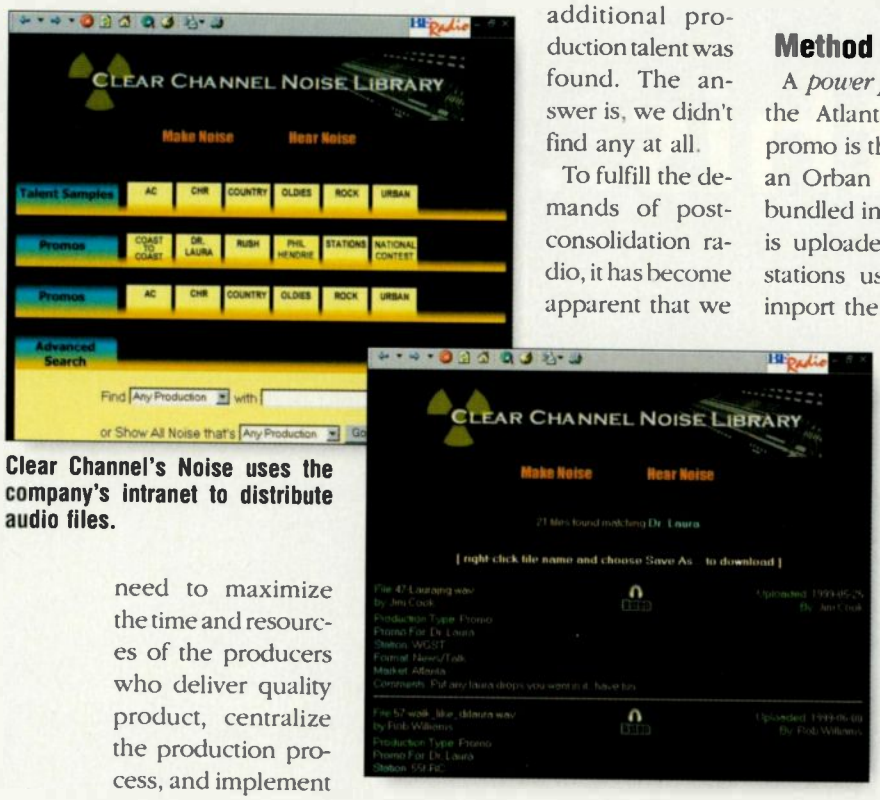
Sharing production resources

By Jim Cook

One incongruity in the post-consolidation radio community is that demands and expectations have increased, but budgets have decreased. The focus on real-time, in-market delivery of product suddenly tilted. We have spent the last 80 years in radio putting our technical eggs into the on-air studio basket while the production room was treated as the ugly stepchild.

In just a few years, we have begun exporting talent, centralizing production and shifting the focus from air to production studios. This raises the question of where this additional production talent was found. The answer is, we didn't find any at all.



Clear Channel's Noise uses the company's intranet to distribute audio files.

To fulfill the demands of post-consolidation radio, it has become apparent that we need to maximize the time and resources of the producers who deliver quality product, centralize the production process, and implement enterprise-wide systems that aid the mandate.

Although we have come a long way, the game has just begun. Given the intramarket differences in equipment, connectivity and human resources, the task is complex at best. The Clear Channel stations in Atlanta provide one example.

Within the building are nine production rooms. Each room is networked so that a session in one studio can be called up in any room. Using Novell networking, a network folder is assigned to each room. You can log onto the network as studio A while in studio B. This flexibility allows for studio use to be maximized and prevents the "I-need-to-get-in-here" syndrome from shutting down production.

Atlanta exists as one of several hub markets for Clear Channel. The Peachtree Road studios currently house four FM, one AM, one statewide news network, and one nationally syndicated talk show. From this location, we also export air talent voice-tracked shows, create, log and air commercial production for spoke stations, and create, network and share station image production with other Clear Channel stations nationwide.

This is accomplished through one of several methods of network connections.

Method one

A *power producer* creates a Rush Limbaugh promo for the Atlanta news/talk station WGST. The multitrack promo is then exported using DAW software, in this case an Orban Audicy. This allows the entire session to be bundled into a single file. The file (with a .prd extension) is uploaded to an FTP site via a T1. Other news/talk stations using Audicy networking can download and import the file directly into their editors.

Once the file is reconstituted at the local station, the producer deletes the Atlanta references and any licensed material and reconstructs a custom local promo. This allows the power producer to finish the job after the upload. No additional customization is required. The producer's time has been used efficiently.

Method two

A station morning show promo is produced on a multitrack DAW. The power producer or secondary producer then strips the promo to a shell, leaving out all local references and licensed material.

The original sound file and the stripped shell are then recorded into a single MPEG file that can be sent via e-mail to a specific market or producers, or can be uploaded to a central storage server (which in our case is called the Clear Channel Noise site).

The Noise site is available on the Clear Channel intranet. It is arranged so the best promos are available to anyone with access to the WAN. A simple follow-the-prompt button and links allow for file uploads and downloads. Each file has a listen button that allows program directors to preview any promo. Once a file is chosen and downloaded, the finished example (with references to the market in which it was created) is removed and the

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two-track shell is loaded into any multitrack editor and customized at the local level.

Also attached to each entry is a comments section that provides complete production details for the local producer.

We have been able to use Noise as a searchable database. We continually upload movie and TV drops, generic winners, news sound bytes, national contest work parts, and talent air-checks. In this way, our most versatile and talented producers are shared across the enterprise.

More examples

A series of promos, teases and sweepers for a groupwide contest is created in Atlanta for AC station Peach 94.9. These elements are stripped of local references and loaded into the digital delivery system. Most Clear Channel stations use the same system (Prophet Systems) and can access the file at Peach 94.9 through the WAN to Atlanta. The audio is sent via data packet to each market on demand at the click of a button.

In cases where two markets are not using the same DAW (Audicy and ProTools, for example), all of the audio is saved to eight tracks in four stereo pairs. The four stereo pairs are saved as MPEG or WAVE files and uploaded and downloaded via any of the above methods. These audio pairs can be saved into any multitrack that accepts the file format and reconstituted as a complete tracked session. In a few cases, the discrete files must be manually aligned. This is done by placing an audio signal (which we call a two-pop) at the beginning of each audio pair. The two-pop sync tone is then lined up on each track pair in any digital editor.

A recent national contest required that a Cincinnati-created production was available for playback within a few hours at all participating markets. This was accomplished by having the power producer in Cincinnati feed the finished session via ISDN to the Premier Network head-end uplink in Los Angeles. The session was then replayed minutes later (sometimes while editing was still in progress) over the satellite and all the stations could receive the feed for playback.

As consolidation forces us to raise the bar in the creative arena, it has increased the demands in the technical forum. The objective is to redesign the production department and to rethink the single station "market island" idea, a concept we have lived with from the dawn of commercial radio. The future lies in minimizing technical variables, increasing training and maximizing time management for the power producer. That's the funny thing about post-consolidation; it has forced us to refocus, rethink, reorganize and, I'm sure we all hope, improve the creative matrix.

Jim Cook is the creative services director and manager of production at the Clear Channel stations in Atlanta. He also acts as a national creative coordinator for Clear Channel Communications.

To: The Broadcast Community

From: G. Scott Benton
President
Commercial Communication Associates, Inc.

Dear Friends,

I am pleased to announce the new ownership and management of CCA by Commercial Communication Associates, Inc.

Commercial Communication Associates, Inc. was formed in a concerted effort between myself and a group of private investors. This new company was formed for the purpose of purchasing the assets of CCA Electronics, Inc. The purchase was finalized on the 24th of March 2000.

Commercial Communication Associates, Inc. is in no way affilliated with any other transmitter manufacuring company. We are privately owned and we operate as a stand alone business.

Our new management team was selected to reorganize the company from the ground up. The entire team is comprised of previous CCA employees. Our employees have a combined experience of more than 200 years. I would like to take this opportunity to introduce them to you. Many of you will recognize some of our names from the past.

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I wish to personally thank those of you who have been calling with words of congratulations and encouragement. It's great to be back!

Thank you,
G. Scott Benton
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Reliable Broadcast Transmitters

How is your VSWR?

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

One phenomenon common to transmitter installations does not always receive the attention it warrants. *Voltage standing wave ratio* (VSWR) can wreak havoc in a transmitter when it suddenly increases and dumps the transmitter in the middle of the night.

The average AM transmitter is seldom prone to severe VSWR problems unless there has been a substantial change to the antenna tuning unit (ATU) or common point (CP) input tuning, or the transmission line is damaged. FM transmitters are just as susceptible to VSWR problems due to antenna problems or transmission line damage. It behooves the engineer to be aware of the VSWR and to ensure that antenna-system components are properly tuned for optimum VSWR.

VSWR facts of life

A transmission line is considered to be a long series of inductances with parallel capacitors (as shown in Figure 1). Each pair of capacitors and inductors represents a very short piece of coaxial cable. Capacitance is produced by the spacing between the wires or inner and outer conductors in a coaxial cable. Inductance is determined by the size of the conductors. As current enters the line, it is retarded by the inductance of each tiny section. The consequent limiting of the charging rate of the capacitive element of the line determines the characteristic impedance of the line. The equation for characteristic impedance can be found in RF Engineering, June 2000, pg. 20. A rough approximation is given by the taking the square root of L/C, where L and C are per unit length of the line.

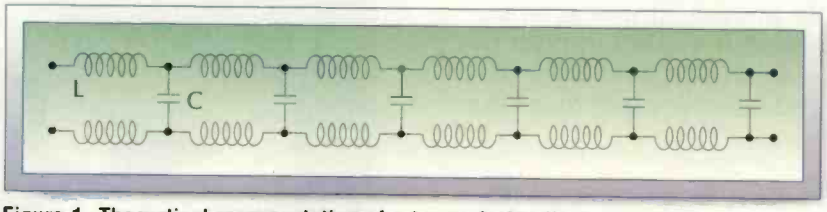

Figure 1. Theoretical representation of a transmission line.

Another element in the antenna system is the effect of the dielectric in the coax on the speed of the signal. As a result, the signal travels more slowly through the cable than through the air. This difference may be as great as 65 percent. Thus, when the electrical lengths of transmission paths are important, it is essential to take *velocity factor* into consideration.

For efficient transmission of power, the load impedance must match that of the line and the generator. When these impedances match correctly, no power is reflected back along the line from the antenna to the generator and the only power lost in the system is that due to I^2R losses and possibly some skin effect loss. But when the impedances do not match each other, losses occur and the power delivered to the antenna is less than that which enters the transmission line. If this occurs, the transmitter output will see either capacitative or inductive reactance. In such cases, the output stage would be detuned to an extent depending on the degree of mismatch. In severe cases it is possible for the final amplifier stage to be damaged.

When a line mismatch occurs, a standing wave caused by the reflected power appears on the coax. Every 180 degrees along the line major current and voltage points will occur. Obviously, halfway between each of these points minimum current and voltage points will occur. The *voltage* standing wave ratio is the ratio of V_{max}/V_{min}, measured at these points. The *current* standing wave ratio is the ratio between the I_{max}/I_{min}.

Measuring VSWR

The basic VSWR meter consists of a line section with a short wire parallel to the inner conductor. The voltage developed on this wire is rectified and passed to a DC voltmeter, which is calibrated in terms of VSWR ratios. A value of 1.0 is shown at the minimum reading point on the scale and, as detected voltage increases, the meter goes upscale showing increases in the VSWR. In many FM transmitters, the output from this or a similar probe drives a PA breaker to protect the stage in the event of massive VSWR increases.

A VSWR reading of 1.1:1, or about 5 percent reflected signal, is usually the maximum that can be safely handled, although most situations are different. Remember that excessively high VSWR can cause high voltage breakdown of cables.

VSWR and AM antenna systems

Most AM antenna systems use 50Ω transmission line but, regardless of line impedance, the same rules apply. AM transmission lines are often quite long, perhaps 300 feet or more, and carry comparatively low power in most instances. Line overheating due to high VSWR is rare. The operating frequency is low and the bandwidth of the signal is basically very narrow. Transmitter final stages are, in general, amenable to output load impedances of about 50Ω, although some modern transmitters are

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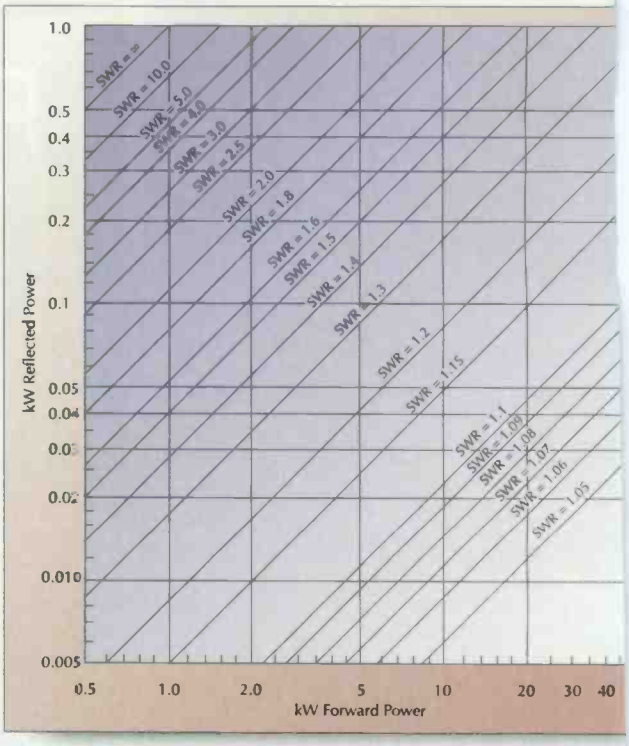
finicky regarding output loads. In many stations, it is unusual to find 50Ω±j0 when an OIB is used to measure the line input impedance at the transmitter and at the ATU input. In many of these cases, measurement of line current showed a very small difference between the two ends of the transmission line, despite the apparent mismatch and expected high VSWR and corresponding power loss in the line.

In stations where a directional antenna is used, common point impedance is of great importance, but even there I have found more than a few stations with mismatches in CP and individual tower lines. Sometimes, checking RF power in the antenna has shown a discrepancy.



The relationship between power levels and VSWR readings.

It appears that, in general, unless a finicky transmitter is used, reasonably high VSWR ratios can be tolerated in terms of RF radiation efficiency. But this definitely does not mean that such kinds of operation should be endured, nor are they up to the Standards of Good Engineering Practice.

VSWR and FM

The average FM installation is far more susceptible to the effects of high VSWR. Again we find that 50Ω is the usual line impedance, and transmitters and antennas expect to see this value. VSWR by itself does not reduce signal coverage, but it can do nasty things to your signal.

Although not especially common in lower-power FM, operations discontinuities caused by transmission line coupling bullets and severely sharp bends in flexible lines can introduce VSWR effects and should be borne in mind. A number of problems can be linked to high VSWR. For example, stereo separation is affected. So is synchronous AM noise, and intermodulation products can increase.

Some antennas exhibit fairly narrow bandwidths. It is a good idea to check your operating bandwidth from time to time. If possible, the transmission system should exhibit flat response beyond the 200kHz spacing. If you don't have the necessary equipment, you can use your FM transmitter and VSWR meter if your transmitter has an exciter with a variable frequency control adjustable in small increments.

