BE Radio

July/August 1997/$10.00
An INTERTEC®/K-III Publication

...from the Editors of BROADCAST ENGINEERING

STUDIO EQUIPMENT
The traditional gear goes on

COMPUTER-BASED AUDIO SYSTEMS
A look at the leaders

SPECIAL 1997 Salary survey

Pristine mic preamps, natural EQ, beaucoup exclusive features, astonishing headroom, an extra stereo bus... and tens of thousands of enthusiastic owners.

MS1402-VLZ

"Great mixer. Really cleaned up the sound of my recording and has done a great job live mixing keyboards with the band and as my main mixer on solo and duo gigs." (J.S., Martinez, GA)

"Finally, a lightweight/compact mixer loaded with practical features that delivers clean, no-noise sound!" (R.B., Franklin, WI)

"Beautiful layout and the smoothest faders I've ever seen in a compact mixer." (B.L., Cedar Hill, TX)

"Great product. Clean sound. Live recordings are great! (D.L., Denton, TX)

"I really like the Control Room mixing and Alt 3-4." (R.P., Fort Lee, NJ)

"I am greatly impressed with the very low noise of the mic preamps." (T.T., Belair, SA)

"I really dig all the features you pack into such a small price. My 1402 was really easy to get into and use." (R.R., Murray, UT)

"I didn't believe the hype until I bought an MS1402-VLZ. NOW I believe the hype." (J.C., Toronto, ON)

"Sure like that 'stereo solo in place' feature. Also, headroom is great with lotsa presence." (L.S., Forest Grove, OR)

"You've heard it all before, I'm sure. Great product. Great price. Options and versatility out the wazoo, from hardware design right down to panel labeling." (J.H., Ithaca, NY)

"I really like the EQ points you've chosen and the EQ curves." (B.M., Lanseshore, MA)

"Plastic mixers can break easily. The MS1402 is made of metal!" (M.S., Shorewood, IL)

"I will be using the MS1402 to track all keyboards on MANDBWDWTTWEL* for Atlantic Records." (R.H., New York, NY)

*Major act, name deleted because we don't want to tangle with entertainment lawyers.

6 mic preamps. The same high headroom, ultra-low noise (–129.5 dBm E.I.N.) preamps used in our 8•Bus studio consoles.

6 mono and 4 stereo line level inputs.

2 aux sends per channel.

Low Cut Filter lets you use LF EQ without boosting mic thumps, room rumble, and P-pops, or losing audible low bass. Exclusive Mackie circuitry.

Trim with –10dB "virtual pad" and 60dB total gain range.

EFX to Monitor switch folds reverb or other effects back into the Aux 1 stage monitor feed. Another Mackie exclusive.

Pre/Post Aux 1 mode switch.

2 master aux returns.

Balanced XLR outputs switch between mic & line levels. Bal./unbal. 1/4" TRS outputs, too.

3-band EQ. Others may have copied our EQ band centers but not the clean, musical sound of our unique circuit design.

Solid steel chassis.

Easy level setting via LED display; in-place stereo solo feature maximizes headroom & minimizes noise.

Control Room/Phones switching matrix and separate volume control lets you submix, feed multi-track tape machines, create separate monitor mixes, preview channels, and much more. A Mackie Designs exclusive.

AFL/PFL solo mode switch.

Constant loudness pan control for precise stereo mixes.

Alt 3-4. The MS1402-VLZ's Mute button is really a second stereo bus in disguise. A Mackie exclusive.

60mm faders with true log taper for accurate fades throughout the controls' travel.

"The Alt 3-4/Mute is ingenious!" (B.L., Cedar Hill, TX)

"On my test run — a live acoustic show — I was impressed by the quiet and user friendliness of the MS1402-VLZ. The audience was also impressed with its crystal clarity." (F.A., Bloomington, IL)

"The 'RUDE' solo light is certainly that, but you never have to worry about leaving it on by mistake." (L.B., Winnepeg, LB)

"The Low Cut button is a big help in cutting boomy stuff when running a big bass and arch-top guitar live." (G.S., Kirkland, WA)

"The quality of the EQ is amazing! I was blown away by the tone and clarity." (J.D., Pomeret, CA)

"The MS1402-VLZ is great — excellent specs (I teach audio engineering) and really clever routing options." (J.P., Los Angeles, CA)

"What I heard when I hooked up my MS1402-VLZ was exactly what I wanted to hear. Nothing. Cleanest mixer I have ever worked with." (R.S., Fergus Falls, MN)

"The 1402 RULES! People all the time come and tell me how wonderful the sound is." (P.F., Cincinati, OH)

"It survived and played through a glass of iced tea spilled all over it at a fashion show for a very important client of mine. Show was perfect. Client paid. I'm buying more Mackie." (H., Houston, TX)

"I do work as a Senior Executive Producer for [major classical music label]. The MS1402 was highly recommended by several studio engineers." (S.E., NY, NY)

"Great product!" (C.B., San Francisco, CA)

Below: A few of the 400+ folks who work at Mackie Designs in Woodinville, WA, 20 miles north of Seattle.

MACKIE

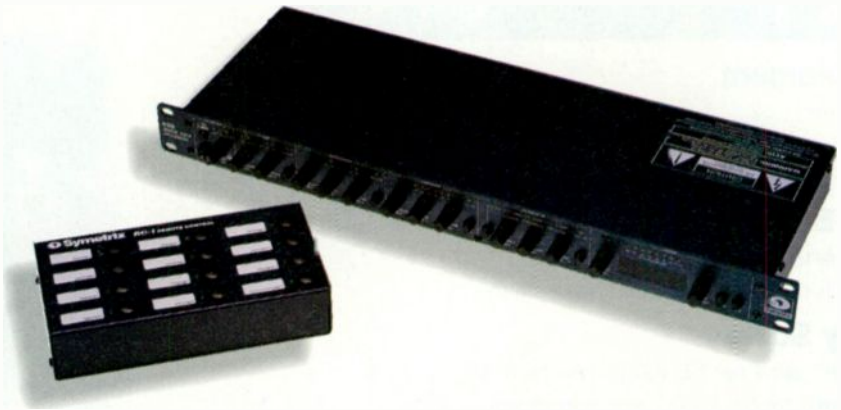
All products made in Woodinville USA by certified Mackoids

Toll-Free in the US, 800/898-3211 • Int'l. 206/487-4333

E-mail: sales@mackie.com • www.mackie.com • NASDAQ: MKIE

Circle (1) on Free Info Card

S W E E T S P O T



20 Bit

CE

Analog dreams become digital reality with the Symetrix 628 Digital Voice Processor. Everybody on the staff will sound better, including you!

Top-notch voice professionals now demand personalized signal processing. The Symetrix 628 gives you the ability to create and store in memory 118 custom presets. You can get on the air instantly by selecting from several finely tuned factory presets.

It rolls a microphone preamplifier, 20 bit A/D converter, de-esser, downward expander/gate, compressor/limiter and parametric EQ into a single rack space unit. Rotary knobs allow real-time parameter adjustments while eliminating multi-layer menus. An optional remote control allows selection of the first 11 presets and a bypass function without frantic dashes to the equipment rack.

Shipping in JUNE!

With analog and digital outputs, the 628 is ideally suited to recording, live performance, and broadcasting applications. Analog outputs provide either line level (+4 dBu) or microphone level (-40 dBu) output. AES/EBU or S/PDIF digital outputs are switch selectable. The 628 operates at sample rates of 32 kHz, 44.1 khz or 48 kHz.

Contact your Harris Representative today to order a Symetrix 628 Digital Voice Processor at a special limited time introductory offer of just

$1049.00! (U.S.)

HARRIS

TELEPHONE: 800-622-0022 FAX: 765-966-0623
http://www.broadcast.harris.com

Circle (4) on Free Info Card

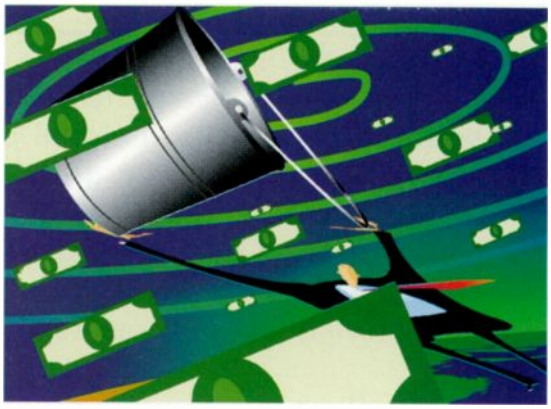
Contents

BE Radio
July/August 1997
Volume 3, Number 4

FEATURES

40

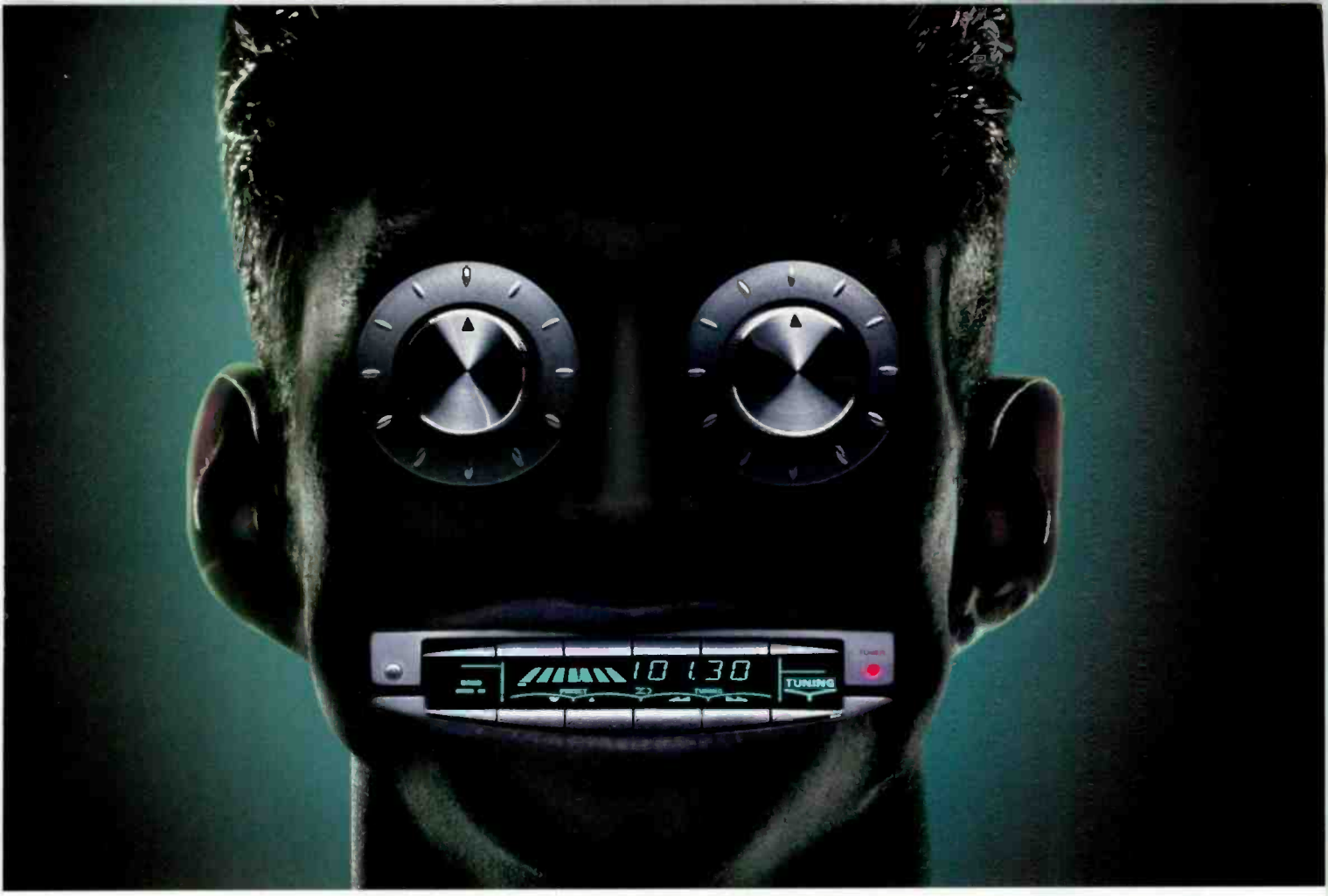
DEPARTMENTS



62

14

ON THE COVER: Studio equipment: Traditional or computer-based? Mark Phelps, engineering manager at WDRQ-FM, Detroit, is sitting at the Audicy workstation used for commercial production. Photo by Douglas Schwartz. Photo courtesy of Orban.



Why your worst day in radio is the best day to judge AirTime.

It's your typical day-from-hell at the station: The on-air talent is definitely "off." Traffic is in a panic to reschedule commercials. The engineer is nowhere to be found. And today's the day the program director decides to overhaul the format. Sounds like a perfect day for AirTime, the first on-air digital delivery system created for the real world of broadcast, where non-stop stress seems to be the rule, not the exception.

AirTime offers a unique combination of easy user interfaces to tap the system's real time power: Live Assist touch screens that actually make on-air tasks easier and more productive. Sound Cube looks and feels like an analog cart machine, which means fully digital on-air delivery without all that staff training time. Sound Slate goes even further, putting a complete range of sound effects and audio at your talent's fingertips.

For commercial scheduling, AirTime's touch screens and easy schedule builder lets you create a commercial once, then access and reschedule it from one powerful database. The same huge, flexible database lets a program director store, organize, and play on-air resources at will.

Best of all, AirTime's UNIX-based operating system gives your station complete multi-tasking in real time. So if running one station isn't challenging enough, now you handle even more stations from a single location with AirTime. Just to make your life easier.

orban

H A Harman International Company

Circle (5) on Free Info Card

Editorial

Re-crystallizing the ball

The broadcast world is dominated by standards. This implies that once a broadcast format is established, it tends to stay that way. But today's technology seems to be moving far from that tradition, for better or for worse. Standards still exist, of course, but they are more like foundations for a common and continuous upgrade path. This is a premise based on a software-centered environment, where end-users can be elevated to the latest format revision through a simple data download delivered via disk, on-line or in firmware.

The myth of a pure software-based upgrade path is well-known to any PC user, however. It usually doesn't take more than a couple of software updates before the *hardware* needs upgrading, too. Moore's Law still applies to hardware and software: Capability doubles at the same price point every 18 months. This leads to a perpetual ratcheting of the upgrade syndrome: a new processor runs the old software faster, then new software is released that does so much more that the processor begins to slow down again and a new processor is needed . . . and so it goes.

This style is difficult enough for consumers to cope with in general-purpose platforms, but nobody wants to see this same performance-chasing loop show up in "dedicated" devices like radios of the future. The only way to avoid this is to build a presciently designed basic receiver platform that foresees the upgrade path of tomorrow's radio service well enough that it can last for a long time. The design may even have to handle numerous generations of software upgrades (delivered over the air, perhaps?) without choking, while not sacrificing any of the attributes of today's radios and keeping the cost down. It's a tall order, but an inevitable one.

Such a requirement for farsightedness worries me when I look at the proposal for a "Grand Alliance" IBOC system under development by USA Digital Radio and AT&T/ Lucent Technologies. This brain trust probably represents the best group that could possibly be assembled for the task, and their sensible assessment of the situation indicates that the best they can hope to achieve is 96kb/s for FM IBOC audio, if compatible analog FM is to share the broadcast channel.

Now, on one hand, perceptual coding continues to improve. I heard some demos of the next generation of codecs and it's astounding how good full-frequency, stereo audio can sound at 96kb/s. But consider the context in which this system would be launched (around the turn of the century): ISDN or ADSL connectivity speeds will be a common telephone interface among U.S. listeners; TV broadcasts may be pumping out megabits of auxiliary data (that may include audio-only services); and DVD players, with their capacity for 24-bit uncompressed audio, will be a typical home playback (or even recording) device. How will a 96kb/s format fare in the face of such competition? Will it not seem immediately out-of-date? Consider a parallel: What if FM had been launched with a bandwidth much smaller than that of the period's standard dial-up phone circuit? These are the kinds of issues and analyses we'll all be dealing with in upcoming years.

The rapid pace of technological change in the telecommunications world makes the need for farsightedness more difficult and more important than ever. This is tough stuff for broadcasters who are used to a much more stable game. But it can also be exciting and add needed stimulus to a stagnating industry. This is what it must have been like to work with Edison, Marconi and Armstrong.

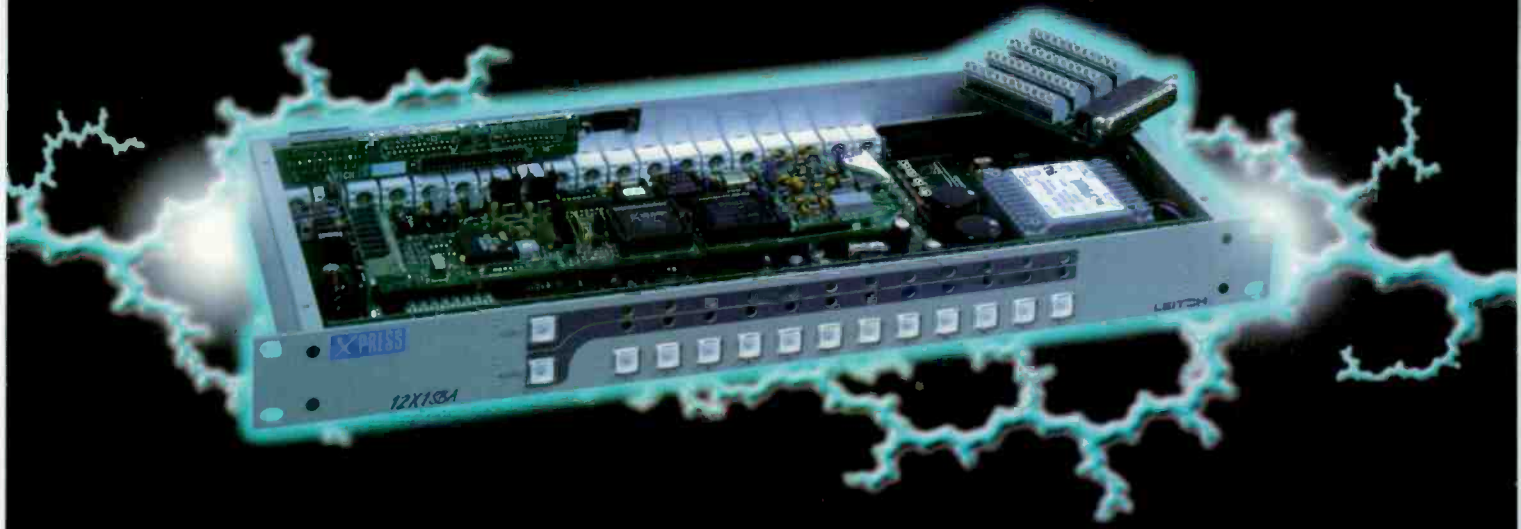
I'm practicing what I preach here, made possible by the growth this leading-edge magazine has experienced. I've moved to the newly created position of editor in chief at *BE Radio*, turning over the editor's spot to Chriss Scherer, most recently a chief engineer at WMMS-FM, Cleveland. Chriss is also a graduate of the University of Miami Music Engineering program, so Chriss has the contemporary RF and audio bases covered. We're also promoting our mentor and former *Broadcast Engineering* editor (and SBE founder) John Battison to technical editor, RF. Together, we'll keep our eyes on the horizon, and help you steer a steady course through the shifting winds of change.

Growth and measured change, balanced with a cache of accumulated wisdom and built on a stable foundation, are the formula for success today. That's what we're doing, and we recommend it to you as well. Meanwhile, stay tuned and keep in touch with all of us as we work to make *BE Radio* an even better tool for your future shop.

Skip Pizzi, editor in chief

Powerful

Serial Digital Leitch Xpress 12x1 Monitoring Router Has Electrifying Features At A Shocking Price



- 12x1 serial video and AES or analog stereo audio in 1RU
- 4 reclocked serial video outputs eliminate need for external distribution
- Built-in video D-to-A provides RGB and NTSC/PAL outputs
- Built-in audio D-to-A provides analog stereo audio outputs (AES models only)
- Local or remote, audio follow-video or breakaway control panels
- RS232/422 serial control with Leitch and GVG TEN-XL* protocol compatibility
- Built-in GPI inputs with selectable joystick override operation

Are you energized? Call Leitch!

Serial Digital LEITCH XPRESS

http://www.leitch.com

U.S.A. (800) 231-9673 Fax: (757) 548-4088
Canada (800) 387-0233 Fax: (416) 445-0595

*TEN-XL is a Grass Valley Group® product.

Circle (16) on Free Info Card

Viewpoint

Going digital . . . slowly

As the digital trend continues, a completely digital audio path is or at least should be the goal of any radio station. We are faced with a situation full of compromises. If it were possible to pull everything out and start over, it would be so much easier, but unfortunately, we have to make the transition piece by piece, staying aware of the final goal, as well as the bottom line. As with any project, careful planning is important to its success. When faced with a decision for an equipment upgrade, having all your information is the only way to start.

There are many starting points for the digital entrance, the obvious choice being the weakest link in the chain. If your plan is to upgrade to a digital STL, attention must be given to the present use and the future use, installing it after an audio processor with only an analog output will reap only some of the benefits. Converting from analog to digital (especially compressed) and back several times is not desirable.

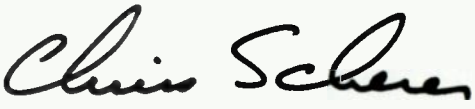
Through the upgrade process, you will also need to maintain a reasonable amount of back-up in case of any problems and for routine maintenance. One possible choice is to make the main chain all digital and the auxiliary chain all analog. The drawback is that if one small part of the main chain has a problem, then the entire chain is down. The other possibility is component compatibility through the system so if there is a failure, you are only covering one aspect. What will work best for you takes care and consideration. Sometimes, an extra interface installed today will allow for more flexibility and an easier upgrade tomorrow.

It's important to know where you are so you know where you're going. The current state-of-the-art equipment offers many flavors of analog and digital devices. This month's issue takes a look at them. Mass audio storage and playback is the heart of most radio facilities and computer-based audio delivery systems are more popular and varied than ever. While the end result of each system may basically be the same, how you get there can make all the difference. Should you consider a peer-to-peer or server-based system? Will you use redundant servers or just redundant drives? How integrated will the system become in the future? If you are trying to sort out some of the basic ideas, this is a great starting place. Our system profiles begin on page 40. Studio equipment has just as many variations in offerings, and the issue of interconnection may play a major role in your next purchase decision. Our cover story deals with the equipment that is still dedicated to audio transmission. There is still plenty of gear that is not computer-based as well. From the microphone to the control room monitors, the studio equipment is where it all begins. Our cover story begins on page 26.

With transitions and changes, it is also good to size up the entire situation. This issue sees the return of the Salary Survey for radio after a three-year hiatus. This is a popular topic that is a welcome return to the pages of *BE Radio*. See where you stand compared to your peers. The coverage looks at management, staff engineering and contract engineering in large and small markets. It is broken down for easy viewing and it should be no surprise that SBE certification shows its advantages. The Salary Survey can be found on page 60.

Change at the station is common and there are also some changes here at *BE Radio*. Skip Pizzi continues to give direction to the magazine by moving up to editor-in-chief and I turned in my pager at WMMS-FM, Cleveland, to assume the position of editor for *BE Radio*. It is also a pleasure to announce the promotion of John Battison with his years of RF experience to technical editor, RF, with this issue as well.

The industry keeps changing, and *BE Radio* changes with it to keep you informed.



Chriss Scherer, editor

E-mail: beradio@intertec.com
FAXback: 913/967-1905

ON AIR

When the ON AIR light glows, there's no time for amateurs or pretenders. That's the reason top professional broadcasters choose Neumann. Rich, smooth, sound – warm, silky tone. Neumann microphones have that classic presence which makes any announcer sound their absolute best. And in broadcast, sound is everything.

Neumann has a comprehensive range of microphones to suit virtually any application and budget. Contact your Neumann dealer today and discover the secret of the pros.

Neumann... the choice of those who can hear the difference.

NeumannUSA

PO Box 987, Dept. 149B, Old Lyme, CT 06371 Tel: 860.434.5220 Ext. 149B • FAX: 860.434.3148
West Coast: Tel: 818.845.8815 • FAX: 818.845.7140
Canada: Tel: 514-426-3013 • FAX: 514-426-3953 • Mexico: Tel & FAX: 52-5-639-0956
World Wide Web: http://www.neumannusa.com

LAN basics, part 1

By Kevin McNamara

The scope of an engineer's duties in the typical station has been expanded to include not only those networked PCs used for the storage and delivery of audio-video information, but to networked PCs in the general non-technical business environment, as well. We don't even call them computers anymore — they are now clients or servers. Trying to keep pace with this technology is difficult to say the least.

Let's look at two terms that form the basis of any computer network or network model:

• ***Message.*** This is the digitized information that is sent from one computer to another, or in other words, the basic unit of information transmitted across the network.

• ***Protocols.*** Simply stated, the rules that define the proper method to package the transmitted message so that it can be understood and processed on the destination computer.

Network architectures

The ultimate goal of the network architecture is to allow interconnectivity of various similar or different computer systems. The specific objectives for a network architecture are as follows:

1. Provide seamless connectivity between all computers on a network.
2. Simplify the task of building the network by use of modular hardware and software components.
3. Support reliable error-free communication.
4. Easy implementation that subscribes to a set of standards.

There have been several network architectures created since 1974 when IBM first introduced its *Systems Network Architecture* (SNA). Digital Equipment created the *Digital Network Architecture* (DNA). As is the case with some others, these network architectures are proprietary and designed to allow only computer systems of the respective brands work on a common network. A network architecture that many of us use while surfing the web is called ARPANET.

Network architectures are designed using a "layered" approach where the network is organized as a series of layers with each building on its predecessor. In other words, each layer performs a specific task and makes available (or advertises) the results to adjacent layers.

Network architectures are designed using a "layered" approach where the network is organized as a series of layers with each building on its predecessor.

The International Organization for Standardization (ISO) has been the primary independent body that is responsible for the establishment of international data communications standards. It also provides the dominant framework for network architectures known as the Open Systems Interconnect model or the OSI reference model. The specific data communications standards compliant with the OSI reference model are established by the Institute for Electronic and Electrical Engineers (IEEE) through subcommittees known as the 802 family. The OSI reference model is not only concerned with the transfer of information, but also with the interconnection of "systems." The goals of the OSI reference model are:

1. ***Interprocess communications.*** The information exchange required by an application.
2. ***Data representation.*** How the information is packaged (and alternative methods to represent data).
3. ***Data storage.*** Concerned with data storage at remote locations and how to access it.
4. ***Process and resource management.*** How application processes are declared, initiated and controlled and also provide a means to find the resources within the OSI framework to accomplish these tasks.
5. ***Integrity and security.*** Provides methods to assure the integrity of data on the network and a means of control to access data.
6. ***Program support.*** Providing an environment for program development and execution at remote locations.

Before I delve into the make-up of the OSI reference model, let's consider another term: *application process.* We all use applications on our computers every time we start a program. If that program is loaded on and running only on a single PC, the total processing of information takes place exclusively on that PC. In a networked environment, however, the processing may still take place on that single PC, but with information derived from another source located on a network. The term application process in this context refers to the application that relies on other network resources to complete a task.

The OSI reference model is based on seven protocol layers. The layers are typically viewed in a vertical stack.

