Radio™
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A solid foundation
Studio furniture sets the stage

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Find the Mic

With a keen eye you can win in our annual sweepstakes
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The Next 10 Years

Look into radio's future
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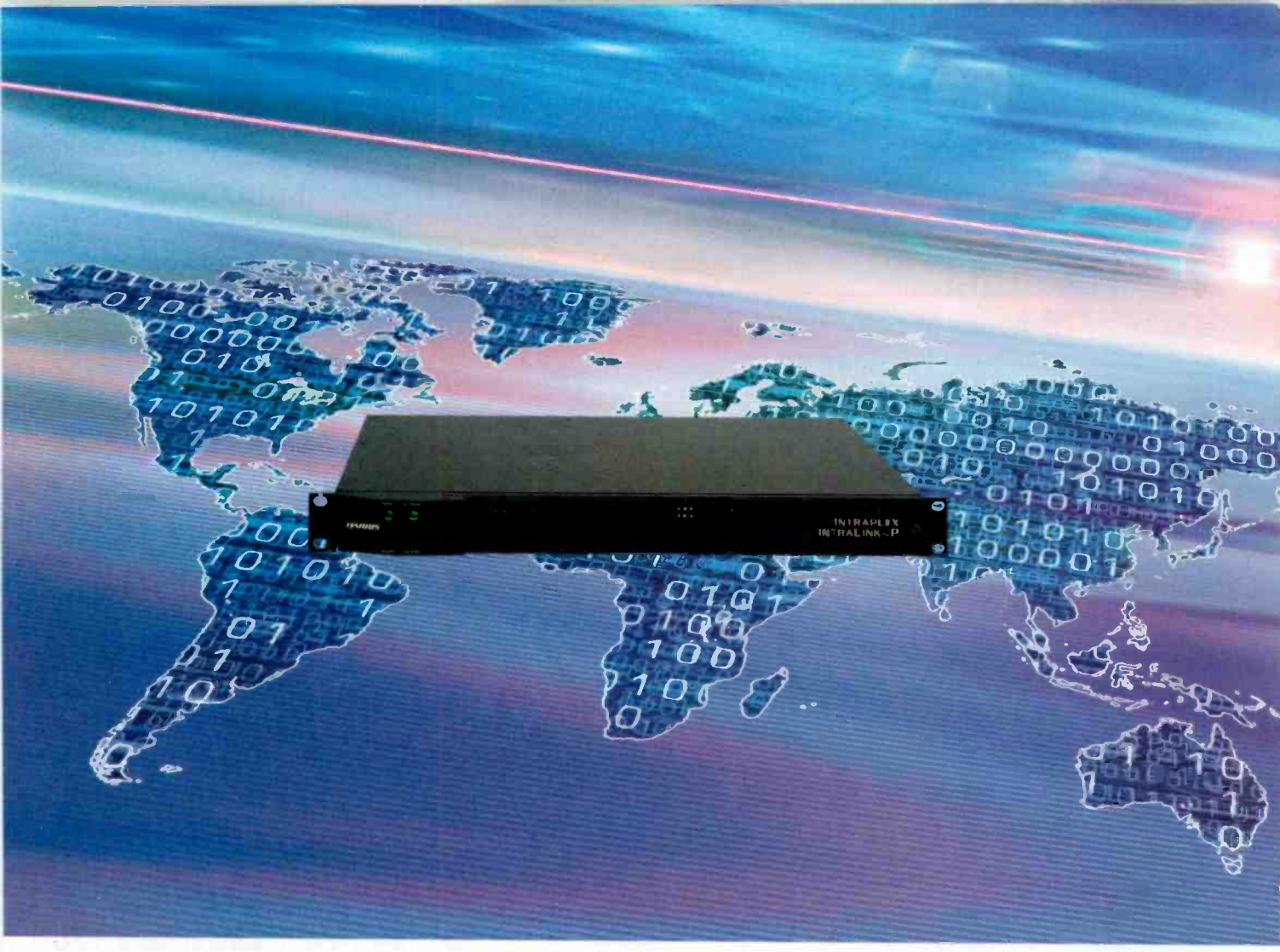

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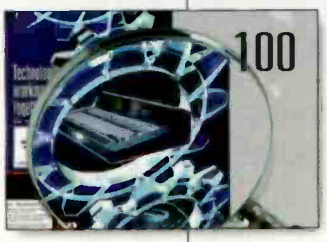

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ON THE COVER:
The right studio furniture can make or break (literally) a studio. Look at the important choices in the studio foundation. Cover design by Michael J. Knust.

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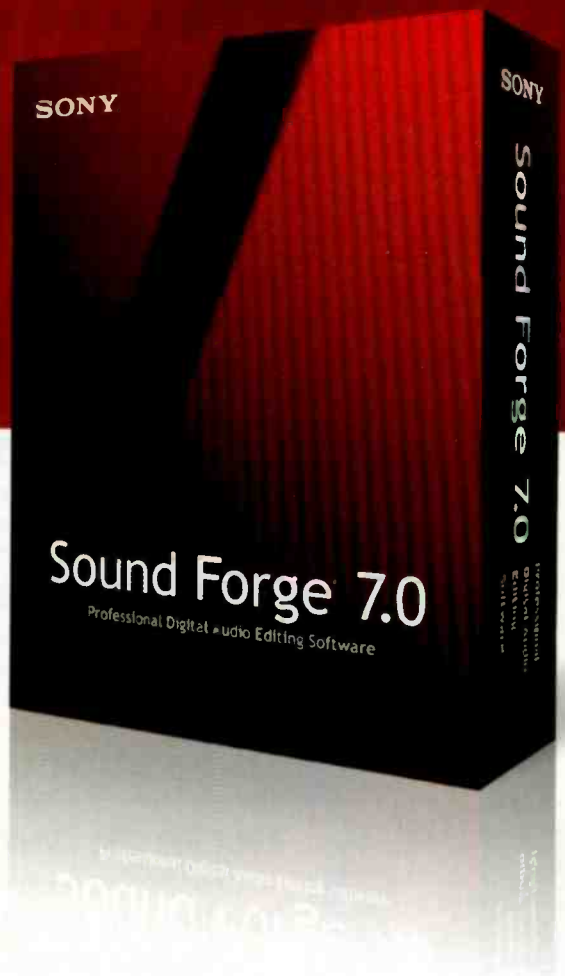

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Currents Online

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

Rohn Enters Into Agreement for Sale of Assets

After having filed Chapter 11, Rohn has entered into an asset purchase agreement with SPX, the parent company of Dielectric, Central Tower, TCI, Flash Technology and Flexline.

WNNK to Install Interleaved IBOC Antenna

Dielectric Communications is working with Cumulus on the installation of the Dielectric's first interleaved analog/IBOC FM antenna.

OMT Acquires Assets of Musicmusicmusic

The parent company of Mediatouch, OMT, has purchased the assets of the former Musicmusicmusic, a Toronto-based multimedia content provider.

FCC's Adelstein Seeks Payola Probe

In a speech, the commissioner called for action in the recent pay-for-play practices in broadcasting, citing various practices used by radio stations to charge record labels and artists for radio airplay and TV stations that charge to conduct interviews.

Microsoft's SPOT Watches Delayed

The Dick Tracy-like watches equipped with Microsoft's Smart Personal Objects Technology (SPOT) won't be available until early next year, missing the holiday shopping season target.

DRM Intros Participation Option

The Digital Radio Mondiale (DRM) consortium has unveiled a new participation option called DRM Supporter, which was created to foster rapid DRM adoption and implementation in markets worldwide.

Site Features

Find the Mic Sweepstakes

Enter online to win a Neumann BCM 104, a Sonifex RB-MA2 or an LPB Silent Mic Boom.

The Best 10 Years of Radio

Recap the past 10 Years of *Radio* magazine and the radio industry in our five-part retrospective. Our online compliment includes a cover gallery and recap of the Pick Hits Awards from the past 10 years.

2004 Radio Industry Buyers Guide Online

The special pull-out section in this issue is a handy reference that you can use all year. Even more information is available online at www.beradio.com. Click on Buyers Guide.

Applications & Solutions

Looking for specific articles relating to a type of product? We provide easy links to technology through the Applications & Solutions section at www.beradio.com. Click on a product category to see articles relating to your interest.

AudioTX Communicator Software ISDN and IP Network audio codec for Windows 98/NT/2000/Me/XP ● Uses Standard Sound and ISDN cards ● Connects to all MPEG 2, MPEG 3 and G.722 codecs ● Ideal for Studio or On-the-road use in a Laptop

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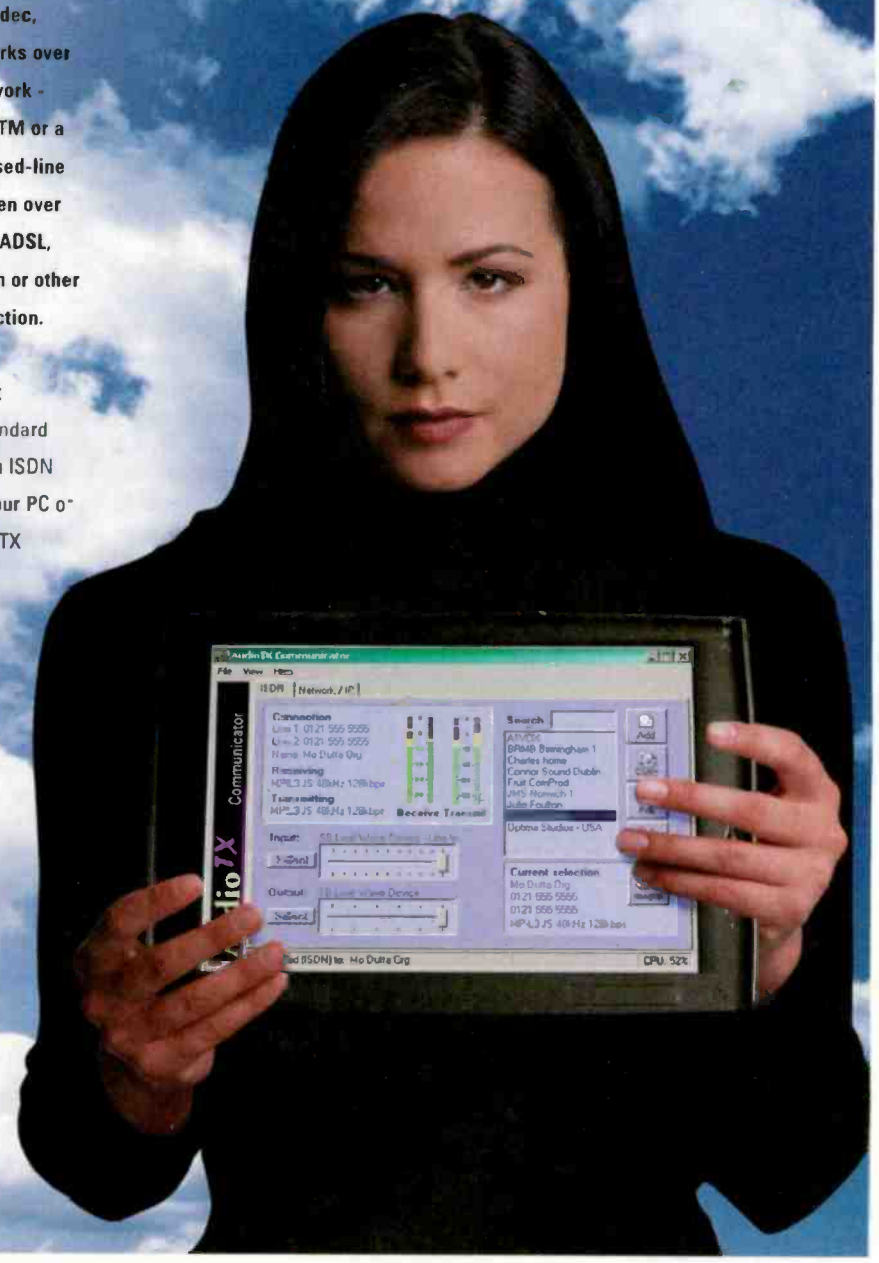

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Chasing perfection

After the release of HDC as the audio codec for the Ibiquity IBOC system, I expected to see many positive comments about the progress on the digital radio transmission system. The performance of the HDC codec is substantially better than PAC, the algorithm previously used. But instead of spurring optimistic statements about IBOC coming of age, the news has had the opposite effect in some circles. The HDC demo CD, which I evaluated in Viewpoint in the October issue, provides several examples of the codec as well as the original source material and an analog broadcast example. In personal conversations as well as online debates in e-mail discussion groups, there are many dissenters as to the success of HDC and IBOC in general.