Finally, extreme cases of high VSWR appear as hot spots on the transmission line. These cases lead to melted insulation and spacers, fire and off-air crises.

E-mail John at: batcom@bright.net.

Correction

In July's RF Engineering, the references to FCC directional antenna tolerances for phase and ratio were reversed. The correct tolerances are ±3 degrees for phase readings and ±5 percent for ratios.

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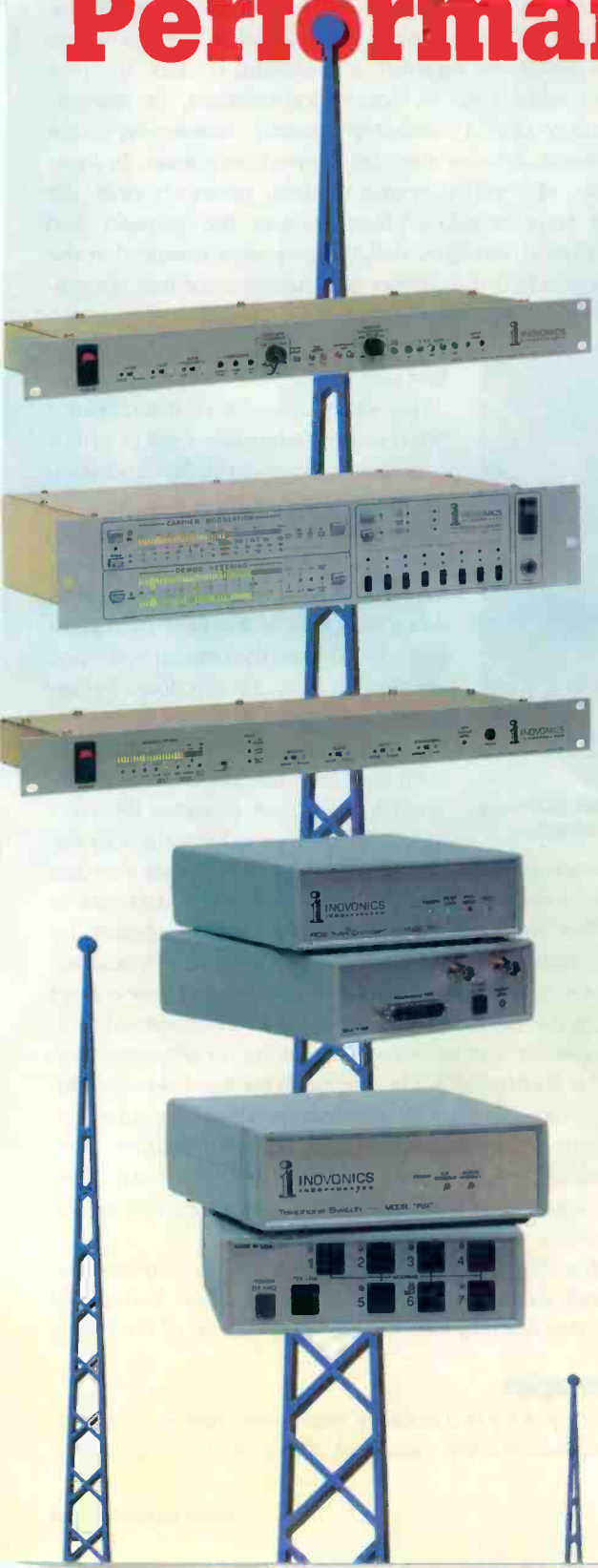

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Basic networking

By Kevin McNamara, CNE

It seems like only yesterday that I started writing articles on PC networking for *BE Radio*. But it was actually a few years ago. At that time, PC-based networks were not only being used for the storage of digital audio, but also to replace the clunky mainframe systems used for business and traffic. Today, PC networks are everywhere in the station. Installing Ethernet or fiber cables around the station is much easier than working with the bundles required for the previous systems. Although most of you have become experienced and, in general, quite proficient at installing and troubleshooting networks, it is always beneficial to step back and review the basic theory that makes your network run.

LAN basics

The name Ethernet defines an *access method*, or a set of rules, that allows two or more computers to communicate over a common medium. Other types of access methods include *Token Ring* and the virtually obsolete *Arcnet*.

The specific access method used by Ethernet is called *carrier sense multiple access/collision detection* (CSMA/CD). In simple terms, this means that, when one PC attached to a network is talking, the others must be listening. If, however, two or more computers send data at the same time, the signals will interfere with each other and no connection will be achieved. Each PC will detect the collision and wait for a random period of time before sending again. The process will repeat until the destination PC successfully receives the data.

Protocols

Protocols are a set of rules defining how the data will flow between two or more computers. Depending on which network operating system you choose, there are several possible protocols. IPX/SPX (Novell), NetBEUI (Microsoft), NetBIOS (IBM) and DECnet (Digital Equipment) are examples of LAN protocols. The most popular protocol currently in use is TCP/IP, which is used exclusively to communicate over the Internet. Protocols permit computers with different platforms to share files.

Figure 1. The OSI seven-layer model defines a standard set of network operating parameters.

Protocols can be classified further into one of two groups: *connection-oriented* and *connectionless*. When two computers establish a successful contact, the protocol takes over. A connection-oriented, or *reliable*, protocol uses a three-step process: connection establishment, data-transfer and connection release. In *unreliable*, also called connectionless, protocols only the data transfer takes place without the connect and disconnect function. Reliable protocols ensure that the data reached the proper destination error-free. Unreliable protocols simply send data without any checks.

OSI

The *Open Standards Interconnect* (OSI) model comprises a set of protocols that attempts to define and standardize the communications process. OSI breaks down the communications process into seven specific *layers*. During the communications process, data flows from one to the next successive layer, either from the bottom up (when sending) or from the top down (when receiving). Figure 1 shows how each layer depends on its surrounding layer. Each layer also has a specific purpose. The *physical layer* provides the electrical and mechanical interface to the network cabling. The *data-link* layer packages the data to send over the network and disassembles data sent to it. The *network* layer maintains the connection by translating logical address information into physical addresses. It also provides network routing and flow control across the network. The *transport* layer ensures data is successfully sent and received, asking for retransmission until it is successful. The *session* layer turns the communications process on or off as needed in order to maintain a clear communications path. The *presentation* layer translates data between different computer platforms. The *application* layer interfaces applications run on the computer and the network.

Other than the physical layer, the OSI is implemented through software drivers loaded at the start-up. You should note that certain protocols might not use all of the layers.

Topologies

The topology of a network refers to the method in which the various PCs are connected. There are three basic types

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of topologies: *star*, *bus* and *ring*. These names describe the physical layout of the network cabling.

Most Ethernet networks use a star topology with a *network hub* at the center of the *star* with cables run to each PC. Hubs can be cascaded together to form other stars. Star topology allows you to centralize the placement of network cabling for ease of troubleshooting and reconfiguration.

The ring topology is not used with Ethernet but is used with Token Ring-type networks. Token Ring networks are characterized by the need to form two discreet signal paths for data flow, thus the cabling used to wire the network will contain two discreet cables. Fiber optic-based networks, even those used to carry Ethernet, will use a ring topology. Fiber network cabling is sold as two-pair zip cables, although you can purchase jacketed multipair cables.

Ring topologies are similar to star topologies in the sense that both physically connect to a central hub-type device. Logically, however, the ring network forms two separate data paths or rings.

More on networks

The *Digital Facilities Workshop* at the NAB Radio Show will feature a session on networks in radio. The session will be moderated by *BE Radio* editor Chriss Scherer and will be held on Thursday, September 21, at 4:00 p.m. in room 102.

TCP/IP

Two protocols, *Transport Control Protocol* (TCP) and the *Internet Protocol* (IP) make up TCP/IP which encompasses other protocols as well.

The IP delivery process provides an unreliable connection. However, the basic function of TCP is to maintain reliable data transfer, therefore TCP/IP is considered a reliable protocol.

Basically, data sent over a TCP/IP protocol is broken down, sequentially numbered and encapsulated into packets that contain specific destination address information. If all of the data packets arrive at the specified destination, the TCP module will acknowledge their receipt. If the packets arrive out of sequence, TCP will attempt to put them in order. If a packet does not arrive, the destination computer will not acknowledge receipt and the source computer will attempt to resend.

Whether you are a certified network professional or someone who learned it the hard way, getting back to basic networking fundamentals always seems to help. It's time to disconnect my reliable connection.

Kevin McNamara, BE Radio's consultant on computer technology, is president of Applied Wireless, New Market, MD.

All of the Next Wave articles have been approved by the SBE Certification Committee as suitable study material that may assist your preparation for the SBE Certified Broadcast Networking Technologist exam. Contact the SBE at (317) 253-1640 or go to www.sbe.org for more information on SBE Certification.

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NAB files brief on LPFM issues

By Harry Martin

In July, in its effort to derail the new low-power FM (LPFM) service through litigation, the NAB filed its brief with the U.S. Court of Appeals for the D.C. Circuit. The brief was filed in the NAB's previously submitted appeal to the court attacking the LPFM rules.

The NAB's brief argues to the Court of Appeals that the commission's LPFM rules should be rescinded because the FCC was arbitrary and capricious in adopting those rules. In general, a court of appeals does not overturn the findings of an expert agency without making a finding that the agency was arbitrary or capricious in some way in reaching its decision.

The NAB's brief points to three specifics in making its argument. First, when the FCC adopted the LPFM rules, it reversed its long-standing policy that low-power services are an inefficient use of spectrum, and it provided no explanation of that reversal. Second, according to NAB, the commission disregarded evidence showing that the implementation of LPFM would cause substantial interference to existing FM service. Third, the commission has insisted that the benefits of LPFM would outweigh any costs, but it has failed to undertake a proper cost/benefit analysis.

The commission's brief addressing these arguments was due in early August. Intervenors in the case, including the 50 state broadcast associations and radio groups on the one side, and Media Access Project on the other side, also had an opportunity to submit briefs in August. On November 28, 2000, the court will hear oral arguments on the issues raised and ultimately will issue a decision. In the meantime, however, as the appeals process moves forward, there is no stay on the LPFM rules adopted. Indeed, the FCC has proceeded with plans for the filing of LPFM applications, with the first application filing window having been opened from May 30 to June 8 for 12 states and territories. More than 700 LPFM applications were filed during that first window, and the commission will now process them. A second window notice was scheduled for August 28 to September 1, for Connecticut, Illinois, Kansas, Michigan, Minnesota, Mississippi, Nevada, New Hampshire, Puerto Rico, Virginia and Wyoming.

Given the delays inherent in the appeals process, the first LPFM applications could be granted, and the stations constructed, before the Court of Appeals issues a ruling. While the proceeding is on an expedited schedule, there will still be a time lapse between oral arguments in November and a decision. If LPFM stations are in place prior to the time the court reaches a decision, this fact might increase the court's reluctance to overturn the LPFM rules.

Recent FCC fines

Fence enforcement. FCC agents visited stations in Virginia, Indiana and Montana to inspect fences surrounding antenna towers. The federal agents found unlocked gates, missing fence slats and broken hinges, and levied the standard FCC fine for fence violations of $7,000. In one case, an FCC agent found two gates unlocked during an evening inspection and a gate unlocked two weeks later during a morning inspection. The station advised the FCC that a painter it had hired left the gate unlocked. However, the FCC held the station responsible for those actions and issued the $7,000 fine. In another instance, an FCC agent inspected a station and found that several slats were missing in the fence surrounding the antenna. The agent determined that the missing fence slats created an opening through which a person could fit. Although the station advised the FCC that it was not aware of the fence damage, it was held responsible. FCC rules mandate that antenna towers having radio frequency potential at the base must be enclosed within effective locked fences or other enclosures.

Buyer and seller fined. To avoid a bank foreclosure on his station, an FM station owner transferred promissory notes, equipment liens and assets to a longtime station employee. The action staved off foreclosure but created an unauthorized transfer of control. Both parties pleaded with the FCC, stating that they had not obtained the advice of counsel in attempting this unconventional action and that they never intended the transfer to be a violation of the FCC rules. Nevertheless, the FCC fined the station owner $8,000. The longtime employee, also the new owner, was fined $8,000 as well.

FCC forms must be filed. The FCC fined the buyer of a station $3,000 for failing to submit forms to report his ownership. In this transaction, as opposed to the one above, the FCC approved the sale of a station in 1996 and the parties properly transferred the station. However, the new buyer neither advised the FCC that the sale had been completed (via a *consummation letter*), nor did he submit an ownership report to disclose the station's new ownership.

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

Dateline

Annual regulatory fees are due in mid-September. September 30 is the deadline for filing the EEO Annual Employment Report (Form 395-B).


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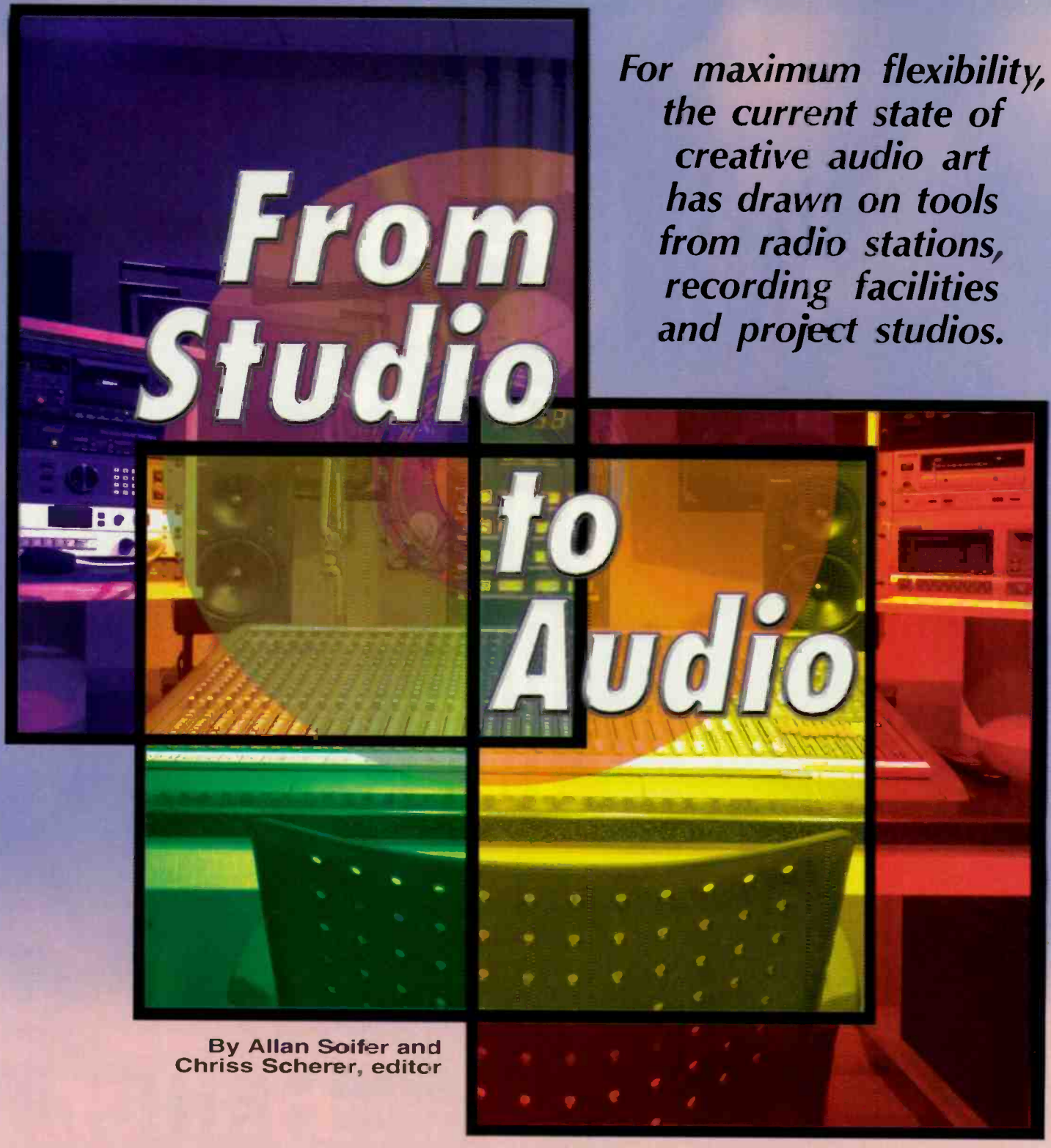
PRODUCTION

From Studio to Audio

For maximum flexibility, the current state of creative audio art has drawn on tools from radio stations, recording facilities and project studios.