The Missing Link in your Digital Air Chain

Serial Sound Broadcast Consoles by Logitek

- Assignable inputs
- Built-in router
- Up to 32 stereo inputs
- Up to 32 pgm & mix-minus outs
- Mix analog and digital ins & outs
- Rate conversion on digital inputs
- 20-bit analog I/O
- 16 to 24 bit digital I/O
- Machine control interface
- 16 MByte delay & reverb memory

- Rackmount Audio Engine
- 32-bit floating point DSPs
- Run two consoles from one engine
- Easily connect automation systems
- Direct factory support via modem

800-231-5870 - fax 713-782-7597 - email help@logitekaudio.com - http://www.logitekaudio.com

Circle (18) on Free Info Card

Lets look at each of these layers and what they do:

1. ***Layer 7, the application layer.*** This specifies the communications interface with the user and manages the communication among the various computer applications.

2. ***Layer 6, the presentation layer.*** This should probably be called the "translation" layer because that's what it does. Computer code is converted from different formats to be usable on the destination computer. For example, this layer makes it possible for an Apple to communicate with an IBM PC or for a PC to communicate with a mainframe.

3. ***Layer 5, the session layer.*** Establishes, synchronizes and manages dialog between communicating applications.

4. ***Layer 4, the transport layer.*** Maintains the integrity of the data communications. Data flow regulation and error recovery take place at this layer. The data is also segmented into units that will be passed on to the network layer.

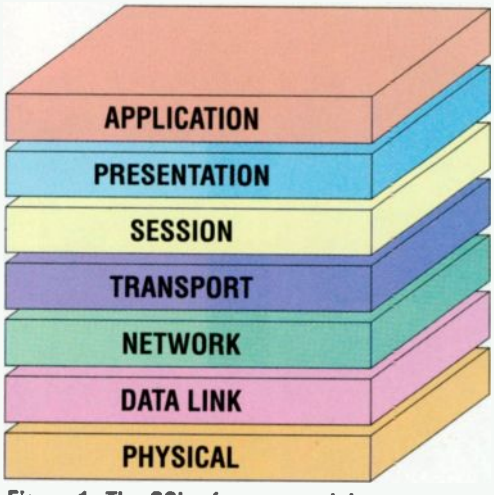


Figure 1. The OSI reference model.

5. ***Layer 3, the network layer.*** Takes care of "routing" information across networks comprised of multiple segments. Network level addressing is implemented here.

6. ***Layer 2, the data link layer.*** Organizes the data into logical frames of information (or packets). Also provides low-level error detection and data recovery. Hardware level addressing takes place here.

7. ***Layer 1, the physical layer.*** Refers to the mechanical and electrical specifications for the cabling, network interface cards (NIC) and other items required to physically create the network.

Keep in mind that the OSI reference model is just that—a model for developers and manufacturers to use when releasing a product that is intended to be used in an "open" or non-proprietary environment. Network architectures may not require the use of all seven layers.

Architectures, such as TCP/IP (used extensively on the Internet), use only four of them. In fact, even those architectures that are considered "proprietary" generally have the ability to map to the OSI reference model and thus be able to communicate with other systems.

As a practical matter, unless you're in the business of developing network hardware and software, having a complete understanding of the specifications for each of these layers is not necessary. If your job description now includes responsibilities for the installation and/or administration of a PC-based network, you will find it a primary concern.

Channel access methods

The amount of expected traffic on your LAN will be the foremost consideration in the design phase of a network; i.e., how much data, how fast and how many users? Passing real-time digital audio and video signals on a LAN would be much more demanding than running a simple business application. Increasing the amount of simultaneous users on the LAN will also encumber the performance of the system. Let's consider how data is passed on each of the three topologies described above. It would be impossible to maintain the integrity of data on the network if all of the devices were permitted to broadcast constant amounts of data. Each device connected to the network must be able to access the network in a somewhat orderly fashion. Any one of three methods may be used to accomplish this. These are called *channel access methods.* They are:

1. ***Contention.*** All devices can transmit at any time. If two or more devices transmit at the same time, each device will wait a random interval of time and try to rebroadcast the data. This will be repeated until a reliable delivery is made. This method is used in bus and star configurations.

2. ***Polling.*** The server initiates queries to other devices on the network in a predetermined order. Devices attached to that network may only respond when queried.

3. ***Token passing.*** Imagine a token signal circulating around a ring (the cable): the token is passed in an orderly fashion around that ring. A device on the network can only transmit when it is in possession of the token; once finished, the token is released. This protocol is used exclusively in ring-type network configurations.

Because of its speed and inherent reliability, the token ring network has been a popular choice for larger networks and, in fact, is the only method used by systems using fiber-optic backbones, such as the Fiber Data Distribution Interface (FDDI). Systems using FDDI will operate at speeds in excess of 100Mb/s. In the past, most businesses found the cost to deploy FDDI prohibitive and opted to use the copper-based Ethernet protocol, which operates at the slower speed of approximately 10Mb/s. Recent advances in Ethernet technologies have brought the speed in line with FDDI, with the advantage of using the less-expensive UTP cable.

Next month, we'll take a look at network topologies and protocols, as well as some practical guidelines for installing the network.

Kevin McNamara, CNE, BE Radio's *consultant on computer technology, is president of Exegesis Technologies, a consulting firm in New Market, MD. He can be reached at (888) EXE-GESIS.*

YOU HAVE A WHOLE NEW

WORLD OF TRANSMITTER SITES.

WE HAVE AN

INTELLIGENT SOLUTION.

THE BUILDING BLOCK APPROACH TO SITE CONTROL
The GSC3000 is flexible enough to meet your needs whether you are a single station site or a multi-station network. You get from 8 to 256 channels of metering, status, and command per site at as many as 256 sites.

MANUAL, AUTOMATIC OR TIME-OF-DAY FUNCTIONS
Program the GSC3000 to make automatic corrections when problems arise. Program it with time-of-day commands to do specific things at specific times on specific days. Then walk away. Of course, wherever you might find yourself, you can access the system via PC or laptop.

You have three transmitters in New York, four in Chicago, two in Orlando and one in Albuquerque. With GSC3000 site controllers from Gentner, you can keep tabs on all of them from a single screen on your Windows® PC. You can execute commands or just let the GSC3000 at each transmitter site handle the decisions and report back at your convenience. The GSC3000 has enough on board intelligence to function without a connection to a PC. Download a free copy of GSC3000 software at http://www.gentner.com.

FREE SITE CONTROLLER GUIDE
Featuring the GSC3000, VRC2000, and all the accessories, this guide will walk you through the decision-making information you need to design or upgrade your site control system. Just call and ask for Gentner's free Site Control Guide.

COMPLEX AUTOMATION THROUGH MACROS
The GSC3000 lets you create macros allowing the system to do complex control tasks, like automatically switching from the main to the standby transmitter. Virtually any event can trigger a macro allowing automation of your system.

WINDOWS® BASED APPLICATION SOFTWARE
Operating in Windows® 95, Windows® NT or Windows®3.1 the GSC3000 software provides point-and-click convenience while you monitor, program, and operate your site or sites. Plus, you can access the system anywhere you have a PC.

1.800.945.7730

Gentner

http://www.gentner.com • FAX on demand 1.800.695.8110
1.800.975.7200

Windows is a registered trademark of Microsoft Corporation

Circle (19) on Free Info Card

On-line services

By Skip Pizzi, editor-in-chief

It's pretty safe to assume today that most radio stations' management and staff are equipped with computers as basic tools. Some stations extend the use of the computer to the platform for audio production and broadcast operations. (Those that don't yet probably will soon.) Another reasonable assumption is that many of these computers have Internet connectivity. This combination of circumstances offers a number of new and important opportunities for broadcasters.

Research and "show prep"

A simple, cheap, yet powerful, use of the station's on-line PCs exploits the original intent of the Internet — research. Managers, producers, reporters and even jocks can use their PCs to search for on-line data that can help them in their work.

For example, news directors can keep up with what's happening by subscribing to an E-mail list that notifies them of events of interest, such as DaybookNews (www.DaybookNews.com). Reporters can obtain up-to-the-minute background on stories they're covering without leaving their desks, using one of the many Internet search engines like Yahoo (www.yahoo.com) or AltaVista (www.altavista.digital.com). DJs can comb the net for jokes, one-liners, weird news and other material to help them prepare their shows. For computer-audio-equipped facilities, jocks can also download sound effects and other audio clips to spice up their programs. A good resource for these sites and applications is "Radio Rider," an on-line publication distributed frequently by Corey Deitz, a Cleveland-based jock. (Contact Corey at www.radioearth.com.)

Note that the Internet can be used for research in two ways, generally known as "push" or "pull." The latter refers to the typical Internet browse or search, where the user goes hunting for data to pull in, navigating the net via hypertext links or with the help of search engines. The "push" approach involves the user signing up for a service that automatically sends selected data to his or her E-mail address (or direct to the computer, if it's on-line at the time), such as Pointcast (www.pointcast.com). Some industry-specific services of these types levy a small per-use fee, while others charge the organization whose information they disseminate rather than the end-user. Most general-audience search engines or push services run advertising on their sites and are free to users.

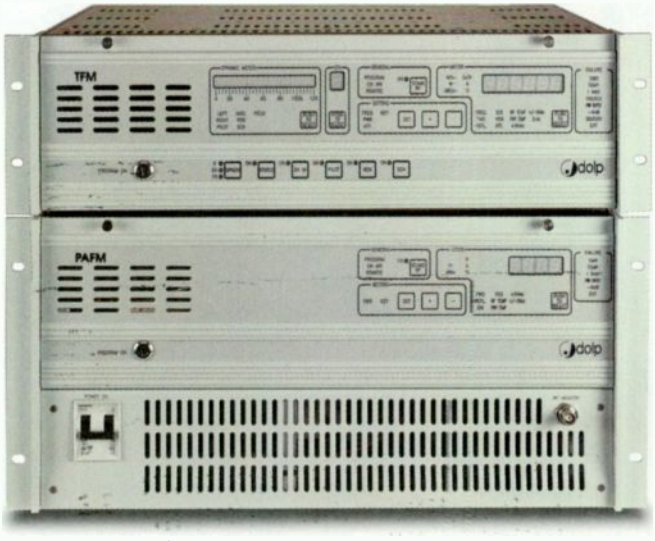
Broadcast professionals can keep up with their peers and the industry via the Internet as well. One way of doing this involves the *bulletin board*, on which a reader "posts" an E-mail message to a site where others log in and read it. This is also called a *news group* or *forum*. They are often sponsored by trade associations or commercial on-line services, such as CompuServe's Broadcast Professionals (BP) Forum. A related function is the *listserv*, which is the "push" version of a bulletin board. Whenever any subscriber to a listserv posts a message, it is forwarded to all of the listserv's other subscribers via E-mail. In most cases, the listserv subscriber has the option of receiving each message as it is posted or getting a single message at the end of each day containing all of that day's postings (the latter is called the *digest* feature).

The Internet as a marketing tool

Every radio station should have a web site, which at present serves primarily promotional purposes. In the future, the station's web site may actually generate revenue, but don't expect that today. The web site is worth some development and operational expense, however, for its marketing value alone. It allows the station to "bolster its brand" with a highly desirable demographic group at relatively low cost. Besides, your

It's Smart

500 W - 10 kW Solid State FM Transmitter *TFMK Series*



TFMK01 • *1 kW*

- Broadband power amplifier modules [87.5 - 108 MHz]
- Compact and user-friendly modular design
- Fully controlled by microprocessor
- Remote control and monitoring capability
- N+1 systems available
- Plug-in module for transposer configuration
- RDS and SCA plug-ins (optional)
- Dimensions 480 [W] x 360 [H] x 500 [D] [mm]
- Forced air cooling

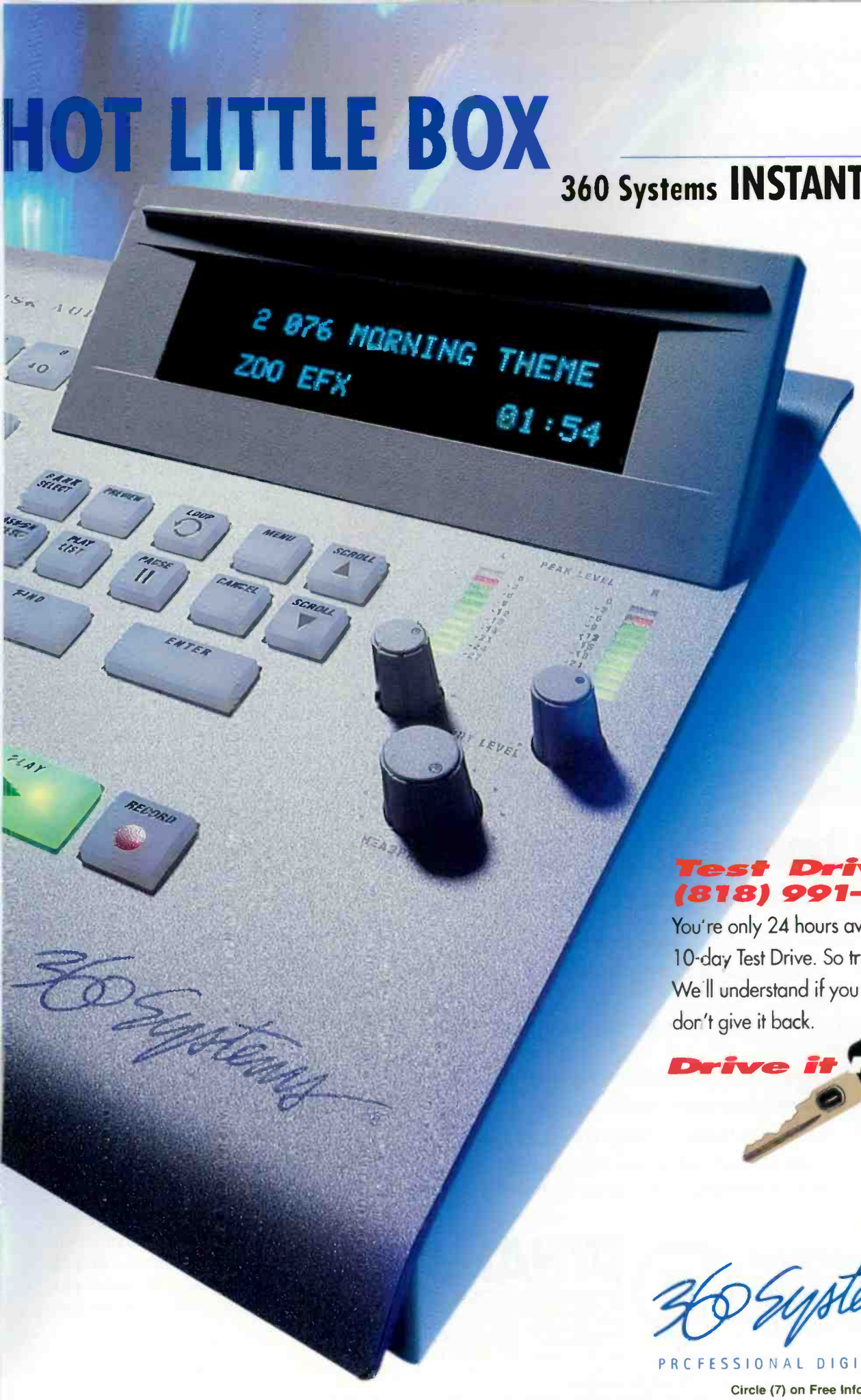
dolp

DOLP is an Itelco group company. For further details please contact: Dolp headquarters: via B. Pontecorvo, 4 - 00012 Guidonia Montecelio (Roma) Italy, phone +39 774 357400 • fax + 39 774 375445 • E-mail dolp@mail.seinet.it - *North America and Canada* • Itelco USA Inc., Westminster CO, phone +1 303 431 1699 • fax +1 303 431 2868 - *Central and South America* • Itelco USA Inc., Miami FL, phone +1 305 715 9410 • fax +1 305 715 9414 - *Turkey* • Itelco Ltd., Istanbul, phone +90 212 2732365 • fax +90 212 2732368 - *China* • Itelco Beijing Office, Chaoyang District Beijing CHINA, phone +86 10 4948151 • fax +86 10 6494823
Itelco group web site http://www.itelco-usa.com.


1000 CARTS IN ONE
Just press a Hot Key and get the sound you want.
Up to 16 hours of true stereo inside. Completely self contained, no PC!
RECORD, PLAY and ORGANIZE...
INSTANTLY

HOT LITTLE BOX

360 Systems INSTANT REPLAY®



Test Drive It
(818) 991-0360

You're only 24 hours away from a free 10-day Test Drive. So try it out. We'll understand if you don't give it back.

Drive it Hard.

360 Systems®

PROFESSIONAL DIGITAL AUDIO

Circle (7) on Free Info Card

5321 Sterling Center Drive, Westlake Village CA 91361 USA Voice (818) 991.0360 Fax (818) 991.1360 web: 360systems.com, e-mail: sales@360systems.com

competitors will be doing it. If your audience has any significant listenership under age 35, you may soon find yourself at a significant disadvantage without a web presence for the station.

Set up a simple, clean web site that listeners can visit and keep its address (more accurately in web lingo, its *universal resource locator* or URL) easy to say and remember. One of the biggest obstacles with a web site is letting people know it's there. Broadcasters have a distinct advantage in this respect because they can announce their URLs on the air frequently. Another advantage is that the uniqueness of a station's call letters virtually guarantees that a corresponding URL will be available (i.e., KXXX-FM should be able to get *kxxx.com* or *kxxx-fm.com*).

The web site can include information for listeners, as well as advertisers. One area of the site can provide profiles and photos of air personalities, program schedule information, a listing of the station's request and information lines and community listings (like concert calendars), while a separate area can list advertising rates, contact information for account execs and so on.

The station's web server can also be set up to receive E-mail from listeners, which can be valuable for audience research purposes. Furthermore, the server can send an automatic response message to the correspondents, which can go a long way in cementing customer relationships (even if the message is an obvious "canned" generic reply).

Taking things to the next level, listeners can be encouraged to join a "listeners' club" at the site, by which they register their E-mail addresses and receive future promotional E-mail from the station on a regular basis. Content of these messages can include on-air programming highlights or announcements of upcoming special broadcasts, station-sponsored event notices, station/DJ news or other items of interest to the listening area. Commercial sponsorships for this "electronic newsletter" could also be sold to the station's existing on-air advertisers. By the way, good "netiquette" demands that it should be easy for listeners to delete themselves from the distribution list for this push messaging at any time.

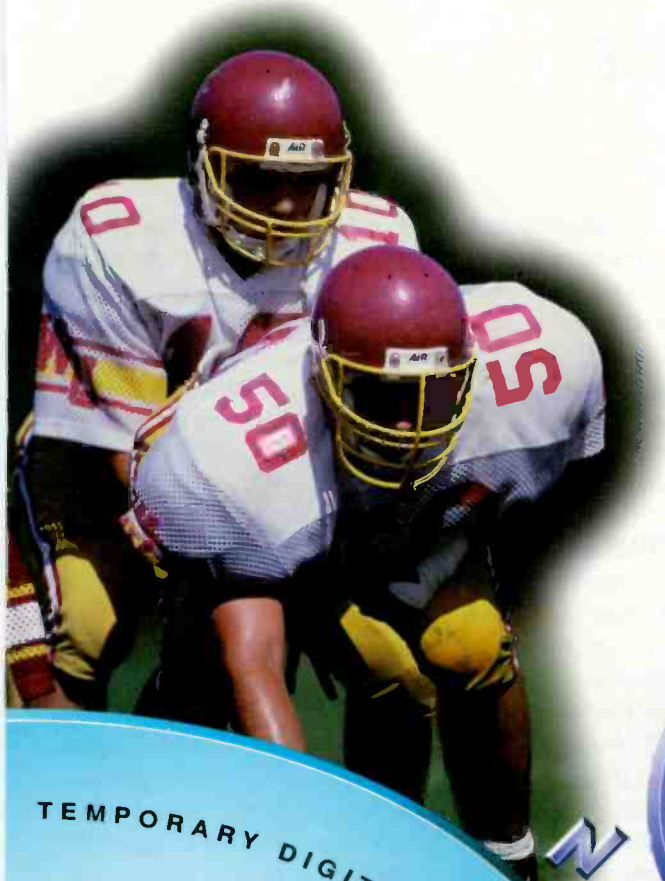
Audio vs. print

The final frontier du jour for radio stations on the Internet is the delivery of audio programming on-line. This will allow stations to do three things they can't do over the air: 1) deliver their air signal to a worldwide audience in real time; 2) create alternate "narrowcast" audio program channels for on-line transmission only; 3) establish an archive of audio programs available for "on-demand"

Continued on page 71

Digital audio links

for broadcasters



SWITCHED DIGITAL AUDIO LINKS

BCF256

Over fixed or ISDN links such as those used for studio networking, STLs and temporary outside broadcasts, this full duplex Broadcast Communications Frame facilitates FM quality stereo digital audio up to 20kHz. The new BCF256 provides a host of features including auxiliary data and integral fall-safe ISDN back-up. An optional digital I/O is available.

THE BEST BITS IN DIGITAL AUDIO COME FROM APT

Whatever your broadcast application, only APT provides the most comprehensive, proven and compatible solution to high quality digital audio links. Characterised by the lowest available coding delay - APT codecs provide the most robust and economic audio distribution available, in applications throughout your broadcast operation.

TEMPORARY DIGITAL AUDIO LINKS

DRT128

Designed for the reporter on the move, the DRT128 Digital Reporter Terminal enables speedy direct dial connection to the ISDN through an integral terminal adapter for the simultaneous transmission and reception of broadcast quality audio. Robust and lightweight, the DRT128 provides a variety of transmission options - including stereo.

FIXED DIGITAL AUDIO LINKS

NXL256

The cost effective solution to networking over dedicated links, the NXL256 Broadcast Network Transceiver is an apt-X based codec with provision for back up feed, providing the assurance of programme continuity. A robust and compact codec, the NXL256 is designed for bandwidths from 6.5kHz mono to 15kHz stereo.

APT

AUDIO PROCESSING TECHNOLOGY

Headquarters Tel: +44 0 1232 371110

Japan Tel: +81 3 3520 1020

United States Tel: +1 213 463 2963

URL: http://www.aptx.com

Circle (9) on Free Info Card

Radio frequency interference

By John Battison

A broadcast station's antenna is the broadcaster's last link with the transmitted signal. Up to that point, the program material can be compressed, expanded, clipped, predistorted, modulated, encoded, digitized and anything else an engineer can think of. For that reason, every effort is made to produce the cleanest and best-sounding signal at the antenna. Once the signal leaves the radiator, it's subject to outside influence and degradation.

The greatest source of signal degradation problems is probably radio frequency interference (RFI). A common type of interference is one that I call "consumer interference," because it's frequently caused by equipment in the listener's home. Two common examples are AC/DC commutator "universal" motors and the RF noise produced by semiconductor-controlled devices, like light dimmers, photo-cell-controlled lights and even battery chargers.

Another source of aggravation to the broadcaster is pole transformer radiation. A faulty pole transformer can cause interference over several miles of power lines. Before going to to the power company, it's helpful to attempt to identify the source of radiation by use of a field-intensity meter (FIM).

RFI sometimes is produced by citizen's band (CB) radios. These are often improperly operated, have faulty antenna systems or, as is too often the case, used with a power amplifier more than 4W. There can also be a potential RFI problem for the listener caused by Part 15 unlicensed equipment. The major difficulty in dealing with these unlicensed users is that operation occurs at random, and often is extremely localized, making it hard to track down.

There are hundreds of causes of RFI in the listener's world. Most can be tracked down with a great deal of time and patience. More will no doubt surface as electronics continue to play a larger part in our lives and homes.

Transmission problems for AM

Just about all the foregoing RFI sources will ruin AM reception. Forgetting these for the moment, what else does our good 'ole faithful AM transmitter face? Heterodynes are infrequent these days. It's seldom that any co-channel transmitter is so far off frequency to cause a whistle. It's possible in some parts of the United States, especially at night, to get a heterodyne from European stations operating with the 9kHz separation. Such region/region heterodynes are seldom a problem, but they should be kept in mind. Another "whistle" problem sometimes is produced by telephone systems using multiplexed lines.

An AM problem that isn't really RFI, although it produces listener complaints is directional antenna "null" distortion. This often arises from a DA that is improperly adjusted and has an impedance that changes rapidly a few kilohertz away from the carrier frequency. This distortion may change depending on local conditions that affect antenna tuning. About the only thing you can do is retune the DA to be as broadband as possible with a flat rate of change of R and X at resonance.

"Fading wall"

Normally, the "fading wall" syndrome won't appear in daytime in AM operation, but at night watch out for it. This is the area where the signal reflected from the ionosphere reaches to ground. We always look for a 20:1 (desired-to-undesired) ratio signal.

When most stations were designed 50 to 60 years ago this phenomenon wasn't recognized. It may be possible to move the "fading wall" to an area with few potential listeners. This involves redesigning the DA to adjust the vertical lobe to make it return to earth in a desired area. This may not be possible because of interference considerations, but it's worth thinking about if the problem involves a desirable listening area.

Skywave interference at night falls under the same category as "fading wall" problems. In this case, there isn't much that can be done. Occasionally, sporadic interference is produced by propagation conditions and there is nothing you can do.

If such interference persists, it could be caused by a local condition producing reradiation or non-linear rectification at corroded metal contacts. Again, this calls for detective work with a FIM to locate the source. Don't take one listener's complaint as gospel — it could be local to one receiver.

In areas where there are several AM transmitters, cross-modulation isn't unknown. There are two kinds: *external* and *internal* cross modulation.

External cross modulation can occur when two or more signals are rectified in the detector stage. It most often happens when close to powerful stations. Better receiver input tuning, such as rejection filters, generally solve the problem.

Internal cross modulation occurs when the signal from a nearby antenna is received by a transmitting antenna and travels to the final amplifier. It then is transmitted as part of the affected transmitter's signal. Nothing will get it out of the received signal.

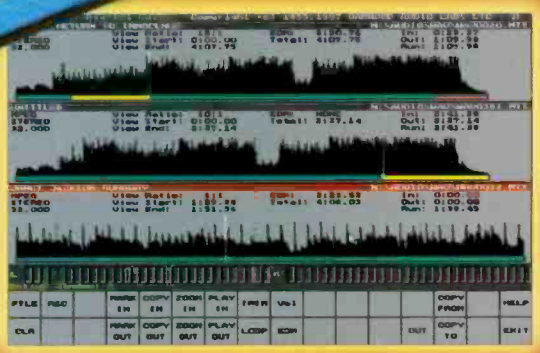
Internal cross modulation is usually cured by the insertion

SUPER DUOPOLY.

GO DIRECTLY TO MEDIATOUCH

DIGITAL INTEGRATION

"OpLOG®" Studio Control Panel



"MediaEDIT®" Digital Audio Editor

SOLUTIONS FOR MULTI-STATION INTEGRATION

We worked on our first duopoly project over 5 years ago and our experience leaves nothing to chance.
No matter what configuration of stations you have, no matter what format, no matter how many studios...
MEDIATOUCH can run it all through one central location, all with the ease of touch screen technology.
And MEDIATOUCH works with your existing platforms. No expensive ecuipment to buy.
Flexible. Affordable. Easy to use. Don't roll the dice in the game of Superduopoly.
Give your stations the MEDIATOUCH advantage.

MediaTouch
A DIVISION OF OAKWOOD AUDIO LABS LTD.
TOLL FREE 1-800-636-0123

Broadcasters General Store
2480 S.E. 52nd Street
Ocala, Florida
34480-7500
Tel: 1-352-622-7700
Fax: 1-352-629-7000

CALL US TODAY FOR MORE INFORMATION

See our web page at WWW.OMT.NET

Circle (10) on Free Info Card

of high-impedance filters tuned to the offending frequency in the affected transmitter's antenna circuit.