Overall, many feel that HDC provides an acceptable encoding quality for IBOC. It's not a perfect system—any perceptual audio encoder will have flaws—but a perceptual encoder is designed to offer a compromise between required bandwidth and perceived audio quality. The negative remarks state that the trade-off in audio quality is unacceptable. Some cited that even at the 96kb/s data rate (the highest data rate on the demo), the encoding artifacts were unacceptable. In my listening, I felt that there were some detectable artifacts, but without comparing the encoded version to the original, most listeners would be hard-pressed to detect these errors. Some in the discussion agreed.

In addition, some performed a subtractive mono sum (left minus right) on the mono material to evaluate the grunge and artifacts that appeared. While no listener would ever make this kind of a detailed analysis, it could be argued that some listeners will detect the added noise and artifacts in the encoded audio quality of HDC. My feeling is that this pool of audio-purist listeners also objects to the bandwidth limitations of the current AM analog system and the pre-emphasis of the FM analog system. You can't please all the people all the time.

The IBOC system locks the transmission to certain data rates, all of which are 96kb/s or less. As broadband connectivity increases in data rates (and popularity), these data rates will seem like stone knives and bearskins compared to newer technologies. A saving grace may be the continued improvement of the audio encoding algorithm used, assuming that it will be possible to upgrade receivers in the field as the technology develops.

In addition to the audio quality arguments, the discussions turned to the overall system performance of IBOC. The usual topic relating to the problems of AM IBOC at night is the most popular argument. Some want to see another option, such as that suggested by Leonard Kahn with Cam-D. Like I said in last's month's Viewpoint, so far Cam-D has been unproven, untested claims and rhetoric.

Other arguments include the reduction in digital coverage compared to the analog signal, the effect that IBOC will have on distance-listening (DXing) and the uncertainty about the theoretical data services. A paper at NAB2003 by Paul Signorelli of Impulse Radio and Dave Maxson of Broadcast Signal Lab recommended a baseline data standard to be established today so that the data services can begin that much sooner.

In the end, technology is a race that cannot be won. While we choose a system and lock in to its parameters today, the advances in technology will continue. An update path must be available to the broadcasters and the consumer receivers or the debate will arise again in another 10 years.

The common theme of the discussions is that IBOC is flawed and should not be accepted until it is perfect. Most of these comments are made in closed circles where the participants are the only ones who hear them. These mental exercises produce some interesting ideas, but unless they are shared with Ibiquity, the NRSC, the FCC, the station owners or any other group that can act on them, they are a wasted effort.

Don't debate the issue in a vacuum. Get the facts and speak your voice. If you don't like the path that IBOC is showing us, speak now or forever hold your peace.

Chriss Scherer, editor
cscherer@primediabusiness.com

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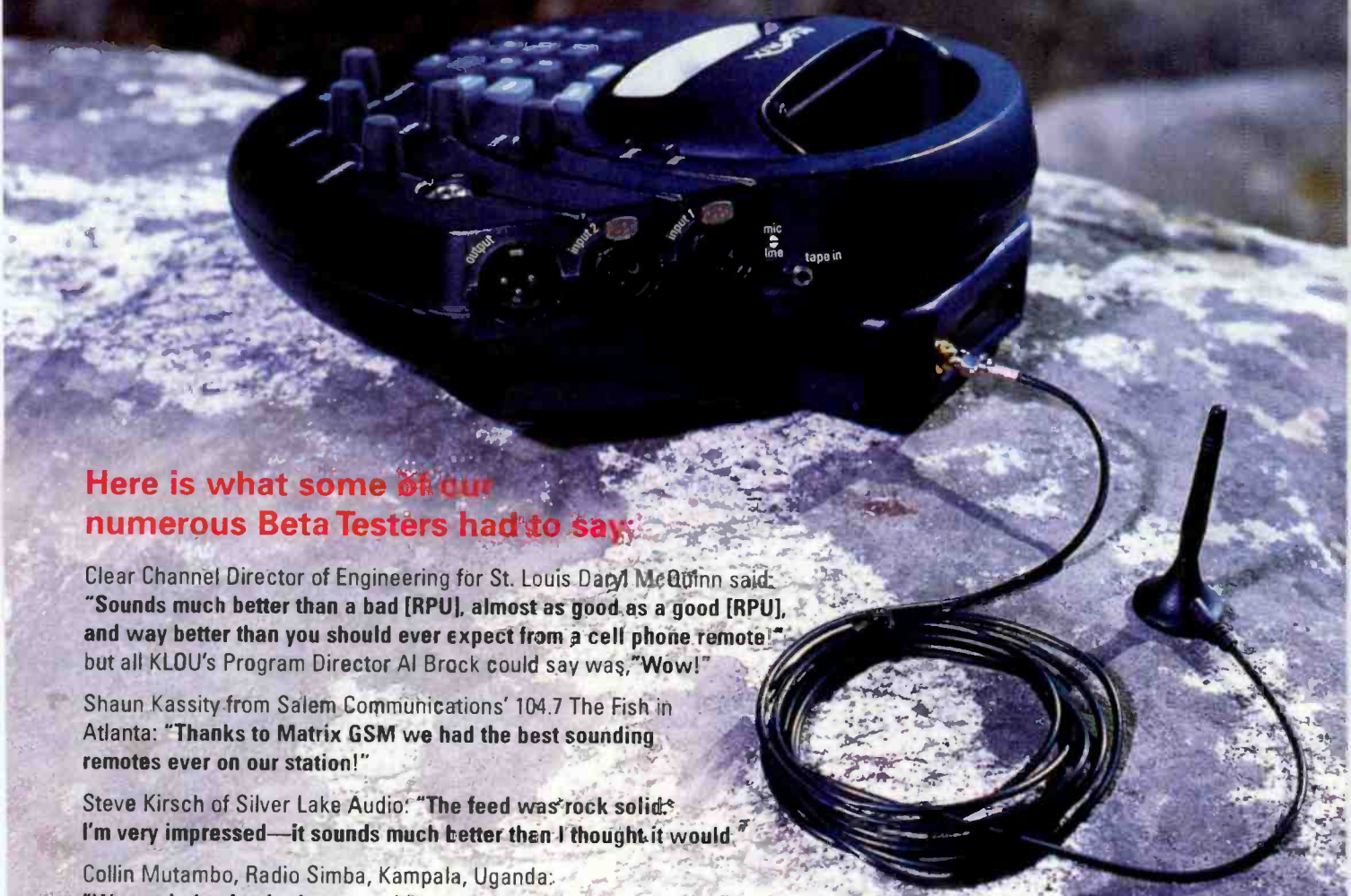

Here is what some of our numerous Beta Testers had to say:

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

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

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

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

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

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Technology cost and depreciation

By Kevin McNamara, CNE

Deploying technology is a double-edged sword—on one hand, it generally causes a particular task to be performed with greater efficiency; on the other hand, the value of the investment for state-of-the-art equipment decreases substantially from the day it is purchased, similar to the value of a new car as soon as it is driven off the dealer's lot.

The fundamental laws guiding technology

It is fair to say that three fundamental laws, laws promulgated by guys named Moore, Parkinson and Gates, have guided most of the advancements of technology during the past 30 years. Like Nostradamus, these visionaries correctly predicted, and in some cases created, the likely progression of technology that we now take for granted.

Moore's Law. The original Moore's Law derives from a 1965 speech given by Gordon Moore, later a founder of Intel, in which he observed that the number of micro components that could be placed in an integrated circuit (microchip) of the lowest manufacturing cost was doubling every year and that this trend would likely continue into the future. Moore's law was recently revised to account for the slow down in pace of the microchip industry. Currently, Moore's law states that the doubling now occurs every 18 months.

Parkinson's Law of Data. What he actually said was "work expands to fill the time available for its completion, and subordinates multiply at a fixed rate, regardless of the amount of work produced." But that was in 1957. Strangely enough, semiconductor memory wasn't a big deal at that time, so more recently someone in the Silicon Valley modified it to state, "data expands to fill the space available for storage." This less known truism from the mid-80s poses that the memory usage of evolving systems tends to double roughly once every 18 months. Luckily, for the same money, memory density also tends to double once every 18 months. Unfortunately, the laws of physics tell us that there is a limit to how small an area a bit can take up.

Gates' Law. "The speed of software halves every 18 months." This oft-cited law is an ironic comment on the tendency of software bloat to outpace the every-18-month doubling in hardware capacity per dollar predicted by Moore's Law.

Technology—depreciation and cost

When talking about equipment, depreciation can be categorized into three specific types: physical, economic and obsolescence.

Physical depreciation is defined as deterioration caused by physical wear and tear, malfunction, breakage or other type of destruction.

Economic depreciation can have two definitions:

- The allocation of the cost of an asset over a period of time for accounting and tax purposes.
- A decline in the value of a property due to general wear and tear or obsolescence; opposite of appreciation.

People trained to deal with finances primarily use these definitions to determine the tax consequences of capital purchases that, in most cases, can reduce the amount of annual taxes paid by an entity.

Functional obsolescence can occur for a number of reasons, including lack of support and replacement parts from a manufacturer, not compatible with newer technologies or perhaps replaced by more efficient devices.

We, as engineers and technology managers, view capital purchases from an entirely different perspective:

- Does the purchase increase operation reliability?
- Can it reduce maintenance costs?
- Will it improve the quality of the final product?
- Does it fit with our growth plan?

The issue of increased reliability is relative. Generally speaking, if we are replacing an ailing piece of equipment, shouldn't it be assumed that it is more reliable? The answer is "maybe." Consider the scenario of simply replacing a dated analog (cart) playback system with a server-based digital storage system. Is that dual-processor bit screamer more reliable than the old 30-pound cart player? The properly functioning cart player will probably withstand most acts of God without even a groan, while a little zap of well placed static electricity might render that state-of-the-art server nothing more than a fancy door stop. The point is that there are additional costs associated with the deployment of

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

Clark Dixon, Chief Engineer
Clear Channel Tulsa.

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

The Essential Codec Checklist

- ☑ Compatible with other 15kHz POTS codecs
- ☑ Unrivalled link stability over POTS (Used for STL's)
- ☑ Connects to other ISDN codecs via G.722 (ISDN option)
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new technologies. Improved grounding, additional cooling and modifications of rooms to maintain a certain level of cleanliness are just a few of the considerations to maintain proper reliability. These items represent additional expenses that should be factored into any technology purchase. By addressing these points up front, you should expect that maintenance costs should also reduce over time.

The computer's operating system sets the fundamental rules of operation. Subsequent upgrades may render programs worthless.

Improving the quality of the final product might be another goal of an equipment upgrade. This is how most non-techie types judge the value of the investment. Engineers are impressed by a widget that can send 1,000 parameters of operational data to our PDA, but nobody else really cares about that; they want to hear an improvement, they want to believe that this piece of equipment is drawing listeners (and advertisers) from every part of the FM spectrum.

Perhaps the most enticing benefit of the current and future generation of technologies is that it typically is designed to support earlier versions of software and hardware. Be aware of trends in hardware and software versions. If something is based on a CPU, there is some form of operating system setting the fundamental rules of operation. Most devices permit firmware upgrades through a physical change of hardware or some form of software patch. Patches and upgrades are issued to address certain bugs, add new features, exploit features of new hardware platforms or address compatibility issues with new or upgraded operating systems. While all of these are important, the last item is the one to pay close attention to. Be aware of announcements of major changes to operating systems. Major changes in operating system software may cause a software application to become obsolete. Get commitments from the manufacturers of the software or hardware you plan on purchasing, that they will support new technologies as they emerge in a timely fashion or you might be replacing all that equipment in a short period of time.