By Allan Soifer and Chriss Scherer, editor

The basic process of creating content offline for use on-air has not changed much. It used to be that a background of music, composed and arranged specifically for a sponsor's use, was played by a live orchestra, and an announcer or singer extolled the virtues of the sponsor's products. Today, the creative producer uses a computerized index to find a CD containing pre-timed thematic music, or he may download it directly to hard drive and mix that under the announcer's copy. Using various processing and digitizing tools, the producer can equalize, compress, limit and vary the length of the spot, then record it to a CD or save it in the station's on-air delivery system.

The basic function of production remains unchanged, but much has changed in the technologies that create the final product. Despite this, the creative art is still very much in the producer's ear and mind.

From the middle

Let's look at the mainstay of the production studio, the console. When radio broadcasting started to grow technically, the manufacturers who catered to the industry simply created downsized versions of their on-air consoles and touted them as production boards. Then, one simply had to adjust the relative level between one or two mics and other audio sources like turntables and open-reel tape decks in order to come up with a pleasing balance. In many stations, the production studio was a clone of the on-air studio, which allowed it to serve as a backup in case of a breakdowns or maintenance. Today, a radio production console differs markedly from the on-air console — it is specifically designed for recording rather than transmitting information.

Production consoles can sport many features not found in the on-air studio, primarily equalization. Proper use of equalizers can make the difference between just any voice and an interesting presence with dynamics. Judicious EQ can heighten the listener's sense of enjoyment and appreciation of musical tracks, and make them more pronounced or intense when buried under the announcer's voice. Many consoles also offer the options of channel-by-channel compression/limiting, reverb or echo, and send-receive to outboard special effects processors. Each of these finds its way into the sum of a given production in the hands of the creative producer. (For more on processing for production, see FEATURE on page 34.)

Depending on the capabilities of the audio editor you use, the console may not be at the center of the studio. Some editors provide a complete mixing interface, and only a small console may be needed for level control and basic routing.

Processing is employed quite differently for production as compared with on-air. Processing can be used for the effect it creates or as a way to compensate for a shortcoming. A compressor can be set to reduce the level of the background audio automatically to allow a voice to cut through. Multiband processing is now finding its way into the production studio as well. Regardless of how it is used, care must be taken to prevent overprocessing before the station's main on-air processor. Processing for effect is a creative tool that can easily be overused. When used judiciously, effects processors can add just the right ingredient to make the final production shine.

Effectively routing various audio sources and effects processors can be a challenge. In analog installations, patch bays are an economical and practical method of routing. With digital sources, the choices are not as easy. Compact audio switchers (both analog and digital) are available for small tasks. Most can also be remote-controlled. Multiple console buses can be used as well if they are available. The method of routing you choose should provide enough flexibility for the producer to focus on the final product and not on what to do to make it happen.

Capturing sound

Microphones for production are, in general, the same as those used on-air, although a higher-quality mic may be chosen for production because of the safer environment. (That is to say that a mic in a production studio will not likely see the same amount of use or abuse as in the air studio.) Using the same mics in production as on-air maintains an aural consistency. Likewise, the same mic processor should be used. Some producers have several different types of mics available in order to capture different voice treatments as well as cater to the differing announce styles and methods of mic technique. Many producers like to have dynamic and condenser types on hand to deal with screamers and whisperers — without too much aggravation and electronic fiddling.

Monitoring facilities are critical to production studios. A good pair of reference speakers is required to enable close evaluative listening to make appropriate adjustments and enhancements. A smaller, near-field pair of speakers should be available to compare the sound to a different listening environment. Because the station's on-air processing can alter the tonal balance significantly, it can be helpful to audition a finished project through a replication of the on-air processing to hear exactly what the listener will hear. Most current production consoles offer several choices of monitoring feeds for headphones and monitors.

Correct monitor placement is critical. Typical production studios have a console and a digital editor. Many times, these two devices are not positioned in the same optimum monitoring position. In these cases, it is helpful to the

producer to have a second set of monitors placed around the second listening position. If most of the producer's time will be spent at the editor, the primary monitoring position should be placed around the editor.

Playing music and sound effects is a major portion of production. Virtually all production libraries are now issued on CD. Today's CD players offer cueing, scrubbing and instant start with repeatability — something most producers appreciate. Music and effects library suppliers have moved forward with the times as well. In the heyday of outsourced music for local productions, only a few agencies offered leasing of various indexed collections of pretimed original music. Today, dozens of suppliers offer a direct purchase license to selected packages. Some suppliers have added special packages of selected pieces or even single-selection purchase options. In addition, some suppliers have made their collections available online for preview and purchase.

With the advent of the home recording studio or project room (some of which are much more than just home studios) facilitated by relatively low-cost digital equipment with high-quality specs, almost every musician who can invest in this prosumer-level gear can become a music producer for radio. Add to this the advent of duplicate-it-yourself CDs, and anyone can offer production music. Interestingly, some progressive radio stations are entering into partnerships with well-equipped musicians for the purpose of offering new and fresh music for local spots at affordable prices. Some stations have gone as far as building and equipping their own project studios adjacent to their production rooms. These project studios can be contracted for the services of several knowledgeable local players to offer in-house music production.

Production control rooms have taken on aspects of recording studios. Instead of on-air radio consoles, multibus mixers are being installed.

Speaking of studio space, when designing a production facility, if possible, allow for a production control room and production studio. This additional studio may be as basic as a small voice-over booth or as complex as a performance studio. A larger studio also can serve as a place for bands to perform live on the air or for occasional multipurpose use, such as a public station's fund-raising drives.

A separate studio will require additional monitoring and talkback capabilities. Some consoles include a provision for studio communication and monitoring. In some cases, an external intercom system may be required for effective communication between the two or more rooms.

Recorders and recording

From cutting lathes to tape recorders to CDs and other digital recording media, the advances in audio recording have been tremendous.

Today's production studio may have an open-reel tape machine, which probably sees little use. There are occasional spots and programs that require a reel to reel. The CD certainly has found a suitable home in a production studio, too. Other media, including mini-disc, DAT and RAM-based recorders, have found uses in production. These formats are also being used in field recording. DAT and CD have found a home in archiving applications. The multiple-access recorders/players that found instant success on-air have also found a place in the production studio. All of these solutions offer inexpensive and convenient storage and retrieval options.

For archiving purposes, it is best to choose a linear recording format. While many data-reduction algorithms sound quite good, the effects of multiple encoding can quickly become apparent. Further, there is no way to know what algorithm may be used in the future for transmission or distribution, so a linear format provides some insurance against incompatible file formats.

The most common building block in a production facility is now the digital editor, also called the digital audio workstation, or DAW. Many manufacturers offer DAWs in a wide price range with an even wider range of features. From basic stereo to multitrack recording and editing, there is a system to fit your needs.

There is no single file-format standard among DAWs. Various recording formats are used, although MPEG and WAVE formats are the most common. The pro audio industry is settling on 24-bit/96kHz performance, but DAWs have not yet settled into a common mode, either. Sharing files between different systems also can be a challenge. Most systems will import and export WAVE and possibly MPEG files. Some

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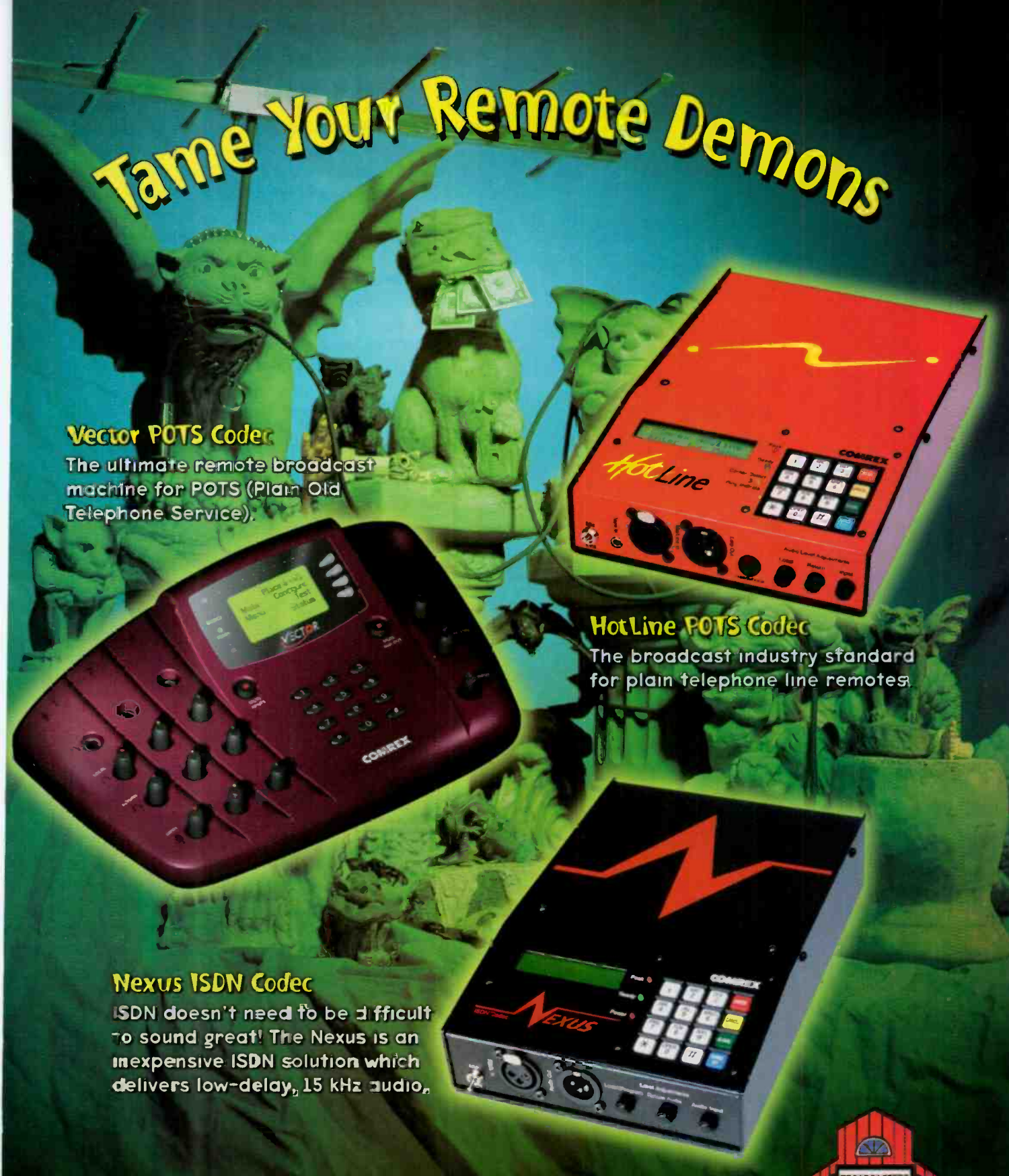

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PRODUCTION

allowances may need to be made for file sharing (see Managing Technology, pg. 14), but different systems should work together.

Computers have natural homes on networks, and computers for audio are no exception. Audio file sharing across the building or across the country is common. Completed productions and contribution elements can be stored on a central file server for easy retrieval by any network user.

Distribution of completed spots usually meant shipping a tape or, more recently, a CD. Faster communications methods for voice and data allow for

Place often-used equipment within easy reach of the producer's primary position.

commercial insertion orders to be processed up to the last possible moment. In these cases, shipping a tape or CD makes no sense. Private distribution networks like DG Systems were created to transport the audio files anywhere a POTS or ISDN connection was available. Now that most stations have Internet access across their office networks, a new path is available.

New service providers have made audio file distribution as simple as sending an e-mail message. While the interface is not exactly the same, the basic idea is. Audio files can be e-mailed or stored on a central file server and then downloaded (sometimes automatically) when needed. The commercial scheduler and audio playback system can even check an FTP site at the beginning of the day to see if a new version of the spot is available and automatically make the update. These Internet services also provide tracking and verification of receipt and transmission of traffic instructions.

Allan Soifer is a freelance production consultant based in Eastern Ontario, Canada.

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Processing for Production

Creativity takes effect

By Brian Sanders

Just which station is responsible for creating the first production room has probably been lost to history. No doubt it was conceived and perhaps constructed following a maintenance catastrophe that paralyzed the primary control room. A second studio, configured much like the main studio, then became a standard design feature of radio stations.

Because these second studios were set up as backup air studios, they used essentially the same equipment and had similar recording, playback and mixing philosophies. Eventually, the basic equipment would include the common audio recorders and players of the day but little else beyond microphones.

By the late '70s, production studios began to depart slightly from the traditional duplicate studio model. One difference is the inclusion of signal processing. No longer simply a duplication of the air studio, today's production facility has almost as much in common with a recording studio as with the broadcast booth.

Practical processing

Signal processing has come a long way in the past 30 years. My 1969 edition of Tremaine's *Audio Cyclopedia* has a section on equalizers but makes little mention of other outboard devices, such as compressors and artificial reverb or echo.

A discussion during an NAB2000 seminar is a case in point. The moderator queried the audience about the technology they had used in the past. Most recalled that it was the early '80s before almost any outboard equipment, such as reverb, EQ, compressor/limiters or other signal processing infiltrated their production rooms. At the time, these devices were commonplace in the recording industry but not in radio broadcast. They were often bulky, expensive and hardly the type of equipment a bottom-line oriented station manager thought necessary.

By definition, an audio processor manipulates the waveform in some manner. Whether by analog or digital means, characteristics such as amplitude and frequency response can be shaped and modified to achieve the desired sonic effect. Musical pitch and tempo can be altered for a performance that is closer to perfection. Even subtleties such as mic selection and the reverberant field are now digitally controllable.

Mic processors, like these from Symetrix and Omnia, not only keep control of levels and equalization, but help maintain a consistant sound from each mic user.