As more transmitters change to solid-state operation and eliminate tubes, the quality of the power supplied becomes more important, especially with microprocessors. These devices depend on pure DC for proper operation. Switching power supplies can sometimes produce spurious signals that affect transmitter operation. Line power that is "dirty" with lots of switching transients or voltage fluctuations can even put a transmitter off the air.

Even the reliable tube transmitters can pass raw power line noise on occasion. It pays to look at your power line on a good scope at the station input, and at other points in the transmitter installation. The high-voltage transmitter supply should always be examined — you can even extract potential component failures from such an examination.

Transmission problems for FM

By its nature, FM can ignore many of the RFI problems that plague AM. Most noises caused by amplitude variations or impulse noise are eliminated in the limiter stages of the FM receiver. But some noise pulses that have an excessive amplitude will usually get through and be heard. Sometimes, this occurs via the audio stage rather than RF.

FM's major RFI problem is probably multipath, and the generation of spurious signals in the vicinity of closely spaced or co-located antennas. In the latter case, the range of frequencies generated can be wide and sometimes has to be tolerated over a limited area.

If an FM transmitter's location is properly selected, multipath shouldn't be a problem. In areas where it's necessary to locate close to large reflecting objects, such as a fountain, a station may have "built-in" multipath. Sometimes, use of a directional antenna with minimum radiation toward the reflector will cure the problem. If a large building is constructed after the FM station was installed there is not much that can be done — except perhaps to move! Fortunately, multipath from new buildings is usually a problem in limited areas.

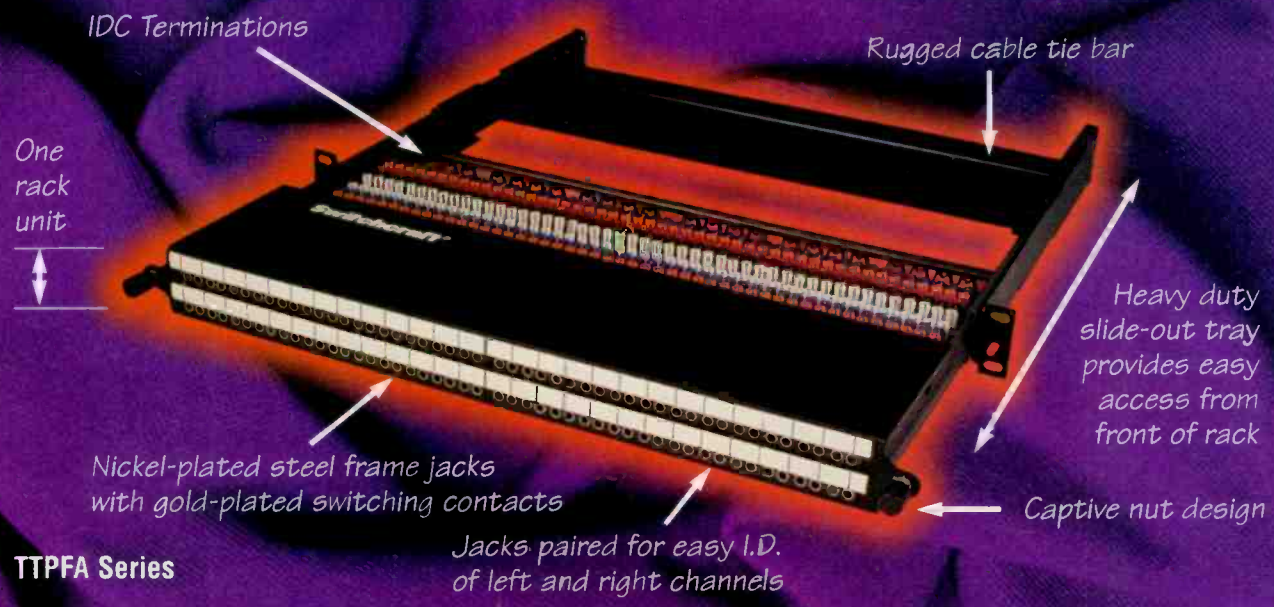
A directional, Yagi-type receiving antenna can also help by eliminating or reducing the unwanted reflection. However, relatively few listeners use external antennas, relying on built-in antennas or power cord pickup.

FM's capture effect generally results in unexpected switches from station to station rather than than garbled multistation reception. The same characteristic also governs the reception of sporadic ionospheric signals.

RFI is on the increase with the proliferation of radiating electronic equipment and unlicensed "low-power" devices. The SBE Frequency Coordinating Committee keeps a tight watch on proposals made to the FCC by potential RFI generators.

John Battison is BE Radio's technical editor, RF, and owns John H. Battison and Associatates, a consulting engineering company in Loudonville, OH.

Fill Your Rack With Switchcraft®...



Introducing the Front Access Patchbay Series...

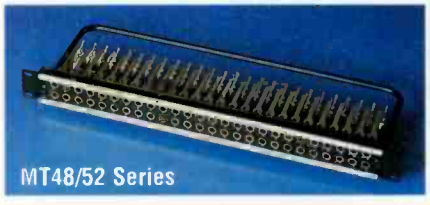
an exciting new reason to make Switchcraft your source for audio panels.

Our innovative front access patchbay gives you space where you've never had it before and convenience you've never dreamed of, in a quality package you've come to expect from Switchcraft. Our heavy duty slide-out tray gives you access to the 96 nickel-plated steel frame jacks ***from the front*** of the unit.

But that's only the beginning! See the photo above for all of the features and benefits, which make this panel ideal for use in studios, tape editing rooms, mobile facilities and anywhere space is limited.

While you're at it, check out the patching products below. Don't forget our high quality patchcords, and industry-standard Q-G® microphone connectors.

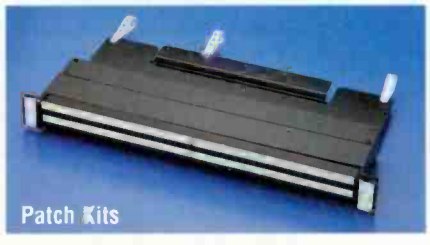
Switchcraft is your one-stop shop for all of your broadcast interconnect needs. Call (773) 631-1234 ext. 243 today for a copy of our Audio Video Products catalog.



- 1/4" Nickel-plated steel frame jacks
- Rugged cable tie bar
- 3 1/2" or 1 3/4" panel height

- TT Nickel-plated steel frame jacks
- Rugged cable tie bar
- Extra wide labeling strips
- 1 3/4" panel height

- Extra wide labeling strips
- Fully-wired with EDAC connectors



- Choose from a variety of normaling configurations
- 3 1/2" or 1 3/4" panel height (1/4" or TT)

Raytheon Electronics

Switchcraft®

Switchcraft®

5555 North Elston Avenue • Chicago, IL 60630
(773) 631-1234 • Fax: (773) 792-2129
www.switchcraft.com
Switchcraft®-Consistently Excellent Since 1946℠

Circle (20) on Free Info Card

FCC Update

Hundt to leave FCC — Quello and Chong replacements nominated

By Harry C. Martin and Andrew Kersting

FCC chairman Reed Hundt notified the White House that he intends to resign upon the appointment of a successor. Hundt's announcement came two days after President Clinton officially nominated FCC general counsel William Kennard to be the Democratic appointee to replace James Quello and House Commerce Committee economist Herald Furchtgott-Roth for the Republican seat previously held by Andrew Barrett.

Four individuals appear to be likely candidates for Hundt's replacement: 1) ex-FCC general counsel Kennard; 2) current commissioner Susan Ness; 3) Kathleen Wallman, an ex-chief of the FCC's Common Carrier Bureau and now staff chief at the National Economic Council; and 4) Ralph Everett, ex-counsel and Democratic staff director to the Commerce Committee, who is being promoted by Senator Hollings (D-SC).

Another possible candidate is the Justice Department's Michael Powell, who has been recommended by Senate Commerce Committee chairman John McCain (R-AZ), to take the Republican seat formerly held by Rachelle Chong. Senator McCain has indicated that he will not move any nominations forward until Powell is nominated. It's unlikely that any further action will be taken concerning Hundt's replacement until later this summer or early fall.

Debate regarding ownership and attribution rules continues

The commission apparently is leaning toward adopting its proposed equity-debt plus attribution rule. This would mean that ownership interests would become attributable at substantially lower thresholds than under the current standards, which would impact many commission licensees.

Also, there is increasing speculation that the commission will consider joint sales agreements to be attributable. The Justice Department has advocated the attribution of such agreements or at least to treat them in the same manner as LMAs. Because radio LMAs have been attributable for some time and some of the commissioners do not favor LMAs, it's likely that JSAs soon will be attributable.

Chairman Hundt previously suggested that the ownership attribution might be concluded as early as last month. Since that's not the case, more recent estimates suggest that the new attribution rules will not be adopted until later in the summer. Because of Hundt's decision to leave the FCC, many believe that the attribution proceeding will not be concluded for some time, and perhaps not until all of the new commissioners are in place.

Proposal to eliminate newspaper-broadcast cross-ownership ban

Senator McCain has introduced legislation that would lift the ban on common ownership of a daily newspaper and either a radio or TV station in the same market. Although the bill is not clear, removal of the ban apparently also would apply in cases where the common owner is the licensee of a radio and TV station in the same market.

McCain called the existing cross-ownership prohibition "one of the most archaic provisions remaining in telecommunications law," noting that the provision dates from a time when there was a realistic fear that common control of print and broadcast media in the same community could result in the public receiving only one viewpoint on important issues. Since that time, however, the number of media outlets has expanded dramatically to include numerous cable channels, DBS and the Internet, even in the smallest of markets.

McCain also noted that in the current era of increasing media diversity, many newspapers have been unable to survive. He believes that eliminating the cross-ownership restrictions may help struggling newspapers by permitting the infusion of much needed resources.

The introduction of McCain's bill followed the FCC's denial of the Tribune Company's request for a permanent waiver of the cross-ownership rule to permit it to own WDZL (TV), Miami and the Fort Lauderdale *Sun-Sentinel*. The commission's decision came as part of its review of Tribune's acquisition of Renaissance.

Although the proposed legislation may provide significant public interest benefits in certain circumstances, the bill is likely to face strong opposition from Senator Ernest Hollings (D-SC), who was successful in preventing further relaxation of the cross-ownership rules under the Telecommunications Act of 1996.

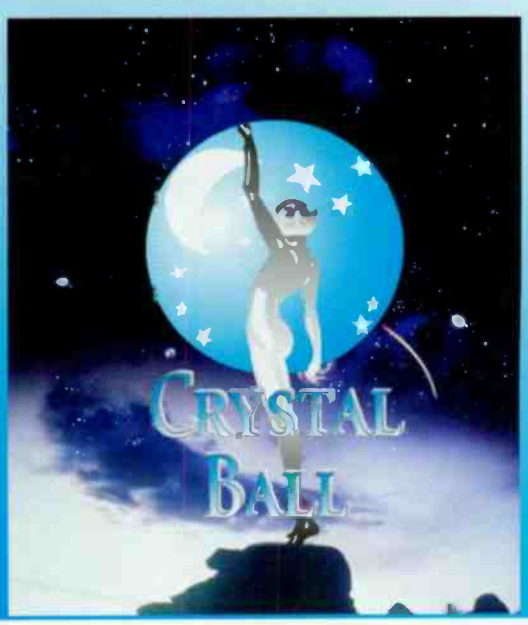
Harry Martin and Andrew Kersting are attorneys with Fletcher, Heald & Hildreth, PLC., Rosslyn, VA.

dateline

Radio stations in California must file their renewal applications on or before Aug. 1, 1997. Commercial radio stations in the following states must file their annual ownership reports on or before Aug. 1: California, Illinois, North Carolina, South Carolina and Wisconsin.

Antenna structure owners in Nebraska and Pennsylvania must register their towers before July 31, 1997. Tower owners in Florida and Indiana must register their structures between Aug. 1 and Sept. 30, 1997.

What is the Crystal Ball?



Do you ever wish you could go into the past to see exactly what happened on the air?

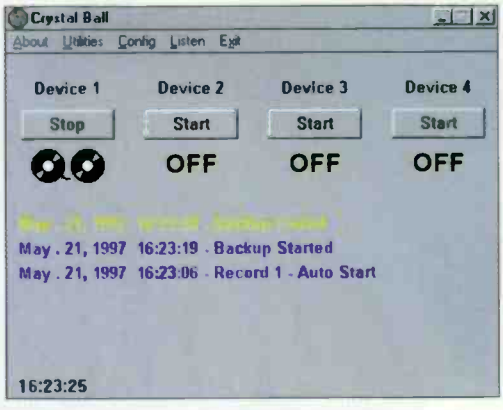
Now you can. Announcing the *Crystal Ball by Prophet Systems.*

The Crystal Ball makes archiving every minute of the day easy and economical. Just type in the date and time of the audio you want to review, and the Crystal Ball will automatically retrieve it for you. Up to four stations can be archived from one computer. The Crystal Ball accurately records audio onto small compact storage Digital DAT tapes instead of older, more expensive forms of storage. The Crystal Ball can retrieve audio for any day and time off the computer's hard disk, or off DAT for instant replay without interrupting any program being recorded. This digital logging device accurately records audio in easy-to-manage one hour files.

Program Directors can use the Crystal Ball to critique any show from any day. Salespeople can easily provide air checks to customers. Production staff can construct promos with full audio quality, and the news department can review call-in shows.

Select sample rates from 32,000 to 48,000 with compression rates from 3.4:1 to 24:1. You can also select mono or stereo.

Examine the past with the Crystal Ball.



Storage requirements

The Crystal Ball is fully user configurable for sample rate and compression ratio.

Choices include:

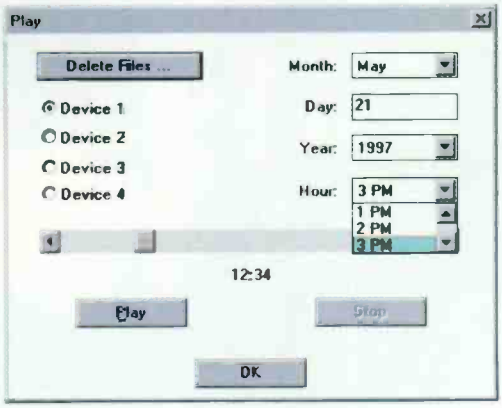
64 Kbps mono which equates to 0.25 meg/minute, 354 meg/day, 2.4gig/week. This is a popular choice if you wish to just review the material for critique or legal purposes. Audio is clear, but not quite FM quality. One single DAT tape will back up 4.5 weeks of programs.

96 Kbps mono which equates to 0.37 meg/minute, 530 meg/day, 3.7gig/week. This is a popular choice if you wish to reuse the archived audio for promos or news. The audio is clear and clean. Three entire weeks of audio will still fit on one 12 gig DAT tape. Up to 4 broadcast stations can be recorded on one workstation.

Price

First station $6500
Includes: Pentium 133 workstation, 32 mg memory, 3.5 gig drive, 14" color monitor, network ready (3COM Etherlink XL 10/100 MBS ethernet card), Internal 12 gig DDS-3 SCSI Digital DAT drive, 15 12-gig DAT tapes (enough for one year), MPEG Layer II compliant Record/Play audio card, Crystal Ball Single Record Software

Each additional station $3750
Includes: MPEG Layer II compliant Record/Play audio card, Crystal Ball Single Record Software



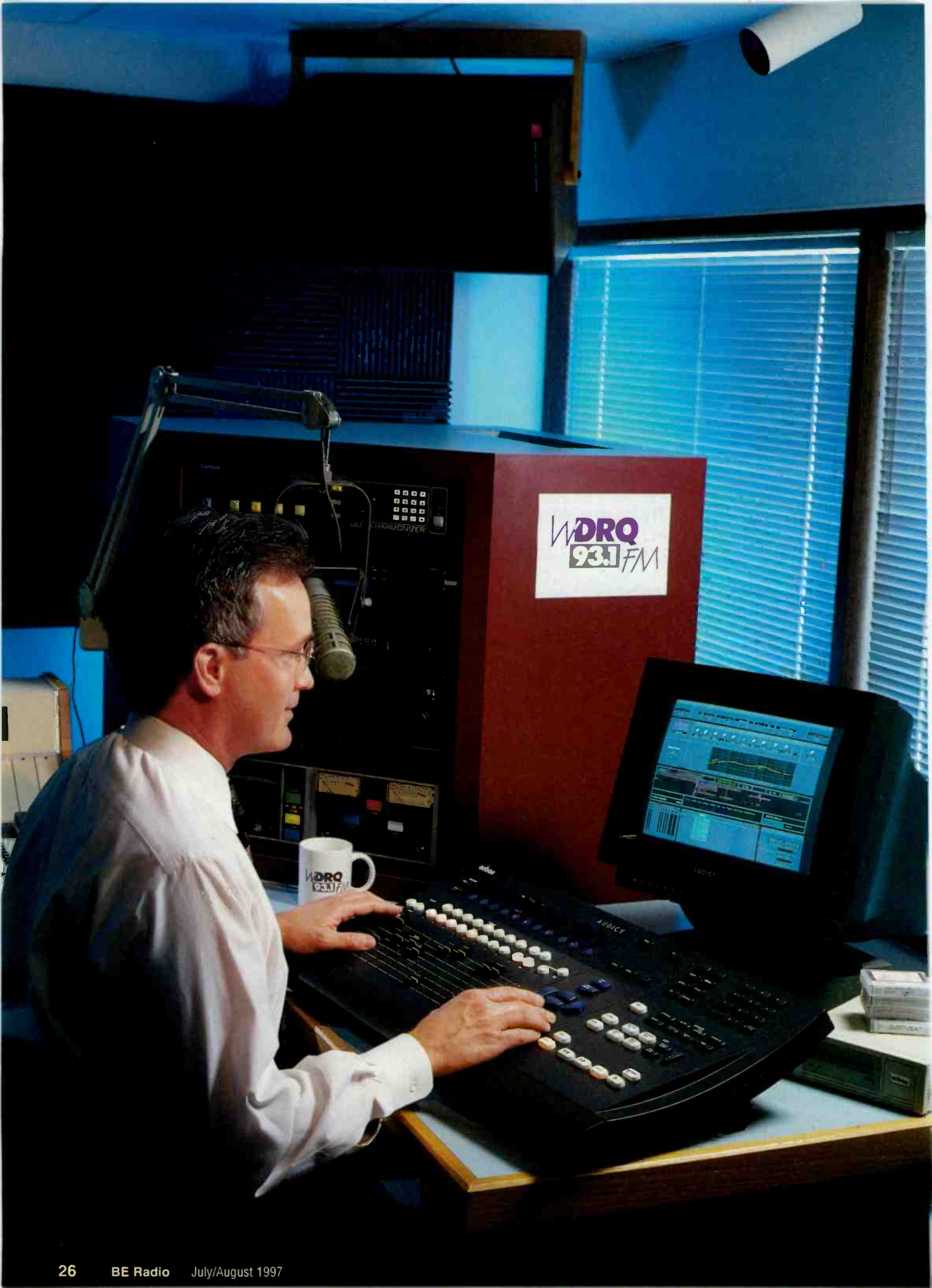
Prophet Systems, Inc.

Our Main Offices:
Prophet Systems, Inc., 111 West 3rd St., Ogallala, NE 69153

Sales: (800) 658-4403
Sales & Support Fax: (308) 284-4181 **E-mail:** sales@prophetsys.com

For International Sales Information:
Broadcast Solutions Pty Ltd, 90 Hotham Parade, Artarmon, NSW 2064
Colin Crowe – Voice: 011-612-9980-2111 Fax : 011-612-9980-1445

Web site: http://www.prophetsys.com


WDRQ
93.1 FM
AUDICY

Studio equipment

There is plenty of equipment not built around a computer.

By Chriss Scherer, editor

Computer-based audio systems are more commonplace every day. Any new project or facility design no doubt has much of the equipment relying on computers or computer control. It is sometimes difficult to imagine running a station without that monitor in the control room. Still, there is plenty of equipment that the PC has not yet taken over. Some of these items are strictly analog, so the chances of them becoming digital is nearly impossible.

Although the non-computer-based equipment is alive, it stays well with technology advances that keep it fresh and improve performance and reliability for the future. As digital audio continues to encroach into more equipment uses, the computer control follows. We'll look at some of the mainstays in studio equipment that are resisting the computer takeover. From microphones to monitors, there is much gear that still holds its place without a computer.

Strictly analog

As we strive for a fully digital audio chain, and eventually transmission chain as well, there are two things that will remain analog — our ears and our voices. Because of that, microphones and monitors will always be analog. It is possible to have a D/A or A/D built-in to the device, but the basic application is still analog. Because of this, acoustic designs are still being improved upon. Digital and computer-based equipment is becoming the standard, but there are still some strong contenders to the contrary.

Microphones

Microphone designs have continued to improve, giving more flexible capabilities for pick-up patterns and sound pressure level handling. The dynamic microphone is in use in many facilities and is a popular choice for remote broadcasts and some field recording because of its low cost, inherent rugged design and good sound. New materials have improved the designs even further.

Dynamic microphones have benefited most recently from the use of neodynium magnets, which are about 10 time more powerful than alnico magnets. Neodynium designs first appeared several years ago and have been progressing ever since. By replacing the magnet in a microphone design, there are two benefits that can be taken advantage of: higher output and wider frequency response.

With a stronger magnet, the electromagnetic field generated can be greater. This allows a higher output level. The stronger magnet also gives the designers more to work with to improve frequency response. There is a trade-off between the two, however. As one increases the other suffers. A middle ground is usually chosen to take advantage of both characteristics.

The diaphragm construction has also benefited from higher-quality materials. Tighter component manufacturing tolerances allow for high and more consistent quality throughout the process.

By combining these elements and the use of virtual modeling instead of real modeling, polar patterns can be consistent across the spectrum instead of changing in different frequency ranges from omnidirectional to a tight cardioid pattern.

Condenser mics have also seen improvements with virtual modeling and higher-quality components. Gold and stainless steel components give exceptionally long and stable lives to condenser mics. The use of phantom power allows condenser mics to be used interchangeably throughout a facility.

Condenser mics have several inherent advantages including smooth extended range frequency response, low noise and rugged design capable of high sound pressure levels.

Many condenser mics also have a switchable polar pattern allowing more flexibility in its use. This is accomplished with the internal electronics of the microphone, because the condenser capsule can have more than one tap or even more than one capsule, depending on the design. Some condenser mics offer switchable capsules as well to tailor its use. This design has become popular more recently especially in recording studio applications.

Regardless of the design, whether it be active or passive, manufacturing technology has made consistency between different mics of the same model extremely high. The tedious matching of microphones is only required in situations with tight critical standards, such as concert broadcasts with a minimal microphone complement.

Mixers

Mixing console designs have improved tremendously even over the last 10 years. Lower noise components, more flexible design options and long life spans have kept the

analog design on top of the heap. More recent introductions of digital designs are slowly making their way into studios, but account for only a small percentage of console use.

Modular design helps in maintenance, allowing a specific module to be pulled for repair without having to shut down the entire console or moving the on-air operation to an auxiliary control room. With operating costs being kept to a minimum, spare equipment is sometimes also sacrificed, giving modular consoles an added benefit.

Some modular console designs have different frame configurations but use the same modules. The obvious advantage here is the reduction of spare modules for backup situations. Sometimes, the production console is used for spare parts when the budget is tight. This approach

Making room for the transition to even some computer control makes for some creative solutions. (Photo credit Paul Shulins, WMJX, Boston.)

is not the best idea, since you are using a working system as a spare parts kit. As is always the case, you will need a backup system when it is not available.

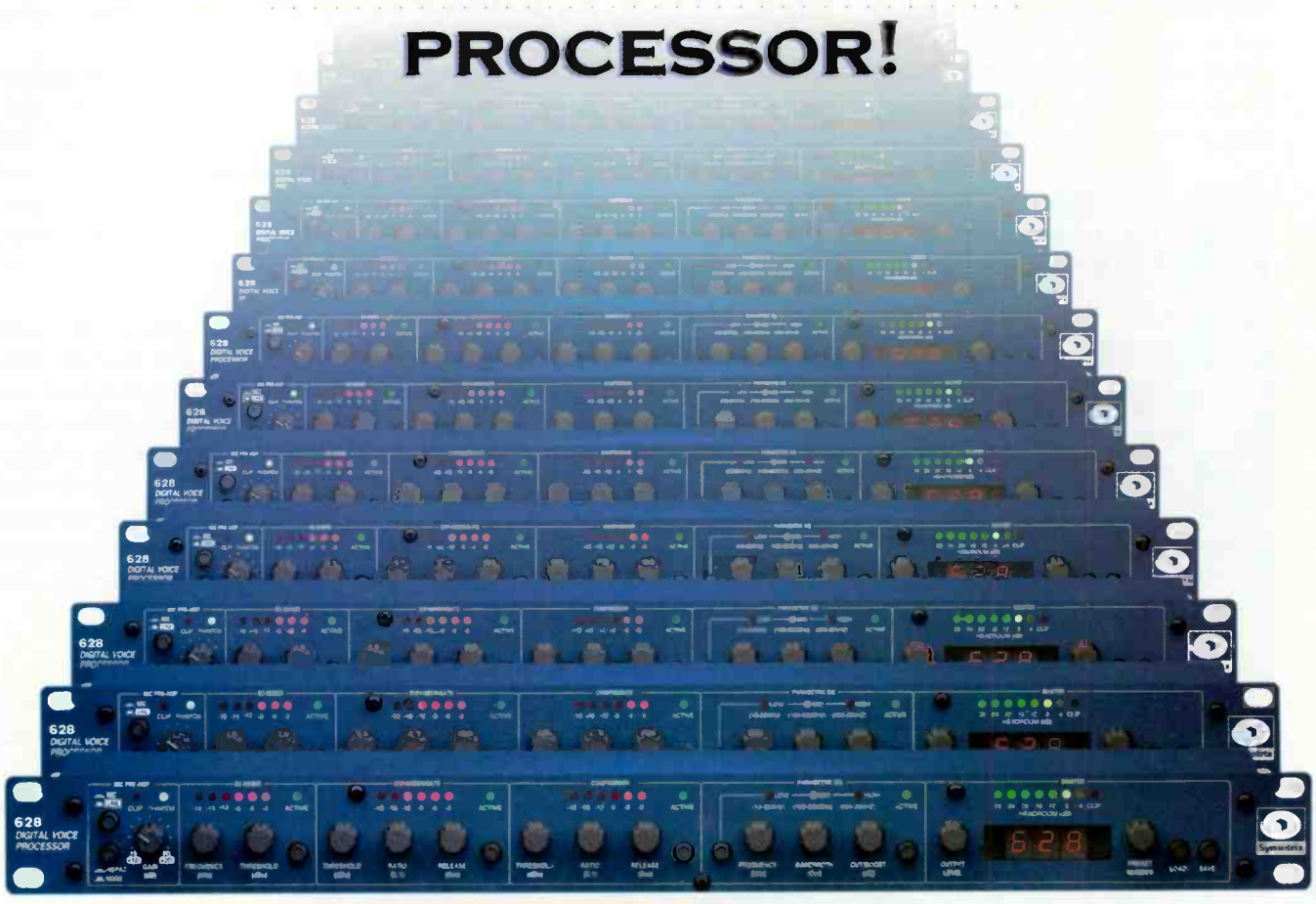
Many options allow for some unique configurations in console layouts. Telephone interface panels greatly simplify the process of airing phone calls and providing a good mix-minus feed to the callers. Various options on similar modules also add to the flexibility of an installation. Auxiliary sends, input mode switching, solo buses and panning/balance controls are some of the features of enhanced modules as opposed to more basic modules.