Here's one more law: Kevin's Law. Equipment you buy today will only have a fraction of the useful life of things bought 20 years ago, but the amount of usefulness per square inch will increase exponentially every 12 months.

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

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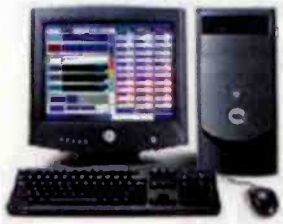

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Frequency coordination for BAS

By Harry Martin

The FCC's newest prior coordination procedures for the Broadcast Auxiliary Service (BAS) took effect in October. The procedures minimize interference between services sharing frequency bands.

With implementation of the new rules, prior frequency coordination procedures are now required for all TV and aural BAS and CARS frequency bands. The new rules specifically affect fixed BAS in the bands 944MHz to 952MHz (950MHz), 2,450MHz to 2,583.5MHz (2.5GHz), 6,875MHz to 7,125MHz (7GHz) and 12,700MHz to 13,250MHz (13GHz). The procedures were already in effect for aural and TV BAS stations in the bands 6,425MHz to 6,525MHz and 17,700MHz to 19,700MHz. For the 1,990MHz to 2,110MHz band, the FCC will continue to maintain procedures that allow for local frequency coordination.

However, the FCC's new rules supplement local frequency coordination procedures for fixed systems to require the submission of a certification, attesting that all co-channel and adjacent-channel licensees and applicants potentially affected by the proposed fixed use of the frequencies have been notified and are in agreement that the proposed facilities can be installed without causing harmful interference to other users.

Requiring adherence to uniform frequency coordination procedures is expected to reduce interference between services sharing a band and to ease the transition from analog to digital technology.

Proposed frequency usage must be prior coordinated with existing licensees, permittees and applicants in the area, and other applicants whose previously proposed facilities could affect or be affected by the new proposal in terms of frequency interference. Coordination must be completed prior to filing an application.

Coordination involves two elements: notification and response. To be acceptable, all applications and major technical amendments must certify that coordination, including response from notified parties, has been completed.

The new prior coordination procedures were supposed to take effect on April 16, but were delayed for six months to give licensees time to correct inaccurate information in the FCC's electronic database.

The Society of Broadcast Engineers (SBE) had requested postponement of the new rules so that licensees could correct information in the FCC's database, including erroneous or missing receive site information such as geographic coordinates, antenna height, and make and model information. The mistakes were left over from licensing methods antedating the FCC's current Universal Licensing System (ULS). The flaws in those older licensing methods are evident from the fact that about 29 percent of all fixed point-to-point BAS licensee records included some mistaken information. Receive site information was not even required prior to 1974, which is why it was missing in many old licenses. The inaccuracies in the ULS would have seriously impacted prior coordination efforts to avert interference.

The SBE also asked the FCC to waive the $120 filing fee for modification applications filed solely to provide information missing from the FCC's database, but the FCC denied that request.

No Tower Lights Equals $120,500 Fine

The FCC has issued a $120,500 notice of forfeiture to a tower company for failing to light a new 1,000-foot tower in Richmond, VA.

FCC inspectors found the tower unlighted for several days and discovered that another tower at the site was unregistered. The maximum possible fine was levied because the FCC previously had fined the same company for failing to light a tower it owned in Florida. The company had been cited for a total of three forfeitures in less than three years for at least 13 instances of failure to comply with antenna structure rules.

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

Dateline:

Radio stations in Arkansas, Louisiana and Mississippi must file their renewal applications on or before Feb. 1, 2003.

Issues/programs lists for the last quarter of 2003 must be placed in the public file on or before Jan. 10.

Logitek Brings Large Console Flexibility

to small workspaces

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

Possible Remora Configurations

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

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

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

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

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Studio Furniture

When form meets function

By Chriss Scherer, editor

Studio furniture plays an important role in the operation of any studio. While this passive component of the studio design serves as the physical foundation for the equipment that will be used around it, it is sometimes barely given more than a casual thought as to its design and installation.

The technology behind studio furniture may not seem sophisticated, but the craftsmen behind the work can usually quote all kinds of specifications pertaining to load tolerance, resistance to warping and durability of materials. In the end, many manufacturers create a quality product that will last for many years. Some details in manufacturing materials are important to consider, but it is easy to get lost in the specifications. A certain exotic material from some distant land may seem like the perfect choice, but in the end, the long-term durability is what matters most.

The most common material debate is between the use of plywood or particle board. Those opposed to particle board cite that it crumbles and warps too easily. This may be true of materials from several years ago, but particle board materials today are manufactured to some of the highest tolerances of any man-made material. Thicknesses are tightly controlled to thousands of an inch. Plywood likewise is a quality material, although the thickness tolerance is a little looser. It is important to know that when particle board is used, it must be an industrial-grade material and not an underlayment grade. Underlayment grade will crumble when screws are used on it.

When a surface material is laminated, the coating must be applied to both sides or the material will warp. By balancing the panel, the absorption of moisture and stresses from use will affect both sides, reducing the likelihood of warping.

A new addition to studio furniture designs is the use of solid-surface materials for the countertop. Materials such as Corian and Gibraltar provide a durable surface that is forgiving of scratches and blemishes. A scratch can be removed by sanding and buffing the area. The surfaces are strong and nonporous, which resist stains. Larger sections can be custom formed to hide seams for a continuous surface. Solid surfaces can also be cut into a variety of shapes without the need for edge molding.

Two distinct paths

Most studio furniture can be classified as modular or custom. Custom designs cost more and are manufactured to specific instructions. The modular approach includes the classic cabinetry designs as well as the workstation design.

One advantage to the modular cabinetry approach is that it usually lends itself to easy furniture reconfigurations. The workstation approach also has some modularity to it, typically providing several basic pieces that can be arranged in various ways to create the final design. Some applications may begin with a modular approach and then customize it to fit a specific need.

Whether choosing a custom package or an off-the-shelf approach, the end result can still look fabulous. When a studio project is started, the furniture is one of the first items needed before installation can begin. With custom choices and exotic materials typically comes a longer manufacturing time.

The workstation designs offer a great deal of flexibility, and by their design have an open look and feel. Conventional cabinet designs will usually provide a stronger base to work from, but

Resource Guide

Selected manufacturers of studio furniture

Spacewise Broadcast Furniture

Products offered: Expression, Delux, Radial, All Talk, DQS, Airshow, Daves

800-775-3660
www.spacewise.com

Middle Atlantic Products

Products offered: Edit Center, Multi-desk, racks

973-839-1011
www.middleatlantic.com

they also offer an inherent wire management and power system that is hidden from view. In addition, the cabinetry can usually provide a space for a punch block connection panel or other wire distribution point.

Equipment cooling is an important consideration. While equipment needs have changed, the largest producers of heat—cart machines—have almost completely disappeared. Instead, studios are being loaded with more computers and computer monitors. In most cases, a passive airflow will be sufficient to maintain an appropriate ambient temperature. The addition of vents to rear panels can help. In some cases, additional forced air may be necessary.

The bigger problem from the introduction of computer-based equipment is noise. More and more equipment relies on cooling fans, which can be a noise problem. If the computer must be placed within the studio, try to place it as far away as possible from any open mics. The computer can also be housed within the furniture, which will attenuate its noise.

A showcase studio begins with the equipment foundation. The studio furniture acts as a passive partner in this system. By making the right choices today, this foundation will faithfully serve its purpose for many years to come.

Studio Technology

Products offered: Basis, custom

800-676-0216
studiotechnology.com

Harris

Products offered: Quickline, Primeline, Smoothline, custom

800-622-0022
www.broadcast.harris.com

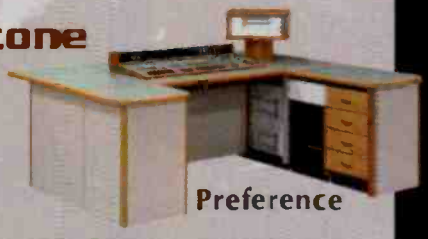
Omnirax

Products offered: Forte, Presto, Prostation, Force, custom

800-332-3393
www.omnirax.com

Wheatstone

Products offered: Preference, Eclipse, Tech Line



252-638-7000
www.wheatstone.com

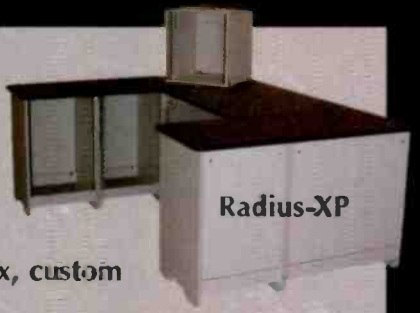
Winsted

Products offered: Various modular systems

800-447-2257
www.winsted.com

Arrakis Systems

Products offered: Radius-XP, Modulux, custom



970-461-0730
www.arrakis-systems.com

Mager Systems

Products offered: Sound Choice, custom

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www.magersystems.com

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Products offered: custom furniture, racks

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www.ramsyscom.com

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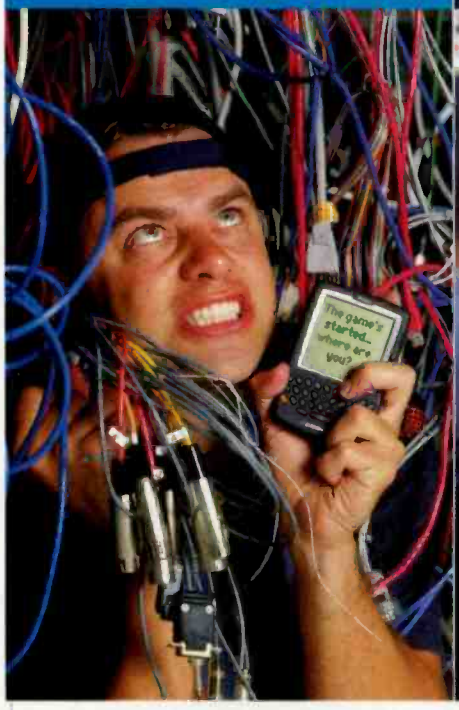