Why should we change the sound in the first place? There are two answers to this question: problem solving and station identity. The station with the best sound on the air has the best chance of attracting an audience and keeping it. The station that chooses to put

better production on the air, broadcast better-sounding news actualities and maintain a more consistent level of audio quality has a step up on the competition.

When to process

At nearly all radio stations, much program content is delivered from sources outside of the radio station in forms such as recorded music, commercial or promotional announcements and network feeds. The production of these elements is often carried out using the finest mics and processors. The local producer, therefore, must have similar tools available to avoid poor-sounding audio by comparison. A good room environment and microphone combination are essential, but additional help may be called for.

Digital signal processing can pack substantial power into a very small package. Multi-effects processors like these from Lexicon, Alesis and TC Electronic, can provide many types of versatile effects.

Voice processors have become common in air and production studios. Their function is to enhance the voice by controlling dynamic range and equalization. If an announcer tends to accent some words and drop others, the internal compressor will compensate for these variations in level. Excess vocal sibilance will benefit from the corrective EQ or de-essing circuitry in a mic processor. With the right EQ setting, a basic mic can sound better than it should. The right setup on the compressor can help hide room noise, such as that from the computer. Some processors include a means of linking units or controlling them externally through *sidechains*. Some mic processors allow external control of their compression function, which is especially handy in a talk format: the host mic can be set up to automatically lower the gain on the guest mics during a moment of controversy. (For more on talk-show technology, see *Let's Talk*, July 2000 *BE Radio*, pg. 28.) Many all-in-one mic processors go beyond multi-band equalization and dynamic range control to provide phantom power, phase reverse, dual-channel operation and other features.

One of the goals in the production studio is to make sure the final project attracts attention as intended. What good is a commercial no one notices? Enter "special effects" — sounds so unnatural they immediately attract the ear. Experimentation (also known as

messing around) resulted in all manner of new sounds, from electric lasers, to Santa's elves and Darth Vader. The first generation flangers, chorus, reverbs and delays were often packaged as separate units. Some were originally designed for electric guitars but pressed into service in the production studio. Today, these effects processors are commonly combined into one integrated unit and include compressor/limiter functions, reverb, delay and EQ. Most ship with preset off-the-rack sounds, but they allow the user to create and store custom effects. Price points for these devices are as wide-ranging as the number and sophistication of the sounds available.

Solid-state compressors like these from Aphex, Alesis and dbx, are staples in production. Tube-based designs are once again commonly being used as well.

One of the oldest effects processors is the equalizer. Its original use was to match the frequency response of telephone lines or loudspeaker system to "equal" or flat response for more accurate reproduction.

A graphic equalizer is a collection of tuned filters that can boost or cut a particular range of frequencies. Human hearing has about a 10-octave range. Equalizers are usually described generically in terms of the number of frequency bands the unit has or how the sections are divided. A 1/3-octave EQ, for example, divides each octave into three parts.

In production, an equalizer can be used not only for special effects but also as a problem-solver. For instance, your field reporter has just called in a breaking story, but the feed has a mysterious hum. Using a graphic and your ears, you can determine which band of frequencies contains the hum. By reducing the level of the offending frequencies, you bring down the hum, making the reporter more easily understood. However, because the graphic works in fixed bands of frequencies, a more precise EQ may be called for.

The parametric EQ divides the spectrum into three or more frequency bands. The user first determines a general range for the individual band and adjusts for a center

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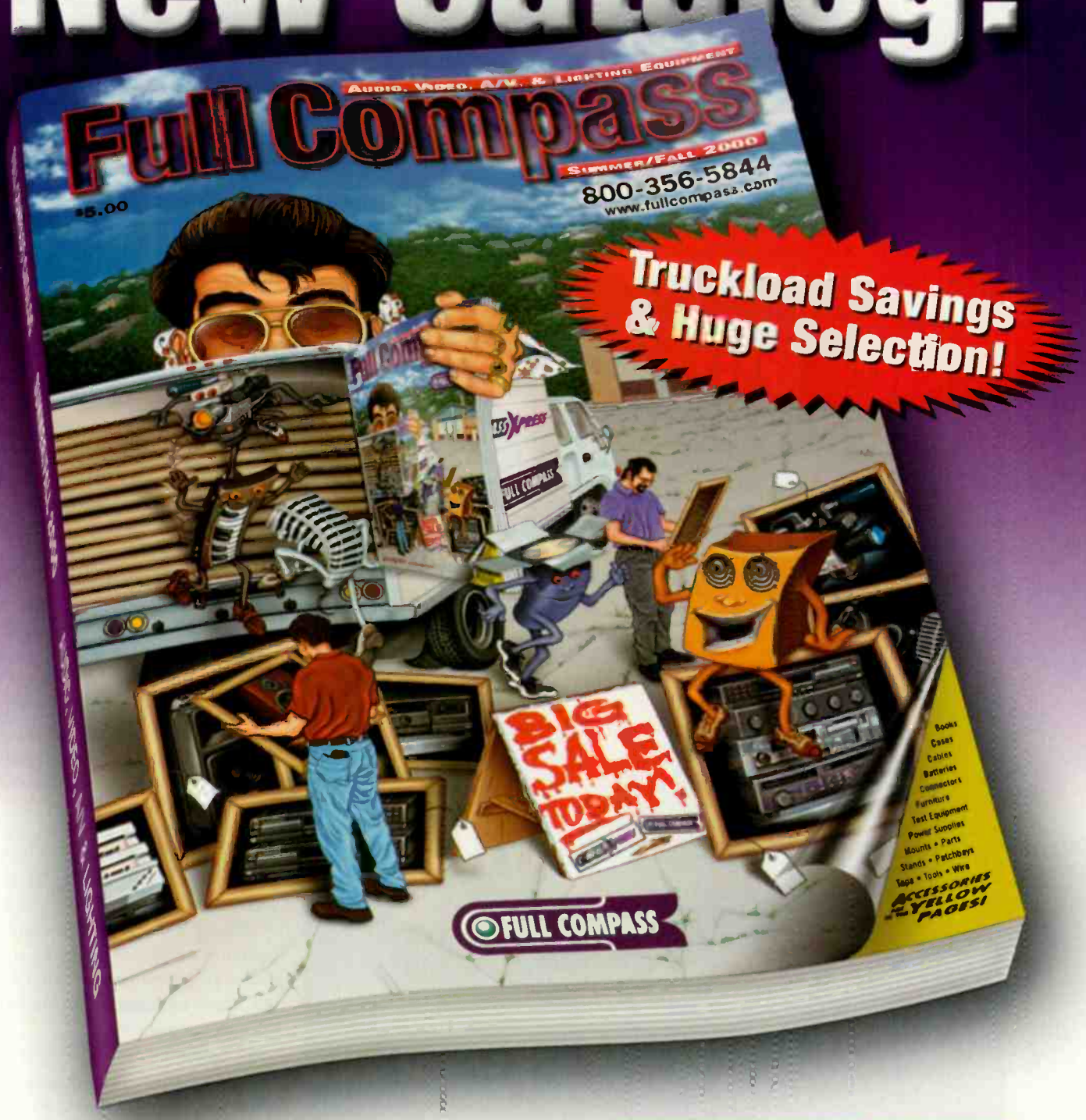

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frequency. Second, using the bandwidth control, or *Q*, the user adjusts for the desired range of frequencies above and below the center. Boost or cut is applied as necessary. The strongest of these equalizers is called a notch filter and can be set to control a very narrow bandwidth.

Equalizers have many different forms, functions and applications. Parametric equalizers, like this one from Rane, offer greater user flexibility but have fewer frequency bands than graphic equalizers.

The least glamorous production tool is the compressor/limiter. Compressors reduce the overall dynamic range of a source to prevent overloads and improve intelligibility or musicality. The operator sets the compression ratio. This means a signal of a given level may increase by several decibels, but the compressor will only allow a slight increase at its output. Above a certain threshold, the signal is completely limited; there is no output increase. The operator has additional controls for attack and decay, which are useful in musical situations where a misadjustment would cause distortion. Compressor/limiters are commonly used on individual voices or instruments in a mix, or as overall program limiting inline ahead of a recording device or transmitter.

When a commercial spot ran a little long in the analog production studio, you either did it over or fudged the label and hoped no one caught on. If a variable-speed tape recorder was available, you could try to crank up the speed a little and hope not too much of the dreaded chipmunk effect resulted. (A producer with access to a pitch shifter could pull the pitch back down for the final dub, but before digital equipment was common, quality pitch shifters were very expensive.)

Computer-based hard-disk editing systems have revolutionized radio production. They can help fit 63 seconds of production into a space of 59 seconds. Software programs emulate nearly everything in the previous generation production studio, from multitrack tape recorders to razor blades.

The leading software programs for disk-based audio recording typically ship with basic effects packages, including time-compression tools for the above problem. Add-on options, called *plug-ins*, provide additional signal-processing capabilities. Plug-ins can be provided from the original editor manufacturer or from third-party manufacturers. Many digital music software — on both Windows and Mac platforms — accept these after-market applications, which offer the same functional flexibility

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Awesome Sound Quality: With AXS 3, your station will sound superb. AXS 3 uses only the best *non*-proprietary +4 balanced *4 output* digital audio cards by Audio Science. These are also sold by most of the major brands of digital systems, but only in their top-of-the-line models costing *lots more* than AXS 3.

Easy to Use: AXS 3 was *designed by jocks*, for jocks. It's 100% intuitive. AXS 3's big on-screen intro timer and separate countdown timers on every deck make pacing a snap.

If you know how to work cart decks, you know how to work AXS 3. It's so simple, everyone can run it! AXS 3 has *big* buttons. Other systems use complex multi-step mouse mazes. AXS 3 gets things done with one simple touch.

Flexibility: AXS 3 seamlessly mixes uncompressed (linear) audio and all popular MPEG II compression ratios. AXS 3 can also play MP3 songs and spots you get from other sources, but if you do this you must stay with one bit rate for all. (It's a limitation of MP3, not AXS 3.)

The Music's Easy: AXS 3 is delivered with *your* music library already pre-recorded for you either in MPEG II or uncompressed at no extra charge.

Jocks love AXS 3! Scott Studios' AXS 3 works with three cart players on the right side of the AXS 3 screen. The program log (at left) automatically loads the decks, or you can insert anything from pick lists. The far left of AXS 3 has 12 Hot Keys that can play instantly at a touch.

AXS 3 comes with Scott's time-saving TLC (Trim, Label & Convert) CD Ripper software for your Program Director's computer. TLC uses a CD ROM drive to transfer 5 minute songs to hard drive digitally in 15-30 seconds.

The Best Air Studio Recording: AXS 3's built-in recorder has a *graphic waveform editor* for easy recording and editing of phone calls, spots, news or announcer lines. AXS 3's log editor lets you add new items to your schedule.

The Best Voice Tracking: AXS 3 works with Scott's optional *Voice Trax*, which you can add to your production room or air studio. Announcers will be able to hear surrounding music and spots in their headphones to match their voice to the moods and tempos of the music. During Scott Voice Trax, the level of your music is automatically lowered by AXS 3.

Quality Hardware: AXS 3 uses an industrial quality Pentium III rack mount Windows computer. Jocks can use a keyboard or mouse, or optional button box or touch screen for fast control.

The Best Tech Support: Toll-free emergency phone support is available 24 hours a day, 7 days a week (including holidays). Software updates with new features are available for AXS 3 customers several times per year to stations on our annual support plan.

Easiest to Install: AXS 3 comes with a pre-wired connections to CAT5 LAN cables for snap-in installation on the AXS3 end of the wiring. Satellite control logic is also a snap with a plug-in connector. Your first two satellite audio connections for music format and news network, as well as another for your production console, are all built into AXS 3. For most music formats, there are no satellite interface cards or external switchers required. Basic connections are built into AXS 3.

LAN and WAN: AXS 3 and other MPEG and uncompressed WAVE Scott Systems use the same recordings. You don't have to dub the same spot several times for several stations.

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that traditional hardware users enjoy.

Many plug-ins emulate effects available only in hardware packages that cost many times the cost of the software. The current generation of plug-ins takes processing to a higher level, creating processors without parallel in the analog or hardware world.

Aphex, TC Works and other manufacturers' plug-ins provide software processors that work directly with DAWs.

Third-party plug-ins can be written for use with several programs. This is done by using an open format source, such as Microsoft's Direct-X for PCs or Steinberg's VST for PC or Mac. There are many other formats as well, some are not as common and may not offer as many third-party DAW choices. An editing program's ability to support plug-ins can provide additional flexibility for the future.

A number of software suppliers offer processors designed to remove hiss, background noises such as traffic, HVAC, or unwanted artifacts from the recording process. These processors typically work by sampling and then phase-reversing a portion of the offending sound. On the other side of that coin, some plug-in programs add noise back in to recreate the characteristics of analog tape recording or vinyl (33-, 45- or even 78 rpm) or to mimic the natural reverb of a particular concert hall or studio.

Analog, digital and software-based processors are essential in the well-equipped production studio. Of course, it takes a creative producer to bring out the best in your station. In some areas, talent like this is in short supply.

Brian Sanders is program director of KUNV-FM, Las Vegas.

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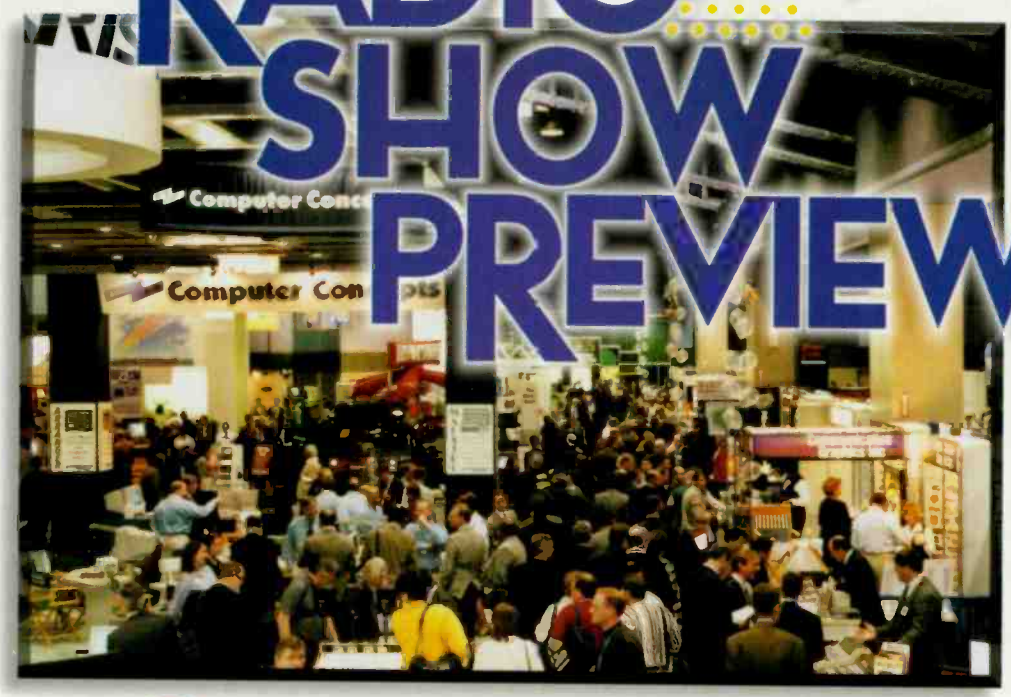
THE NAB RADIO SHOW PREVIEW

A return to the West Coast



Spanning the range of radio products and services

By Chriss Scherer, editor

San Francisco probably brings you visions of cable cars, hilly streets and television commercial jingles. Now it can bring you a complete view of radio. This location continues the NAB's plan to move the fall convention around the U.S. In 1998, the convention was held in Seattle and proved to be a successful location. Last year's show in Orlando had disappointing results. Exhibitors and the NAB hope that the return to the West Coast will yield a positive showing of attendees and exhibitors.