Multiple output buses are also an excellent way to provide additional mix-minus feeds for the growing demand from remote broadcasts. With the delays associated from codecs, mix-minus feeds are crucial to a good-sounding remote.

Smaller consoles are not always modular in design, but can sometimes offer just as much flexibility. In smaller applications where multiple source control is not required, some of the desktop mixers are a perfect choice.

More recently, manufacturers of smaller, lower-priced consoles have made tremendous advances in performance quality. Many of these consoles have found their way into production rooms because of their simple layouts, impres-

NOW, ALL YOUR JOCKS CAN HAVE THEIR OWN VOICE PROCESSOR!



AND YOU ONLY HAVE TO BUY ONE!

THE SYMETRIX 628 DIGITAL VOICE PROCESSOR

- 128 Processing Presets
- Easy Adjustments with Front Panel Knobs
- Independent Metering of Processing Functions
- Optional Remote Control
- Dual Analog and AES/EBU or S/PDIF Digital Outputs

Now you can lock in custom settings for each and every voice talent at your station and access them at a touch of a button. The new Symetrix 628 Digital Voice Processor offers 128 processing presets and combines six separate functions (Microphone Preamplifier, 20-Bit A/D Converter, Parametric EQ, Compressor/Limited, Downward Expander/Gate and De-esser) into a single, affordable rack unit!

Why you receive a better value when you order through BSW!

- Lower prices on all professional audio and broadcast equipment
- The most comprehensive inventory representing over 200 manufacturers
- Knowledgeable sales representatives with broadcast and studio engineering experience
- Fast, customized delivery to meet your needs
- Integrity, support and lasting commitment

BSW®
BROADCAST SUPPLY WORLDWIDE
7012 27th Street West Tacoma, WA 98466 USA

CALL OR FAX YOUR ORDER TODAY! PHONE: 800.426.8434 FAX: 800.231.7055 WWW: HTTP://WWW.BSWUSA.COM

Circle (23) on Free Info Card

sive features and specifications, and most importantly, price. Not specifically designed for broadcast, they do not offer some of the features that a broadcast console does, like remote starts and monitor muting, but these tradeoffs usually can be accepted or accommodated for externally. There are even third parties manufacturing add-ons for machine control and muting from these inexpensive "pro audio" mixers.

The digital consoles that are starting to emerge have the built-in advantage of future integration. With the capability of accepting analog or digital inputs, they are poised for the transition to an all-digital facility. Even though there is an internal CPU, the layout and function of the more recent digital consoles have a look and feel of the analog standards in use for years.

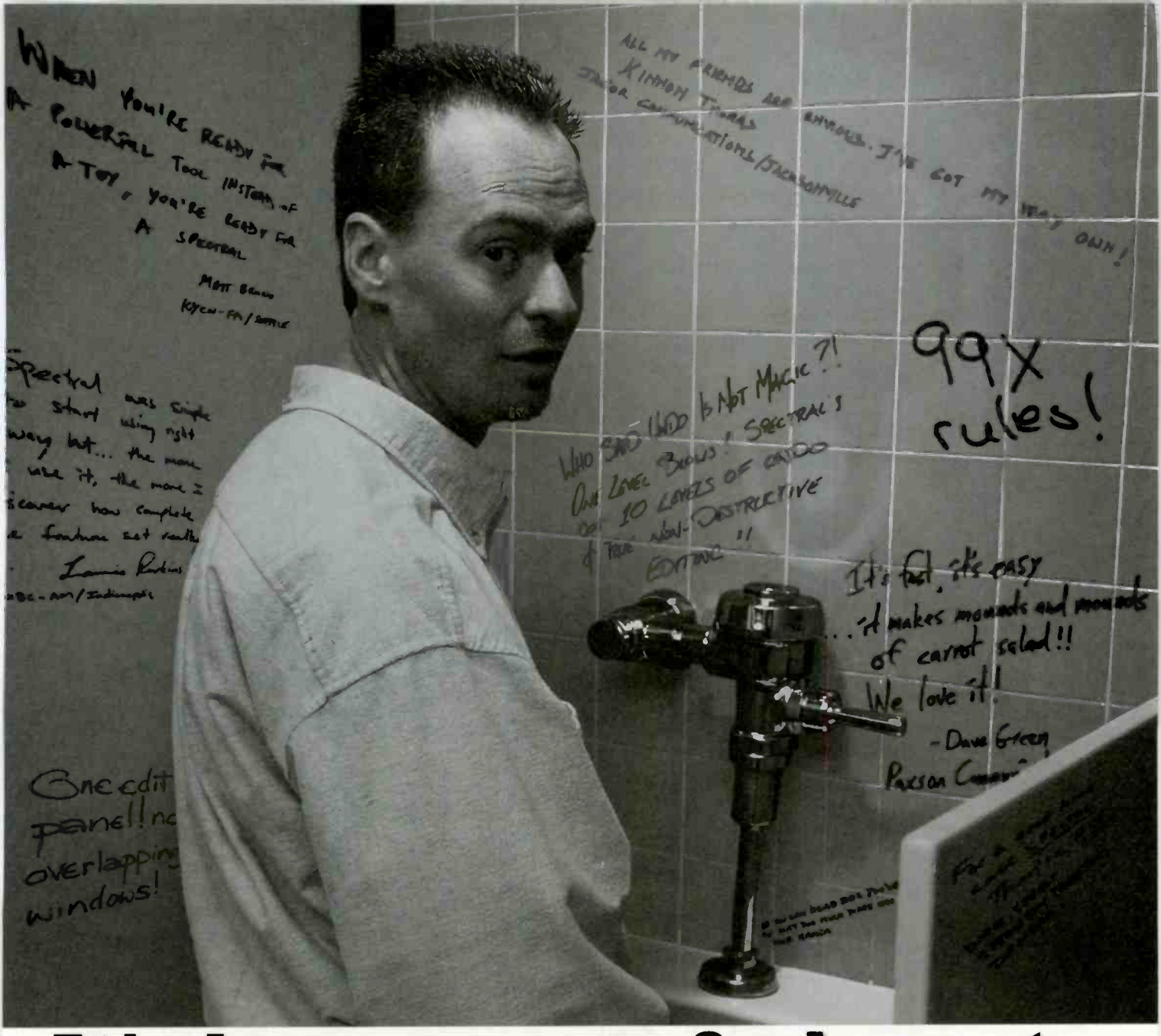
A good stereo cue system can sometimes serve for a quality near-field monitor system.

Some of the digital designs are still using the analog concepts, as well. Modular panels are sometimes still used, even though the function is not the same as the analog counterpart. The "module" is really a control panel. Many possible configurations are available with this design.

While the digital console entries are rather new to the studio, they also offer some advantages that designers can take advantage of. Most of the major electronics are mounted in external rack-mount chassis that can be located up to 100 feet away. This can help keep the equipment count within a studio down, and also help with noise and heat generated within a room.

Recording and playback

The one area most heavily affected by computer control is recording and playback. The cost comparisons are



It's become my 2nd most useful appendage!

Keith Eubanks
Production guy/Voice Over talent

Keith Eubanks is a Spectral user. And that's nothing to shake a ....stick at! As the voice of over 60 of the country's hottest radio stations, Creative Services Consultant of Atlanta's 99X and Assistant Scoutmaster for Troop 1087, Keith's a busy guy. Keith can't afford down time and neither can you. Call Spectral today and find out why so many of radio's "big guys" depend on Spectral Digital Audio Workstations.

SPECTRAL'S
EXPRESS for Prisma for PRISMA digital audio workstation

easy to look at, easier to use

Complete PC-based Turnkey systems starting at just $8495

SPECTRAL, Incorporated
18800 142nd Ave NE Woodinville, WA 98072 USA

Call Today: 206 487 2931
Fax: 206 487 3431
http://www.spectralinc.com
E-Mail: sales@spectralinc.com

SPECTRAL
A Euphonix Company

Circle (12) on Free Info Card

close on the equipment level, but analog hangs in there because of its simplicity and transportability. Within a facility, shuffling of recorded bits is common, and it is sometimes easier to walk a reel down the hall than initiate a file transfer.

Sales of new analog recorders have fallen off somewhat, with trends showing less-expensive equipment getting more use since the intention is to only have to keep it for two or three years at most. In the past, higher-priced and higher-quality machines were installed for at least five years and usually much longer.

With improvements in manufacturing, what was considered low end a few years ago is sometimes held in higher regard today. The purchase of analog reel-to-reel equipment can be more of a short-term bandage than a long-term solution.

The basic technology behind analog recording has not changed much since its inception. Again, improvements in the electronics have helped its success and keep it where it is today. Tape formulations have improved for better noise and retentivity. Longer tape lengths have also helped stimulate longevity. The process of manufacturing tape heads has also seen improvements.

The venerable cart machine is still firmly planted in many facilities. Their manufacture has significantly decreased over the past few years, and the ones still in service are typically awaiting retirement until the new commercial playback system is installed. The upgrade to a digital delivery system seems to have hit the smaller markets more quickly than the larger ones, possibly because the larger markets bought newer equipment more recently and need to get the equipment life out of it before upgrading is possible.

Another possibility is the "fear factor." In larger markets, being on the leading edge (or sometimes bleeding edge) is desirable, but taking the risk is not. Being the first to brag about the use of a new technology is not worth the trouble and frustration of fixing the bugs. In less-critical situations and stations with ancient equipment, the down time to repair something old is an easy trade-off for the minor inconvenience of working out the final adjustments.

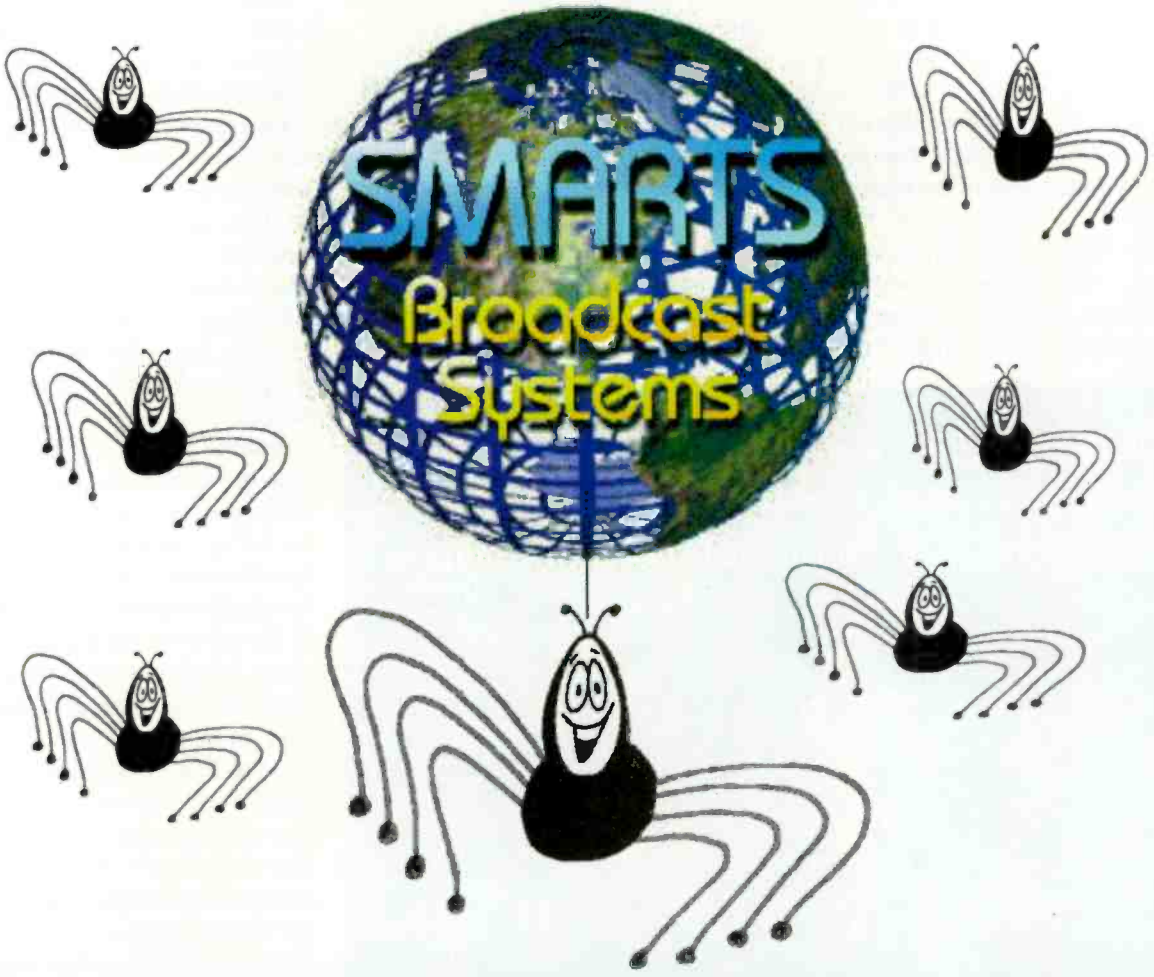
There is plenty of equipment that does not rely on a computer, and both traditional and computer-based systems must work together.

Digital audiotape (DAT) has made strong inroads to the radio station. This compact media is smaller than an analog cassette with longer reliable record times and digital quality. Many stations have adopted DAT as their archival standard, but it is not as perfect as it may seem. The bit-error rate of DATs rises quickly over time. You may be surprised to see the results of a bit-error rate test. The use of DAT for short-term commercial archive is generally accepted. Choosing an appropriate archive medium is a topic unto itself, which is best covered at another time.

The home recording boom brought out many new multitrack recording formats. All of them are digitally based and there is a mix of formats between removable and non-removable media. The cost and reliability of these systems make them natural choices for studio upgrades.

Non-removable media systems would seem to have the disadvantage of file sharing. Many of them do offer some form of file transfer between units and sometimes across platforms to other systems. By the use of backup storage, projects can be stored and then deleted from the main storage area for future productions. In a radio production environment, this method does work well for day-to-day use. Productions being used daily over long periods of time can be called on quickly.

Removable storage systems are typically based on a videotape format transport, but there are a few using magneto-optical or some other storage. By using media and a transport developed and perfected from another use, the low cost and flexibility shows well. Productions can be



We're Proud of the Bugs in our Software!

"The Spider" interlinks your station groups to provide broadcasters a virtually free audio and data path from one station to the next, so you can centralize many costly operations into a single, very efficient system. We now have multiple stations linked via the internet so that production, traffic, and all business operations are at a single location, with sales and very minimal operational staff in the field. The system to transfer spots, music and other programming to the distant stations is intuitive and automatic once the original production is completed. SMARTS has taken the next big step in operating cost savings. You could be realizing those savings in your group. Call **SMARTS** or any of our dealers today for more information on ***"The Spider"*** from **SMARTS Broadcast Systems.**

P. O. Box 284 Emmetsburg, IA 50526 http://www.ncn.net/smarts
Phone (800) 747-6278 Fax (800) 498-0618 Email smarts@ncn.net

Circle (14) on Free Info Card

stored on various tapes and used as needed, and even shuffled between different production rooms or across town (or further) to another facility.

Both of the multitrack methods also offer linking or synchronization options for additional track storage. The ability to upgrade your track capability slowly is a great advantage and can ease the budget strain. Typically, many of these do not offer the best editing capabilities, and an additional editor must be integrated for fuller function. This is one area where the computer-based designs have shown their strength.

Telephones — POTS and ISDN

The telephone is still the most common way to get remote audio to the station, most often from listeners. Telephone hybrids have advanced significantly from DSP, but they still interface to analog tip and ring. Even this will change though. Some manufacturers are already looking toward manufacturing an ISDN hybrid.

Telephone hybrids were first developed to work with existing telephone systems and much work has been done to interface systems. With the 1A2 telephone systems declining in use, the number of all-in-one on-air telephone systems has increased. Most of these all-in-one solutions start at a few lines and can be expanded for as many lines as needed. The biggest advantage to these is not having to maintain 1A2 equipment, which many telephone vendors no longer supply or service.

Systems that build on existing key-system or PBX technology offer the built-in expansion capability. To build on to an existing system requires a hybrid and interface, and call routing is handled by the host system. In the case of the all-in-one systems, you are typically limited to only the number of lines that are provided, and routing calls from one system to another is difficult if not impossible.

POTS codecs have recently become popular, replacing many of the multiline frequency extenders. The compression algorithms being developed are being optimized for the reduced and often-changing data transfer rates in POTS applications. The MPEG standards and several proprietary methods all have their own advantages and disadvantages that must be considered.

ISDN availability increases everyday. What once was a luxury in some areas has become a necessity to most of us. The early codecs all enjoyed their own company, interfacing only with other units from the same manufacturer. As the use increased, the different algorithms each proved its strengths (or weaknesses) in different applications. Most codecs share at least one common coding scheme if not more.

Having ISDN capability is almost taken for granted at most stations because we have come to rely on it so heavily.

Processing

Many top-rated processors today are DSP-based, but there is still a large call for analog processors. Some of this demand is for older vintage processors. The recent increase in tube-based designs shows that many people still

TELLING IT LIKE IT IS ...

...about DADPRO, the Digital Audio Delivery system that's ideal for both Production and On-Air, whether Live Assist or Automated, small market or large

"In our pre-purchase research, we found that the most common compliment paid to competitive units was that their technical support staffs were always there when the system crashed. When we talked with DAD users, they hardly knew anyone at ENCO since their systems had never gone down. That's the kind of compliment I was looking for! DAD's segue editor feature revolutionizes automation. We pre-program the entire station, then the talent previews and customizes their breaks to give us a totally live feel. Plus, we simulcast both stations and DAD lets us easily set up separate spot schedules. It's major market ready, and built like it."

Philip Urso, GM
WDGE/WDGF,
Providence, RI

"We've had five DAD workstations in action for over a year, and I really don't know how we could get along without the system. It allows all three of our stations to present a consistent on-air sound and frees the talent to concentrate more on communicating with the audience. We're still finding new and innovative ways of using the system a year later. In my opinion, if you're planning on automation, you can't do it RIGHT without ENCO!"

Chris Andree, Asst. PD
WWKL/WYMJ/WCMB,
Harrisburg, PA

"We're a news programming provider and deal with a large number of actualities every day, so speed in production and getting it down the line are paramount. DAD allows us to bring information in, and seconds later it's ready to go. The greatest feature is the ease of editing and file transfer between our four workstations. On-air is a breeze."

Dane Wilt
Radio News Company,
Las Vegas, NV

"Way cool. The greatest thing about DAD is that it acts and thinks like a cart machine and doesn't intimidate the talent. We use touchscreens, and the learning curve is about 2-1/2 hours before they're up and running. From an engineer's standpoint, it's great because DAD uses off-the-shelf hardware, so maintenance is a snap."

J.R. Rogers, Asst. CE
KSON/KIFM,
San Diego, CA

"The DAD system was on the cutting edge of systems we looked at, and there was some initial reluctance to enter the digital arena. After having the system in-house for a month, the entire production and on-air staff felt like they could never do without it again. Now our news staff has a system of their own, and we're getting a third system for our sister TV station."

Chuck Whitaker, PD
WSBT, South Bend, IN

Call your DAD dealer or ENCO for complete information.

ENCO SYSTEMS, INC.

ENCO America, 24555 Hallwood Court,
Farmington Hills, MI 48335 USA
Tel: 800-ENCOSYS (362-6797); 810-476-5711; Fax: 810-476-5712
Web Site: http://www.enco.com

Circle (25) on Free Info Card

prefer the sound that a tube offers. It seems ironic that after spending years trying to eliminate tubes from the air chain, they begin to creep back in.

Processors are available in fully analog, digitally controlled analog or fully digital designs. With the improvements in construction and design, some of the consumer products have found their way into high-end applications. Walk into a production room and see how many producers are using their favorite guitar or keyboard effects in their station productions.

The analog processor has been enhanced and improved more times than can be counted, but even with the digital equipment available, many stations still use the same processor they have had for years. It comes down to personal preference. The number of field modifications to analog equipment is also quite high. Many modifications are based on a previous idea, but it is surprising to see how many modifications are based on trial and error. If you inherit an analog processor, it is always a good idea to check the alignment and verify whatever modifications may have been done.

These field modifications are not always for the better. You may find a unit with some changes made that have other changes made to counteract the effect they created! Again, whenever you inherit a piece of equipment, it is always a good idea to check it out thoroughly.

Digital control of analog signals has been around for many years, as well. This was one of the early analog processor improvements. This allowed the speed and reliability of digital circuitry to handle the control of the equipment. Another advantage was the addition of remote control via serial communications. Equipment setup can be copied and duplicated again in the same piece of equipment or downloaded into another one.

Digital processing adds the benefit of digital audio. Also, some algorithms too costly or difficult to achieve in analog design are now simplified by digital signal processing. This is often the first step to an all-digital air chain.

Monitors

Not video, but audio this time. Control-room monitors used to be the largest thing hanging over the console (next to the overnight guy). There are many options in monitoring setups today, and sometimes it seems that monitor placement takes a back seat to all the other equipment. A good listening environment makes it easier for the on-air talent to hear a problem, as well as to reduce fatigue. Good monitor placement can also help the overall volume level coming out of the room. The operator won't have to turn it up as loud to hear it.

There are trade-offs between smaller near-field monitors and larger room monitors. Near-fields generally do not have the bass response of their larger cousins due to their size. It is common for production rooms today to have switched monitors for near-field and room monitor setups.

Cue monitoring has also improved in its application. The tiny speaker buried behind the console is becoming full-range, stereo monitoring. Most cue systems are now actually

Use the HotLine

...when ISDN doesn't make sense

One-time remotes just got easier!

Sometimes it's impractical to install a special circuit like ISDN for a one-time remote. However, a plain telephone line is usually available. Wouldn't it be nice if you could have high quality two-way audio on that plain line? That's just what you get with the *HotLine*.

Special introductory price: $2995

Call us for details

800-237-1776

http://www.comrex.com

Wideband two-way audio on POTS (Plain Old Telephone Service)

COMREX
We make great connections

COMREX Corporation, 65 Nonset Path, Acton, MA 01720 USA Tel: 508-263-1800 Fax: 508-635-0401
Email: info@comrex.com Fax-on-Demand: 508-264-9973 Toll-free: 800-237-1776 in North America
or 0-800-96-2093 in the U.K.

Circle (27) on Free Info Card

fairly good near-field monitor positions, sometimes with better placement and imaging than the main monitors. Part of this is due to console manufacturers adding a better cue bus to their consoles.

The rack room

OK, so the rack room is not the studio. With the changes and advances in studio equipment, however, the need for rack space increases and will continue to grow. With advances in equipment requiring servers and PCs to run them, the rack room is becoming more of a nerve center than before. It is always good to keep in mind the need for future expansion. The addition of more PCs for station functions also adds more ambient noise and heat. The rack room can be altered to handle this load more easily than a control room.

Even though computer-based systems are becoming more and more common in every studio, there is still plenty of equipment that is strictly audio by design. No mouse. No video monitor. Even as we plan a studio design to have less equipment in it, the actual amount of equipment does not seem to really diminish. Regardless of what is on the inside, be it a computer or a moving magnet, it's all audio.

Phantom powering

Condenser microphones, also sometimes called capacitor microphones, require a power source to operate. Sometimes, this power can be provided internally with a battery. More commonly, however, an external supply is used. Most consoles today have a phantom power source built into the microphone input channel.

Phantom power, also called simplex power, is typically fed at 48VDC, but can actually range from 9V to 52V. The name "phantom" power is just like it implies: It's just there. Phantom power uses the same conductors as the audio path so no additional wiring is required.

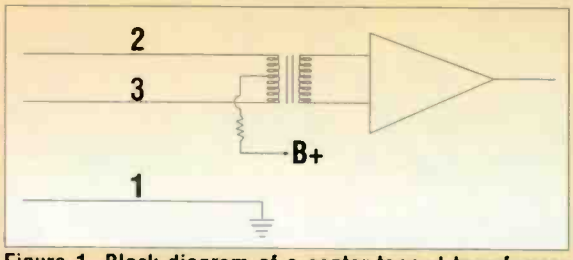


Figure 1. Block diagram of a center-tapped transformer applying phantom power.

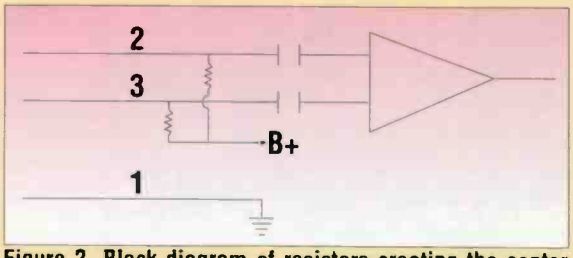


Figure 2. Block diagram of resistors creating the center tap to apply phantom power.

Microphones requiring phantom power have an internal voltage regulator to accept the possible range of voltages.

Standard balanced low-impedance microphone wiring can support phantom power. The advantages of phantom powering are clear. Without the need for special wiring, the cost of installation or use is reduced. The power supply voltage already present within a console can be adapted for phantom use. While the phantom voltage is present, microphones that do not require it can also be used on the same inputs without any adverse effect.

Figures 1 and 2 show how phantom power is put onto the audio lines for the microphone input channel. The main difference between these two methods is the use of a transformer input. If the input transformer does not have a center tap, a hybrid resistor design can be used. The value of the dropping resistor will limit the current draw of the mic to 10mA or less.

The simplicity of phantom powering is its greatest asset. The built-in foolproof design also allows non-phantom powered microphones, like dynamics and ribbons, to also be used interchangeably.

YOUR ONE

FOR SATELLITE SERVICES.

NPR Satellite Services can customize your package to include any of the following:

- Full-time Service - 24 hour programming capability;
- Occasional Service - lease according to your need -- whether it's for an hour, a day, or an event;
- Digital equipment;
- Uplinking services - either portable or fixed - can get you up and running FAST!
- Top-notch, 24 hour-a-day trouble-shooting and monitoring by our System Technical Center (STC).

STOP Your Search...

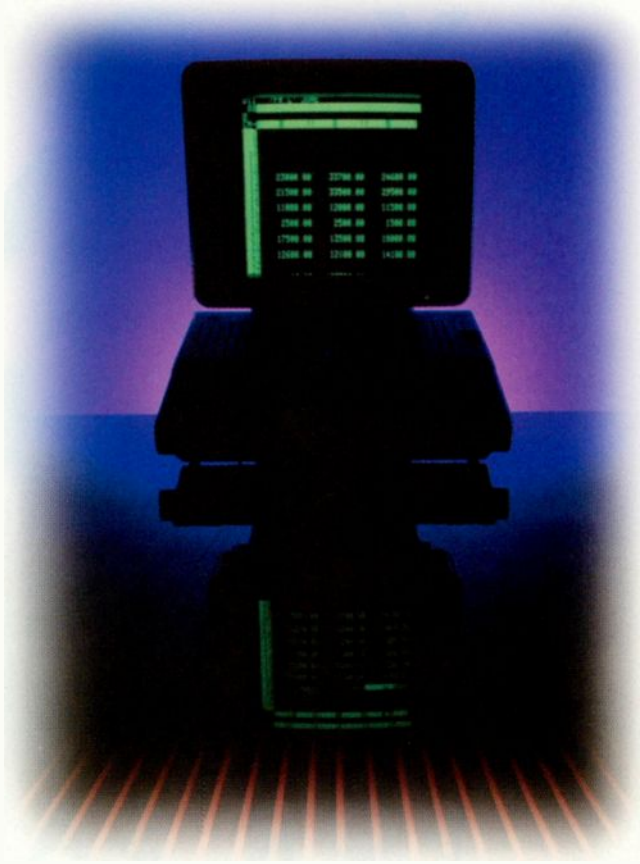
Call NPR Satellite Services at (202) 414-2626 for more information on your customized satellite services package today. Link up with us for a one-stop solution to your satellite services needs.