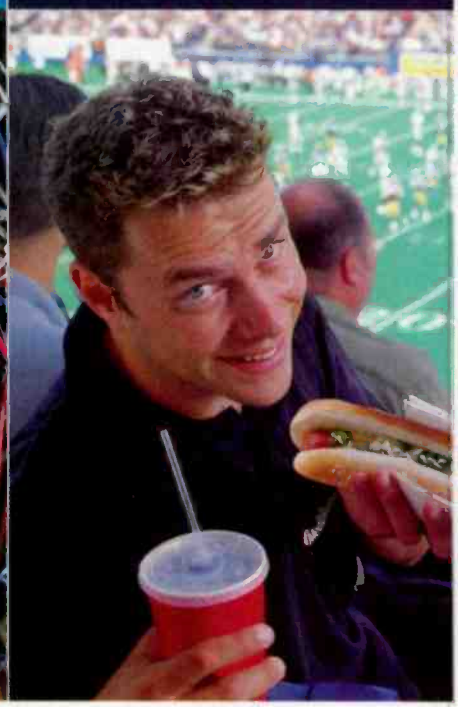

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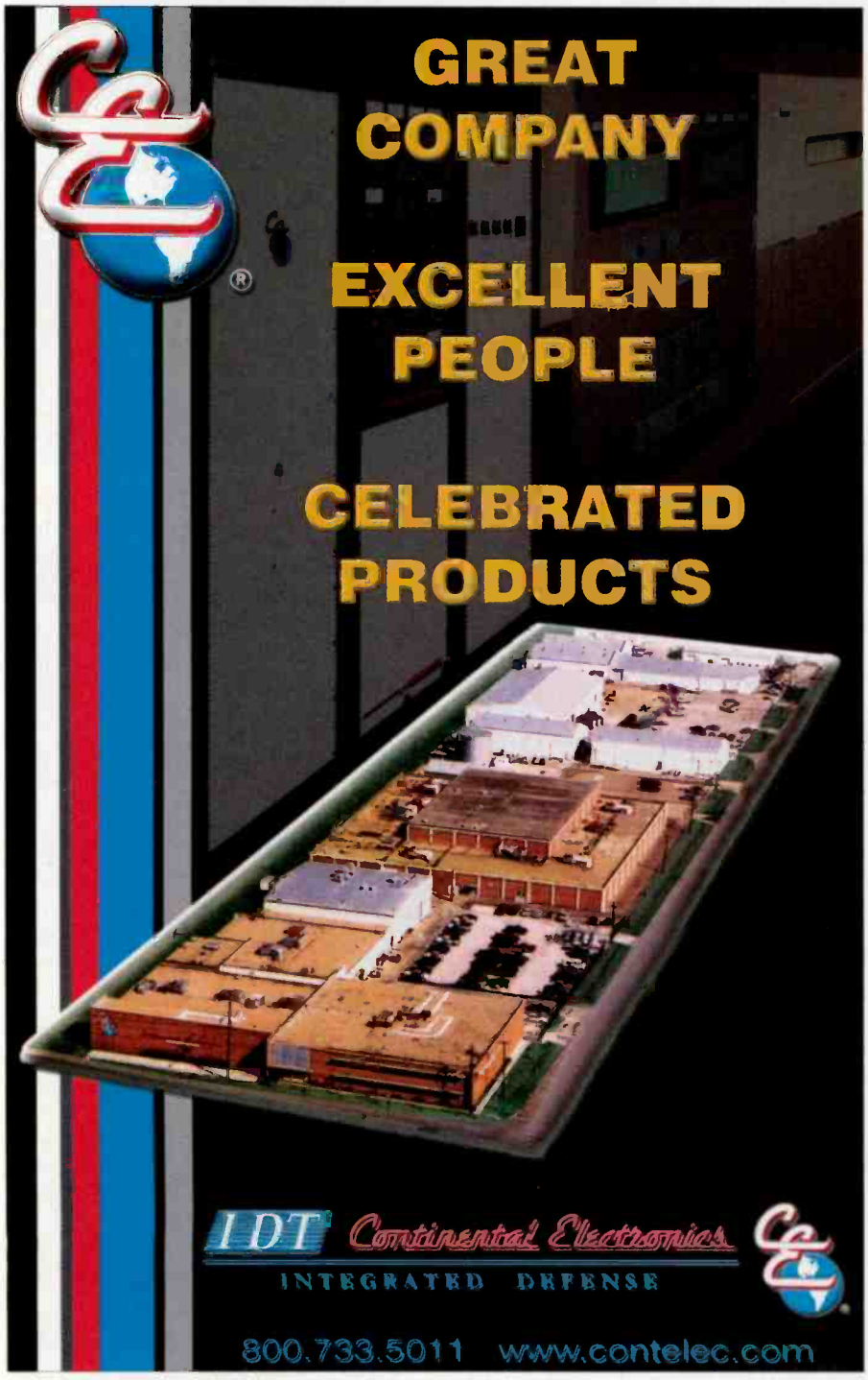

The furniture accessory

Equipment racks are just as important as studio furniture. Besides the utilitarian factor of the steel rack, there are variations designed to offer environmentally sealed uses or special sound isolation functions. Here are some companies that offer equipment racks in various designs that can complement a studio furniture decision. ■

Amco Engineering
800-833-3156
www.amcoengineering.com

APW Enclosure Products - Stantron
800-558-7927
www.apw-enclosureproducts.com

Chatsworth Products
800-834-4969
www.chatsworth.com

Electrorack Products Co
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The IBOC debate

We received lots of letters relating to IBOC over the past month. Here are some of them.

The emperor has no clothes

FM IBOC (HD Radio) has been touted as the future of radio: better audio quality, no multipath, data services promising killer applications. What more could FM broadcasters ask for?

NPR compiled a CD of various music styles and voices with the original cut, an FM sample and then 96kb/s and 64kb/s codecs. The 96kb/s version is the de facto codec for FM. The 64kb/s codec is proposed for NPR's Tomorrow Radio dual-channel service currently in development.

I received this CD and took a listen. After I picked my jaw up off the floor I started posting my observations on the Public Radio e-mail reflector (Pubtech). *Radio* magazine asked me to digest my comments and write them up. That's mighty courageous of them.

Let's start with audio quality. It's my opinion that the current 96kb/s codec is incapable of reproducing even a simple male voice without generating objectionable artifacts. It gets worse with music. On the classical cut the strings were thin and harsh. For those of you who are broadcasting contemporary formats, the codec removes sibilance unnaturally, changes the timber of symbols and makes back up vocals strident. This is not CD-quality by a long shot. In fact, during my listening test I found that our station's plain old analog signal sounded better than the 96kb/s codec.

My comments about these observations resulted in lots of feedback. Lets take it from the top with the comments and my reaction.

Consumers don't care about audio quality. Really? If this is true why do the auto manufactures offer high-end sound systems as options? I don't think GM would be offering Delco Bose and Monsoon optional sound systems if consumers weren't buying them. If we take this argument to its logical conclusion, why would you even bother with HD Radio? If the consumer obviously doesn't care how it sounds, the existing FM service is just fine.

HD Radio fixes multipath. We can solve 95 percent of multipath problems today with diversity FM radios. Motorola offers OEM chipsets that support this today. My 2002 Cadillac DTS with its optional Delco Bose sound system has a diversity FM radio in it and there is virtually no multipath issue.

HD Radio data service will result in "killer applications" that will revolutionize and reinvigorate data broadcasting for radio stations. We can do some of these killer applications today with RBDS, including artist and title, traffic and traffic alerts. On top of that, almost 70 percent of the cars built today have RBDS capability right now. Additionally the advanced interactive HD Radio functions will require HD Radios with built in cell phones. I can just see that coming down the pike.

Of course the real killer application that is missing is to make the HD Radios a software-defined radio that is updateable via the data stream. That would let us update the codec and radio as technology improves instead of being locked into what I consider to be a very marginal codec we have today.

So what does this all mean? Well here at KUVO we have a CPB HD Radio seed grant and we will be putting HD Radio on the air. That doesn't mean that I like it or that it can't be significantly better than it is now.

Mike Pappas
chief engineer
public radio station KUVO
Denver, CO
mpappas@qwest.net

More on IBOC audio quality

I think the Reader Feedback comments on Quality Audio for IBOC in the November issue make some excellent points, and said what needed to be said. Having had an AM station that we spun-off primarily due to the almost total lack of decent wide-band AM radio receivers comparable to FM, I can second what was said. There is a tendency in our industry to totally embrace digital, with little or no consideration as to whether it is the best choice from a technical standpoint. Where unlimited bandwidth is available (compact disc, hard-drives, etc.), digital is the clear choice. But in dealing with limited bandwidth systems (AM and FM) every technical innovation and solution needs to be considered.

Over the years I have acquired several wide-band receivers, and can confirm that AM quality can be excellent, even on a par with FM. As a whole the broadcast industry is doing a grand job of transmitting high quality audio, considering the trashy receivers out there, which I would account for

at least 99 percent the receivers. I agree that if the broadcast industry (which certainly has the resources to take on the present radio manufacturers) could begin a mass manufacturing and marketing plan of wide-band receivers, from pocket to full-size portables, clock, walkmans, boom boxes, auto and component stereo units—all with digital tuning—it could change the face of our industry. Why, I'll bet even Wal-Mart would take on the whole line. I realize that the purpose of this project would not be so much a money-making one, but to just get decent radios in the hands of the listeners.

Raymond O. Creely
president and chief engineer
Brooks Broadcasting Corporation
Falfurrias, TX

Care to comment?

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Send your letters to
radio@primediabusiness.com.

The future of IBOC

As part of our Annual Salary Survey we asked survey respondents "Why won't your station commence IBOC operations?" Some of the responses were posted online with the October issue. The following letter is in response to these comments. —CS

I just read some of the comments that accompanied the *Annual Salary Survey* in the October issue. We are small, 250W, stand-alone AM in Ottawa, KS, and I have followed the development of IBOC closely. I think IBOC is essential to the continuation of free over-the-air broadcasting, but I think because of some of the negative reactions I have heard from the industry (like what I read from your survey) it's doomed. One comment read that IBOC's fate is much like that of AM stereo. To me that is a self-fulfilling prophecy. Some leadership needs to take place here.

I think the AM product has greater hurdles to clear than the FM. We are a stand-alone AM and we still play music. But if something like IBOC doesn't come in and allow us to compete with a music format, I think it will devastate small community stations across the nation (especially AMs). One example is a station in Kansas City that moved its successful Country format from an AM frequency to an FM frequency.

Instead of complaining about how inferior it is, the industry should work to fix it if it doesn't meet acceptable standards. Otherwise, the Internet and satellite radio will have gained a strong hold on our audiences and then in a few years we will be sitting there wondering what happened.

Brad Howard
owner/president
KOFO-AM
Ottawa, KS

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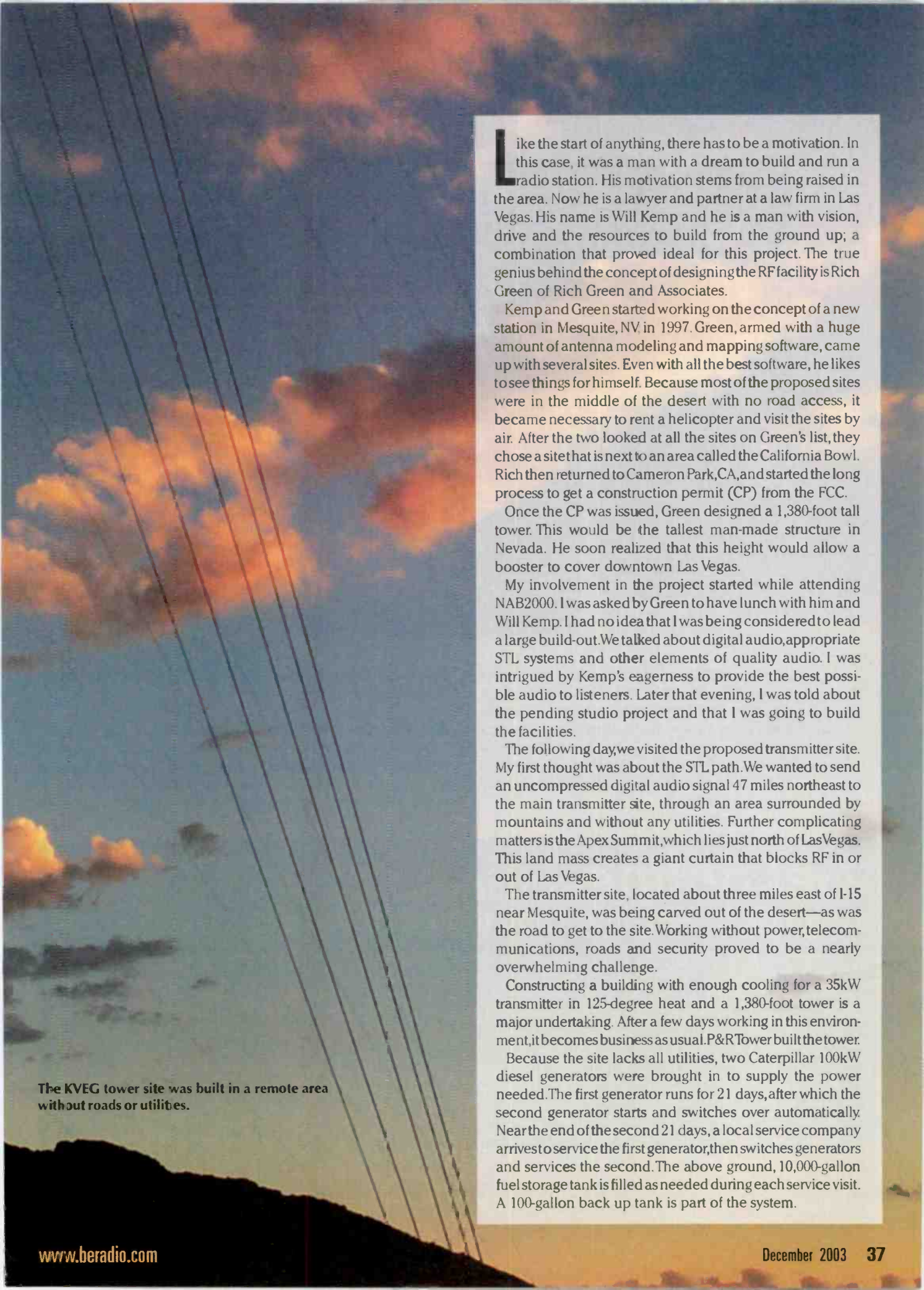
The birth of a radio station

By Jay Rose

KVEG Las Vegas gets a new home



The KVEG tower site was built in a remote area without roads or utilities.