The NAB Radio Show has a history of targeting managers and programmers. In recent years, an increased focus on engineering interests has appeared. The Spring convention plays to a wide range of interests, but the Fall show can concentrate strictly on radio's interests.

Radio's scope also has grown, and once again the Internet will be a hot topic for exhibitors and attendees. As you walk to the show floor, you will see that nearly every exhibit has something Internet related.

What to see and do

The products on display are a major part of any convention. IBOC DAB has been a regular topic for several years, but now that there is a consolidated (there's that word again) effort among the developers, it is hoped that major progress will be seen. This newly formed alliance already has many manufacturers behind it providing product support and equipment for the system development. Look for IBOC demonstrations in several locations throughout the show.

IBOC also will be covered in some of the sessions. The Digital Facilities Certification Workshop has a segment on IBOC that should prove to be very interesting. See page 60 for more on this session.

It seems that there is never enough time to see and do everything that you want to at a convention. To help with that, the session schedule has several spaces built in for exclusive show-floor hours. If your schedule is tight, this time can help you cover more ground. However, since there are no sessions, more floor traffic will be likely. These exclusive hours may be better spent looking and noting where specific exhibitors of interest are located. If a booth is not too busy, stop in and start looking. If the booth is busy, a later return visit may be in order.

Online attention

You won't be able to take more than a few steps without seeing an Internet application. Hosting and content service companies were very popular last year and will still have a large showing. These partner companies offer stations a way to enhance their Web presence, typically with additional, dynamic content and online shopping opportunities. There is usually a chance for increased revenue with these services as well.

NAB Radio Show Preview

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Where the Creative Community Meets

Many stations stream their air signal online as well. Streaming content is not a new topic (and one that has been covered many times in *BE Radio*), but the online stream has become a candidate for generating additional station revenue. Simulcasting your station online may bring some additional advertisers, but many stations are discovering that there is no need to give away the commercial inventory that exists online. New technologies in *stripping*, also called *ad insertion*, are allowing stations to resell the commercial inventory online.

Development has begun on Internet radio appliances that allow online listening without a dedicated computer. Other companies are working on devices to make Internet radio a new audio component in the home listening environment. These typically involve a method to send the audio stream to a listener's home stereo system or throughout the entire house so that the Internet is another audio source to join CDs, tapes and terrestrial radio.

Off the floor

As I mentioned earlier, the history of the Radio Show being targeted for programmers and managers is being rewritten. Engineering is now a strong focus as well. In some sessions, the particular interest is obvious to the target audience. In other sessions, the line is blurred and may present something of interest to more than one segment of your station's team. The *BE Radio* staff has surveyed the sessions and chosen a few that should prove interesting. Your own reasons for attending the Fall show will certainly cover your own interests, but if possible, take in a session or visit an exhibitor that offers something outside your usual area of interest.

Exhibit hours

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Thursday,
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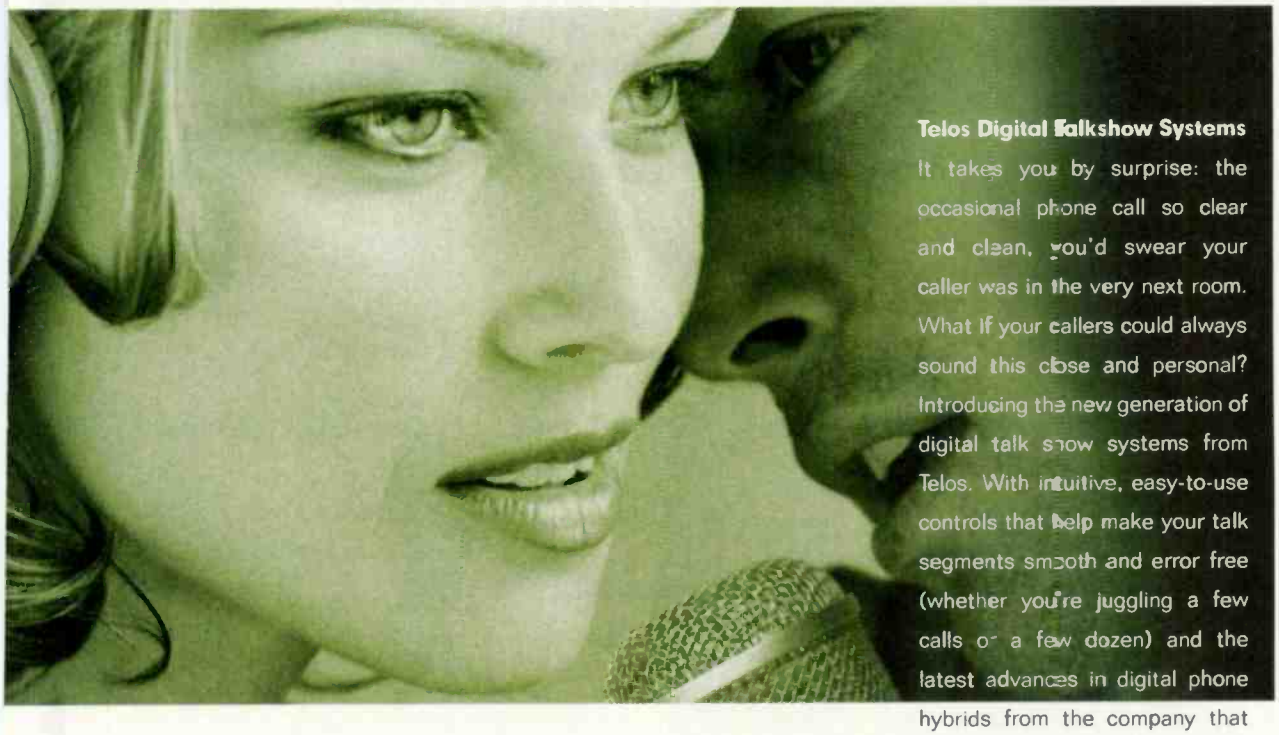

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BE Radio session picks

While all the sessions have something important to offer, a few look to be particularly interesting this year. Here are some that the *BE Radio* staff has chosen that offer unique topics for engineers, managers or programmers.

Wednesday

1p.m. to 5 p.m.
AM/FM Antenna Workshop
FM Antenna System Maintenance
AM Antenna System Maintenance

1:15 p.m. to 1:45 p.m.
Sneak Preview

5 p.m. to 8 p.m.
Exclusive Exhibit Hall Hours

Thursday

9 a.m. to 10:15 a.m.
Industry Keynote Address

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

10:30 a.m. to 11:45 a.m.
75 Ideas in 75 Minutes

11:45 a.m. to 1:30 p.m.
Exclusive Exhibit Hall Hours

1:30 p.m. to 6 p.m.
Digital Facilities Certification Workshop
(see page 60)

4:15 p.m. to 6 p.m.
Exclusive Exhibit Hall Hours

Friday

8 a.m. to 3 p.m.
AM/FM Transmitter
Certification Workshop

11:15 a.m. to 12:15 p.m.
Seven Fatal Failures of
Cluster Management

2 p.m. to 3 p.m.
The Internet, The Law and You

2 p.m. to 3 p.m.
New Revenue Models

3 p.m. to 6 p.m.
Exclusive Exhibit Hall Hours

Saturday

9:00 a.m. to 10:15 a.m.
Building a Successful
Internet Strategy

10:30 a.m. to 11:45 a.m.
Radio's Future

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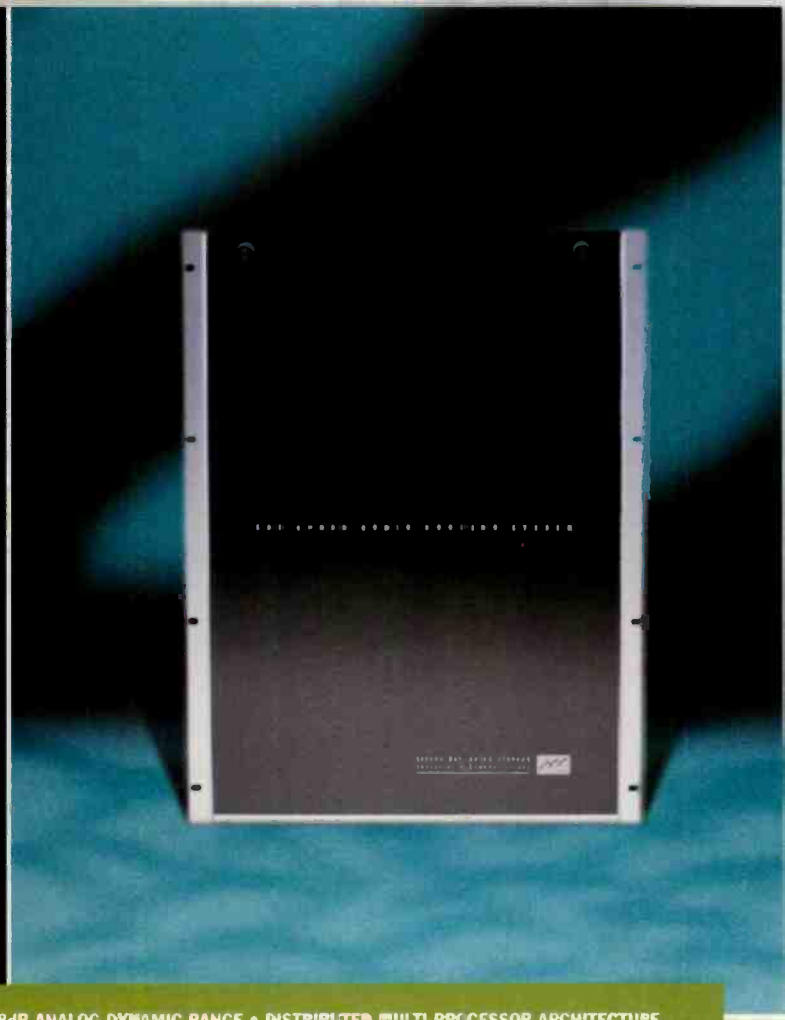

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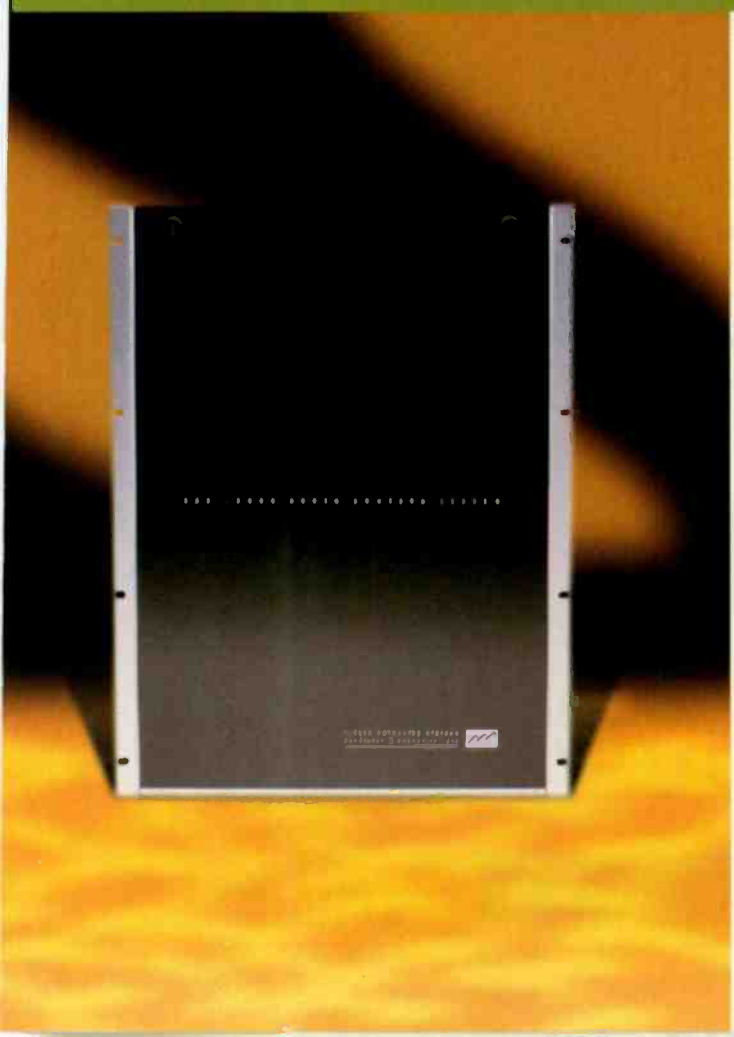

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The NAB Radio Show exhibitors offer a wide range of products and services. The constantly increasing interest in Internet radio and Internet enhancements for terrestrial radio is obvious from many of the exhibitors. However, traditional radio and audio products are still standing strong.

The following booth listings can be used with the show-floor map on page 62. Keep in mind that booth assignments and sizes are subject to change.

#

A

B

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The Studer On-Air 2000 Digital Continuity Console offers a unique and intuitive user interface via touch screens (**Touch'n'action** concept). Due to its modular audio interfacing and a wide range of options and configurations the On-Air 2000 may be adapted to any radio stations needs. The new released version 3 software features up to six cleanfeeds, assignable master faders and a comprehensive interface for integrating with CAB systems.

The combined system of Studer DigiMedia and On-Air 2000 is the perfect solution for computer assisted broadcasting.

The new **Studer DigiMedia Pro CAB System** (Computer Assisted Broadcasting) provides powerful features for the complex requirements of a competitive radio station: Drag&Drop for title and jingle insertion, remote control over LAN or telephone line, integration of industrial standard audio editors and control of digital mixing consoles. Enhanced functionality for RDBS and internet publishing. The open architecture allows for easy interfacing of DigiMedia with all major scheduling software. Newsroom systems may be integrated using the DigiMedia database replicator.