NPR Satellite Services®
Link Up With Us

635 Massachusetts Avenue, NW, Washington, DC 20001
(202) 414-2626

Circle (38) on Free Info Card

Computer-based system profiles



With all the systems that are available, deciding which one is best for your station just got easier.

By Yasmin Hashmi and Stella Plumbridge

It seems that technology is advancing to the stage where it's now allowing manufacturers and users to fully exploit the potential of random-access computer systems for live-assist and automation. Although ingenious methods have been used to overcome the limitations of storage and operating systems, the next generation of technology has helped manufacturers make noticeable advances in the user-friendliness and range of applications.

Improved user interfaces

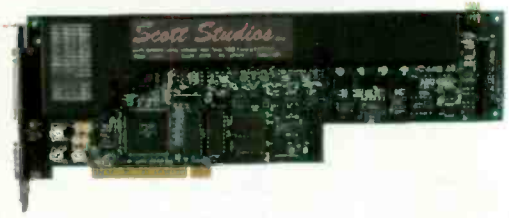
One of the most obvious developments is in how many systems now take advantage of Windows NT and 95 operating systems. Gone are the days of monochrome text-based displays requiring keyboard-intensive operation. Now, we have graphical user interfaces, with drag-and-drop of audio items for live-assist, macro keys for complex operations and fast access to virtual carts, either triggered by touching the screen or by clicking a mouse. This doesn't mean that all systems look the same or operate in the same way. Indeed, although it may be desirable for differing makes of systems to adopt certain common procedures, terminology and methods of presentation, there is still an imaginative range of user interfaces

Scott Studios' Breakthrough: Uncompressed Digital Audio at a Compressed Price!

Your station can make the quantum leap to *uncompressed* digital music from hard drives! *You'll hear the difference* in quality from this superior system!

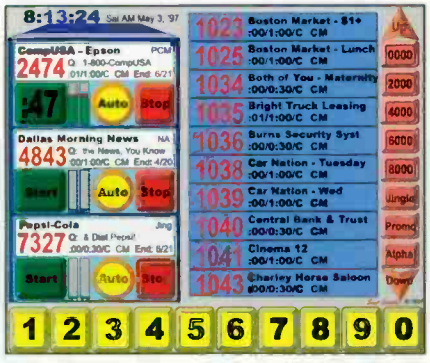
Best of all, Scott Studios' *killer* new linear audio *costs no more* than compressed systems! Scott Studios is the *only* company playing *four* great sounding *uncompressed* digital stereo streams at 24kHz, 32kHz, 44.1kHz, 48kHz or any mix *with overlap* and *while recording! No* other system uses the sizzling hot new Motorola 56301 DSP chip and *32-bit PCI bus* audio cards! *Only* Scott Studios' system prevents dueling algorithms and eliminates undesired compression artifacts with linear audio *at no extra charge!*

You also get a fail-safe watchdog for *unequaled* reliability, a 6x6 preview switcher that lets you hear ends of spots or songs while the middle is on-the-air, superior headroom, General Purpose Interface, digital ins and outs, optional timing stretch & squeeze, optional MPEG or APT, and more.



Scott Studios exclusive new 32-bit PCI audio card plays up to four true CD quality uncompressed stereo channels while recording!

Good Spot Box



Scott's new digital Spot Box triple-deck "cart" replacement delivers awesome *linear* CD quality sound.

Spot Box is the *easiest* digital system to use! There's only one screen, so your jocks always know what's happening. At the left, three players give you legible labels, countdowns and End-of-Spot signals, with big well-lit buttons that show what's playing. Even though it uses Windows® 95 or NT, Spot Box works like carts, *not* a computer. At right, there's a "rotary cart rack" that lets you pick and play any recording by number or name. Or, number keys at the bottom can load your cut quickly.

As options, Spot Box can automatically load logs from traffic by diskette or LAN. You can record spots and edit phone calls at the right of the screen.

Starting at $5,000, Scott's Spot Box is so affordable many stations can even put two in an air studio for redundancy.

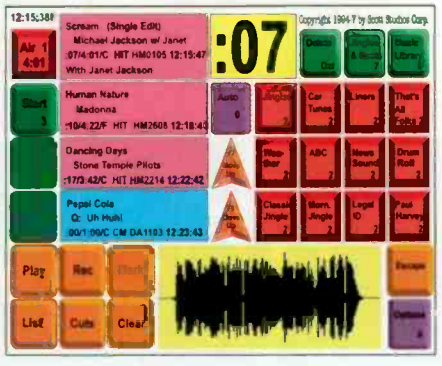
Better AXS®

AXS® (pronounced ax'-cess) is radio's premier digital audio system for satellite or news/talk formats, CD automation and cart replacement for live jocks. AXS® gives you instant play Hot Keys, log editing, music on hard drive, Power Fill, satellite jock substitution, link to NPR's SOSS, an easy-to-use Real Time Scheduler, the industry's simplest and best net catcher, and an optional production or phone recorder and editor in the air studio.

Scott Studios offers AXS® satellite systems as low as $7,500 complete.

With Spot Box, AXS® or a Scott System, you can get 24 hour, 7 day support from our 45 person staff—the biggest (and best) in digital audio! With several Spot Box, AXS® or Scott systems, any can record a spot once for all! Also, for spot or music on hard drive AXS® or Scott Systems with typical playlists, you choose whether to get *uncompressed*, MPEG or APT at no difference in price.

Best Scott System



The Scott System is radio's top-of-the-line for digital music on hard drive. You get instant play Hot Keys, touch screen music libraries for instant requests, log editing, built-in phone recorder, pre-recording Voice Trax in context, and production that imports from any WAV digital multi-track.

Scott also offers an *invincible* seamless redundancy option. It's self-healing, so regardless what happens, your spots and hits just keep on comin'!

Good. Better. Best. Scott Studios' three digital systems can be tailored to *your* needs and budget. Call or E-Mail info@scottstudios.com for details.

Scott Studios Corp.
13375 Stemmons Freeway, Suite 400
Dallas, Texas 75234 USA
(972) 620-2211 FAX: (972) 620-8811
8 0 0 7 2 6 8 8 7 7
(800) SCOTT-77

available to suit individual preferences.

Not all systems are IBM/compatible-based, a handful use the Mac platform, which has always had a user-friendly operating system, and some use dedicated hardware with a more tactile approach. There are units for live operation that have the appearance of traditional cart machines, using a variety of storage media including removable disks, such as MD, Iomega Jaz or Zip drives or which may be connected to fixed hard-disk storage subsystems or centralized servers. There are also those that look like production systems, offering more comprehensive editing features, with dedicated buttons and keys for recording, trimming and triggering, and then there are those that use a combination of the personal computer and dedicated controller, allowing more comprehensive displays and access to libraries and networks, while allowing sound files to be assigned to controllers for instant triggering.

For live-assist and automation purposes, more manufacturers either support interfacing with third-party music scheduling and traffic management systems or, as we are increasingly seeing, offer their own scheduling and traffic modules. In addition, more are promoting music on hard-drive operation as an alternative to CD jukebox control and some also offer pre-recorded libraries.

Expanded applications

One of the most significant advantages of the PC is that it can act as a standard platform for a wide range of applications, and using off-the-shelf hardware also helps to keep costs down and makes maintenance easier. Nonetheless, although the next generation of computer platforms support integrated audio features, manufacturers still find it necessary to use specially designed third-party or proprietary cards for audio handling and I/O.

From the software point of view, users are now being offered a range of modules to run on the same platform, typically including applications, such as simple cut-and-paste editing, multi-channel editing, text editing, playlist generation, voice track recording, telephone call editing, file transfer, database management, live, live-assist and fully automated playout. PC-based applications are even available for the humble MD cart player, allowing more control over playlist creation and file searches.

Networking

Another advantage of the PC is that it can be networked, which allows even greater control and flexibility. For example, the function of a terminal in a particular studio can be changed simply by loading a different application via the network. There is less need for duplication of material or data because transfer is electronic rather than phys-

Now, the RS-12 is under $5,000.00*

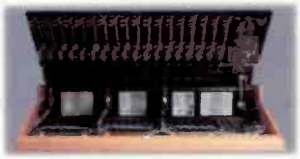
(beat that!)

This is a great opportunity to own a Radio Systems RS-6, 12, 18 or 24 console.

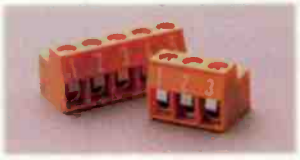
Today, while some console companies are just finally offering scaled-down versions of their boards for around $10,000 - Radio Systems' most popular console, the RS-12 channel, is on sale for half that amount!

Plus, our boards are priced fully equipped, with no need to buy expensive options or modules to make them work.

Contact Radio Systems or your dealer today, and while supplies last, *buy a fully equipped RS-12 channel console for just $4995.00 (normal pro-list $6795.00), or a RS-6 channel console for just $3995.00 (normal pro-list $4795.00), or a RS-18 channel console for just $6995.00 (normal pro-list $9895.00), or a RS-24 channel console for just $9495.00 (normal pro-list $12995.00).



No board is easier to wire or service. All parts and sub-assemblies, including switches, faders and circuit boards, are socketed or connectorized. Repair involves simply removing the bad part or circuit board, and plugging in a new one.



All input, output, and remote control wiring is via these unique, ultra-convenient, removable barrier strips. These connectors greatly simplify initial installation, and provide for quick future wiring changes.

If you do have special interface needs, Radio Systems manufactures a full line of inexpensive remote control, mix-minus, input extender, and audio distribution cards.

Copy stands, special color fader knobs and titles scribed on switch caps are all factory provided so your board can be customized to your application and look.

RADIO SYSTEMS INC.

601 Heron Drive P.O. Box 458 Bridgeport, N.J. 08014-0458 (609)467-8000 Fax(609)467-3044 www.radiosystems.com

Circle (40) on Free Info Card

ical, and as networks allow multi-user access, any log changes made by one terminal could for example, be instantly viewed by all others. Indeed, such features are particularly useful for news applications, for which a growing number of systems are available supporting modules for wire capture for audio and text, editing of text with audio triggers, and remote control of journalists' recordings to a central server via DTMF telephone.

For stations that require access to vast amounts of material, there are networked servers that allow independent control of multiple channels, some with interfaces to mass archiving systems. There are also store-and-forward systems, allowing host sites, for example, to forward via satellite to downlink sites, schedules and audio items produced for particular markets. Depending on time constraints, a cheaper alternative is the Internet or intranets, and an increasing number of manufacturers now offer audio and data file transfer using this.

File formats

Although most live-assist and automation systems support some editing capabilities, many manufacturers recognize that specialized tools are required for more complex production. Certain digital audio workstations are enjoying particular success in the radio market and so there is a growing need for the ability to transfer material prepared on such workstations to on-air delivery systems.

An increasing number of manufacturers are either integrating third-party editing applications within their systems, cooperating with other manufacturers to support their respective proprietary file formats or at least allowing conversion from popular formats, such as the Microsoft WAVE. Moreover, the development of the Broadcast Wave File (BWF), a version of the WAVE file format designed specifically for broadcast applications, promises to make file transfer between systems even easier, particularly if manufacturers begin to use it as a native file format, as recommended by the Digital Audio Production and Archiving (P/DAPA) group of the European Broadcasting Union. In practice, BWF has yet to make an impact, but it has already been adopted by a number of workstation and delivery system manufacturers, and anything that makes life easier for the user and/or offers more choices must be a welcome development.

Arrakis Systems
Digilink III live on-air satellite automation

The Digilink III is a complete system designed for any format or operational mode. It includes an expandable five-input source switcher, which simplifies multiple source satellite automation installations. The system is configured around software and hardware provided by Arrakis. Simultaneous recording and playback of audio is possible. Its ability to interface with Pioneer CD jukeboxes makes it work well for automation systems.

Special features: A Digilink III system can be connected via standard LAN cabling to interface with other Digilink systems, Trak*Star3, traffic and music scheduling systems. The included software features include audio overlapping, auto end trim, time announce, intro/end cuing, time fill and instant audio playback. Up to 9GB of internal storage is possible with the ability for more external storage.

Price: $7,995 for the basic DL3-600 with 1.2GB of internal storage.

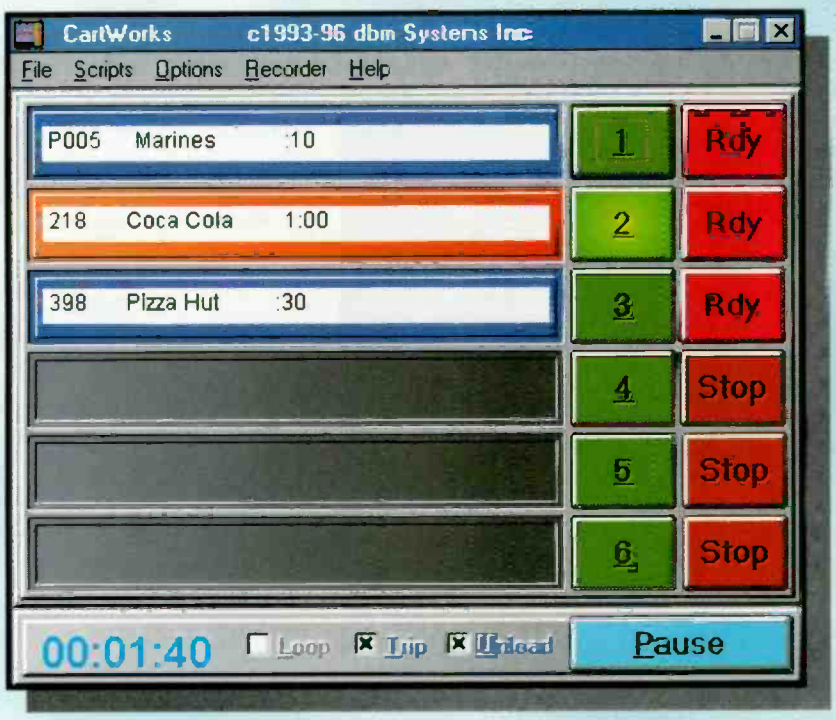
Phone: 970-224-2248; Fax: 970-439-1076

For more information circle (200) on Free Info Card

Arrakis Systems
Digilink IV

Designed as a direct cart machine replacement, the DL4 has three independent players and one recorder. All audio is stored on a shared hard-drive system. Automation is made possible with the addition of a PC running the optional DL4-AUTO software under Windows 95, which allows multiple modes of live, live-assist and full auto-

Going Digital Just Got Easier !



CartWorks

Digital Audio Systems

From simple cart replacement to full automation, CartWorks is the easy choice!

Familiar Operation

One look and you'll know, CartWorks is undoubtedly the easiest digital audio system to learn and operate. But don't let the simple user interface fool you. There's lots of power hidden below the surface.

Windows95*

We've got features you'll never find on any dos based system. With CartWorks and Windows95, you get more than just a digital audio system. Better yet, operators already familiar with Windows become instantly productive.

Affordable

CartWorks is reasonably priced.
Complete Cart Replacement systems start at $4,995.
Complete Satellite Automation systems start at $6,995.
Truly affordable - music on hard drive coming soon!

Performance

CartWorks was developed by a team of longtime radio pros for the broadcast environment. It's designed to operate the way you'ld expect, like broadcast equipment. And we use only the latest and best industrial grade PCs with world class apt-X digital audio.

Support

24 hour, 7day a week Technical Telephone support by real radio engineers. We speak your language and understand the importance of staying on the air.

Extended Connectivity

CartWorks gives you more choices so you can work more efficiently. LAN Network, Dialup Networking, Remote Control, and Internet Spot Transfer.

NEW ! X-CONVERT

Converts audio storage formats digitally, allowing you to use most any digital editor with CartWorks.

For a free demo disk or to learn more call dbm Systems today:

1-800-795-RADIO

Fax (601) 853-9976
Or visit our site on the world wide web:

Circle (46) on Free Info Card

http//www.cartworks.com

*Windows & Windows95 are registered trademarks of Microsoft Corp.

mation. Analog and digital I/O and full logic for console interfacing is provided.

Special features: Up to 9GB of internal storage in 2RU. Operation is similar to analog cart machines for easier use. Individual DL4 systems can be linked to a central storage library for full facility integration. An optional 84-button "Jingle Box" cart wall gives instant access to any cut.

Price: $3,495 for the DL4-600 with 1.2GB of internal storage.

Phone: 970-224-2248; Fax: 970-439-1076

For more information circle (201) on Free Info Card

Broadcast Electronics
AudioVAULT

AudioVAULT servers are configured to provide the number of play-and-record channels required in a facility. Workstations are then located throughout the facility, tied to the server(s) via LAN, running software that controls the various record and play channels. Software programs are available for live operations, automated stations, live-assist and virtually every level of control in between.

Special features: AudioVAULT can be interfaced directly to the Studio Audio and Video SADiE, Orban DSE 7000, Orban Audicy and Spectral digital audio workstations. AudioVAULT uses the proprietary AV-100 digital audio card, with an architecture designed to provide greater reliability than traditional PC audio cards and better bandwidth use, resulting in more simultaneous channels serviced by a single audio file copy.

Price: From $15,000 to $1.5 million, depending on the scope and capabilities of the custom-configuration.

Phone: 217-224-9600; Fax: 217-224-9607; E-mail: future@bdcast.com; Internet: www.bdcast.com/public

For more information circle (202) on Free Info Card

BSI
WaveCart and WaveStation

A non-proprietary system that uses the Windows environment completely. The software runs under Windows 3.x, 95 or NT. Workstations play compressed or uncompressed .WAV files using any windows-compatible sound card. Networking of systems is accomplished through Windows native networking in a peer-to-peer configuration. WaveCart is designed for manual operation for up to 10 on-screen cart decks and WaveStation handles live-assist or full automation.

While broadcast and video production environments have changed over the years, your need for a Shure mixer has remained.

First the Shure M67 and then the Shure M267 became industry standards, taking their place in the most demanding broadcast applications and setting new levels of ruggedness, reliability, and versatility.

Now there's the Shure M367. Since its recent introduction, the M367 has found its way into the hands — and hearts — of audio professionals.

Just as versatile and reliable as its predecessors, the M367 includes a list of impressive new features — like low-noise circuitry making it quiet enough for digital formats, input peak LEDs, 12- and 48-volt phantom power to handle a wide variety of condenser microphones, two XLR outputs, an easy-access side battery compartment, a headphone monitor circuit with monitor in function, and a detachable power cord.

Your audio needs may continue to change, but there is one product you can always count on: your Shure mixer.

For the Shure M367 Dealer Nearest You, Call 1-800-25-SHURE.

New Faithful

Shure M367 Professional Mixer

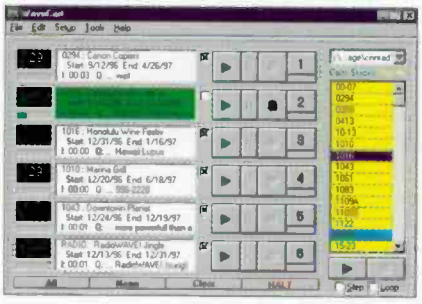
The Sound of Professionals...Worldwide.®

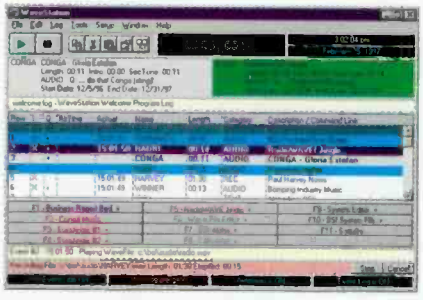
SHURE®

Circle (29) on Free Info Card

Computer-based system profiles

Special features: Because of the design using established Windows drivers, the BSI package can run on a variety of user configurations on a Pentium platform. Hardware choices are left to the user, but full support and implementation is available from BSI, including 24-hour support. The use of standard .WAV allows easy file transfers to and from other systems. It also has the ability to triple-layer audio playback for a song segue with a voice-over.





Price: $249 for WaveCart, $999 for WaveStation, $278 for the external relay control package. All hardware is provided by the user.

Phone: 602-572-8525; 888-274-8721; Fax: 602-572-8116; E-mail: info@bsiusa.com; Internet: www.bsiusa.com

For more information circle (203) on Free Info Card

CartWorks/dbm systems

CartWorks

CartWorks, with its Cart Deck main window, is designed to operate as much like traditional broadcast equipment as possible. CartWorks systems are sold as turnkey packages that include all required hardware and software. Systems are configured as live-assist units or automation for the easiest to the most complex satellite installation. CartWorks stores audio on hard disk in 4:1 apt-X-compressed format and new software is available for music on hard drive. Currently, base units use an Acer/Intel Pentium 133MHz processor, Windows 95, a 1.6GB hard drive, apt-X digital audio card and 24-bit TTL I/O card.

Special features: the X-Convert utility provides digital conversion between native apt-X CartWorks format and standard Windows WAV files allowing CartWorks to interface to other digital audio workstations. CartWorks production workstations can also be optionally preconfigured with third-party editing software installed and registered.

Price: From $4,995 for complete CartWorks live-assist unit for cart machine replacement with 1.6GB hard drive giving nine stereo hours of audio storage. From $6,995 for CartWorks satellite automation systems including an eight in by two out stereo switcher. Custom relays, isolators and hardware are available.

Phone: 800-795-7234; Fax: 601-853-9976; E-mail: bes@cartworks.com; Internet: www.cartworks.com

For more information circle (204) on Free Info Card

Computer Concepts

Maestro

Maestro is a 32-bit Windows-based system that integrates the recording, storage and playback of commercials, IDs, all types of audio and music on hard disk into one digital operation. It works with various station formats, such as live, live-assist and self-contained or satellite automation, with easy switching from one to the other. Multiple Maestro workstations can be networked to adapt easily to the needs of regional groups, mega-groups, duopolies and LMAs. Maestro also accepts network downloads and provides system diagnosis, software updates and remote control via modem.

Special features: Maestro allows for the integration of various digital audio editing software, including triple DAT and CUTmaster from Creamware and Sound Forge from Sonic Foundry. The graphical user interface can be configured as required, for example, number of channels, hot keys, voice tracking, auditioning, recording on-air, etc.

Price: From $7,000 depending on configuration.

Phone: 800-255-6350; Fax: 913-541-0169; E-mail: Tlantz@ccc-dcs.com; Internet: www.ccc-dcs.com

For more information circle (205) on Free Info Card

Dalet Digital Media Systems

Dalet digital audio system

Dalet offers integrated modular solutions for small or large radio stations and for various formats. The system comprises applications for recording two-, four- or eight-track editing, live-assist, satellite, archiving, intranet, traffic management, newsroom and LAN or WAN networks for radio groups. These applications can be stand-alone tools or work as part of the total system, and secure client-server technology is integrated with standard PC platforms running under Windows NT or Windows 95. The Dalet configuration supports multitasking and allows multi-user access to audio and text stored on a central server.

Special features: The Dalet system can import MPEG Layer II, raw PCM, A-Law and Broadcast Wave File (BWF) formats from other digital audio systems and can export files as WAV or Real Audio formats. The open architecture of the Dalet system allows it to work with third-party systems, and a specially designed modular control panel is available for digital audio workstations.

Price: On application.

Phone: 212-226-2424; Fax: 212-226-1673; E-mail: acarver@dalet.com; Internet: www.dalet.com

For more information circle (206) on Free Info Card

ENCO Systems

DADpro & DADpro32 digital audio delivery systems

DAD is software coupled with commonly available non-proprietary computer hardware and network architecture. The new DADpro32 runs on the Windows NT operating system. DAD provides full features for live-assist and automated on-air operation, as well as production recording and editing and library management. DAD can be configured as a stand-alone workstation with simultaneous automated on-air and production capabilities or as a multi-workstation system of any size, with each workstation optimized for its specific application and all sharing access to the data stored on a central file server.

Special features: DAD can be interfaced directly to the Orban DSE 7000, Orban Audicy and Spectral multitrack digital audio workstations. In addition, DAD can interface with virtually any other piece of equipment in the broadcast chain via standard protocols. DAD

is sold outright, with no added monthly or annual licensing fees.

Price: From $12,000 for a basic stand-alone workstation including software, DSP boards and all computer hardware. Typical systems comprising two workstations average $30,000+.

Phone: 800-362-6797 or 248-476-5711; Fax: 248-476-5712; E-mail: lamoray@enco.com; Internet: www.enco.com

For more information circle (207) on Free Info Card

LPB

Salsa & Salsa NT

Salsa software can be configured to operate as a basic satellite network station, a fully automated music station, a live-assist station or combinations of these three, including multiple network satellite stations. Salsa is especially suited for the station with talk shows using varying formats. Salsa offers music on hard drive, which can be augmented with an optional feature that allows control of CD changers, plus other external sources, such as satellite, cart machines or even reel-to-reel machines. Basic off-the-shelf hardware is used for ease of maintenance and there is a software utility package for troubleshooting.

Special features: Salsa can be interfaced with digital audio workstations that use standard WAV files. It offers custom audio transfer software, allowing audio files to be recorded to one or more Salsa systems along with scheduling data. Other features include variable and editable audio overlap for each audio track, drag-and-drop live-assist, detailed logging for diagnostics and record-keeping and an on-screen copy stand with text hot keys.

Price: $5,495 including the Antex SX12a audio card, the LPB 15 in/three out audio switch card with eight output closures and 16 TTL inputs and the fully implemented four modes of Salsa operation, excluding PC and hard drive. $8,995 complete with PC and standard 1.6GB hard drive.

Phone: 610-644-1123; Fax: 610-644-8651; E-mail: lpbinc@aol.com; Internet: www.lpbinc.com

For more information circle (208) on Free Info Card

McCurdy Radio Industries

D-MAS (DAL multichannel automation system) & M/2000 multichannel radio automation system

This automation system provides tape, disk and routing switcher automation for use in TV and radio broadcast operations. It has been designed to automate multiple program streams from a common traffic schedule, allowing the creation of multiple networks from a single pool of equipment. Fully redundant rack-mount industrial computers, robust software design and control paths are used for reliability. A variety of control panels and special displays are available to simplify operation and inform operators. Serial interfacing is available for any documented protocol. Parallel interfacing is available to allow custom interfacing to devices or push buttons.

Special features: The system automates from one to 200 channels and channels can be added at any time. It offers fully redundant, separate main and backup computers with automatic switching.

Price: On application.

PLATFORM FOR THE FUTURE

BE Radio NAB 1996 PICK HIT

Radio World Cool Stuff Award

The 802D Digital FM Exciter from the world leader in advanced RF products puts you in a whole new universe of digital performance.

- A standard platform open architecture means simple software upgrades for RBDS and other technologies; plus, modular hardware design allows for expansion of DSP capacity to handle additional functions.
- Flexibility in design allows for program input in either AES/EBU digital format, analog composite, analog left/right, or multiple SCA inputs, depending on configuration.
- The 802D maximizes audio performance by using DSP's which adhere to the IEEE 754/854 standard 32-bit floating point format, thereby maintaining audio precision and dynamic range.
- A frequency-agile direct conversion system makes the 802D perfect for use in N+1 applications.
- Detailed control and monitoring information is available from a unique front panel LCD screen, plus front panel adjustment buttons provide full control over operating parameters.