Like the start of anything, there has to be a motivation. In this case, it was a man with a dream to build and run a radio station. His motivation stems from being raised in the area. Now he is a lawyer and partner at a law firm in Las Vegas. His name is Will Kemp and he is a man with vision, drive and the resources to build from the ground up; a combination that proved ideal for this project. The true genius behind the concept of designing the RF facility is Rich Green of Rich Green and Associates.

Kemp and Green started working on the concept of a new station in Mesquite, NV in 1997. Green, armed with a huge amount of antenna modeling and mapping software, came up with several sites. Even with all the best software, he likes to see things for himself. Because most of the proposed sites were in the middle of the desert with no road access, it became necessary to rent a helicopter and visit the sites by air. After the two looked at all the sites on Green's list, they chose a site that is next to an area called the California Bowl. Rich then returned to Cameron Park, CA, and started the long process to get a construction permit (CP) from the FCC.

Once the CP was issued, Green designed a 1,380-foot tall tower. This would be the tallest man-made structure in Nevada. He soon realized that this height would allow a booster to cover downtown Las Vegas.

My involvement in the project started while attending NAB2000. I was asked by Green to have lunch with him and Will Kemp. I had no idea that I was being considered to lead a large build-out. We talked about digital audio, appropriate STL systems and other elements of quality audio. I was intrigued by Kemp's eagerness to provide the best possible audio to listeners. Later that evening, I was told about the pending studio project and that I was going to build the facilities.

The following day, we visited the proposed transmitter site. My first thought was about the STL path. We wanted to send an uncompressed digital audio signal 47 miles northeast to the main transmitter site, through an area surrounded by mountains and without any utilities. Further complicating matters is the Apex Summit, which lies just north of Las Vegas. This land mass creates a giant curtain that blocks RF in or out of Las Vegas.

The transmitter site, located about three miles east of I-15 near Mesquite, was being carved out of the desert—as was the road to get to the site. Working without power, telecommunications, roads and security proved to be a nearly overwhelming challenge.

Constructing a building with enough cooling for a 35kW transmitter in 125-degree heat and a 1,380-foot tower is a major undertaking. After a few days working in this environment, it becomes business as usual. P&R Tower built the tower.

Because the site lacks all utilities, two Caterpillar 100kW diesel generators were brought in to supply the power needed. The first generator runs for 21 days, after which the second generator starts and switches over automatically. Near the end of the second 21 days, a local service company arrives to service the first generator, then switches generators and services the second. The above ground, 10,000-gallon fuel storage tank is filled as needed during each service visit. A 100-gallon back up tank is part of the system.

The birth of a radio station

The KVEG control room is at the center of the fully digital facility.

The STL path length was about 47 miles from end to end. I envisioned a double hop, but did not know where the middle point would be. I soon discovered a site on the west side of the freeway while driving north on I-15. While it was not easily accessible, I determined the position with GPS and turned it over to Kemp. This large peak with existing radio towers is called the Apex Communications site.

In short order I had a name and phone number to coordinate a site visit with a representative. I used my spectrum analyzer to check for available microwave frequencies and sent my findings to Green.

We quickly learned that a microwave channel would not be available in a timely fashion. An alternative was needed. I chose Harris TM-2400 Aurora 2.5GHz spread-spectrum radios for the primary link and the TM-5800 5.8GHz Aurora spread spectrum radio for the secondary link. Many consider spread-spectrum to be unreliable, but both systems have worked perfectly with no down time in three years. Both radio systems interface directly with Harris Intraplex T-1 multiplexers, which provide an uncompressed bidirectional link. Program audio is sent to the transmitter site and an air monitor is returned. The system also carries the transmitter remote control data. The primary Intraplex system uses digital input cards, while the backup system uses analog cards. At the transmitter site, the two outputs feed the TFT 999 Digital Insertion unit. This accepts the analog and digital signals and automatically switches to the analog feed if the digital signal fails.

Green designed an air conditioner system with a custom built pre-cooler that works with great efficiency. The pre-cooler air is only on when the outside temperature is lower than the transmitter exhaust. It uses isolated outside air blowing across an air exchange then back outside. This keeps the outside air from contaminating the transmitter building's closed air-cooling system.

Inside the studios

Kemp wanted a facility that could handle several stations, including radio, TV and webcasting. He wanted four studios, starting with an on-air studio and production studio. The other two studios would be built for future expansion. Kemp wanted an impressive

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facility to demonstrate his commitment to his new industry.

We planned on building the station in one of his existing properties on the Las Vegas strip, which was next to a large parking lot that is often used for bus traffic. Buses would sit in the lot idling for long periods of time, providing a constant noise source that needed to be addressed. I designed the studios with the usual construction techniques: double walls, three layers of insulation and double sheetrock. Although the cost of specifying an NC-20 standard in this case was impractical, all efforts were made to make it as quiet as possible. Even with good communication between the contractor and me it still took several inspections during construction to prevent sometimes almost hidden breaches of the isolated walls. We decided to spend the money on backup power and studio equipment. This turned out to be the right move.

Looking up at the Apex Communications site, which serves as the middle point of the STL path.

Kemp also wanted the best possible audio to crush the competition. We wanted the perfect digital chain: CD quality with absolute linearity all the way through to the exciter. I started with a product that I knew well; I needed a hard-drive media delivery system with truly linear capabilities at 44.1kHz. It needed to handle all the latest nuances, such as CD ripping, importable music scheduling, ease of use and plenty of backup infrastructure including a backup server and separate play-to-air machine for each room. I also wanted to remotely locate the machines in the rack room to keep the studio as quiet as possible. Luckily for us, my last responsibilities at KMEL were to purchase and install just such a system to replace the station's aging ITC cart machines. I knew which system I wanted. We purchased a Mediatouch system.

For the audio console, I chose a product that I think offers a lot of bang for the buck; the Logitek audio engine with the Numix control surface. Its mix-minus capabilities and ease of use makes it a real winner and it looks great. We used these consoles in the on-air and production rooms.

The telephone hybrids are from Telos, complete with talk-show options. The Inter-Tie system was my own design that I first used at KSTE in Sacramento, CA, in 1993. I have always felt that if engineers had more options, they wouldn't use 66-style punch blocks with their knife blade's width connections.

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The birth of a radio station

After all, most phones and data circuits develop problems because of bad punch connections. My system uses a series of Molex, BNC and F-type connectors and can be fitted with any other connector as well.

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Equipment List

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APC Smart UPS-3000
Auratone 5R3C-FG rack monitors
Belden 1192A Starquad, 1222B 16-pair cable, 1633A CAT5 cable, 1800B 22-gauge cable, 1806F 12-pair cable, 8240 RG-58, 8241 RG-59, 8325 25-pair control cable, 8444 22-gauge cable
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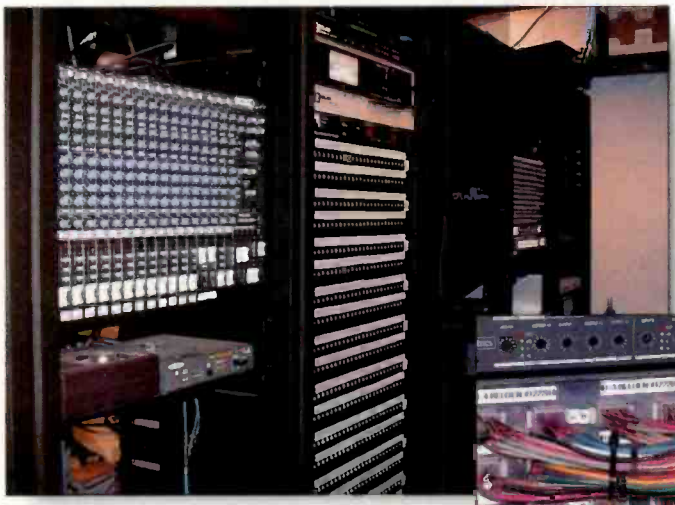
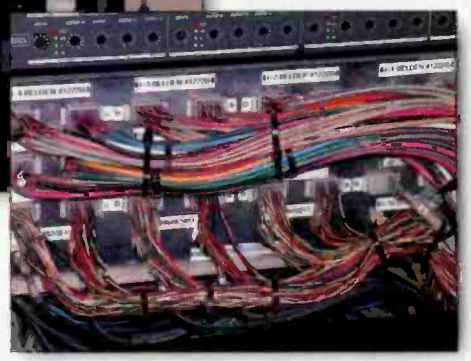


The rack room houses the automation system and serves as the central wiring point for the facility.



A typical installation using the JRBE Inter-Tie Panel, which serves as a high-density rack or wall-mounted cable termination.

both ends. It is considered permanent and even if the room is rebuilt, these connections need never be removed. The user end can be used as needed or changed completely. With every wire numbered it was easy to trace any wire. I believe that full documentation is always appropriate, if not for your benefit, for whoever follows you. It is a real challenge to explain it to management, but they can be made to realize that it will cost them more in the long run for engineers to try to figure out the wiring every time a change or connection is needed.

The air chain

Content (music) is ripped into the Mediatouch system from CD in straight PCM 44.1kHz format at eight times speed or faster. Content is reproduced on the Mediatouch play-to-air machine (PTA) for studio A (on-air control room), which is equipped with Digigram digital audio cards. The system features a second play-to-air machine running off the redundant server simultaneously playing the same content for the back up. In case of a failure, the secondary can be brought in immediately. The AES digital audio from the PTA machine is routed to the air studio and feeds one of the Logitek audio engine digital inputs. Mixed program audio leaves the control and returns to the rack room, feeding the TFT program interrupter. The digital output of the interrupter feeds a Ward-Beck Systems POD digital distribution amplifier. Digital output-1 goes to the main transmitter Intraplex digital input and the second

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The birth of a radio station

The production studio is also equipped with a Logitek control surface.

digital audio output-2 goes to the booster transmitter Intraplex digital input. The main transmitter audio is sent to the Apex site. The main transmitter Intraplex digital audio output fed an Orban 8200, which then fed the input of the Broadcast Electronics Predator Exciter. (We have since changed the processor and exciter.) The entire path maintains a digital signal throughout at 44.1kHz sampling rate.

The Predator is outfitted with the 10MHz time-base option, which is fed by an ESE GPS receiver. This works well to synchronize the main and booster carriers. The audio is carefully synchronized through another Intraplex card to add a small amount of delay. To give the station every edge possible, Kemp let me indulge in new and some old processors and exciters to make the station sound its best.

While digital audio has a natural advantage for maintaining audio purity, when it's all said and done the ear is still analog. We like certain types of distortion. We found that another processor and exciter combination sounded even better, and we incorporated a few new and old tricks that work nicely. I feel that in the end, an all-digital chain helps to provide excellent audio all the way to the transmitter and gives you a great platform to work some analog magic for our analog ears.

Rose is chief engineer of Jay Rose Broadcast Engineering.

Photos by Jay Rose and Eric Clause, chief engineer, KVEC.