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THE NAB RADIO SHOW PREVIEW

J

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R

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Radio Data Group 2311
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Radio Systems 314
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S

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***SierraAutomated
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Power Amplifiers 2527***
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T

Target Positioning 2522
Telos Systems 1906
The C.A.R. Show 509
The Label Company 438
The Media Audit 1642
TOMA Research/
American Consulting 2413
TuneInNow Network 2106

U

U.S. Census Bureau 328
U.S. Tape and Label 1322
Ubarter 1243
USA Digital Radio 914
USA Radio Network 2212

V

Valcom Limited 414
VCS Nachrichtentechnik 942
V-Soft Communications 1241

W - Z

WarpRadio.com 730
Webfriends.com 231
WebPresence 228
Wheatstone 1918
Wicks Broadcast Solutions 1728
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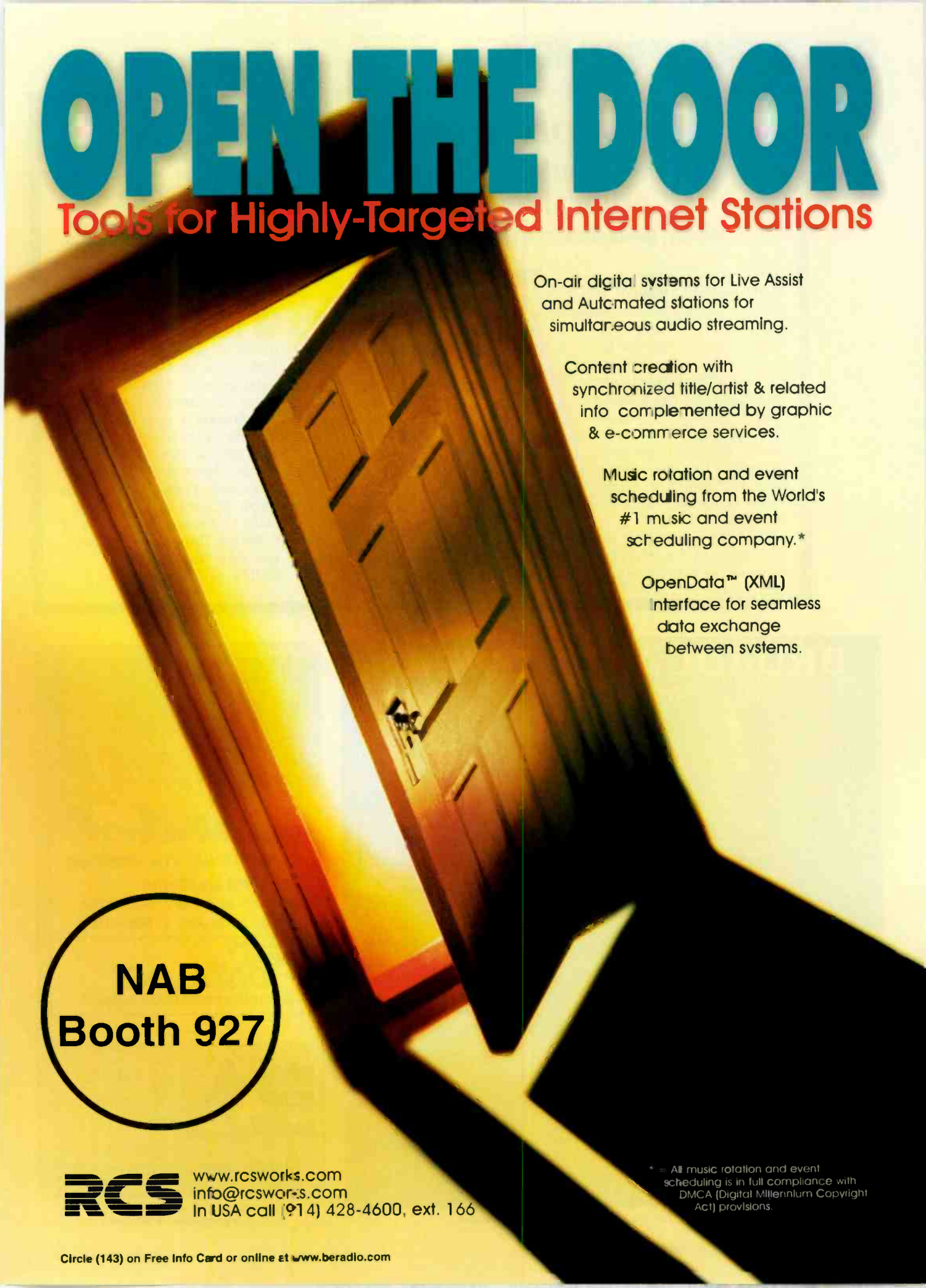

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Session Spotlight

Digital Facilities Certification Workshop

Thursday, September 21 • 1:30 to 6 p.m. • Room 102

Once an industry buzzword, "digital" is now commonly used in nearly every aspect of radio. The audio side was the first to become digital, and now the RF side is becoming digital. New ways are being found to utilize computers in day-to-day radio operations. This session has two separate segments. The first segment from 1:30 to 4 p.m. covers issues concerning IBOC and its implementation. The second segment from 4 to 6 p.m. looks at the role computer networks play in radio.

IBOC implementation

Now that the IBOC proponents have joined together as iBiquity Digital, the focus of this IBOC session can look at the specific progress and planning that are underway. Real-world implementation will be discussed in areas of projected costs, equipment requirements and specifications, site installations, and processing. The session moderator is Glynn Walden of iBiquity Digital. Presenters include George Cabrera of Harris, Dave Hartup of Xetron, Wendell Lonergan of Nautel and Frank Foti of Omnia Audio/Cutting Edge.

Networking in the broadcast facility

Computer networks are used for more than just business operations. Most stations use some type of computer-based, networked audio storage and playback system. More recently, network usage includes equipment control and diagnostics, and distribution of audio files and their associated data. This session will cover the basics of computer networks, look at the changing role of the radio engineer from audio and RF to computer networking, and provide a case example of a radio networking installation. The session moderator is Chriss Scherer of *BE Radio* magazine. Prespenters include Ralph Hogan of Washington State University, Terry Baun of Criterion Broadcast Services, and Chris Cottingham of AMFM San Francisco.

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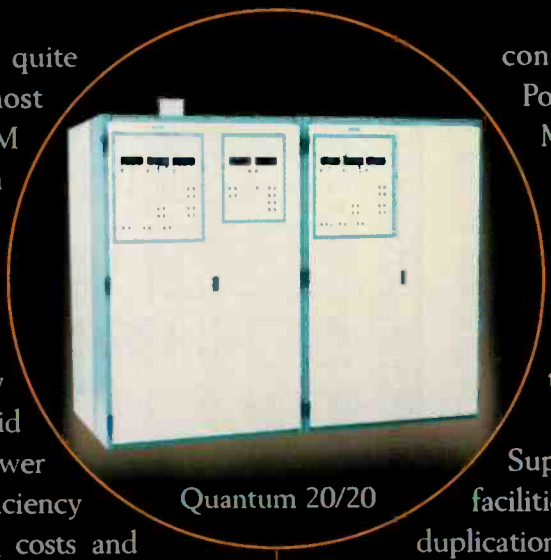

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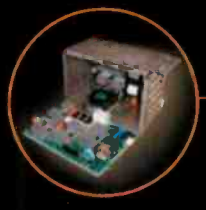

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Getting around the show

The show floor

This show-floor map should give you an idea as to where you can find all the exhibitor at the Radio Show. Keep in mind that booth assignments can change at the last minute. The key to navigating the floor is understanding how the numbering system works. Each booth has a three- or four-digit number. The first one or two numbers indicate the column and the last two numbers indicate the row. Exhibit hours are on page 46.

Shuttle buses

The NAB provides a free shuttle bus service from many major hotels in San Francisco. The three bus routes operate all four days of the show and arrive every 20 (peak time) or 30 (off-peak time) minutes. A complete list of hotels on the shuttle routes is at www.nab.org. The shuttle operating hours vary on each day of the show.

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WireReady

By Paul A. Litwinovich

Computer-based automation or live-assist is becoming the preferred method of operation at many stations. There are many systems available with a variety of hardware and software features. Our goal was to fully automate our stations that carry a format of NPR news and talk programs. We also wanted to provide daytime operator assistance for our music station that is automated overnight. We needed a moderately priced system with a large number of features and a great deal of expansion capability. WireReady fit the bill.

What it is

WireReady offers a modular system comprising the traditional AP newswire capture program, ControlReady automation program, CartReady for cart-function emulation including on-air assist, and ReelReady for assembling longer programs. Other modules (e.g., those for compiling storm-cancellation data) are also available. We use the DOS version, which runs on a DOS/Novell or a Windows NT network. WireReady currently has a Windows NT version as well.

Performance at a glance

- NT or Novell networks
- DOS or Win 9x workstations
- Easy-to-use screens with "cart machine" terminology
- Nonproprietary hardware
- SCSI, RAID or IDE file storage
- Expandable
- Plain-language programming
- Event sync with contact closure
- Commercial play verification
- Prompt and responsive tech support

WireReady has a central server to handle the application and the audio files. Additional servers functioning as mass-storage devices can be added if required. Individual computers are used for workstations and as the automation controllers for each automated program stream. The network consists of routing switches with 100baseT connections to the servers and 10baseT connections to the automation computers and workstations. Audio generates from each workstation's sound card which eliminates an audio cable run from the server. It also allows any networked computer into a workstation. You can supply your own computers or have WireReady build machines for you.

What it does

The ControlReady module handles the automation functions. Daily playlists dictate which spots to play, which satellite feeds to air and which programs to record for later broadcast. Any spot, newscast or music file entered at any workstation is immediately available for use within a playlist. It takes our traffic manager about 15 minutes per radio station to enter an entire day's worth of spots. WireReady recommends one specific manufacturer's serially controlled audio routing switch to connect sources to the air chain, but any serially controlled audio router should work. A contact-closure interface is available for tape machine start commands.

The CartReady module emulates all of the functions typically associated with carts. In the air studio, the operator assist screen displays 10 virtual cart decks that can be loaded directly from an on-screen library. Carts can be played in an automatic sequence or manually. A large countdown timer and a smaller count-up timer display the current status. The length and title of each loaded cart also is displayed. A virtual cart recorder, which includes a trim editor, is used in the production room.

The ReelReady module facilitates the assembly of longer programs, allowing talent to listen to the intro and outro of each song and add elements such as voice tracks and spots. A six-hour overnight program can be assembled in about 90 minutes.

WireReady recommends running the system on a Novell network with DOS workstations for maximum reliability. It also will run on a Windows NT network with Win95/98 workstations. We chose NT for three reasons. First, no one on our staff was Novell certified. Second, Novell dedicates substantial overhead to network security which is not an issue at our station. Third, the staff wanted the simpler interface of launching programs from a Windows icon. This also allows the staff to use their desktop computers as production workstations. By adding a small mixer and a sound card, reporters could now load fieldwork into the system and edit stories at their desks.

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Pros and cons

The system runs with a reasonable degree of reliability. Like any automation or assist program, it is only as good as the network it is running on. The few problems that we have encountered have been network-related and are no different than the occasional glitches that may occur on other brands of automation equipment. The news department reuses the same audio file names each day (i.e., for the 10 a.m. news break or morning weather report). This allows music hosts to prepare a show in advance if they need a day off. They can still have timely news or weather inserted into their programs.

The system can be custom configured to individual needs and budget. It can be expanded easily as a station's needs grow. Only a network cable is required to establish a work- or control station. Like most DOS programs, it does not occupy much disk space (less than 1MB), which leaves room for audio files.

As mentioned earlier, we use the DOS version. Windows users who are unfamiliar with DOS may find this version somewhat difficult to set up and administer, but this should not pose a problem for air talent and production people because the user interface has a colorful, Windows-like appearance. The DOS version does not handle any form of compressed audio files. Some purists may not see this as a disadvantage, but such uncompressed files occupy large amounts of hard-drive space. All substantive editing must be done on an independent editing program. WAVE files must be converted to WireReady files prior to use. The NT version addresses these concerns.

WireReady really shines in technical support. The DOS system is ideal for small- and medium-sized stations. We pushed the envelope substantially with a network of five studios, three radio stations under full- or part-time automation, 12 individual workstations, and computers dedicated to satellite recording and playback. The WireReady tech support team always has been available to assist us with any problems or questions that arose.

Paul A. Litwinovich is chief engineer of WSHU-AM, WSHU-FM and WSUF-FM, Farifield, CT.

Editor's note: *Clear Channel is installing WireReady32, the Windows version, in its facilities nationwide. Look for a Facility Showcase on the Clear Channel Denver installation in an upcoming issue of* BE Radio.

Editor's note: *Field Reports are an exclusive* BE Radio *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 BE Radio *to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* BE Radio.

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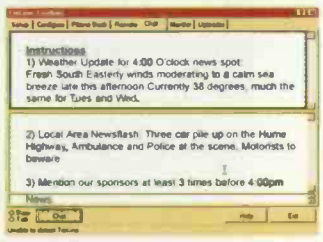

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NAB Booth 1623

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Amplifier series
Hafler Professional/AES Booth 846

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AES Booth 1141

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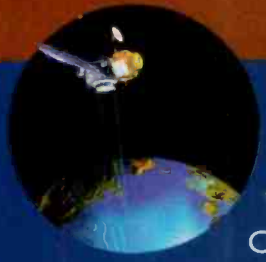

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- LCD menu display
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New Products

Mic cable
Wireworks/AES Booth 1809

MusiLux: A highly flexible, 100 percent thermoplastic shielded cable. Durable and tangle resistant. Comes in 10 jacket colors and strips in 1sec. Ideal installation cable that is small, easy to strip and designed for fixed installations.

800-642-9473; fax 908-686-0483; www.wireworks.com; info@wireworks.com

Circle (270) on Free Info Card or go to www.beradio.com

Upgraded multitrack editor
Sonic Foundry/AES Booth 1263

Vegas Audio 2.0: This upgrade and replacement to the Vegas Pro is now available. Vegas Audio 2.0 is a PC-based, multitrack audio recording and editing system, combining a powerful feature set with a streamlined interface to quickly edit and construct audio projects. Includes new features such as XFX 1, 2, and 3 DirectX Plug-Ins with DirectX Plug-In support on all tracks, envelopes that lock to events and cutting, copying and pasting of envelopes. Also includes time stretching with pitch correction (Rubber Audio), a built-in metronome, destructive effects processing, an advanced media pool and enhanced video support. Files can be arranged with different sampling rates, bit depths and file formats on a single track.

608-256-3133; fax 608-256-7300
www.sonicfoundry.com

Circle (273) on Free Info Card or go to www.beradio.com

Music library
Megatrax/NAB Booth 744

Promo Collection: A 95-CD production music library that is filled with broadcast length tracks and designed specifically for advertising and promotion. Includes live instruments, superb variety and top recording artists. With three recording studios in-house, a minimum of 15 to 20 new update CDs are scheduled for production each year.

888-MEGA-555; fax 818-503-5244
www.megatrax.com
megatrax@megatrax.com

Circle (260) on Free Info Card or go to www.beradio.com

New Products

Digital to analog 24-bit converter
ATI/AES Booth 1319

▶ **DM200 Digital Monitor:** Accepts loop-thru AES-3 format digital audio data via 110Ω XLR and 75Ω BNC and RCA connectors. A 24-bit, 96kHz D/A converter feeds stereo headphone drivers, balanced audio line outputs and a stereo LED meter. Input sample rates of 32-, 44.1-, 48-, 82.2- and 96kHz are decoded and indicated with a front-panel display. A data Valid light indicates that there have been no data or transmission errors. Bright, stereo, two-color LED meters are switchable to the D/A converter output and indicate headroom down from 0dBFS (the D/A's maximum output) in 10, 3dB steps. Reads the balanced line output level with 0dB midscale equal to +4dBm output. Display ballistics are PPM for optimum indication of audible peaks. Accepts sample rates from 27kHz to 96kHz.