Complete test and analysis information is available at front panel BNC connectors.

The 802D Digital FM Exciter won't limit your facility's ability to grow and advance in a rapidly changing world, providing a solid platform for performance and growth... only from Continental.

5.96.121

1946-1996. For 50 years, Continental Electronics has provided excellence in broadcast transmission products worldwide. Refuse to compromise... call Continental first!

TEL 800-733-5011 • WWW.CONTELEC.COM

Continental Electronics Corporation

P.O. BOX 270878 • DALLAS, TEXAS 75227-0878 • 214-381-7161 • FAX 214-381-4949

Circle (32) on Free Info Card

Computer-based system profiles

Phone: 1-800-267-8800; Fax: 416-248-6755; E-mail: sales@mcradio.com; Internet: www.mcradio.com

For more information circle (209) on Free Info Card

MediaTouch (a division of Oakwood Audio Labs)

MediaTouch OpLOG

OpLOG is designed to integrate with talk, news, classical or popular music formats as a single station user or multistation duopoly and provides touchscreen live-assist or full automation. OpLOG is a systems controller that communicates with devices via LAN, RS-232, telco or Internet. Device controls are available for digital audio, CD jukeboxes, switchers, satellite receiver frames, tally control and routers, and are installed as modules to meet individual requirements. OpLOG can be provided as a turnkey package using DEC computers or clients can purchase their own hardware.

Special features: OpLOG can be interfaced directly to any digital audio workstation that uses Antex, aptX, MPEG, WAV or Digigram digital audio file formats. Other features include synchronized redundancy, long-distance remote control and the ability to serve large multistation "super duopolies."

Price: From $4,995 for a single station cart replacement system comprising on-air and production software and audio cards, excluding computer hardware and network. From $44,000 for integrated AM/FM combo including DEC computer hardware, Windows NT operating system, music on hard

GET IT ALL.

FINALLY. COMPLETELY INTEGRATED RADIO OPERATIONS.

The perfect digital radio operation. Now it's a reality with Computer Concepts complete line of integrated radio products.

From traffic and reporting to music scheduling to complete studio ops, Computer Concepts has the integrated digital product line for complete station operations.

MAESTRO® is the brain for all operations — from commercials to music to announce text to schedules, all on screen with instant access to all of your audio inventory.

VOICETRACKER® Combine your music, commercial library and pre-recorded voice segments and create a "live" sounding automated program.

V.T. (NEW!) Sure to be the leading traffic system in the world. Now manage and report all traffic operations for up to 128 different stations from **one** location.

NEWSROOM™ Capture text and audio from wire services, networks or any source. Write, edit, package or play plus link sound bites to copy.

Even a Multi-track Editor is available with built in digital EQ and powerful mixing features.

Get real digital operations with just one call. Computer Concepts.

Computer Concepts Corporation

8375 Melrose Drive • Lenexa, KS 66214
Toll Free 1-800-255-6350 • Phone 913-541-0900 • Fax 913-541-0169

Circle (54) on Free Info Card

Computer-based system profiles

disk, touchscreens and multitrack production.

Phone: 1-800-636-0123; Fax: 352-629-7000; E-mail: omt@omt.net; Internet: www.omt.net

For more information circle (210) on Free Info Card

mediatron

mediatron computer-aided radio and broadcast automation system, mediatron AirControl NT & mediatron AirControl 2000

The mediatron system provides a complete digital solution. It offers news editing, multitrack recording and editing, notebook recording and editing with GSM and ISDN communication, satellite automation, digital cart replacement and 24-hour program automation with live-assist and integrated music and traffic scheduling. The AirControl NT system is a 32-bit application running under Windows NT. Designed to run 24-hour stations, it provides live-assist and automation operation and uses fault-redundant RAID 5 hard-disk arrays for all audio material and music with CD-quality MPEG compression. AirControl NT can be expanded as required using mediatron plug-in technology. The AirControl 2000 runs under MS-DOS and provides live-assist and automation operation using the Pioneer CAC-V5000 CD changer for music and hard-disk storage for jingles, news, commercials, etc.

Special features: mediatron systems can be interfaced to any digital audio workstations that use the MPEG file standard. Converters are available for interfacing to other systems, such as WAV. The mediatron software structure is modular and uses proprietary plug-in technology, allowing flexible expansion as required. mediatron plug-ins currently include CuePlayer cue and listening player, AirEdit program scheduling, QuickSearch database browser, X-FadeEdit segue editor, VoiceTrack voice recording and segue editor, HotControl hotkey playback, CartWall cart playback module and Internet Interface multimedia interface.

Price: From $8,700 for a typical system, depending on the storage capacity, audio channels and plug-ins.

Phone: +49-8131-8305-0; FAx: +49-8131-8305-25; E-mail: stein@mediatron.com; Internet: www.mediatron.com

For more information circle (211) on Free Info Card

Orban

AirTime

AirTime is an on-air broadcast delivery system that can be configured for live assist, full automation, dual play or multiplay operation. Four different user interfaces are available including a creative user interface for demanding live-assist applications. QNX, a UNIX-based real-time multitasking operating system, provides fully integrated networking and allows virtually unlimited system expansion without network reconfiguration. A range of digital and analog I/O facilities are offered for operational flexibility and reliability is assured by comprehensive backup, redundancy and disk mirroring features. AirTime can accommodate broadcast facilities with multiple studios producing two or more simultaneous on-air programs.

Special features: AirTime interfaces at the file-based level to the Orban Audicy and DSE 7000FX digital audio workstations. Other features include the Sound Cube cart emulator and Sound Slate keypad user interfaces, a Quick Record function for handling phone calls, and Sound Exchange audio interfaces that support up to 16 simultaneous stereo playback channels from a single CPU.

Price: From $12,000 for base AirTime system including on-air playback, automation, database management, cut maintenance, utilities, logging, reports and interfaces to Sound Cube, Sound Slate and Sound Exchange.

Increase Your Footprint

Capture the Audience!
It's *your* Listeners. *Your* Viewers.
Make them *Stay With You!*
The *DBMAX*™ Digital Broadcast Maximizer gives you *the impact you need* to reach them!

The *DBMAX* is an innovative no-compromise digital audio processor with excellent sound features, that will interface with all analog and digital broadcast formats.

The *DBMAX* was developed in close cooperation with chief engineers at broadcast facilities world-wide, resulting in a combination of three powerful broadcasting tools in one compact, easy-to-use unit:

Transmission Processor:

- Transparent multiband on-air dynamics processing
- Expansion of the broadcast coverage area, by providing better signal to background noise ratio for all receivers
- Easily adapts to any broadcast standard - all pre-programmed and easy to set up

A Sound Investment!

Inserted as the final audio link in the broadcasting chain, the *DBMAX* maximizes your audio modulation. It provides excellent sound optimization in AM and FM broadcast as well as DAB and digital TV audio transmission. Here the *DBMAX* becomes the optimal Transmission Processor, ensuring a louder and more consistent signal, thereby expanding the actual coverage area. Better coverage means you get better ratings, which in turn makes the *DBMAX* extremely good value!

Outside Broadcast Tool:

- Louder, clearer and punchier signal
- Dynamic compression of spot/trouble frequencies (air conditioning etc.)
- Ensures that dynamic levels are within your station's standard
- Automatic Gain Control for unattended operation

Reliability You Can Back-up!

Years of research and experience in digital compression and limiting techniques for CD mastering have led TC Electronic to the development of the three-band *DBMAX* processor. Reliability and interchangeability is equally important for Outside Broadcasting, so we made sure the information you store on your PC-card will make any *DBMAX* run 100% according to your specific settings. In turn it makes the PC-card an ideal back-up media for your *D3MAX*.

Radio, TV & Film Post Production Optimizer:

- Louder, crisper, warmer, punchier, more subtle, more spectrally-balanced production – the choice is yours...
- Finalizes the material
- Makes it possible to check what the sound will be like after transmission

Put Yourself in the Place of Your Listener

Used as a Post Production Tool the *DBMAX* gives the production engineer the ability to hear exactly what the program material will sound like as received by the listener. The *DBMAX* allows transmission-settings to be copied to the production suites, enabling engineers with a *DBMAX* to listen to the final transmitted signal during the production phase. This way you can make sure your listeners receive the signal you intended them to receive!

t.c. electronic

20 years 1976

TC Electronic Inc., 790-H Hampshire Road, Westlake Village, CA 91361, USA • Telephone: (805) 373 1828 • Fax: (805) 379 2648
Email:info@tcelectronic.com • WWW: http://www.tcelectronic.com
TC Electronic A/S, Sindalsvej 34, DK-8240 Risskov, Denmark • Telephone: +45 8621 7599 • Fax: +45 8621 7598

Computer-based system profiles

Phone: 510-351-3500; Fax: 510-351-0500; E-mail: custserv@orban.com.; Internet: www.orban.com

For more information circle (212) on Free Info Card

Pristine Systems

Pristine RapidFire

The Pristine RapidFire digital studio system is designed to provide spontaneous and creative control via its graphical user interface. It uses four virtual cart machines, and items can be aired from a playlist or directly loaded into any of the four players. The Quick Picks feature allows music, commercials and last-minute insertions to be added or easily changed. The system also includes the Music Plus integrated multipass music and playlist scheduling package, the Timewarp! network timeshift hard-disk audio recorder, VoiceTraxx, which allows voice tracks to be recorded while viewing the playlist days in advance and Audio Commander for recording audio files.

Special features: Pristine RapidFire is compatible with Dolby AC-2, all MPEG formats, PCM, ADPCM, and WAV formats at 32k, 44.1k and 48k sample rates. RapidFire accommodates up to 12 individual operator profiles allowing up to 90 drop box items for each. RapidFire is EAS-compatible and operates on generic computer equipment.

Price: On application.

Phone: 310-670-7500; Fax: 310-670-0133; E-mail: boyce@pristinesys.com; Internet: www.pristinesys.com

For more information circle (213) on Free Info Card

Prophet Systems

Audio Wizard for Windows

Audio Wizard for Windows is designed for live-assist, satellite and automated formats in settings from single to multiple radio stations and networks. It offers flexibility and reliability with a choice of multiple levels of redundancy and a wide range of features including hard-disk automation, traffic and music scheduling interfaces and management reports.

Special features: The Audio Wizard offers real-time multitrack editing and news editing. Other features include an audio conversion module, call tracking, voice tracking, time/temperature announce modules, password security and remote access.

Price: On application.

Phone: 1-800-658-4403; Fax: 308-284-4181; E-mail: sales@prophetsys.com; Internet: www.prophetsys.com

For more information circle (214) on Free Info Card

RCS

Master Control NT

Master Control NT was recently redesigned on the Windows NT platform to fully integrate its networking capabilities. Running in a client-server arrangement, the server routes the audio files that are stored locally within a studio's computer. The two-monitor setup displays the Manual Scheduler, allowing quick and easy last-minute changes and updates, and the Manual Sequencer, which shows the current on-air status and events in que. A built-in web browser links music log events to web sites.

Special features: Control inputs for remote start any of the four audio playback channels, with control outputs for console control. One analog stereo input, four analog stereo outputs and AES3 digital input are standard. AES3 outputs are optional. Full integration with RCS selector and linker are standard for instantaneous changes.

Price: $30,000 for the basic system,

OMB

OMB America
3100 NW 72 Ave #112
Miami, Florida 33122
Phone: 305-477 0974
Fax: 305-4770611
Toll free: 888-OMB4USA
E-Mail:info@omb.es

BAYS

Stainless steel construction, input connector type N, Maximun input power per Bay 600W, circular and vertical polarization

POWER DIVIDER

Brass made, chrome plated, EIA 7/8 input connector, Broadband 88-108 Mhz, maximun input power 2 Kw, Stainless steel mounting brackets included,double step.

JUMPER CABLES

1/2 inch coaxial cable, included male N connectors

MP 2-4

RADIATING SYSTEMS UP TO 20.000W

PRICE
$1,650.00
Offer valid until May 1997

OMB also Manufactures:

FM transmitters
TV transmitters
FM and TV Links
TV antennas
Medium power FM antennas
Connectors

For other radiating systems please contact us

1-888-OMB4USA

Circle (49) on Free Info Card

Computer-based system profiles

consisting of hardware and software for the air studio, production room, program director and server including installation and training.

Phone: 914-723-8567; Fax: 914-723-6651; E-mail: info@rcsworks.com; Internet: www.rcsworks.com

For more information circle (215) on Free Info Card

Scott Studios
AXS & AXS Pro

AXS is a digital hard-drive system for satellite formats with one or more live jock shifts. Music is played from hard drive or CD players, from consumer six-packs, 18-packs or 100+ CD jukeboxes. AXS uses a button box for fast control and offers high-quality digital audio using APT cards. AXS Pro offers the look and feel of three digital cart machines showing the item playing, the next item and the one following that. AXS Pro also offers pages of hundreds of spots, songs, jingles and other recordings that are always ready for playback. It uses a button box for fast control and offers high-quality digital audio using PCI cards. In addition, a satellite control module will be available soon.

Special features: The AXS and AXS Pro can be interfaced directly to the Scott 16-track workstation, as well as editing software, such as the Innovative Quality Software SAW, the SEK'D Samplitude and the Syntrillium Cool Edit or any digital audio workstation that uses standard WAV files. AXS and AXS Pro can use the Scott Lazer Blade production system to add cart label information to items, such as account name, start and end dates and times and end-of-message trim.

Price: From $7,000 for the AXS air studio complete with dual overlap APT audio cards. From $7,000 for the AXS Pro air studio complete with dual overlap PCI audio cards. Both configurations include Pentium rack computer, and on-air and production software. Options include higher-capacity hard drives for music storage.

Phone: 800-SCOTT-77 or 972-620-2211; Fax: 972-620-2211; E-mail: info@scottstudios.com; Internet: www.scottstudios.com

For more information circle (216) on Free Info Card

Scott Studios
the Scott Music on Hard Drive live system & the Scott Invincible System

The Scott Music on Hard Drive supports an unlimited number of workstations and is based on a proprietary 32-bit PCI audio card. Features include touchscreen operation, instant play hot keys, preview of recordings in cue, recognition of start/end dates/times, sports logs and live tags. Options include console remote buttons, a telephone recorder-editor, remotes by modem, time and temperature announce, auto record of networks or field reporters, voice tracking, a satellite switcher and pre-problem warning for walk-away operation. The Scott Invincible is a major market seamlessly redundant version. It uses dual-redundant hardware, duplicate files on separate hard drives and duplicate computers with redundant audio cards. Scott Watchdog software ensures continuous play and automatically switches to the hot standby system in case of failure.

Special features: The Scott Music on Hard Drive and Scott Invincible can be interfaced directly to the Scott 16-track

QUALITY AM ANTENNA PRODUCTS

COMPONENTS

- Inductors
- Capacitors
- Lighting Chokes
- Static Drain Chokes
- Contactors
- RF Plugs & Jacks
- Meter Switches
- Insulators
- Antenna Sample Loops
- Equipment Boxes
- Copper RF Wire, Tube, and Strap
- Coaxial Cable, Feeder Systems

Visit Us @ WWW.LBAGROUP.COM

Offered in a wide variety of types and ratings, LBA RF Components are intended for application in Medium Wave/AM antenna and transmitter equipment with power levels to over 500kW. LBA products are built to the highest standards to ensure long life and reliability.

Antenna Tuning Units - Combiners - Matching Networks

ANTENNA EQUIPMENT

- Tunipole™ Folded Unipole Antennas
- Combipole™ Multiple Frequency Antennas
- Detunipole™ Detuning Systems
- Antenna Tuning Units, Diplexers, Triplexers
- Transmitter Combiners
- PowerTopper™ Toploading Systems
- Basemax™ Base Enhancement Systems

LBA is the world leader in single and multiple station folded unipole antenna systems for high efficiency, wide-band AM transmissions at all power levels. LBA systems are found worldwide from Alaska to Argentina, Kuwait to Saipan.

LBA Technology, Inc.
3400 Tupper Drive • P.O. Box 8026
Greenville, North Carolina 27835

TOLL-FREE - 800-522-4464
919-757-0279 • FAX 919-752-9715
E-Mail: lbatech@www.lbagroup.com

TUNIPOLE™ - Folded Unipole Antenna Systems

An LBA Group Company

Se Habla Español

workstation, as well as editing software, such as the Innovative Quality Software SAW, the SEK'D Samplitude and the Syntrillium Cool Edit or any digital audio workstation that uses standard WAV files. The Scott Lazer Blade production system can be used to add cart label information to such items as account name, start and end dates and times and end-of-message trim. The Scott Voice Trax option can be used for recording voice tracks while hearing context.

Price: From $25,000 to $35,000 for Scott Music on Hard Drive, depending on hard-drive capacity and options selected, including touchscreen air studio, traffic and music and copy interface, LAN and on-site training, but excluding $5,000 for the Lazer Blade production studio. From $50,000 to $100,000 for the Scott Invincible depending on hard-drive capacity and options selected.

Phone: 800-SCOTT-77 or 972-620-2211; Fax: 972-620-2211; E-mail: info@scottstudios.com; Internet: www.scottstudios.com

For more information circle (217) on Free Info Card

Smarts Broadcast Systems

The Smartcaster Generation 2000 system

The Generation 2000 system allows live, live-assist and full automation operation and provides storage, transmission and retrieval of broadcast-quality audio. It is a multinode system that can be networked locally via LAN and globally via the Internet. It allows for recording from multiple nodes, storage on hard drives located anywhere on the LAN network and instantaneous playback from any other node on the LAN without the need to copy files from node to node. With the Spider option, the system will allow for audio transfer from a central hub to spoke stations automatically and via the Internet. The system is built on a heavy-duty industrial-quality passive backplane rack-mounted chassis.

Special features: The Smartcaster Generation 2000 system can interface to digital audio workstations via an industry-standard AES/EBU output at 32kHz. Other features include the ability to do full remote broadcasts via touch-tone phone with no one at the studio, unattended and automated recording of complex long-form programs, such as talk shows, highly complex switching of many sources to multiple destinations, and interfaces to satellite receivers for automated transponder and channel switching.

Price: From $7,500 for a basic system. Generation 2000 systems are sold by the node, which range in price from $6,884 for a production system to $12,724 for a rack-mount simultaneous record/play system with audition channel.

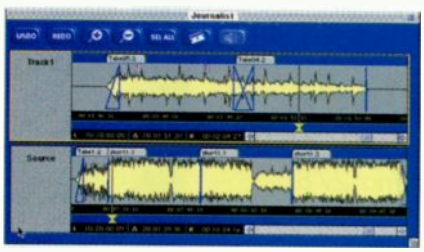
Phone: 800-747-6278, Fax: 800-398-8149; E-mail: smarts@ncn.net; Internet: www.ncn.net/smarts

For more information circle (218) on Free Info Card

Sonic Solutions

Sonic On-Air

Sonic On-Air is a set of integrated applications designed for broadcast production from recording to on-air delivery using hard-disk storage. It is designed for live, live-assist and fully automated operation, and is aimed at large network production facilities that require complete end-to-end digital production systems and at stations that want a completely networked facility. Sonic On-Air provides easy and instantaneous file access for work group efficiency among those who perform recording, editing, processing and on-air presentation tasks, and it allows for modular expansion of all production subsystems.



Special features: Sonic On-Air can be interfaced directly to the Sonic Solutions SonicStudio digital audio workstation. Sonic On-Air provides an integrated, networked solution for all forms of production, from simple news clip editing to long-form feature programs. Other features include high-quality audio with up to 24-bit resolution.

Price: $8899 for a Journalist Editor digital audio workstation including computer, keyboard and mouse, 17-inch color monitor, audio processor card, stereo A/D/A and Journalist Editor software.

Phone: 1-888-SONIC-4U or 415-893-8000; Fax: 415-893-8008; E-mail: info@sonic.com; Internet: www.sonic.com

For more information circle (219) on Free Info Card

Studer Professional Audio

DigiMedia V 2.3

The DigiMedia broadcast automation system is based on true 32-bit software for Windows NT4 or Windows 95. It can control internal digital audio, as well as external studio devices and CD jukeboxes. It is suitable for manual mode, live-assist or full-automation operation. Manual mode allows the mixer faders to be handled conventionally. The DigiMedia Studio PC workstation automatically controls the crossfade of two audio sources to the on-air mixer, according to the running playlist, and prepares the cuing of events, such as music title, trailer, jingle, etc. DigiMedia has proprietary communication software for delay-free remote control of complete on-air screen activity.

Special features: DigiMedia requires only two PC workstations for full broadcast automation including audio editing, library editing and playlist scheduling. Other features include four stereo playout channels per on-air workstation and instant audio pre-listen, via the on-air screen, to 12 titles on the loaded playlist and to any title from the library.

Price: From around $20,000 for a two-PC system comprising one On-AIR workstation and one Edit workstation with peer-to-peer network link, but dependent on storage capacity and the overall network/server structure.

Phone: 615-399-2199; Fax: 615-367-9046; E-mail: marketing@studer.ch; Internet: www.studer.ch

For more information circle (216) on Free Info Card

Continued on page 72

IT'S 100% RADIO

Succeeding in a NEW ERA

NEW! Certification Programs for Engineers

THE NAB RADIO SHOW

September 17–20, 1997
New Orleans, Louisiana

At The NAB Radio Show you can take charge of the new era in radio. Help control the destiny of your business and your career. This is radio's most exclusive event, focused on one thing only—*your business*, the business of radio! Plan now to attend The NAB Radio Show and...

- Supercharge your engineering skills in these cutting-edge certification programs:
  - AM Directional Antenna Workshop
  - RFR Workshop
  - AM/FM Transmitter Workshop
- Interact with the industry gurus on the issues and opportunities facing your station.
- Network with radio's movers and shakers.
- Make the business deals that will take you into the next century.
- Experience ground-breaking technologies first-hand.
- Meet face-to-face with the suppliers that are shaping the new era of radio!

PLUS, you won't want to miss these exciting events:

- Radio's Opening Reception
- The NAB Marconi Radio Awards Dinner and Show
- The NAB Radio Luncheon and National Radio Award Presentation
- The NAB Career Fair
- And so much more!

The excitement is building—Register Today!

For more information:

- **WEB:** Point your web browser to **www.nab.org/conventions/** to register on-line or to receive up-to-the-minute conference, hotel and travel information.
- **FAX-ON-DEMAND:** Dial **301-216-1847** from the touch-tone handset of your fax machine and follow the voice instructions.
- **CALL: 800-342-2460** or **202-775-4970.** Want to exhibit? Call **202-775-4988**

SUCCEED IN THE NEW ERA OF RADIO

GET MORE INFO TODAY!

Fax this completed form to **202-429-5343**. BE

Please send me more information on ○ Attending ○ Exhibiting

Name _____ Title _____

Company _____ Call Letters _____ ○AM ○FM

Address _____

City _____ State _____ ZIP _____

Country _____ Email _____

Phone _____ Fax _____

Circle (36) on Free Info Card

NEW ORLEANS

1997 BE Radio Salary Survey

How do you fare among your peers?

By Chriss Scherer, editor

When was the last time you had a raise? A welcome return to *BE Radio*, this year's Salary Survey offers some guidelines as to what your peers make. Approximately 65% of the respondents received a raise over the last 12 months, were you one of them? With next year's budgets being planned over the next months, this is an excellent opportunity to see where your salary stands.

The role of the engineer continues to change as the technology we work with changes. Today's radio engineer must naturally be versed in audio and RF, but other areas of experience are quickly becoming a requirement. Telephony and HVAC are two common areas the engineer has been involved in for quite some time. Even telephony is growing. POTS lines are still in use, but now add ISDN and all the higher-capacity digital data circuits offered by telephone companies.

Computers and computer networks are becoming increasingly more common. Many times, the engineering department must also serve as the information services department. How do the salaries of today compare to the salaries from three years ago? You can see that the median salary has increased. At the same time, the cost of living has gone up and the engineer's skill level requirement has also increased. With reduction of staffs becoming more common with consolidation, the workload of engineering continues to increase, as well. Does the increase in salary follow the other increases? I'll let you decide.

The data was collected during February and April of 1997. The objective of the

SCEC 97
The 19th Annual Satellite Communications Expo & Conference

September 17-19, 1997
Washington Convention Center
Washington D.C., U.S.A.

DISCOVER

SCEC'97:
Discover the power of the technologies, products, services, and developments that are shaping the future of your business.

- 20++ educational workshops and roundtables
- 100++ exciting exhibits featuring the latest satellite technologies and services
- 1000++ new ideas and solutions for the technical & engineering management professionals

This power-packed conference program provides practical solutions to the challenges presented by today's changing satcom industries. Topics include:

- How Satellites Do What They Do
- Satellites for Applications
- The Increasingly Irresistible VSAT
- Broadcasting Radio Direct by Satellite
- Putting Remote Process Control to Work
- Asia Calling: Satellites Fill the Telephony Gap
- Betting on Latin American Power
- Busy Signals at the LEOs and MEOs
- DBS for the Pacific Rim
- Ka-band: Multimedia and the Internet Tomorrow
- How to Make Peace in North America
- Satellite Systems & Operations
- The Big Squeeze: Advances in Compression
- Switching to Digital for Satellite News Gathering
- Operating a Compressed Video Network
- Multimedia and Internet by Satellite Today
- How to Waltz with Wall Street
- A Longer Reach for Local TV
- Satellite Television Wars in Europe
- Negotiating for Occasional-Use Capacity
- Competition with PTTs: Real Progress or Lip Service
- The New Shape of Intelsat and Inmarsat

ATTENTION VENDORS:

Prime exhibit space is going fast. For details on exhibiting, call Kim Greenway, Show Manager, 770-618-0423.

For complete information on the conference, exhibitors, hotels, special events and more, return this coupon today or call **FAX-ON-DEMAND** at **1-800-601-3858.** Questions? Call Intertec Presentations at 1-800-288-8606 or 303-220-0600.

If you're involved in planning, using or buying satellite communications services, systems and/or products, the solutions to your challenges can be found at SCEC '97.

☐ **YES!** Please send me attendance information.
☐ Please contact me about exhibiting.

First Name _____
Last Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Country _____
Phone* _____
Fax* _____

International guests, please include country and city codes. SOURCE CODE: AD

Sponsored by: SATELLITE COMMUNICATIONS

Managed and produced by Intertec Presentations, a division of Intertec Publishing. With support from these other INTERTEC*/K-III Media Publications: Telephony, Global Telephony, Broadcast Engineering, World Broadcast News, Cellular Business, WirelessWorld, RF Design, Mobile Radio Technology, and Cellular & Mobile International.

MAIL OR FAX TO:
Intertec Presentations • SCEC '97 • 6300 South Syracuse Way, Suite 650 • Englewood, CO 80111
Phone: 1-800-288-8606 or 303-220-0600
FAX: 303-770-0253

Circle (37) on Free Info Card

1997 BE Radio *Salary Survey*

survey is to provide a reference of salary levels within a specific title group. Each of the job groups is broken down into two ADI groups. For the engineering titles, the value of SBE certification is also shown.

I would like to thank the survey participants for their contribution to this year's survey.

Station management

Station management salaries show a marked difference between large and small markets. The median salary for the Top 50 markets is $44,374.00. For markets below the Top 50, the median salary is $32,916.00. In this survey, station management includes the job titles of general manager, VP operations, operations manager/director, station manager, production manager, program director and news director.