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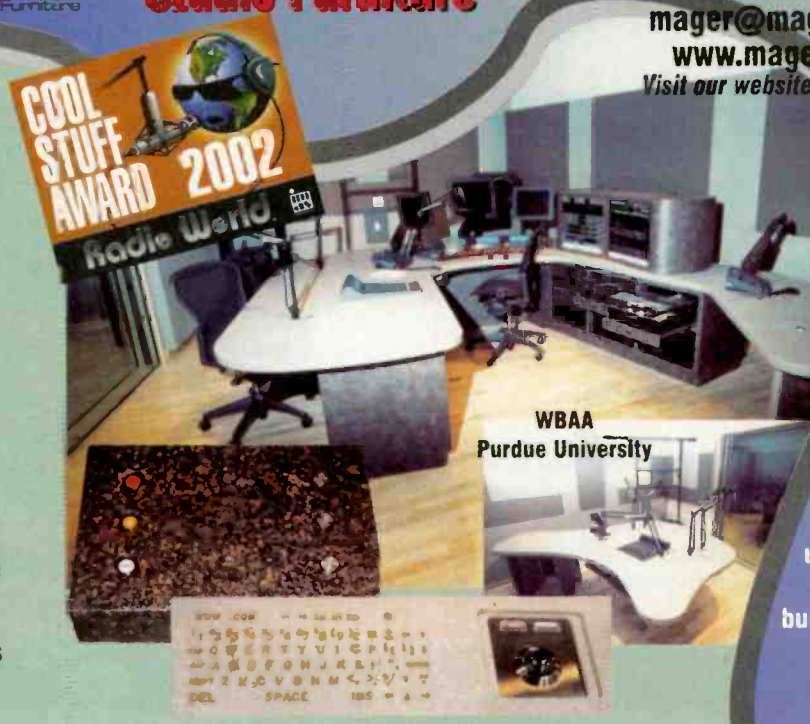

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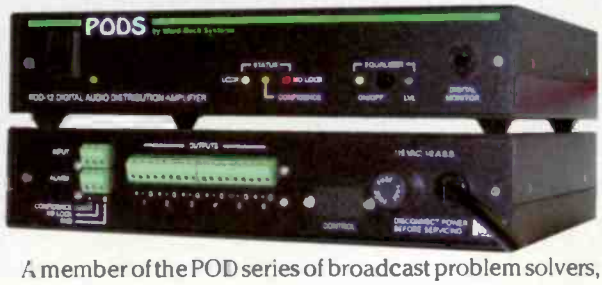

A member of the POD series of broadcast problem solvers, POD 12 is a one-input, six-output AES distribution amplifier. It features cable equalization and reclocking techniques that ensure reliable recovery of the incoming digital signal. Front panel tallies give positive indication of the status of the signal. These tallies are also available on a rear connector for remote display. POD 12 is available in 110 and 75 ohm models. Visit our website for a full range of problem solvers, from analog audio to HDTV, in the POD series. Compact, cost efficient, smart solutions.

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Contemplating the FUTURE

By Kari Taylor, associate editor

While hindsight is 20/20, predicting the future proves to be more elusive.

Take a moment and think back to 1994. What was the life of a radio engineer like in 1994? Most radio stations still used cart machines. Operator permits were still required by the FCC. Now, think about the next 10 years of radio. What will the radio industry be like in 2014? Will machines be so intelligent that they can fix themselves when they break? Will digital radio be the standard way of broadcasting and analog radio will be a vague memory for engineers to reminisce about? Will satellite radio take over the world?

To gain some insight, I consulted several radio industry professionals. Our discussions about technological advances in the next 10 years provided some interesting ideas and plans for the future.

"I think by the time we get 10 years out there, digital radio will be solidly established, and I might even make the prediction that the majority of listening will be done digitally by that time," said Milford Smith, vice president of engineering at Greater Media in East Brunswick, NJ. "Most of the issues have been ironed out with digital radio and we're actually seeing a fair amount of stations going on the air—more all the time."

"But I also think along with that is an opportunity that we're really just starting to recognize and starting to pursue, and that is the opportunity for data services, either associated with the main program material, or perhaps not associated with it at all. The ability of a broadcaster to offer sort of a multimedia experience really hasn't been possible up until the advent of digital radio, so I think there is going to be tremendous growth in that area over the next 10 years," Smith said.

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Contemplating the FUTURE

When asked about technological advances in the next 10 years, Dave Maxson, who is a managing partner of Broadcast Signal Lab in Boston, believes that every new radio will be digital. "Even if it's only picking up an analog signal—that is, the technology for extracting the most out of analog signals are improving with digitally-based chip sets," Maxson said.

Maxson agrees with Smith that the technical kinks of IBOC operation have mostly been resolved, and that the overall listener experience of radio will be greatly improved with digital radio. Maxson said he would tell IBOC skeptics that technical compromises have been made that the NRSC sees as offering a substantial improvement in service.

"We're all used to fiddling with our antennas in order to get rid of the multipath in FM reception. We're used to having cheap $10 radios that pick up six stations when there are 30 or 40 available. We're used to AM interference and AM fades under bridges and structures. IBOC makes that pretty much go away. So, there are advantages to digital radios that pick up IBOC over digital radios that will make the best of analog they possibly can," Maxson said.

Maxson also pointed out an important advantage to IBOC: the opportunity to enhance the listener experience with multimedia and interactive features. "It's not TV for radio," Maxson said. "It's the ability to provide text and images that can be stored and manipulated along with the audio, and that will create a richer experience for the radio listener. And, the nay-sayers will say 'You can't mess with that in your car, you're busy driving.' To a degree that's true. On the other hand, with a couple of simple feature buttons on a digital radio with these new capabilities, the radio will even be able to provide people driving a car with a more useful service."

We're used to having cheap $10 radios that pick up six stations when there are 30 or 40 available.

"There's discussion about location-based technology so that your car knows where it is and digital radio is receiving information all the time. For example, you can find the location of the nearest fast food joint at the touch of a button. Or perhaps the nearest fast food joint that is carrying a promotion that the radio station that you're tuned to is offering. Another example would be the ability to pull up a location-based traffic report in the voice of your favorite radio host or things like that, that will enhance your

continued on page 91

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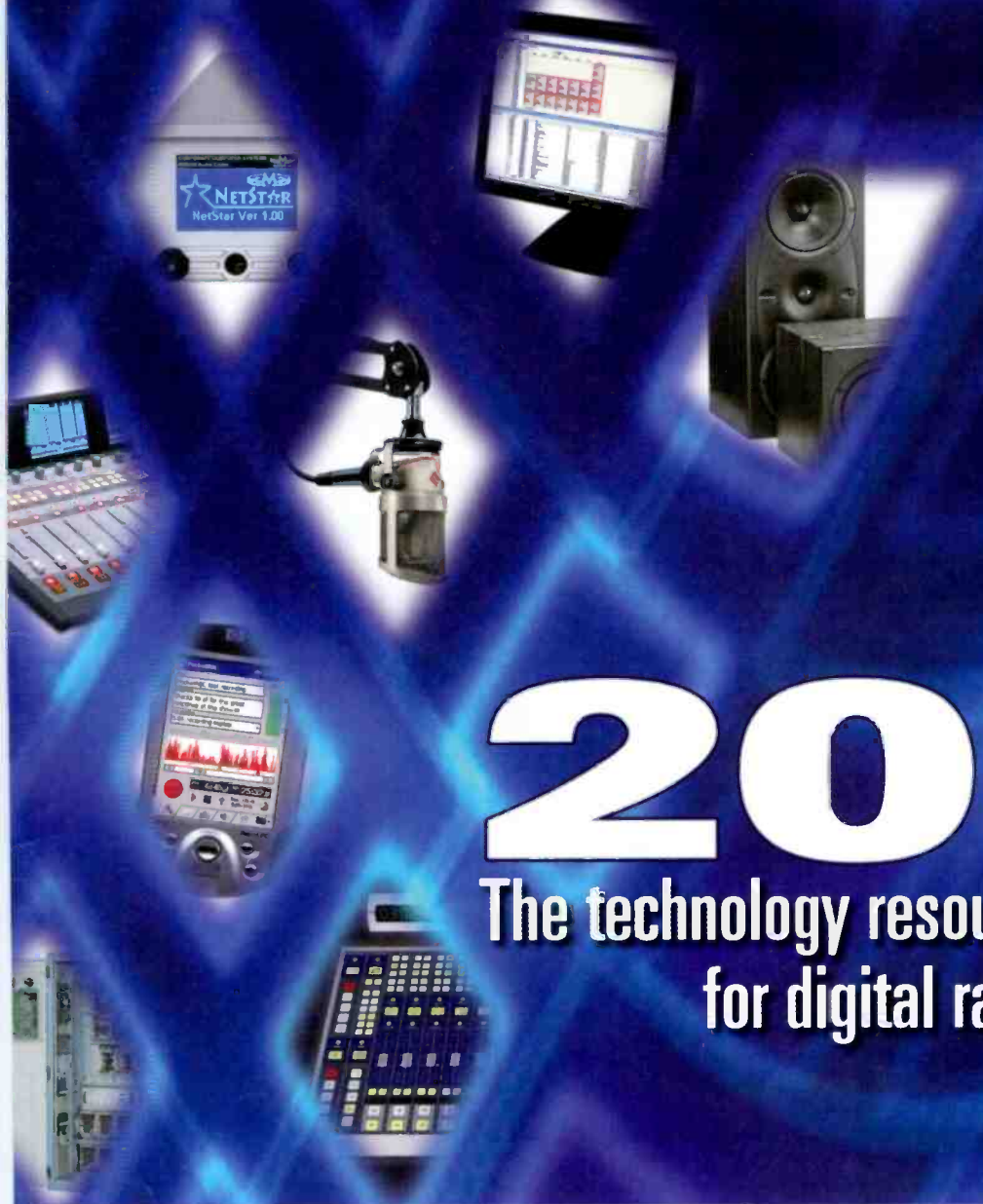

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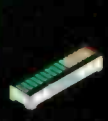

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This print edition is only part of the Radio magazine Buyers Guide resource. You can also access the information online at www.beradio.com. Just follow the Buyers Guide link to get started. The online version lets you search and sort in several ways, providing even more flexibility. We plan to improve this Buyers Guide every year and add more features. If there is something that you would like us to add, let us know.

Chriss Scherer
editor

Comments?
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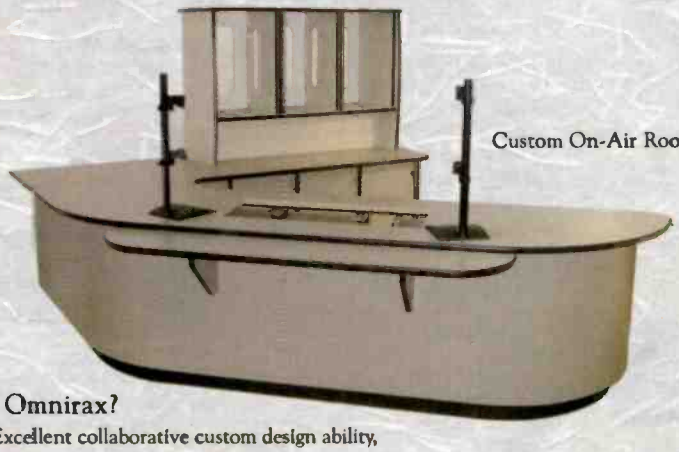