800-959-0307; fax 215-443-0394; www.atiguys.com;sam@atiguys.com
Circle (251) on Free Info Card or go to www.beradio.com

On- and off-site remote monitoring
Audemat/NAB Booth 2102

ITS4: A monitoring system for individual stations and extensive broadcast networks. The unit is the first product of its kind to give broadcasters total control over the continuity and quality of their broadcast signal. Monitors every station in a market or specific stations as required by the operator. Monitoring includes RF analysis, composite monitoring, co-channel monitoring, intruder detection, RDS data control and false-alarm identification. This multireceiver performs like an intelligent electronic listener monitoring all RF, audio and data parameters remotely from one or multiple locations. Monitors all conditions at the transmitter site and all signals in the reception area. Should a problem occur, the unit notifies the appropriate person or persons via telephone, modem, fax, pager, e-mail, or simply stores the information in a history logbook.

978-392-2110; fax 978-392-2287; www.audemat.com; audItem@audemat.com
Circle (252) on Free Info Card or go to www.beradio.com

Video/audio press feed system
Opamp Labs

VA-32: A 1-in/32-out video/audio press feed system. Video specifications include a meter with source/load switch and gain control, DC to 8MHz (-1db), R (out) of 75Ω, gain of up to 6db and a level of 1v p-p. Audio specifications include mic/line switchable input w/gain control, VU-meter, XL-type connectors, 50Hz to 15KHz (-1db) range, 16 outputs mic/line switchable, 16 line only, and a level of +8dbm. The S/N is >70db.

323-934-3566; fax 323-462-6490
www.opamplabs.com; bel@opamplabs.com
Circle (262) on Free Info Card or go to www.beradio.com

Software
Logitek/NAB Booth 1943, AES Booth 142

Supervisor software: Provides for integrated configuration of multiple Digital Audio Engines and Control Surfaces and supervision of all routing and switching functions among the group of Engines. Aso enables advanced functions such as scheduled audio switching and Control Surface configuration, audio routing control, and storage of Control Surface layout "snapshots." Ideal for consolidated stations or large broadcast facilities.

877-231-5870; fax 713-782-7597
www.logitekaudio.com
info@logitekaudio.com
Circle (259) on Free Info Card or go to www.beradio.com

RADIO AND TV RADIATING SYSTEMS

FM Antennas
Medium power circular polarization

SGP-1	$690	4Kw
SGP-2	$2,690	8Kw
SGP-3	$3,595	10Kw
SGP-4	$4,500	10Kw
SGP-5	$5,300	10Kw
SGP-6	$6,100	10Kw

FM Antennas
Low power circular polarization

GP-1	$350	1.5Kw
GP-2	$1,350	3Kw
GP-3	$1,900	5Kw
GP-4	$2,600	6Kw
GP-5	$3,150	6Kw
GP-6	$3,700	6kw

Other power configurations contact OMB America

FM Antennas
Educational circular polarization

MP-1	$250	0.6Kw
MP-2	$680	0.8Kw
MP-3	$980	0.8Kw
MP-4	$1,280	0.8Kw
MP2-4	$1,820	2Kw
MP3-5	$2,270	3Kw
MP3-6	$2,740	3kw

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Tel:305-477 0974
Fax:305-4770611
ombusa@bellsouth.com

www.omb.com

New Products

Audio console

Klotz Digital /NAB Booth 2138, AES Booth 1363

▲ **Paradigm:** Available in an eight- and a 16-fader version. Includes voice processing and three-band EQ on all mic inputs, sample-rate conversions on all digital line inputs, machine control on all line inputs, mode, pan and phase reverse on all inputs, six faders with A/B switching and two faders with analog/digital six-source selectors. The LCD flat-panel screen displays a large time-of-day clock, event timer and intuitive, central control for console setup. Accepts 24 sources and has PGM, AUX, TEL1, TEL2 and cue outputs. Headphone, studio and control-room monitor outputs with source selectors are standard.

678-966-9900; fax 678-966-9903
www.klotzdigital.com; klotz_digital_sales@compuserve.com
Circle (272) on Free Info Card or go to www.beradio.com

Cross-platform entertainment software application

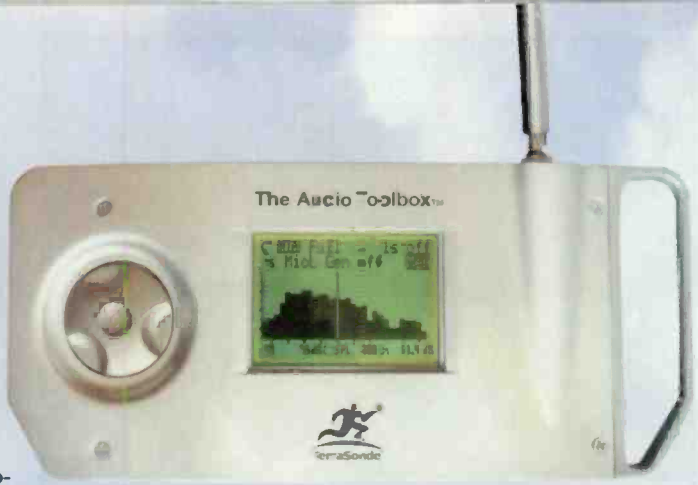
Qdesign

▲ **MVP v1.2:** Use this all-in-one application for recording from CD to QDesign Music, MP3 and MP2 files, converting one file format to another, playback of digital music and videos, and playlist management and more. Uses QDesign MP2 encoding/decoding. Access to all possible MP3 encoding settings, from 8kb/s to 320kb/s. Allows for conversion of files between supported formats (e.g., WAVE to MP3, MP3 to MP2). Can compress audio up to 60:1 using the QDesign Music format while maintaining full 44.1khz stereo quality audio. Many other improvements and feature enhancements. Find a free download at www.wpvsite.com.

604-688-1525; fax 604-688-1524
www.qdesign.com; support@qdesign.com
Circle (264) on Free Info Card or go to www.beradio.com

New Products

Audio test set and generator
TerraSonde/AES Booth 452



▶ **Audio Toolbox Plus:** Replaces a sound level meter, RTA, polarity tester, signal generator, level meter, impedance meter, phantom power tester and cable tester. Also functions as a SMPTE time-code generator and analyzer, distortion meter, sample scope (with X-Y mode for phase testing), frequency counter and headphone monitor amplifier. Has a built-in rechargeable battery system, a PC and Mac computer interface for printing, software can be upgraded in the field, and is able to store the graphics screens in nonvolatile memories. Conforms to Type 1 precision instrumentation standards. Packaged in an aluminum and steel chassis, it has ¼ inch, XLR and RCA inputs and outputs, BNC microphone connector, 40 nonvolatile memories, computer interface and an internal speaker for signal monitoring.

888-433-2821; fax 303-545-6066
www.terrasonde.com
info@terrasonde.com
Circle (275) on Free Info Card or go to www.beradio.com

IBOC peripheral
Shively Labs/NAB Booth 1221

▲ **IBOC Filter/Signal Injector:** Accommodates transmitters up to 5kW in a package that measures only 26 inches square, less than 38 inches high and weighing about 200 pounds. VSWR spec of 1.07:1 or less. This small, lightweight unit is the perfect fit for crowded transmitter rooms.

888 SHIVELY; fax 207-647-8273
www.shively.com
sales@shively.com
Circle (277) on Free Info Card or go to www.beradio.com

New Products

Wireless mic system

Sabine

AES Booth 1023

True Mobility: Includes a built-in FBX Feedback Exterminator, auto de-esser and compressor/limiter. The company's patented FBX gives you exceptional feedback control. Also features a turbo setup mode, 10 FBX filters, and easy-to-use controls. Each microphone has all of the individual processing necessary to produce the best sound. The new auto de-esser algorithm senses, tracks and removes sibilance without affecting the rest of the program. The digital compressor offers the gain management needed to compensate for all types of performers and speakers, from those who are shy around microphones to the boldest presenter.

800-626-7394; fax 904-418-2001
www.SabineUSA.com
sabine@SabineUSA.com
Circle (266) on Free Info Card
or go to www.beradio.com

Near-field monitor

Tannoy/TGI North America

AES Booth 1141

▼ **Proto-J:** Provides high-quality monitoring to those on a budget and where space is at a premium. Extended low-frequency response, controlled dispersion and dynamic character make it ideally suited for 5.1 channel project studios. Uses a durable 6.5-inch mid/bass driver and a new 3/4-inch high-frequency unit, ideally placed in a front-ported reflex enclosure. Each cabinet employs integral threaded inserts on its rear for easy wall mounting.

877-426-4TGI
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New Products

Recorder/editor
360 Systems/NAB Booth 814, AES Booth 1019

Short/cut 2000: Performs all editing operations several times faster than the original version. Its speed is virtually instantaneous. Processing speed for internal functions has also been greatly enhanced. The company has designed a series of upgrade kits, allowing owners of all previous versions of the product to upgrade to Short/cut 2000. For earlier models, the kit includes many features added in recent years, as well as the high-speed operation of the new 2000 model. The upgrade kits include new software, hardware and a revised operations manual. All upgrade kits can be ordered from 360 Systems at the number listed below. Full upgrade descriptions and further information may also be obtained from the company's website.

818-991-0360; fax 818-991-1360
www.360systems.com; info@360systems.com
Circle (271) on Free Info Card or go to www.beradio.com

Audio storage and playback system
Arrakis/NAB Booth 614

DL4; DL4-SASS Audio Tape Replacement Systems: Several versions of Arrakis DL4 software are available to run on a Windows 95 PC computer to control the DL4 workstation. Digital audio engine features Triple Play with simultaneous record (expandable up to 96/32 play/record events) and separate outputs for each playback with console start/stop, cart-like control logic.

970-224-2248; fax 970-493-1076
www.arrakis-systems.com; sales@arrakis-systems.com
Circle (250) on Free Info Card or go to www.beradio.com

Phone editor software
Enco Systems/NAB Booth 1528

Digital Intern: Combines the power, user-friendly interface and speed of competing products with industry standard operating system support and WAVE file format allowing interoperability with most digital delivery systems. Features a fast waveform display and a single screen interface with hot keys and numerous keyboard shortcuts. Runs on Windows 2000 on customer-supplied hardware and uses Digigram, Antex or SoundBlaster sound cards. Will initially be available as either a software-only package or bundled with a Digigram VX-222 sound card.

800-362-6797; fax 248-476-5712
www.enco.com; support@enco.com
Circle (255) on Free Info Card or go to www.beradio.com

Windows to the Web

www.logitekaudio.com

Logitek Electronic Systems: Manufacturer of digital audio consoles plus a full line of audio meters. Visit our website for information on the NUMIX, ROC-5 and ROC-10 digital audio consoles. You'll also find information on our DSP-based audio meters, offering a range of displays while conforming to IEC standard ballistics. Logitek — digital with a better difference!

www.omt.net

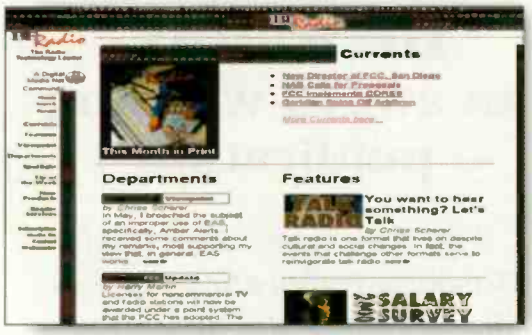
OMT Technologies: MediaTouch by OMT Technologies provides radio stations with state of the art digital audio systems for live assist or full automation use. With over 14 years of broadcast experience, MediaTouch has innovative software solutions starting as low as $995. Surf to MediaTouch, see our exciting new products and find out how our clients sound better and save money with our unsurpassed quality, reliability and support.

www.managementdata.de

Management Data Media Systems AG: One of the market leaders in the development and implementation of partial or full systems for digital broadcasting operations. In 1999, Management Data Media Systems introduced the new D'ACCORD III product range, a streamlined, updated system with improved features for recording, editing, storing, archiving and playing of digital audio files.

www.arrakis-systems.com

Arrakis: Manufacturers of studio systems including the popular DigiLink computer-based audio storage and playback systems, Arrakis analog consoles, Colorado Revolution digital and analog audio consoles, and broadcast studio furniture. The website features an online interactive catalog, station equipment calculator, an equipment list price generator and a section to download the latest software versions and patches.



www.beradio.com

***BE Radio* magazine:** *BE Radio* gives radio station managers and engineers the information they need to make critical equipment purchase decisions. The magazine is published 12 times a year and distributed to over 14,000 qualified subscribers in North America. The website features Currents (all the news updated daily), The Studio Spotlight and the Tip of the Week in addition to the quality information available in each issue.

www.antex.com

Antex Electronics: If you're looking for the most versatile, best-sounding sound cards for broadcast applications, it's time to look at Antex. Browse through Antex's complete line of analog and digital-ready products, read independent product reviews, get in-depth technical information, check out high-end applications of Antex products in the Sound Advice newsletter and buy products securely online. Already a customer? Download drivers, software, owners manuals and more.

New Products

Mic interface for computer audio
Sound Devices/AES Booth 1840

USBPre: A complete, high-performance, portable mic interface for hard-disk recording. USBPre is the direct connection between microphones and computers. Features include 48V phantom power, mic,

line, instrument DI, or tape level input per channel, and bus powering via USB. Also includes a portable, all-metal chassis, 20-bit DACs and complete monitoring. USBPre is designed for computers running Windows 98, ME or 2000 as well as Macintosh OS9 computers — both notebook and desktop.

608-524-0625; fax 608-524-0655
www.sounddevices.com; info@sounddevices.com
Circle (267) on Free Info Card or go to www.beradic.com

Booth numbers are provided by NAB or AES and are accurate as of August 18, 2000

Dehydrator
Andrew/NAB Booth 427

NXT 2000 DryLine: The first fully automatic nitrogen membrane dehydrator designed specifically for large volume, 2,830 liters to 31,130 liters, broadcast transmission systems. DryLine pressurization equipment improves transmission system performance by delivering a constant supply of dry gas under pressure to a transmission line, thus ensuring high signal quality and low VSWR. The unit produces nitrogen gas with a dew point better than -75 degrees. Works by forcing pressurized air through a patented membrane-drying cartridge, where moisture and oxygen are separated from the nitrogen and vented to the outside. A remote pressure sensing system activates and deactivates the unit's compressor, responding to the actual pressure demanded in the transmission line. This automatic feature is an advantage for remote broadcast sites because the dehydrator operates only when needed, minimizing wear and tear and the need for maintenance.

800-DIAL-4-RF; fax 708-349-5444; www.andrew.com
Circle (276) on Free Info Card or go to www.beradio.com

Reader Feedback

The following letter was received by BE Radio *magazine. The author, a respected broadcast engineer, has asked to remain anonymous. — editor*

Broadcast Engineers: Protecting an Endangered Species

According to a recent article in the *Wall Street Journal*, Japan's newest heroes are shop-floor craftsmen who are more proficient than machines. As Japan grew rich, manufacturing duties passed from people to machines. More labor-intensive tasks were farmed out to other countries where labor was cheap. The law of supply and demand kicked in. It always does, but in a backfire sort of way. It made sure certain skills would become rare. People in the existing workforce lose their jobs. Over time, young people have little or no incentive to go into certain industries. More people leaving and few people entering a profession eventually deplete the number of skilled practitioners. The master-craftspeople slots at the top of bell curve do a non-linear plummet. Does this sound familiar?