STATION MANAGEMENT	TOP 50	BELOW TOP 50
<$20,000	0.00%	13.20%
$20,000 to $24,999	0.00%	5.70%
$25,000 to $29,999	15.80%	13.20%
$30,000 to $34,999	10.50%	15.10%
$35,000 to $39,999	7.90%	7.50%
$40,000 to $44,999	21.10%	9.40%
$45,000 to $49,999	5.30%	2.80%
$50,000 to $54,999	13.20%	13.20%
$55,000 to $59,999	2.60%	3.80%
$60,000 to $64,999	2.60%	2.80%
$65,000 to $69,999	2.60%	0.90%
$70,000 to $74,999	0.00%	1.90%
$75,000 to $79,999	5.30%	1.90%
$80,000 to $89,999	7.90%	3.80%
$90,000 to $99,999	0.00%	0.00%
$100,000 or more	5.30%	4.70%
Median Salary 1997	$44,374.00	$32,916.00

Staff engineer

Both market results show a substantial increase in salaries. Top 50 market staff engineer salaries have increased nearly 18% since 1994, while those below the Top 50 have increased 23%.

Again, SBE certification shows its value. Certified staff engineers earn an average of $2,000 more than non-certified staff engineers.

The staff engineer category includes the job titles of chief engineer, technical director/manager and vice president of engineering. Of all the survey respondents, 30% hold the title of chief engineer.

STAFF ENGINEER	TOP 50	BELOW TOP 50
<$20,000	1.70%	18.20%
$20,000 to $24,999	5.00%	20.00%
$25,000 to $29,999	0.00%	5.50%
$30,000 to $34,999	5.00%	9.10%
$35,000 to $39,999	0.00%	14.50%
$40,000 to $44,999	21.70%	12.70%
$45,000 to $49,999	13.30%	7.30%
$50,000 to $54,999	8.30%	1.80%
$55,000 to $59,999	11.70%	5.50%
$60,000 to $64,999	6.70%	3.60%
$65,000 to $69,999	6.70%	0.00%
$70,000 to $74,999	10.00%	0.00%
$75,000 to $79,999	1.70%	1.80%
$80,000 to $89,999	5.00%	0.00%
$90,000 to $99,999	0.00%	0.00%
$100,000 or more	3.30%	0.00%
Median Salary 1997	$52,999.00	$33,999.00
Median Salary 1994	$44,999.00	$27,553.00
Increase:	17.8%	23.4%

Contract engineer

Contract engineer salaries are more uniform between markets than the other job classifications. Also, SBE certification does not show as heavily in salary differences as it does with staff engineers. Both of these are probably due to contracting fees being determined by the local area instead of the business as a whole.

The use of contracted services has also increased, particularly in the smaller markets. This is one area where a year-to-year comparison will show the changing role of the

CONTRACT ENGINEER	TOP 50	BELOW TOP 50
<$20,000	20.00%	18.60%
$20,000 to $24,999	20.00%	16.30%
$25,000 to $29,999	8.00%	7.00%
$30,000 to $34,999	8.00%	9.30%
$35,000 to $39,999	12.00%	2.30%
$40,000 to $44,999	8.00%	7.00%
$45,000 to $49,999	0.00%	4.70%
$50,000 to $54,999	4.00%	11.60%
$55,000 to $59,999	4.00%	0.00%
$60,000 to $64,999	0.00%	4.70%
$65,000 to $69,999	8.00%	4.70%
$70,000 to $74,999	0.00%	4.70%
$75,000 to $79,999	4.00%	2.30%
$80,000 to $89,999	0.00%	0.00%
$90,000 to $99,999	0.00%	4.70%
$100,000 or more	4.00%	2.30%
Median Salary 1997	$32,500.00	$34,999.00

contract engineer. In the larger markets, more contract engineers work exclusively as radio broadcast contract engineers, while in the smaller markets, contract engineers are also working in other areas.

Almost 25% of the survey respondents are contract engineers.

Did you receive a salary increase over the past 12 months?

One gauge of work progress is a salary increase. Did you receive one over the past 12 months? The average amount of the increases shows a correlation to the cost of living increases. Larger markets show a higher average of receiving a salary increase than smaller markets. Again, with contract services more frequently used in smaller markets, this stands to reason.

SALARY INCREASE	TOP 50	TOP 50
	Yes	No
Station Management	78.90%	21.10%
Staff Engineer	73.30%	26.70%
Contract Engineer	52.00%	48.00%
SALARY INCREASE	**BELOW TOP 50**	**BELOW TOP 50**
	Yes	No
Station Management	48.50%	50.00%
Staff Engineer	65.50%	34.50%
Contract Engineer	27.90%	72.10%

STATION MANAGEMENT	TOP 50	BELOW TOP 50
< 3%	16.70%	9.10%
3% to 4.9%	43.30%	33.30%
5% to 9.9%	30.00%	39.40%
10% to 14.9%	3.30%	6.10%
> 15%	6.70%	6.10%
no answer	0.00%	6.10%
STAFF ENGINEER	**TOP 50**	**BELOW TOP 50**
< 3%	11.40%	16.70%
3% to 4.9%	36.40%	19.40%
5% to 9.9%	47.70%	38.90%
10% to 14.9%	0.00%	13.90%
> 15%	2.30%	8.30%
no answer	2.30%	2.80%
CONTRACT ENGINEER	**TOP 50**	**BELOW TOP 50**
< 3%	7.70%	25.00%
3% to 4.9%	38.50%	8.30%
5% to 9.9%	23.10%	8.30%
10% to 14.9%	7.70%	8.30%
> 15%	23.10%	41.70%
no answer	0.00%	8.30%

Certification works

SBE certification makes a difference in your salary. With the removal for the requirement for FCC Operator Licensing, certification is really the best way to show expertise in your field. To learn more about SBE certification, call 317-253-1640.

What percentage of your income comes from radio broadcasting work?

Contract engineers do not always dedicate their services strictly to radio engineering. The amount of income derived from service performed for radio are broken down, and it can be seen in smaller markets that contract engineers earn more income from non-broadcast work, showing why the average salary in smaller markets could be higher. As consolidation continues, these figures will no doubt continue this trend.

RADIO CONTRACTING INCOME	TOP 50	BELOW TOP 50
<25%	12.0%	25.6%
25% to 49.9%	16.0%	4.7%
50% to 74.9%	16.0%	20.9%
75% to 99.9%	24.0%	20.9%
100%	32.0%	18.6%
no answer	0.0%	9.3%
Median percentage	80.0%	60.0%

Editor's note: *The complete results of the Salary Survey are available for $50 each. Contact Amy Katz at 913-967-1946. Or, contact the* BE *FAXback line at 913-967-1905 for more information.*

Cover letters and questionnaires were sent to a total of 1,000 domestic *BE Radio* subscribers selected on an *n*th name basis among radio station and network subscribers. The survey was split into title and ADI market rank groups.

Auditronics NuStar 3000

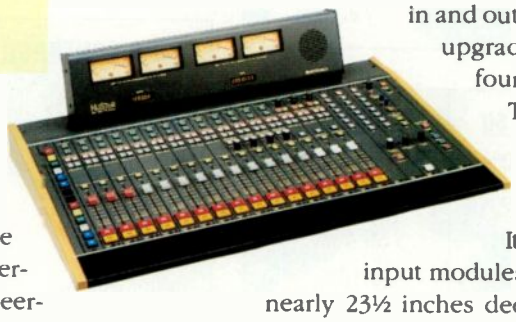
By Gary Condrey

On Feb. 9, 1997, WEGR-FM (Rock 103) in Memphis became the first station to go on the air with the NuStar series 3000, a new digital audio console from Auditronics.

WEGR was already considering replacements for its aging 15-year-old Auditronics 200 series console when we were approached by Auditronics to test the digital on-air console. I was familiar with the product line and its quality and reliability, because WEGR has several generations of the company's consoles dating back to the early '80s. We eagerly signed on to this opportunity to move a step closer to digital broadcasting. WEGR had already converted to a digital STL link and digital audio processing. Adding a digital console seemed a logical next step. During the final stages of console development, we were able to provide feedback, from a broadcaster's perspective, to the Auditronics engineering team. The installation of the NuStar console was straightforward and went flawlessly.

Performance at a glance

- Digital signal flow
- Familiar layout
- Analog or digital line-level inputs
- Sample-rate conversion
- Up to 18 inputs with full logic
- Modular design



Parts is parts

The console is composed of two primary parts: a control surface that appears similar to a conventional Auditronics console and a rack unit that houses the majority of the electronics. All external input/output connections (analog, digital and logic) are made to the rear of the rack electronics, which occupy 7RU. This allows easy access to the wiring at installation and later, when the inevitable source changes come along. The only cables that run to the actual control surface are an RS-422 connection, monitor, metering, cue and headphone feeds.

Input cards can be ordered for either analog or digital inputs. Presently, our CD players feed AES/EBU digital inputs. The digital input cards handle the rate conversion, supporting all three standard sample rates of 32kHz, 44.1kHz and 48kHz. Analog input cards are used for WEGR's cart tapes and other sources. When we convert from analog cart tape to a digital storage system for commercials, we will merely swap out the appropriate input cards for direct digital connections. All NuStar analog input modules are line-level cards, there are no microphone-level-specific input cards. Therefore, a microphone input requires an external microphone pre-amplifier.

The NuStar has four stereo output buses standard, each available as AES/EBU digital and conventional analog outputs. The console has a full complement of logic and muting for inputs and outputs.

Each module has two audio inputs, which also have their own full logic control. A module's input is made analog or digital by inserting the appropriate card in the chassis. All connections on the rear of the rack electronics are made with DB connectors. The modules in the rack chassis are mounted vertically and slide in and out for easy maintenance and future upgrades. The cover is held on with four knurled-knob thumb screws. The entire console is powered by a 3RU power supply.

The console is modular in design for easier maintenance. Its surface can accept up to 18 input modules and is only 36 inches wide and nearly 23½ inches deep, which is a smaller footprint than analog consoles with similar input sizes.

Because our three-person morning show is highly interactive with telephone callers, we ordered the NuStar console with two telephone interface modules. This gives us a lot of flexibility in conferencing and controlling what audio we feed back to the callers. Interfacing with phone systems, mix-minus and all the associated issues often lead to console telephone modules being complicated and confusing for operators. The telephone modules on the NuStar, while offering a high degree of functionality, have a clean layout that is immediately understandable and user-friendly. Our staff did not need to be trained on the NuStar. They came in and used the console as though it had always been there.

The proving ground

The proof of all the new technology, however, is in the sound quality. Although nothing else was changed in our air chain at the time of the console installation, our

staff and listeners could immediately hear the improvement in our on-air product. Currently, our air chain is not digital all the way through because our STL and audio processor, although themselves digital, have analog input and output cards. There was a substantial improvement in clarity and detail with the NuStar. We are hearing nuances of recordings that we never could hear before on the air, especially with newer digitally mastered CDs. We have had a number of unsolicited listener comments about the improvement in our air sound.

Our staff did not need to be trained on the NuStar. They came in and used the console as though it had always been there.

From an engineering standpoint, the all-digital design should provide us with a stable console, whose performance should remain constant over time, while providing a long MTBF. The NuStar's versatility and functionality rely on hardware and software, both of which can be upgraded or reconfigured as technology progresses. One future enhancement that we have already seen an early demonstration of is the ability to run the console remotely from anywhere in the world. Just imagine some pretty sophisticated remotes that may be on the horizon. With an ISDN line for programming and a computer for console control, where do you want to run your show from today? Another enhancement that should soon be possible is remote diagnostics of the console from the factory or your own home.

It's clear to us that Auditronics has done its homework in moving to the digital arena. The company has built a console with the look and feel of a traditional console, while providing the sonic benefits that only digital can deliver. The NuStar should be a leader in the next wave of radio's digital transformation.

Gary Condrey is chief engineer of WEGR-FM, Memphis, TN.

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's 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 *magazine.*

New Products

Portable codec
Musicam USA

• **RoadRunner:** an economical ISDN codec/mixer that comes complete with three mixing inputs, two dedicated to mics and one selectable for mic and line levels; there are also two separate headphone monitoring circuits, each with separate send and receive level controls; the completely bi-directional RoadRunner has a built-in terminal adapter with on-board NT1 (where required) and provides high-quality digital audio at efficient data rates; additional features include automatic detection of incoming algorithm and bit rates, four relay contact closures to activate far-end relays, 256 speed-dial addresses and 30 SPID, ID and switch profile memories; the RoadRunner can receive software upgrades directly from the factory over ISDN lines.

908-739-5600; 908-739-1818
Circle (151) on Free Info Card

Sound editing software
Sonic Foundry

• **Sound Forge XP (version 4.0):** this software has been integrated into the DV Master from Fast Electronic U.S.; the DV Master is a DV editing system that processes data in real time with a DV hardware CoDec; in addition to Sound Forge XP, the product is bundled with DV Master's PCI Busmaster card, an external connection box and other software; Sound-Forge XP features reverb, 10-band EQ, distortion and fade in/out; by using the mix, paste and crossfade functions, you can combine sound files in a single step, and unlimited undo/redo capabilities mean complete editing freedom.

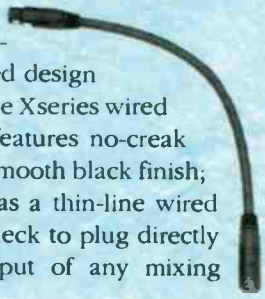
608-256-3133; fax 608-256-7300;
www.sfoundry.com
Circle (152) on Free Info Card

Portable cable reel
Hannay Reels

• **Model AVX-100:** a cable reel designed specifically for broadcast and pro-audio applications; it stores stage-box units and features a slotted divider disc design that allows connector pigtails to be safely stored alongside snake cable; an adjustable friction brake prevents cable run-over during operation; a non-reflective, black matte finish helps keep the reel out of sight and it has a convenient carrying case for easy transport.

518-797-3791; fax 800-733-5464; www.hannay.com
Circle (158) on Free Info Card

Modernized Rubber-Neck
Ac-cetera



• **X series wired Rubber-Neck:** featuring a modernized design and a lower cost, the Xseries wired Rubber-Neck still features no-creak technology and a smooth black finish; they are available as a thin-line wired XLR-to-XLR gooseneck to plug directly into the active input of any mixing console.

800-537-3491; fax 412-344-0818;
aaps@pgh.nauticom.net
Circle (164) on Free Info Card

Equipment lubricant
CAIG Laboratories Inc.

• **CaiLube MCL:** a precision lubricant formulated to lubricate conductive plastic and carbon compound faders, switches and other similar components; it replenishes lubrication lost on surfaces due to repeated cleaning and wear; CaiLube MCL can help prevent malfunctions on conductive membrane switches and components caused by oil, grease and acids that can build up from repeated finger contact — the lubricant provides a long-lasting barrier against these types of contamination by placing the oil, grease and acids above the CaiLube MCl layer preventing contact with the plastic membrane.

800-224-2123 or 619-451-1799; fax 619-451-2799; caig123@aol.com;
www.caig.com
Circle (155) on Free Info Card

Advanced sound enhancer
Philips Electronics

• **IS 5022/F3D:** an advanced version of the IS 5022 professional sound enhancer; added features include two Philips stereo DAC7 devices and the new 5B digital filter with fourth-order noise shaper (dither added), that offers improved analog performance for the S/N by 5dB, for dynamic range by 6dB and for THD+N by 7dB; like the IS 5022, the enhanced version offers scratch suppression (declicking), noise reduction, stereo enhancement, simple EQ, jitter removal and sample rate conversion; it also features analog interface and digital SPDIF ports and is designed for rack mounting with balanced and unbalanced analog and digital SPDIF- and AES-EBU-format I/Os.

909-394-9007 or 408-453-7373; fax 408-453-6444
Circle (162) on Free Info Card

XLR connector
Gold Line

• **Gold Lite/1k:** a Neutrik XLR connector that contains a miniaturized 1k tone generator and a phantom power detector; it is small enough to fit in your pocket, only weighs a few ounces and requires no batteries; some of the uses for the Gold Lite/1k include determining whether a floor-mounted mic jack is supplying phantom power, indicating what channel the jack is going to, checking inputs on the board and troubleshooting equipment in the field.

203-938-2588; fax 203-938-8740
Circle (154) on Free Info Card

Motion sensing alarm
Nalpak

• **Lil' Screamer:** a motion sensor alarm that can help you protect your gear; you can secure it with a self-contained retractable cable to any item, press the activation button and within seconds, the flashing LED will indicate that the alarm has been set; movement of the item will activate a 110dB alarm and any attempt to cut the cable will also activate the alarm; the Lil' Screamer offers several months of continuous service with a single 9V battery (included).

619-258-1200; fax 619-258-0925; www.nalpak.com/nalpak
Circle (161) on Free Info Card

Personal power station
Galaxy-Valley Audio

• **Far Outlet:** a self-contained portable source of 110V, 60Hz, household current that is about the size of a lunchbox; this lightweight power supply provides up to 250W continuous and 400W peak power; the DigiScrub digital filtering circuitry produces extremely low-noise AC power that will not introduce discernible distortion into computers and audio devices; with a standard deep cycle battery the Far Outlet will provide hours of service between charges and it can be charged by plugging it into a wall socket or a cigarette lighter (with optional converter).

316-263-2852; fax 316-263-0642; www.galaxyaudio.com
Circle (157) on Free Info Card

Hand-held ISDN tester
Jensen Tools

• **Aurora^{plus}:** this product, available in the Jensen Tools catalog, is a powerful and flexible basic rate ISDN tester that tests most ISDN call and connection types at their U interface and on the S bus, including point-to-point and point-to-multipoint operation; it uses the national ISDN protocol, as well as custom protocols for AT&T and Nortel switches; the tester displays dialed number, calling party number and cause codes along with control and status information; the dual B-channel packet test can be verified and a solo bit error rate test can be performed by calling out on one B channel and receiving on the other; the unit also tests line polarity on all interfaces and detects crosstalk and analog loops; it operates off a rechargeable battery or line power.

800-426-1194 or 602-968-6231; fax 602-438-1690; www.jensentools.com
Circle (159) on Free Info Card

New Products

Surface-mount power jacks
Switchcraft, Inc.

• **Surface-mount miniature power jacks:** the latest addition to Switchcraft's line of right-angle miniature power jacks; a sleeve/shunt spring functions as a built-in switch that permits automatic switchover from AC to DC when a plug is inserted or withdrawn; a new flat-top housing aids in automatic placement on PC boards; the right-angle jacks are available with three center-pin diameters: .100", .080" and .050" and all materials are heat-resistant for high temperature soldering.

773-631-1234 (ext. 243, request New Product Bulletin #500) or 312-792-2700; fax 312-792-2129; www.raytheon.com/re/swc.html
Circle (165) on Free Info Card

Power triode for audio
Svetlana Electron Devices

• **3CX300A1:** a powerful metal-ceramic power triode for audio amplifiers, in Class A, AB and B or for use as a power-supply pass device; it features high transconductance (20,000microSiemens typ.) and low plate resistance (450Ω typ.); the ceramic-metal construction, with cathode and grid rigidly mounted on coaxial cones, reduces microphonic effects and resists mechanical and thermal shocks; the 3CX300A1 fits Svetlana SK2A sockets, standard loktal sockets or special sockets intended for the 4CX250B tetrode; the exceptional linearity is well-suited for push-pull amplifiers and a single pair can produce 800W in Class B.

415-233-0429; fax 415-233-0439; engineering@svetlana.com
Circle (156) on Free Info Card

Microphone
Audix

• **OM6:** a vocal microphone that features the same unmatched off-axis rejection characteristics as the other mics in the OM series (OM3, OM5 and OM7); the OM6 has a low frequency extension that is not typical of other dynamic microphones and an extremely flat frequency response allows it to approximate the sound and performance of costlier condenser microphones; this microphone features a sensitivity of -69dB and a frequency range of 48Hz to 19kHz.

800-966-8261 or 714-588-8072; fax 714-588-8172; www.audixusa.com
Circle (160) on Free Info Card

DAB encoders and DAB L-band transmitters
Unique Systems

• **Models DAB-UEN:** a line of DAB encoders equipped with a 20-bit A/D, multidrop control bus, an asynchronous AES/EBU interface, security features and a monitoring decoder capable of non-intrusive real-time monitoring of the DAB-encoded MPEG stream.

• **Models DAB-UTX:** indoor/outdoor DAB L-band transmitters that feature a feed-forward design with output power protection, AGC input control, an RS-232C interface and an LCD display.

905-474-0091; fax 905-474-1563
Circle (153) on Free Info Card

Compressor-dehydrator
Shively Labs

• **Model 7070:** a "no-frills" automatically regenerative compressor-dehydrator that is designed to be free-standing; it removes moisture within a heatless-reactive dual chamber dehydrator and each chamber is solidly packed with desiccant; the unit uses compressed air to purge and reactivate one chamber while drying air with the other chamber; features include thermal overload protection, a back pressure regulator, humidity indicator and pressure switch.

207-647-3327; fax 207-647-8273; sales@shively.com
Circle (163) on Free Info Card

Continued from page 18

delivery to on-line listeners.

Until recently, audio was only available on-line via downloadable files. These files generally took longer than their actual playing time to download, and could only be played back after the download was completed. Within the last two years, however, streaming audio has become possible on-line. This allows surfers on the World Wide Web to hear real-time sound when they access a web site. Naturally, radio stations can take great advantage of this capability, and it is this streaming audio technology that is fueling the current wave of "webcasting" among radio stations.

Streaming audio has become possible on-line. This allows surfers on the World Wide Web to hear real-time sound when they access a web site.

Internet access cost

One major difference between on-air and on-line services is that each on-line "receiver" (i.e., a listener's computer or client) must connect to the "transmitter" (i.e., a content-provider's program stream or server) via an independent, discrete connection. This means that popularity can actually kill a particular site if it is "clogged" by a large number of simultaneous users. It also implies that the cost of providing an on-line service is directly proportional to the number of simultaneous listeners that a content-provider wants to serve. More servers and more incoming lines are required to accommodate these users, and each increment adds to the cost of the service to the webcaster.

Contrast this "serial" type of service to the more "parallel" approach used by traditional broadcasting, in which the number of simultaneous listeners has no effect on the capacity or cost of providing programming to the coverage area.

Of course, the flip side of this analysis indicates that the broadcast listener has no return path by which the program's content can be chosen or controlled (other than calling the station's request line). It also implies that a broadcast service with few listeners costs just as much to deliver as one with many listeners. Therefore, material with broad simultaneous appeal is better-suited for broadcast delivery, while content of narrower interest — or with which a capacity for return-path interaction is worthwhile — is more appropriate for on-line delivery. Thus, the two forms of delivery can co-exist well, serving two types of listeners (the proactive "seeker" and the passive "surfer") and carrying two types of audio programming.

This distinction may blur a bit within the next few years with the introduction of a new on-line technology called *IP Multicast*. It allows the Internet's own servers to replicate a broadcast-style program stream to multiple simultaneous clients. The webcaster (content provider) need only provide a single stream from a single server to the Internet backbone, without absorbing the total connectivity burden for a popular live program.

Clearly, the on-line environment offers tremendous potential for broadcasters, from simple promotional uses to worldwide extension of their coverage areas and multichannel delivery opportunities. The technology is still in its infancy, so additional possibilities of value to broadcasters may continue to emerge.

Computer-based system profiles

Continued from page 60

360 Systems
Shortcut personal audio editor

Shortcut is a stereo digital audio editor optimized for quick editing of call-ins, news reports and actualities and voice-overs. Powerful enough for production, yet simple enough for on-air use, Shortcut features full cut/copy/insert/erase editing using dedicated buttons and precision scrubbing. It records and edits directly on its internal hard disk and has a SCSI expansion port that supports Iomega Jaz and Zip drives. Shortcut is self-contained and includes a bright backlit LCD waveform display, analog and digital I/O, built-in monitor speakers and a mic pre-amp.

Special features: Shortcut can be interfaced directly to the 360 Systems DigiCart/II and DigiCart/II Plus storage and replay units. Shortcut is portable, weighing 12 pounds, and can be powered by all voltages. Because it is completely self-contained, remotes can be recorded and edited with just a microphone. It features full GPI capability, and so can be easily interfaced to phone hybrids and other controllers.

Price: $2,995 complete with 1.5 hours storage. $3,495 with three hours storage; $3,995 with four hours storage.

Phone: 818-991-0360; Fax: 818-991-1360; E-mail: info@360systems.com; Internet: www.360systems.com

For more information circle (221) on Free Info Card

360 Systems
DigiCart/II Plus

DigiCart/II Plus is a hard-disk recorder designed to replace analog cart machines in radio and TV master control and teleproduction applications. It offers analog and digital I/O, user-selectable 16-bit linear or Dolby AC-2 compressed audio storage, editing and playlisting capabilities. It also provides remote-control options including a production remote, a play-only remote, keyboard for titling and remote control and GPI and serial interfaces.

Special features: DigiCart/II Plus can be interfaced directly to the Shortcut personal audio editor by 360 Systems. It uses low-cost Zip disks for archiving and features D-Net high-speed file transfer networking as standard.

Price: From $3,995 for a system with 1.5 hours of linear or eight hours of compressed digital audio storage, with built-in Zip drive, digital I/O and D-Net networking included.

Phone: 818-991-0360; Fax: 818-991-1360; E-mail: info@360systems.com; Internet: www.360systems.com

For more information circle (222) on Free Info Card

TM Century
Ultimate Digital Studio (UDS)

The UDS is an audio management and control system designed for live-assist and walkaway operation. The primary concept of the UDS is as a machine controller. It has serial interfaces to the Computer Concepts' DCS and Broadcast Electronics' AV-100 hard-disk systems and a variety of CD jukeboxes, plus interfaces to popular music and traffic scheduling systems. A basic system comprises the Z-5000 computer with monitor, the A-4000 audio frame, and from one to 79 CD audio sources. The UDS uses the hard-drive system for storage of short-form programming like commercials, jingles, etc. and CD jukeboxes for primary program storage.

Special features: The UDS offers complete machine interfaces and all interfaces are bidirectional. Kill dates are adhered to with hard-drive interfaces. Sticking or skipping CDs are detected by reading the time code for CD jukebox interfaces. By using CD jukeboxes, the UDS provides a cost-effective means of delivering linear audio or large database formats.

Price: Around $20,000 for a typical system complete with hard-drive interface, music and traffic interface and jukeboxes, but excluding the hard-drive system.

Phone: 972-406-6800; Fax: 972-406-6890; E-mail: tmci@tmcentury.com; Internet: www.tmcentury.com

For more information circle (223) on Free Info Card

Videoquip Research
DAVE-2000

The DAVE-2000 system provides a workstation for detailed audio editing and a playlist environment for program automation and cart replacement. It is intended primarily for live-assist operation, but a parallel I/O card is available for remote activation of various system functions or for system automation. The system is specifically designed to edit and assemble audio tracks for broadcast applications. Storage of audio tracks is via the system hard drive and both single computer and networked systems are supported. Each playlist may contain up to 300 tracks, and eight different playlists may be enabled for instant access. Manual override is immediate and the next track to play may be changed on the fly for last-minute cues.

Special features: The DAVE-2000 system stores files in a proprietary format, but also supports WAV format files. The DAVE-2000 system also includes DNEWS, a complete capture and editing facility for use with any news wire service and supports news text and news audio files.