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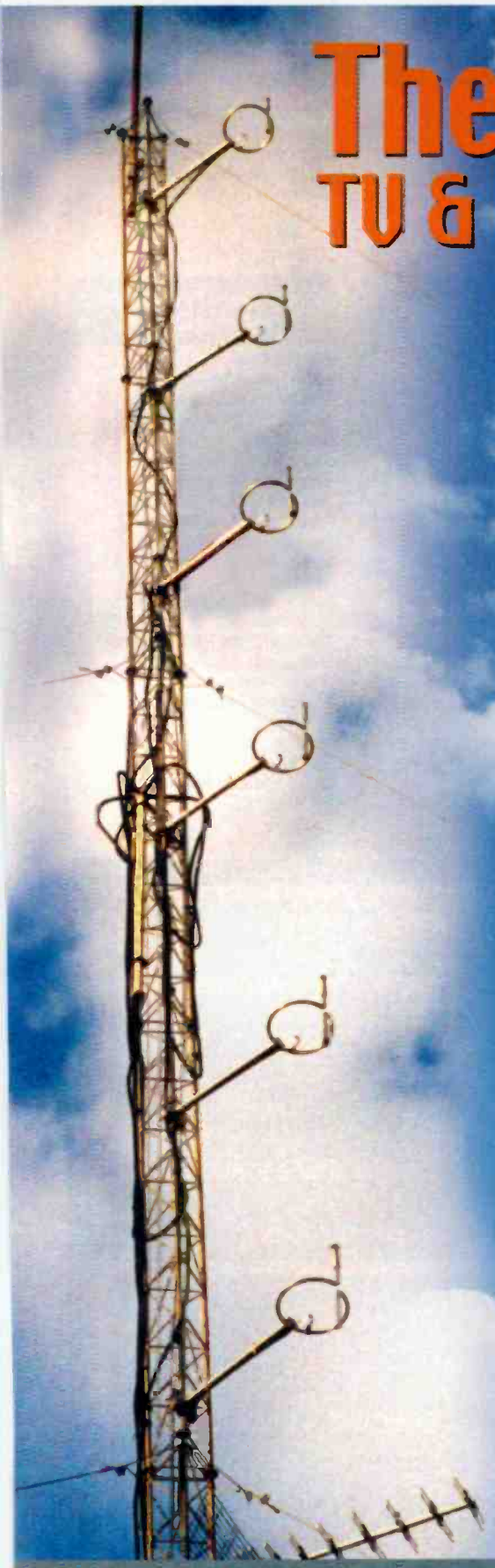

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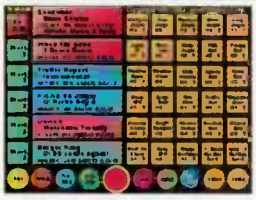

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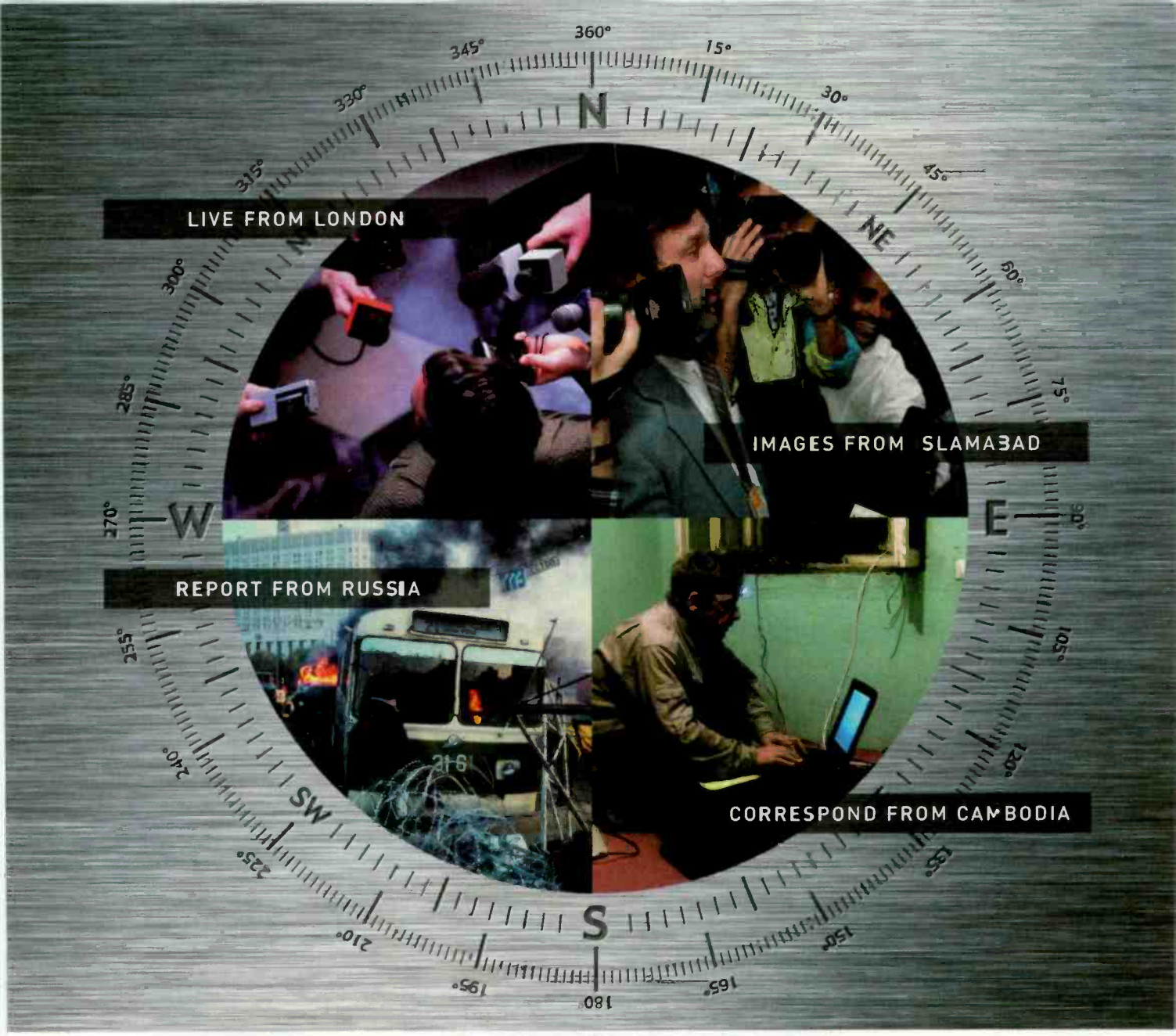

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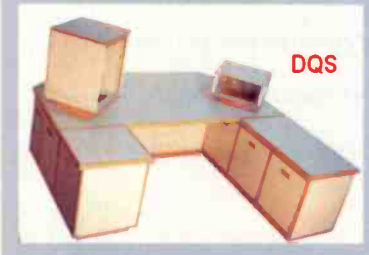

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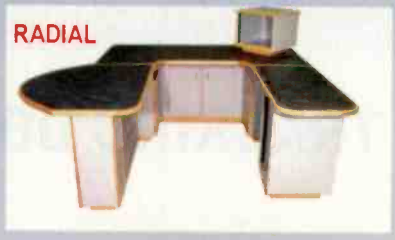

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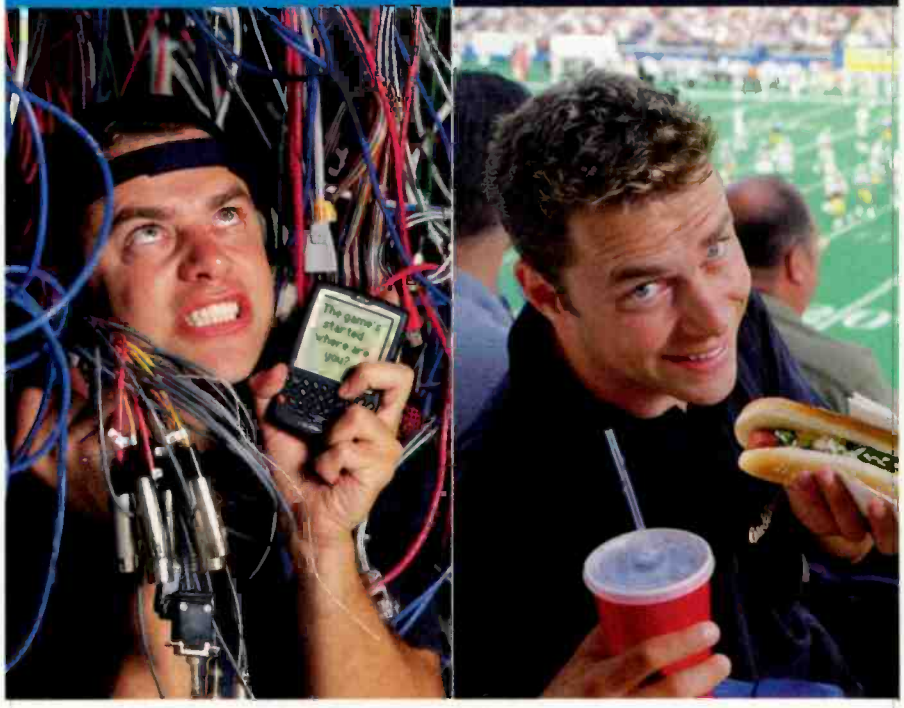

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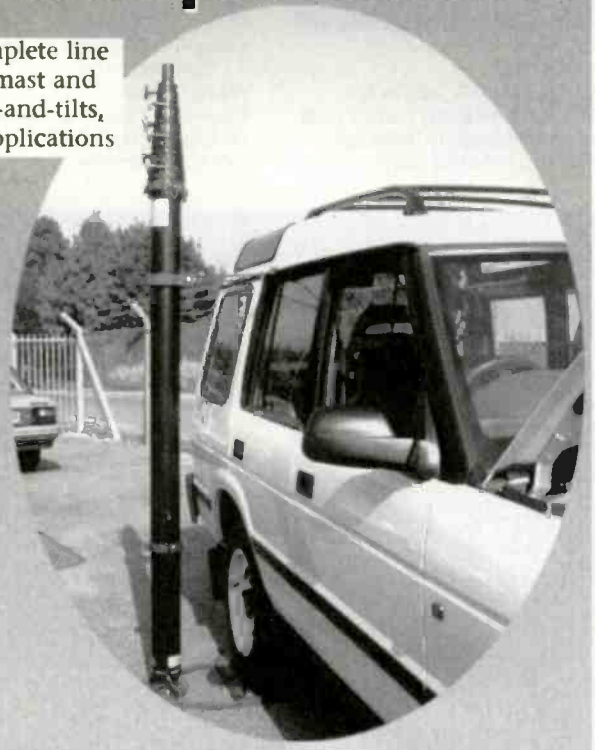

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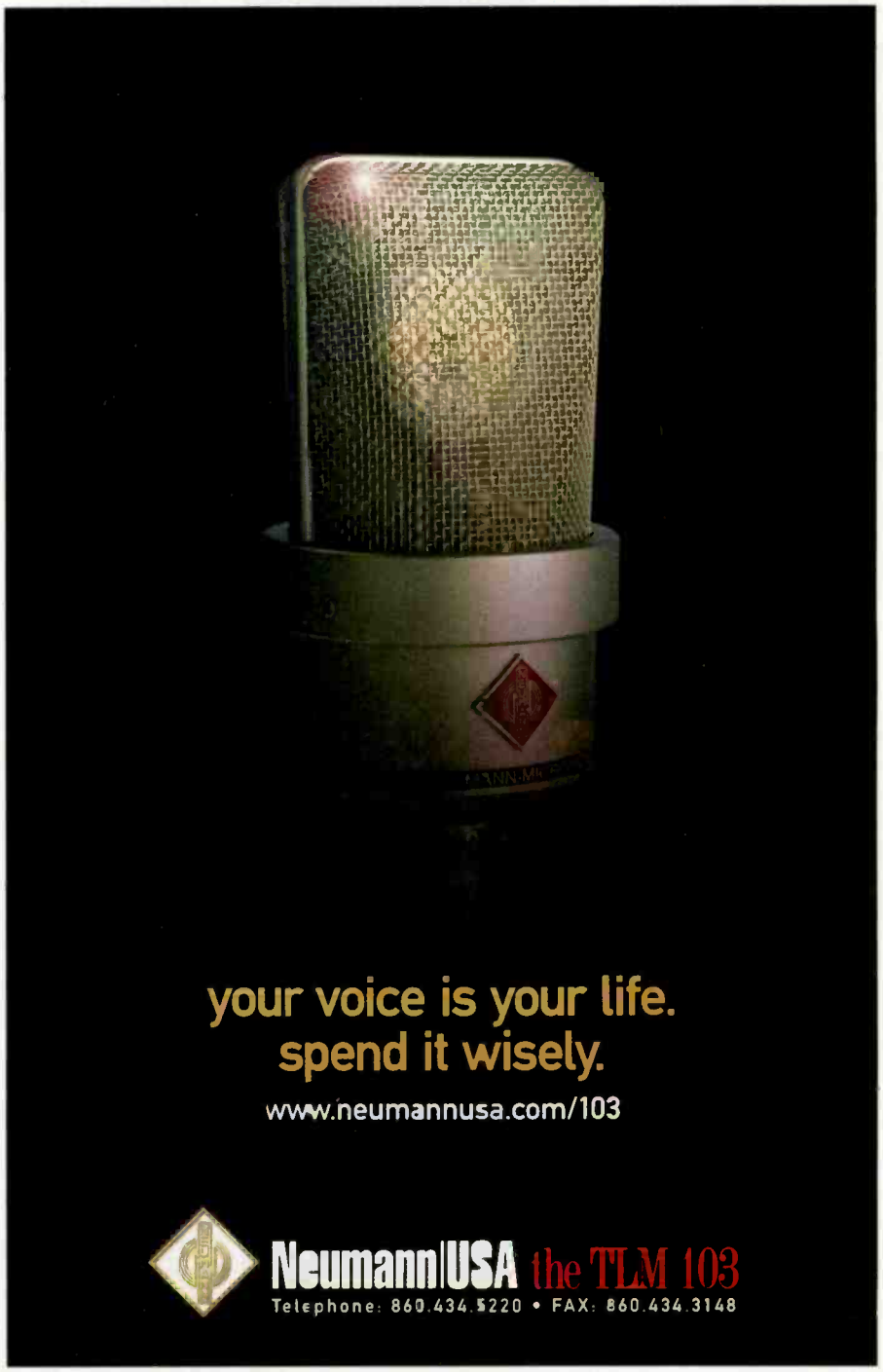