So Japan has come full circle. The nation that rose from feudalism to become the icon of industrial innovation finally saw that something was missing. Certain individuals who can do things machines and other people can't do are now being declared *supaa ginosha*, or super technician. It's the people equivalent of being declared a member of an endangered species.

The connection to what is happening in our profession is inescapable. Shigeru Tsuji is an honorary professor at the Tokyo Institute of Technology. He helped design the super technician program. What he says about the endangered Japanese craftsman is what some of us feel applies to us. "Society is losing respect for them." I know that this sounds familiar.

This latest Japanese industrial evolution development goes back to feudal Japan. Even then, they figured out how to treat people with special skills essential to their society. Certain artisans were literally declared national treasures. A lofty title was created to honor and support them. The skilled sword smiths, kimono weavers and other people with special talents who had been summarily pushed aside by the forward march of technology eventually got back some of what they lost. Their society got back some of what it lost, too. The title of "Bearer of Important Intangible Cultural Assets" was bestowed on a select number of competent souls who had probably gone through a feudal version of labor hell.

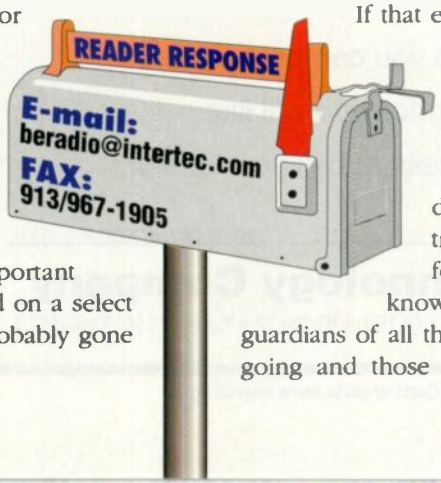
How does this tie to the current state of our radio-engineering profession? First, like the pioneers who brought us the machine age, we may have sown the seeds of our own destruction. Being on the air more than off became the norm. We made it look too darned easy. We just possibly have invented, innovated and preventively maintained ourselves out of business.

The current crop of non-technical managers were still in training pants when transmitters sites were manned. Those were the days of 24/7 transmitter shifts when transmitters and audio consoles were filled with those hot, glowing things called tubes. These managers do not remember when daily preventive maintenance was needed just to keeping stations on the air. Though we all know the need for periodic maintenance (PM) continues, it is understandable why our current managers do not. Their mandate is to make the bottom line look pretty. It seems now like we never have a chance to catch up, or even clean up. Even the once-a-week visit to the transmitter site is getting harder to do.

But, some things never change. Our old enemies, heat and dirt, have not gone away or become obsolete; they just act to insure a slower death sentence for equipment, the inevitable point of failure. There are only two kinds of broadcast stuff: equipment that has failed and equipment that will fail.

Most of us realize that the same dedication and standards that kept those tubes glowing is still needed to keep solid state from becoming quiet state. Bottom line pressures force us to discount the need for ongoing PM at unmanned transmitter sites, propelling us closer to a crisis maintenance mode. Once the groundcover of preventive maintenance dies on the station hillside, erosion and landslides are inevitable. As they say in Geology 101, it is only a matter of time.

Speaking of standards, most of us live or die by one unspoken rule. Anything short of 100% uptime for on-air operations is unacceptable. If you question this, think of what happens if we slip to a mere four-nines (99.9999%) reliability. That computes to eight whole minutes a year. If that eight minutes all happened during the Super Bowl, or even during morning drive at some radio stations, there would be a lot of explaining to do.



To think of oneself or what one does for a living in terms of national treasures seems like the highest form of conceit. Yet, as many of us know, we are the practitioners if not guardians of all the magic that keeps radio and TV going and those spots ringing the cash registers.

Reader Feedback

Maybe this Japanese model should be nothing more than proper recognition for our dedication, professionalism and competence? Or, spend a few moments contemplating that we are the only people standing between millions of dollars of spots airing or not airing. So, maybe it's high time we are accorded the trappings and honors of being officially recognized as *supaa ginosha*.

Right now, we are a long way from that recognition. We are still living out the part of the story that talks about the thinning of the herd. We have not yet really seen the devastating effects of years of accumulated neglect. By then, we may not even have to write our congressman to get this done.

But, the eternal truths of maintenance have not changed. We have fought wear, heat and dirt in the past. We still need to fight them today, or at least we should. It just takes longer to see the effects. It is not a question of *if* we will attain recognition as an endangered species, but *when*. Someday, Los Angeles will be where San Francisco is now. It happens over long periods of time and by millimeters, but it is as inevitable as death and stock offerings.

The truth on LPFM

Many thinks to Skip Pizzi for such a well-written and insightful article concerning LPFM (April, Last Byte). In one page he has revealed the real issues and foreseen the consequences. To bad those who need to read these words the most will likely never see this magazine.

Parks Hall
Chattanooga, TN

I read *BE Radio* regularly and look forward to Skip Pizzi's well informed and reasoned column. He's done it again. His column on LPFM in your April issue is clear and to the point.

Roger Chesser
Lexington, KY

Reader Feedback

On EAS

Chriss:

I want to compliment you on addressing the issue of proper use of the EAS (May, Viewpoint). It also has been an issue here in Southwest Ohio. Ours was a gray area concerning use of a CEM. Thanks again. Well done.

I also praised Ron Bartlebaugh when I saw him last on his studio series in *BE Radio*. The articles are excellent.

Jeff Johnson
WVXU, X-Star Radio Network
Cincinnati, OH

Chriss:

I thought your EAS editorial in the May issue was right on target. FYI, we now have a deal with NPR so they will be "backfilling" the national alerting web. NPR in Washington will uplink national EAS alerts it gets off air from a PEP station. NPR affiliates will be able to "volunteer" to reinforce the national alerting web.

State and local EAS chairs are/will be notified soon that they should talk to their local NPR outlet. Once the NPR station connects the satellite audio source to a spare audio input on their EAS device, and the local LP-1 monitors the NPR station, the web in that region is reinforced.

Richard Rudman, CPBE
KFWB
Los Angeles, CA

In the October issue of BE Radio

Transmission
We take an in-depth look at RF including the information you need to know when planning for IBOC.

Remote Site Control
We'll review the Rules and examine interpretations on site monitoring and control. We'll also look at the harware available.

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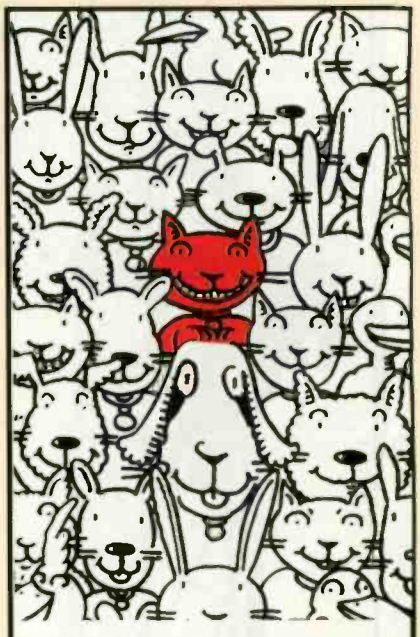

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Fax: (913) 967-1900
E-mail: steven_bell@intertec.com

CLASSIFIED ADVERTISING
Brian Huber
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(913) 967-1732
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E-mail: brian_huber@intertec.com

REGIONAL MKTNG MGR
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Telephone: (913) 967-1947
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LIST RENTAL SERVICES
Lori Christie
Telephone: (913) 967-1875
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Jenny Eisele (Editorial Reprints)
Telephone: (913) 967-1966
Fax: (913) 967-1898
E-mail: jenny_eisele@intertec.com

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CORRESPONDENCE
Editorial and Advertising: 9800 Metcalf, Overland Park, KS 66212-2215. Phone: 913-341-1300; Edit. Fax: 913-967-1905. Advt. Fax: 913-967-1904.

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What's wrong with DAB?

By Skip Pizzi, executive editor

The recent announcement of the iBiquity Digital "grand alliance" may signal the beginning of the end for IBOC. While most mergers of established companies result from perceived mutual financial benefit, the alliance of competitors before the actual launch of their businesses is usually motivated by a lack of confidence in the market. Just as a similar grand alliance in U.S. DTV produced a bastard-child format that is proving stillborn in the market, the same result is now likely for IBOC DAB.

This is not to say that merged technologies cannot be successful. Under the proper guidance of an open standards process, such combinations have flourished (witness the several MPEG formats). That's not the case, however, for the iBiquity deal — a closed corporate process that is likely to have less than optimal results.

What each player wants

Lucent's primary objective in this deal is the use of its PAC audio-compression algorithm, which is now certain to be used in IBOC. To gain this position, Lucent may have to give up its channel coding and modulation scheme in the combined format to USADR's. This outcome is USADR's ostensible goal. Some observers believe Lucent's transmission system (called *MultiStreaming*) is more robust than USADR's. That debate aside, however, there is one universally acknowledged, functional difference between the two systems that could have substantial resonance.

The USADR system is (by design) unable to carry multiple program streams — at least during the transition period when analog and digital signals will both occupy the channel. (This will probably be a very long time.) The analog signal acts as a backup to the digital signal in the USADR system, meaning that the two signals are inextricably linked in simulcast. The Lucent system has no such dependency, and it would allow separate digital and analog signals to coexist on an IBOC channel.

This difference could be key to IBOC's success. Without *quantitative* change (i.e., expansion of services), DAB is sure to fail. This was the lesson learned in the AM-to-FM transition. When FM was only a higher-quality simulcast of AM signals, it languished. Once FM stations were required to offer separate programming, the service became dominant.

By this analysis, because IBOC offers a smaller qualitative improvement over FM than did FM over AM, IBOC could be an even greater non-starter than FM was in its early, simulcast-only days. If the iBiquity deal mandates a simulcast-only system, it could ensure that IBOC DAB will be DOA.

If the iBiquity deal mandates a simulcast-only system, it could ensure that IBOC DAB will be DOA.

Other problems

These are not the only problems plaguing DAB. Throughout the world, radio broadcasters appear stuck in a paradigm they cannot escape. While the future of audio delivery is IP-based, today's DAB services are constrained to simply delivering digitized versions of analog radio. There is no accommodation for interactivity or file downloads, and there is no standardized method of Web integration into the receiver (such as the DTV industry is developing). DAB's lack of such features will hurt its long-term success. If nothing else, DAB's inability to engage the e-commerce wave may ultimately place it alongside FMX and RBDS in the dustbin of failed radio standards.

Even the Eureka 147 DAB system that has been adopted outside of the U.S. has been slow to catch on. Broadcasters in several countries have begun to offer service, but the audience remains infinitesimally small. This is certainly due in part to the non-availability of affordable receivers, although this may change with the recent development of a new Eu147 receiver chipset from Philips. Nevertheless, across the international consumer electronics industry, DAB has remained a minor player, with fading rather than rising momentum, probably due to its inability to excite consumers with sufficient added value.

Requiem

IBOC remains a brilliant concept for transition and spectrum efficiency, but it has always been a business and allocation plan in search of a technology. In the U.S., satellite DAB has captured much recent attention. This attention will increase dramatically as services begin to roll out in upcoming months. IBOC has been a distraction for U.S. broadcasters during this critical period, and it may already be too late for broadcasters to find a delivery standard that will allow them to play on a level field with emerging competitors.

IBOC was a great system for radio in the late 1980s and 1990s. Today, this DAB system that was never really born has already passed its prime, and iBiquity will likely serve as its final resting place.

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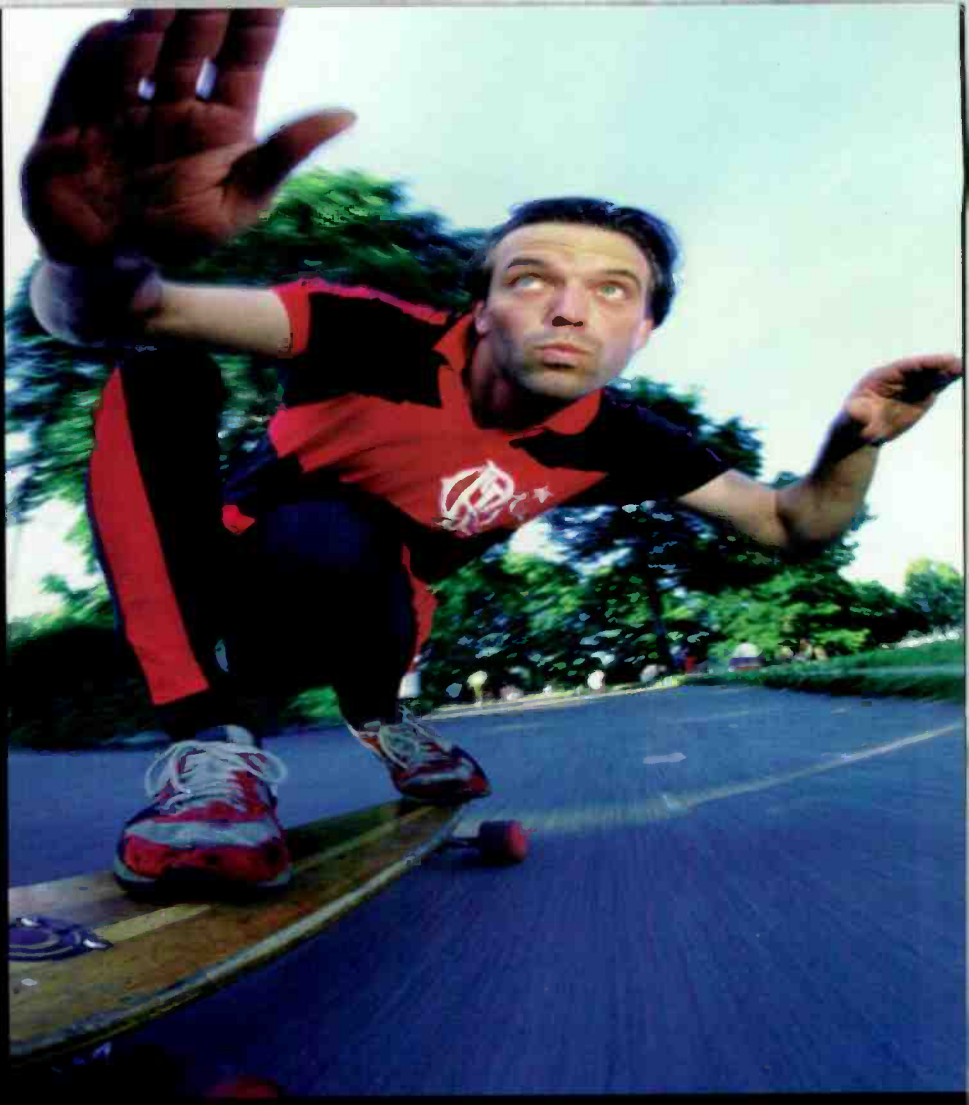

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