Price: $2,000 for the software and DAVE-2000 audio card. Phone: 416-293-1042; Fax: 416-297-4757; Internet: www.videoquip.com

For more information circle (224) on Free Info Card

WireReady NSI

CartReady

CartReady enables stations to use standard computers and LANs to build a completely digital facility. ControlReady, NewsReady, StormReady and SalesReady are add-on software modules that support integrated walk-away automation, news, music and sales, respectively, with all material being stored and played back from standard IDE and SCSI hard drives, although removable Iomega Zip and Jaz drives can also be used. Software is non-proprietary and works with off-the-shelf audio cards, such as the Digital Audio Labs CardD Plus and I/O and all Creative Labs Soundblaster models. Automation works with off-the-shelf switchers and controllers from companies, such as Broadcast Tools.

Special features: CartReady systems can be interfaced directly to the ENCO DAD system on a Novell file server. This allows a station to have a music/commercial touchscreen system supplied by ENCO, integrated with a digital newsroom provided by CartReady.

Price: $1,495 for the first CartReady computer, $795 for each additional computer and $1,995 for ControlReady automation; around $5,000 for a typical walk-away system including all the interface equipment, setup and training costs, excluding Pentium computer.

Phone: 1-800-833-4459; Fax: 508-393-0255; E-mail: sales@WireReady.com; Internet: www.WireReady.com

For more information circle (225) on Free Info Card

Yasmin Hashmi, BE Radio's international correspondent, and Stella Plumbridge, BE Radio's European correspondent are partners in the consultancy firm Sypha, based in London, England.

Business/People

BUSINESS

The **Wheatstone Corporation** is relocating its administrative and manufacturing facility from Syracuse, NY, to larger facilities in New Bern, NC. The company plans to be in the New Bern Industrial Park by October.

HHB Communications appointed Bay Roads as its East Coast manufacturer's representative. Bay Roads' home office is located in Sharon, MA.

Itelco appointed Trade Systems Inc., San Francisco, as its representative for The Phillipines. Trade Systems will also collaborate with Itelco to provide turnkey systems from single stations to complete networks.

Warner Music Canada and Toronto's **2ndSun Productions** delivered John Fogerty's latest single, "Walking in a Hurricane" across five different time zones over the Digital Courier International (DCI) network. Canada's top 67 AOR and CHR radio stations simultaneously received the single.

Broadcast Electronics, Quincy, IL, announced that Digital Radio Engineering Inc. will represent its RF and studio division lines for the region from Maine to Maryland. Digital Radio Engineering is based in Middletown, NY.

PEOPLE

Leitch Inc., Chesapeake, VA, has expanded its customer service department with the addition of **Robert Leeper** as U.S. customer service manager.

Terry Skelton joined Clear-Com Intercom Systems, Berkeley, CA, as Southwest regional sales manager.

Mitchell D. Wein, chief engineer of WFLC and WHQT, was named Radio Engineer of the Year by the South Florida chapter of the Society of Broadcast Engineers.

Rick Funk was named radio district sales manager for Harris Broadcast Division, Quincy, IL.

Following its acquisition of Northeast Broadcast Lab, the Harris Broadcast Division in Richmond, IN, announced several appointments for the new Harris sales office in South Glen Falls, NY:

Rich Redmond was named office sales manager; **Brian Szewczyk** will retain the position of broadcast sales specialist; **Joe Myers** will continue to serve on the broadcast sales staff; and **Gary Hardwick**, a sales specialist, will transfer from the Richmond office to the new office.

BE Radio expands editorial staff

From its first issue, **Skip Pizzi** has been involved in the rapid growth of *BE Radio* and he was recently promoted from editor to editor in chief. A past technical editor for *Broadcast Engineering*, Skip has been published in more than a dozen broadcast trade magazines and has authored or contributed to numerous handbooks and texts, such as *The NAB Engineering Handbook*.

Chriss Scherer, a frequent contributor to *BE Radio* and former chief engineer for WMMS-FM, in Cleveland, has joined the staff of *BE Radio* as editor. With a degree in music engineering technology from the University of Miami, Chriss has been an audio engineer for many years. He was involved with the Rock & Roll Hall of Fame opening ceremonies and is active in the Society of Broadcast Engineers.

John Battison is *BE Radio's* new technical editor, RF. Originally from England, John has been a broadcast engineer for the last 52 years. Moving to the United States, he designed and built a high-power transmitter for the "new" high FM band at a station in Kansas City, MO. Later he became the education director at the National Radio Institute in Washington, DC. John has been instrumental in starting many radio and TV stations worldwide and runs a consulting business.

Mackie sues to stop knockoff products

Mackie Designs Inc. filed a lawsuit alleging trademark and trade dress infringement, copyright and patent infringement and unfair competitive practices. The company is suing Sam Ash Music Corporation, Samson Technologies, Ulrich Bernard Behringer and his company Behringer Spezielle Studiotechnick GmbH. The lawsuit claims that the defendants conspired to manufacture and distribute copies of Mackie audio products using copied layouts and components identical to those developed by Mackie.

Mackie alleges that the copied products were manufactured and assembled by companies located in China, and sold at prices lower than the Mackie products. The company claims that the knockoff products have cost Mackie lost revenues in addition to damaging its market position. As a result, Mackie's complaint seeks damages in the amount of $327 million.

On Air Worldwide Media buys UDS

TM Century, Inc., Dallas, sold its Ultimate Digital Studio (UDS) division to On Air Worldwide Media, Inc., Los Angeles. According to Ralner Eichhorn, general manager of parent On Air Digital, the company has implemented the UDS in broadcast organizations in Europe and the Middle East, and the purchase of UDS allows On Air Digital to continue its implementation in the United States and remaining worldwide markets.

On Air Worldwide Media is a subsidiary of On Air Digital, one of Europe's largest distributors of broadcast-related equipment with offices in Berlin, Los Angeles, Dallas and an office soon opening in Paris.

Sonic DVD Creator receives Dolby approval

Sonic Solutions, Novato, CA, announced that its Sonic DVD Creator has received Dolby Digital audio certification. Dolby Digital sound, formerly known as AC-3, is a standard for DVD audio encoding, and the Sonic DVD Creator is a professional audio workstation-based Dolby Digital encoding solution. Having Dolby certification indicates that audio mastered on Sonic DVD Creator will retain all of its quality when played back on a Dolby-equipped DVD player.

Increase revenues with new reports

A monthly multimedia report will soon be available that features radio, TV and newspaper advertising expenditure information for all active radio advertisers in their respective markets. Through an exclusive agreement, Competitive Media Reporting (CMR), an advertising intelligence firm, and Miller, Kaplan, Arase & Company, a certified public accounting and consulting firm, will share strategic expenditure information that will be published in the Radio Market X-Ray Report. The new and expanded version of the report will soon be available in many large and medium-sized markets. The Windows-based programs will provide information that can help stations target advertising prospects. "If radio is to continue to grow in terms of revenue opportunities, it must target the entire advertising spectrum," said Dick McCauley, vice president of broadcast sales at CMR. "X-Ray will provide radio the ideal exposure to enhance its position as an integral and growing part of the media mix."

Another CMR report, the Radio Market X-Ray Plus Report, covers reports on all accounts using local newspapers and spot TV irrespective of their use of radio. For more information contact: phone 212-789-1400 or fax 212-789-1450.

21st century radio

Hitachi Ltd., Matsushita Electric Industrial Co., Ltd. (Panasonic), Sanyo Technosound Co., Ltd. and Victor Company of Japan (JVC) made an agreement with WorldSpace to develop and mass produce a new portable radio that can receive large numbers of broadcast programs direct from satellites.

The WorldSpace receivers will be small, portable units capable of receiving 100 or more channels of information, education and entertainment programming. The portable radios will contain new processing chips and technology developed by WorldSpace and its partners. SGS-Thomson and ITT Intermetall in Europe are under contract to produce two million chips for the new radio receivers. Other companies that are working on the system include Alcatel Espace, Arianespace, Matra Marconi Space, TIW and the Fraunhofer Institute of Germany.

WorldSpace will launch its first satellite in mid-1998 over Africa and the Middle East and plans to also launch satellites over Asia, Latin America and the Caribbean.

Harris acquires ITIS and Northeast Broadcast Lab

Innovation Telecommunications Image and Sound (ITIS), a French company, has been bought by Harris Corporation. According to Harris, the acquisition will allow the company to provide digital radio products that meet U.S. and European standards. ITIS specializes in the development of technology and products for the European standards for digital radio and television that are used in Europe and other parts of the world.

The ITIS operation, located in Rennes, France, will become part of Harris' Broadcast Division, but will operate independently to provide equipment and services to its existing customer base.

In other news from Harris, the company completed its acquisition of Northeast Broadcast Lab, Inc. Harris is establishing a sales center at Northeast Broadcast Lab's facility in South Glen Falls, NY, that will provide technical sales support, as well as on-line product information.

IRS- Montreux 1998

Once again, radio broadcasters will be traveling to Montreux, Switzerland, to get a glimpse of the future of broadcasting at the IRS-Montreux 1998 International Radio Symposium and Technical Exhibition. The general program will take place from June 10-13, 1998, while the Technical Exhibition will run from June 11-13.

June 10 has been designated as Montreux DAB Day with sessions organized in association with the European Broadcasting Union. Two new features at the conference include the "World's First Investors Summit on Radio" and the first Montreux Radio Awards.

For more information contact: telephone +41 21 963 52 08; fax +41 21 963 52 09; E-mail vanhoorn@symposia.ch.

Easy-to-read standards catalog of consumer electronics

The Consumer Electronics Manufacturers Association (CEMA), a sector of the Electronics Industries Association (EIA), has published the first engineering catalog that specializes in standards for consumer electronic products. These standards, created by EIA/CEMA, have been available from Global Engineering Documents, but CEMA's catalog presents the information in an easy-to-read, easy-to-access format that focuses solely on consumer electronics.

The catalog is available in electronic form via CEMA's web site at **www.cemacity.org/works**. To order EIA/CEMA standards, call Global Engineering Documents at 800-854-7179 or visit their web site at **www.ihs.global.com**. EIA/CEMA members receive a 25% discount.

British Telecom rolls out MusicLine One audio service

Audio Processing Technology supplied 250 codecs to British Telecom (BT) for the rollout of MusicLine One. This new point-to-point unidirectional 7.5kHz monophonic audio service is designed for connection between radio station studios and transmitters or for interstudio feeds. A single MusicLine One service consists of a pair of apt-X-based codecs, linked by BT's 64kHz Kilostream network, which is to be made available on one- to seven-year leased terms.

MusicLine One systems are also being installed at Capital Radio and Radio 210.

Fast-speed modem proposal

Following the adoption last year of the amended V.34 standard that gave the go-ahead for equipment manufacturers to start delivering products based on this high-performance data technology, the International Telecommunications Union (ITU) formed the Expert Group (or Rapporteur Group as it is known within the ITU-T). The group was created to prepare an ITU-U Recommendation for pcm-modems, also referred to as 56kb/s modems. Building on the success of the V.34 modems, the Expert Group is working to satisfy market needs and encourage the growth of this new market with an ITU-T Recommendation. The group plans to have the technical work completed by September. The target date for a fully approved Recommendation is January 1998.

Increased modem transmission speed cuts down the time needed by a computer to transfer information resulting in lower telephone bills. The proposed modem could also dramatically improve Internet access.

New web sites:

Soundtracs
www.soundtracs.co.uk

Reader Feedback

Dear Skip,

I read your "Last Byte" in the May/June issue and am largely in agreement with your assessment of the viability of webcasting. But I think there are a couple of additional points that need to be made.

First, one of the primary benefits of webcast capability is for archiving audio material of an informative nature. The best example that comes to mind is the great archive of reportage by National Public Radio (NPR), whose current and past broadcasts of "Morning Edition" and "All Things Considered" are accessible through the RealAudio home page.

Secondly, to use anything with this technology, your personal computer must be connected to the Internet and, if you are connecting from home or anywhere else without a permanent Internet connection, that means dial-up over a modem. This, of course, engages your local loop to the telco's central office, and I'm sure you are aware that the telcos are complaining bitterly to state and federal regulatory agencies how the increased average call durations occasioned by rapidly growing Internet use have strained the capacity of telco switches. I myself have noticed blocking much more frequently than in years past. So the telco complaints have legitimacy, though whether rate increases are warranted is another question. Naturally, the recently popular flat-rate plans offered by ISPs, which facilitate listening to webcasts, have exacerbated the blocking problem. There's no free lunch.

John Covell
Executive producer, City Visions
KALW-FM 91.7, San Francisco
"Information Radio"

Dear John,

Thanks for your insightful comments. Yes, on-demand access to audio archives is an important subset of the webcasting revolution. But like many transitions of the past, the first uses of a new medium imitate the techniques of its predecessors.

Remember that most commercial broadcasters are brokers of the here and now -- selling time, not storing content. Warehousing audio is more the business of libraries and record stores today, and it brings up a host of copyright and intellectual property issues that real-time webcasting has avoided. Firms that offer on-demand audio on the web are generally outright owners (or proper limited-rights holders) of this material. Music-formatted radio stations have no such claim on their primary content, although any station's locally produced material is fair game for the on-demand server.

It's also true that the Internet is changing the telephone industry. Increased demands for bandwidth and connect-time are causing telcos to rethink their architectures and business models. Keep in mind that many other developed nations do not have flat-rate local telephone service. Will the United States have to join their ranks?

Skip Pizzi, editor in chief

Next month in the September/October issue of *BE Radio*:

Cover Story: *Talk Radio*

Production facilities for radio talk shows are a strange breed, requiring unique elements in areas ranging from physical design to equipment selection. Some computer-based systems and increased integration of telephone-hybrid control have added a few wrinkles.

Feature: *Audio Processing*

The perennial battle of the ears rages on between engineers, managers, program directors and consultants for the station's proper air sound. Numerous interacting issues must be considered when deciding on audio processing. In many cases, the conventional wisdom just doesn't make sense anymore — if it ever did.

Contract Engineering: *LAN Basics, part 2*

Kevin McNamara, CNE, our computer/broadcast engineer continues his explanation of the basics of setting up a local area network at a radio station or production facility to interconnect computer-based administrative, audio and control functions. (Part 2 of a two-part series.)

Managing Technology: *Datacasting*

What are the business issues involved in auxiliary data transmission? Is a station selling its soul when it leases subcarrier space to a third-party data-content provider?

RF Engineering: *Proofs of Performance*

The process of quantifying a station's end-to-end performance is becoming a lost art, but is still necessary to the station operation. A veteran broadcast engineer explains how to do it right.

. . . Plus Field Reports, New Products and other News.

BE Radio

CLASSIFIED

PROFESSIONAL SERVICES

HELP WANTED

Prophet Systems Customer Support Engineer- and post-sales technical support for our broadcast automation products. Support areas include hardware, software, system design, layout and troubleshooting. Some amount of travel is required. A moderate technical background is necessary. Knowledge of DOS, Windows and Novell computing environments will prove beneficial. E-mail or fax resume to Jeff Zigler; jeffz@prophetsys.com, (308) 284-4181.

ADVERTISING RATES

Advertising rates in BE Radio Classified Section are 45^{00} per column inch, per insertion, with frequency discounts available.

Ads may also be purchased By-The-Word for $1.75 per word, per insertion. Initials and abbreviations count as full words. Minimum charge is 30^{00} per insertion.

Call Jeff Utter at 1-800-896-9939 or fax your od to 913-967-1735.

AD INDEX

	Page Number	Reader Service Number	Advertiser Hotline
Antenna Concepts	71	54	916-621-2015
Audio Broadcast Group	84	68	800-999-9281
Audio Processing Tech. Ltd.	19	9	+232-371-110
Audiotronics, Inc.	91	2	901-362-1350
Autogram Corporation	81	60	972-424-8585
Besco Internacional	85	70	214-630-3600
Broadcast Software Intl	69	52	602-572-8525
Broadcast Supply Worldwide	29	23	800-426-8434
Broadcast Technology Co.	86	72	719-336-3902
Broadcast Tools Inc.	85	71	360-428-6099
Circuitwerkes	86	73	904-331-5999
Coaxial Dynamics, Inc.	73	56	216-267-2233
Computer Concepts Corp.	53	34	913-541-0900
Camrex Corp.	37	27	508-263-1800
Continental Electronics	51	32	214-381-7161
Cortana Corporation	81	61	505-325-5336
Crown Broadcast	34	15	219-294-8000
DBM Systems/Cartworks	45	46	601-857-8573
Enco Systems Inc.	35	25	810-476-5711
Energy-Onix	56	45	518-758-1690
Equi=Tech Corporation	44	41	514-597-4448
ESE	83	66	310-322-2136
Euphonix	31	12	415-855-0400
Fidelipac Corporation	18	8	215-464-2000
GBH Mobile	80	59	617-492-2777
Gentner Communications	13	19	800-945-7730
Gorman Redlich Mfg Co.	84	67	614-593-3150
Harris Corp./Broadcast Div.	3	4	217-222-8200
Holaday Industries	86	74	612-934-4920
Innovative Devices, Inc.	22	11	250-260-2861
Inovonics	50	31	800-733-0552
Intraplex, Inc.	52	33	508-692-9000
Iteico	15	6	305-715-9410
Jampro Antennas, Inc.	36	26	916-383-1177
JK Audio	73	57	800-JK-AUDIO
Kintronic Labs Inc.	54	35	423-878-3141
LBA Technology Inc.	59	50	800-522-4464
Leitch Incorporated	7	16	800-231-9673
Lightning Master Corporation	83	65	813-447-6800
Logitek	11	18	713-782-4592
Mackie Designs Inc.	2	1	800-258-6883
Mediatouch	21	10	204-786-3994
Mediatron	42	39	498-131-83050
Mouser Electronics	86	75	800-992-9943
Multidyne Electronics	87	76	800-4TV-TEST
Murphy Studio Furniture	30	24	619-698-4658
NAB Broadcasters	61	36	202-429-5350
Neumann (USA)	9	17	
NPR Satellite Services	39	38	202-414-2613
NSN Network Services	67	51	800-345-VSAT
OMB America	57	49	305-477-0974
Orban	5	5	510-297-2774
Phasetek Inc.	58	47	215-536-6648
Pristine Systems Inc.	85	69	864-292-0300
Prophet Systems Inc.	25	21	308-284-3517
QEI Corporation	48-49	30	800-334-9154
Radio Programming & Mgmt.	46	43	800-521-2537
Radio Soft	74	58	904-426-2521
Radio Systems	43	40	609-467-8000
Roscom	82	63	770-992-2230
Satellite Systems	69	53	719-634-6319
SCEC '97	63	37	800-288-8606
Scott Studios Corp.	41	42	800-330-3004
Sennheiser Electronics Corp.	38	28	203-434-9190
Shively Labs	87	77	207-647-3327
Shure Brothers	47	29	800-25-SHURE
Silicon Valley Pwr Amplifier	58	48	408-986-9700
Smarts Broadcast Systems	33	14	800-747-6278
Switchcraft Inc./Div Raytheon	23	20	312-792-2700
S.W.R. Inc.	32	13	814-472-5436
Tannoy/TGI North America Inc.	70	55	519-745-1158
T.C. Electronic USA	55	44	805-373-1828
Transcom Corporation	87	78	215-884-0888
TSA Sites, Inc.	82	62	703-807-0000
Universal Electronics Inc.	87	79	614-866-4605
Ward-Beck Systems Ltd.	28	22	416-438-6550
Wheatstone Corporation	92	3	315-452-5000
Whirlwind	82	64	510-284-8417
360 Systems	16-17	7	818-991-0360

SALES OFFICES

NATIONAL & INTERNATIONAL
Steven Bell
9800 Metcalf Avenue
Overland Park, KS 66212-2215
Telephone: (913) 967-1848
FAX: (913) 967-1900
E-mail: steven_bell@intertec.com

CLASSIFIED ADVERTISING
Jeff Utter
Telephone: (800) 896-9939
(913) 967-1732
FAX: (913) 967-1735

WESTERN U.S.
Sue Horwitz
809 South Orange Drive
Los Angeles, CA 90036
Telephone: (213) 933-9485
FAX: (213) 965-1059
E-mail: 76345,2624@compuserve.com

LIST RENTAL SERVICES
Lori Christie
Telephone: (913) 967-1875
FAX: (913) 967-1897

BE Radio

EDITORIAL
Skip Pizzi, *Editor in chief*
Chriss Scherer, *Editor*
Brad Dick, *Editorial Consultant*
Dawn Hightower, *Senior Associate Editor*
Deanna Rood, *Associate Editor*
Jim Saladin, *Associate Editor*
Tom Cook, *Senior Managing Editor*
Carl Bentz, *Directories Manager*

ART
Stephanie L. Masterson, *Art Director*

BUSINESS
Raymond E. Maloney, *President*
Cameron Bishop, *Senior Vice President*
Dennis Triola, *Publisher*
Eric Proffitt, *Marketing Coordinator*
Kathy Volkland, *Advertising Coordinator*
Annette Hulsey, *Classified Advertising Coordinator*
Doug Coonrod, *Corporate Art Director*
Barbara Kummer, *Circulation Director*
Leann Sandifar, *Circulation Manager*
Customer Service: 913-967-1711 or 800-441-0294

TECHNICAL CONSULTANTS
Jerry Whitaker, *Contributing Editor*
Yasmin Hashmi, *International Correspondent*
Stella Plumbridge, *European Correspondent*
Russ Berger, *Broadcast Acoustics*
John H. Battison, P.E., *Technical Editor, RF*
Dane E. Ericksen, P.E., *Systems Design*
Donald L. Markley, *Transmission Facilities*
Harry C. Martin, *Legal*
Curtis Chan, *Audio/Video Technology*
Kevin McNamara, *Computer Technology*

MEMBER ORGANIZATIONS
Sustaining Members of:
- Acoustical Society of America
- Audio Engineering Society
- Society of Broadcast Engineers

Member, American Business Press
Member, BPA International

BE RADIO (ISSN 1081-3357) is published bimonthly (except an additional issue in August) and mailed free to qualified recipients by Intertec Publishing Corporation, 9800 Metcalf, Overland Park, KS 66212-2215. Non-qualified persons may subscribe at the following rates: USA and Canada, one year, $30.00; all other countries, one year, $35.00 (surface mail), $70.00 (air mail). Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 0956244.
POSTMASTER: Send address changes to *BE Radio*, P.O. Box 12937, Overland Park, KS 66282-2937.
BE Radio is edited for corporate management, technical management/engineering and operations and station management at radio stations and recording studios. Qualified persons also include consultants, contract engineers and dealer/distributors of radio broadcast equipment.

SUBSCRIPTIONS

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.

INTERTEC PUBLISHING

The EAS future

By Leonard Charles, CSTE

Broadcasters are now halfway through the first year of the new Emergency Alert System (EAS). Though some have a more colorful term to describe this first year, the FCC had the foresight to call it the shakedown year. Although it is true there were, and still are, many challenges in the process of EAS conversion, glimmers of what the system will become are beginning to show.

Some areas are already closely interacting with local government agencies, having created solid relay webs using existing government frequencies and networks. Those areas have proved by successful monthly tests that the beauty of the raspy EAS digital audio bursts is their ability to turn on, take over and turn off systems automatically.

A world of possibilities

This may be premature, but allow me to peer into the EAS crystal ball to a time when the system is up and running with high reliability. Once the initial paths of EAS alerts are background channels originated by government sources, a world of possibilities opens for this technology. Those digital audio bursts can do so much more than activate a decoder in a broadcast station.

Although it is true there were, and still are, many challenges in the process of EAS conversion, glimmers of what the system will become are beginning to show.

Imagine every home or vehicle receiver scanning for EAS headers day and night. Your radio or television would find an EAS alert without regard to what spectrum within which it was originated. If the receiver is being used, it could temporarily and automatically switch to the channel of the alert and perhaps turn up the volume to make sure the alert is not ignored. If the receiver is off, it could turn itself on.

How about EAS receivers wired into home security systems to broadcast alerts on hard-wired paging speakers through the residence and on outside loudspeakers? The same arrangement can also turn specific lights on in the home and provide other alerting means that cannot be ignored by people with or without disabilities.

In the EAS future we could see all public areas and buildings equipped with Public Address systems interfaced to an EAS decoder to automatically broadcast alerts, even in storage areas, elevators and stairwells. With these decoders monitoring the local emergency management frequencies, the public will no longer be deprived of an alert message because a broadcaster dropped the ball.

With the necessary codes incorporated into the system, emergency vehicles could turn upcoming traffic lights green in their favor with vehicle-mounted encoder/transmitters and pole-mounted receivers. One code for north/south travel and another for east/west travel automatically tracked as the vehicle changes direction. I'm sure someone will figure out how to handle those angled streets and ensure the lights are never green in both directions.

With mobile encoder/transmitters, law enforcement authorities can issue local area evacuations from the street where an incident is developing. These evacuation alerts will be received directly by any receiver in the homes surrounding the area. State Patrol officers can issue emergency road closure information to approaching traffic along with alternate route instructions from the front seat of their squad car. County officers can issue tornado warnings from their squad cars, which will be wide area broadcast via the sheriff's repeater. Firefighters on location can quickly evacuate neighborhoods in the path of a runaway brush fire.

For those areas not well-suited to an effective EAS terrestrial web, a single narrow satellite carrier could serve as an effective web for the entire country. Every emergency management office in the country could be equipped with an EAS encoder interfaced to a dial-up ISDN line to the uplink. Though every alert in the country would be carried on this single carrier, because of the specific location coding in the EAS header, only the decoders specific to the area of any alert would react. Additionally, once true satellite pagers are commonplace, every single person in the country would receive alerts for the area they have wandered into. The pager would automatically know the specific area because it could be equipped with internal Global Positioning (GPS) circuitry.

These are but a few of the possibilities once a high level of confidence in the EAS is achieved. And there are many more.

Leonard Charles is a staff engineer at WISC-TV in Madison, WI. He also serves on the Society of Broadcast Engineers board of directors and is chairman of the SBE EAS committee. He can be reached by E-mail at lcharles@wisctv.com.

THE FUTURE OF RADIO IS HERE

NuStar is ON-AIR

Cleaner, Clearer, Quieter
DIGITAL AUDIO IS THE DIFFERENCE

The sonic quality of WEGR-FM in Memphis is really very good and it just got better. Their NuStar 3000 Series installed quickly and operates flawlessly. The Morning Wake-up Crew, TIM, BEV, and BAD DOG are pictured above at the control surface. Tim Spencer (P.D.) says "The great thing about it is that it's Digital, but operates like the regular Board we're used to. We feel that's important because with the new console, our staff hasn't had any operator miscues at all. The transition was seamless."

- AND IT'S READY FOR YOU AND YOUR STATION -

With new equipment technology and your air time on the line
The Name You Can Trust To Deliver Is:

AUDITRONICS

3750 Old Getwell Road, Memphis, TN 38118 USA
Telephone: (901) 362-1350 FAX: (901) 365-8629
www.auditronics.com E-Mail: sales@auditronics.com

Circle (2) on Free Info Card


Some Countries
Have It ALL!
WSIX - Nashville, Tennessee
"Country Music Station of the Year"
A-500 Studio Furniture delivered March 1993
A-500 Console S/N 20789 delivered April 1993
A-500 Console S/N 20792 delivered April 1993
A-6000 Studio Furniture delivered March 1995
A-6000 Console S/N 22536 delivered March 1995
R-16 Console S/N 22557 delivered March 1995
SP-5 Console S/N 22593 delivered April 1995
1995 Academy of Country Music Award
1995 Marconi Country Music Award
1995 Billboard Country Music Award
1995 Country Music Association Award
1995 Country Music Association SRO Award
1995 Gavin Country Music Award
1996 Gavin Country Music Award
1996 Academy of Country Music Award
Wheatstone Model A-6000 Audio Console shown
Wheatstone Corporation
tel 315-452-5000 / Syracuse, NY
Circle (3) on Free Info Card