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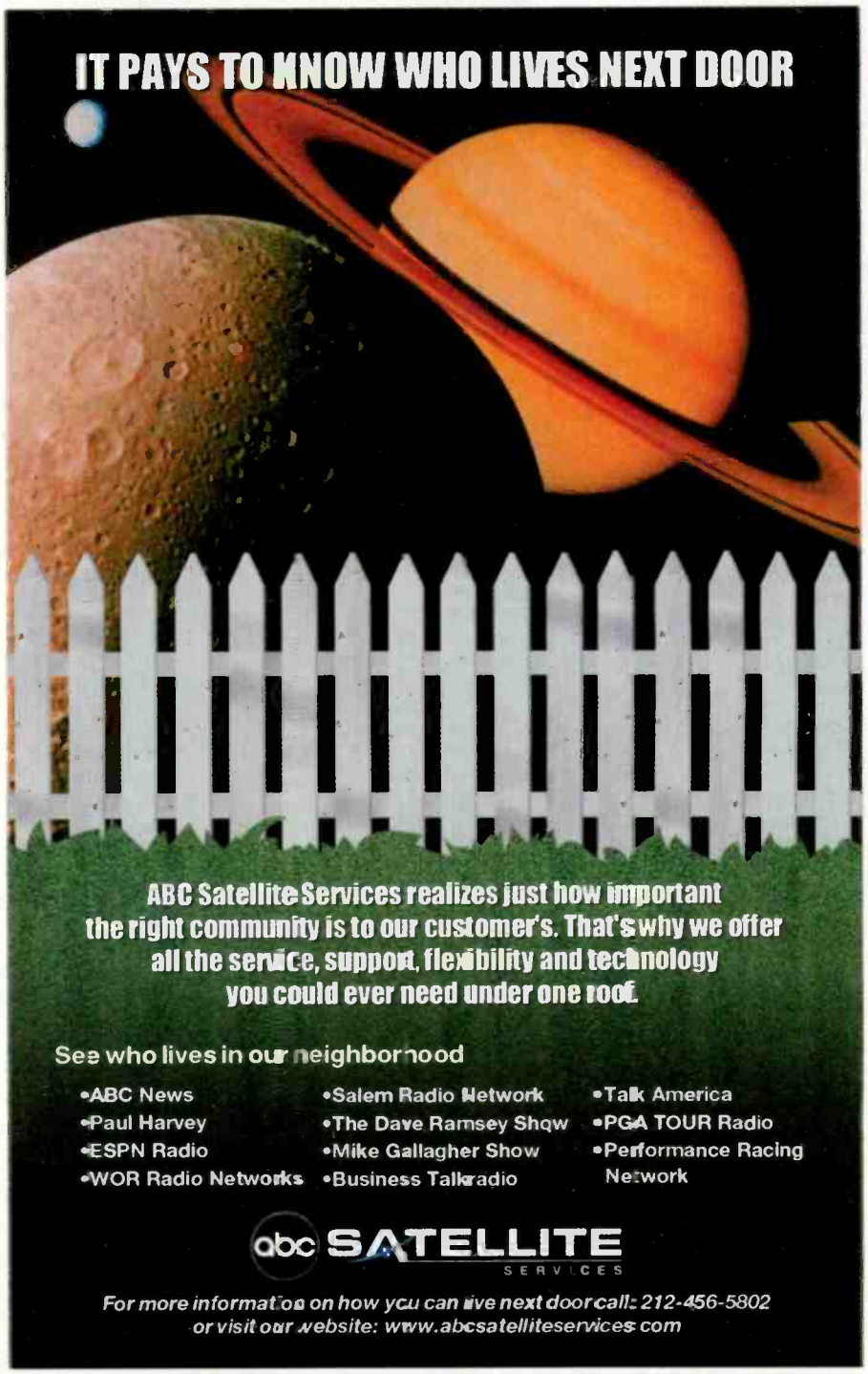

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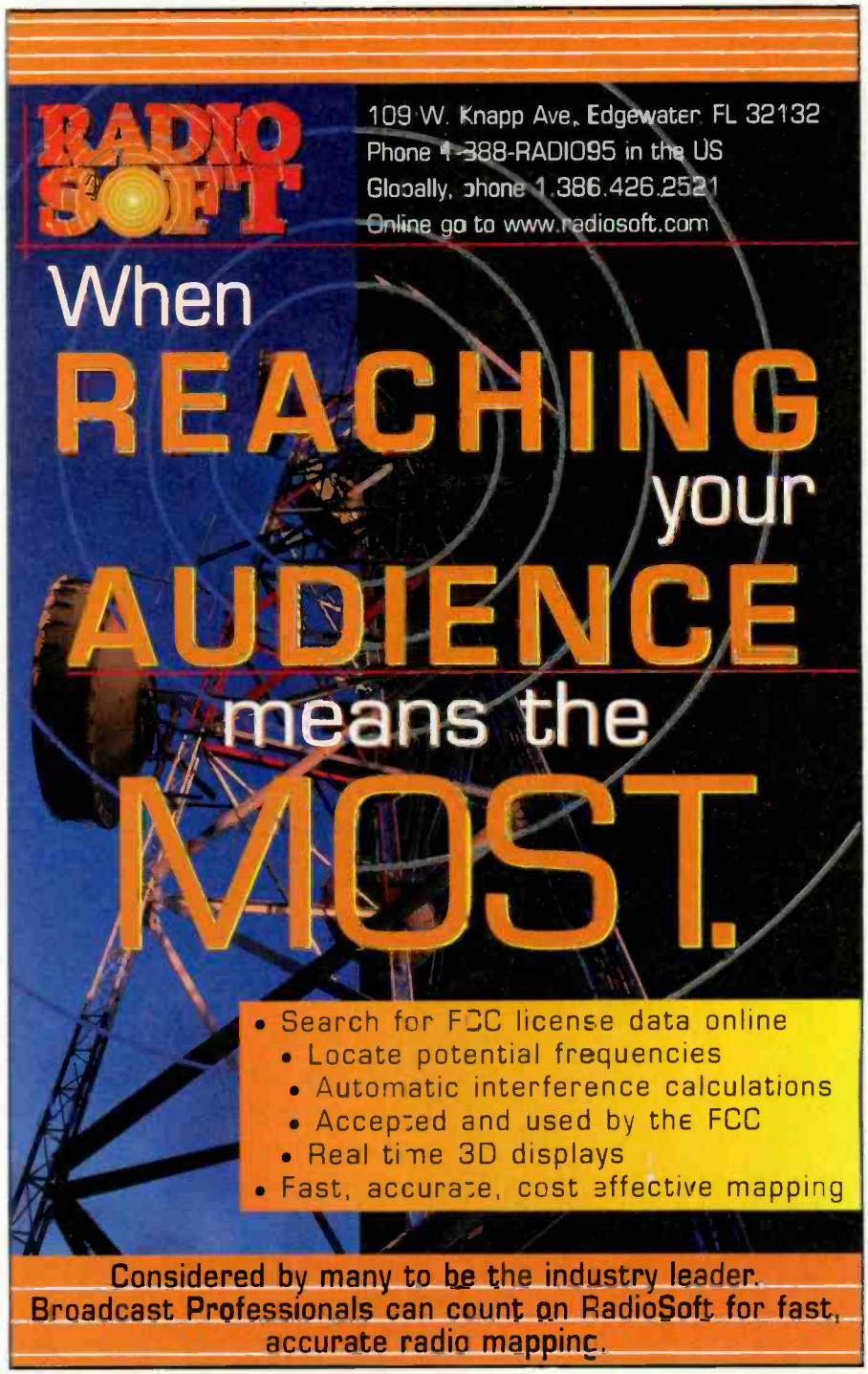

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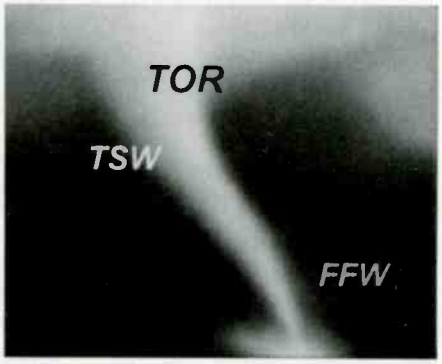

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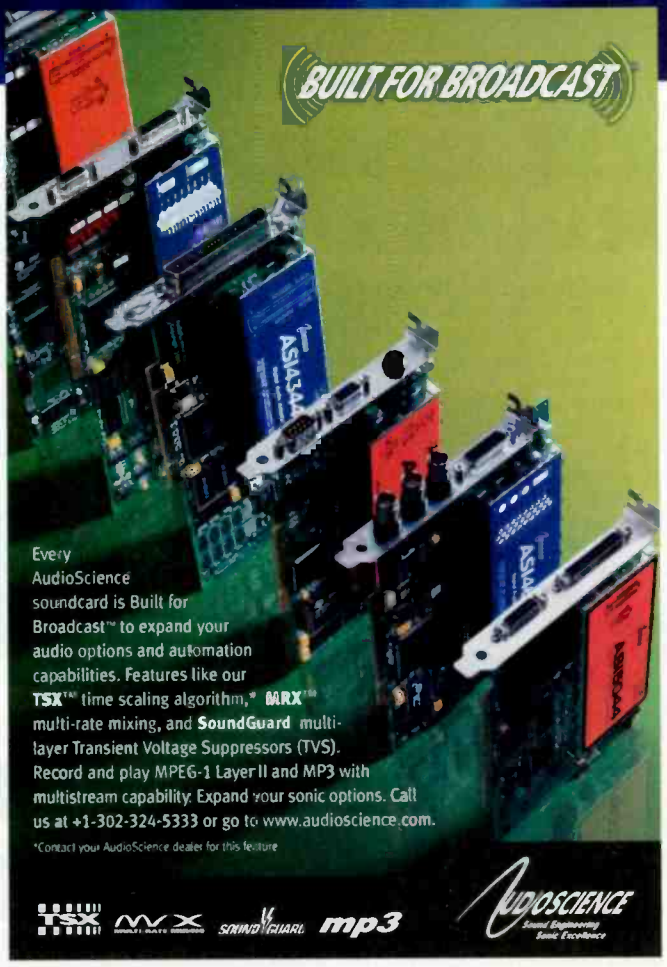

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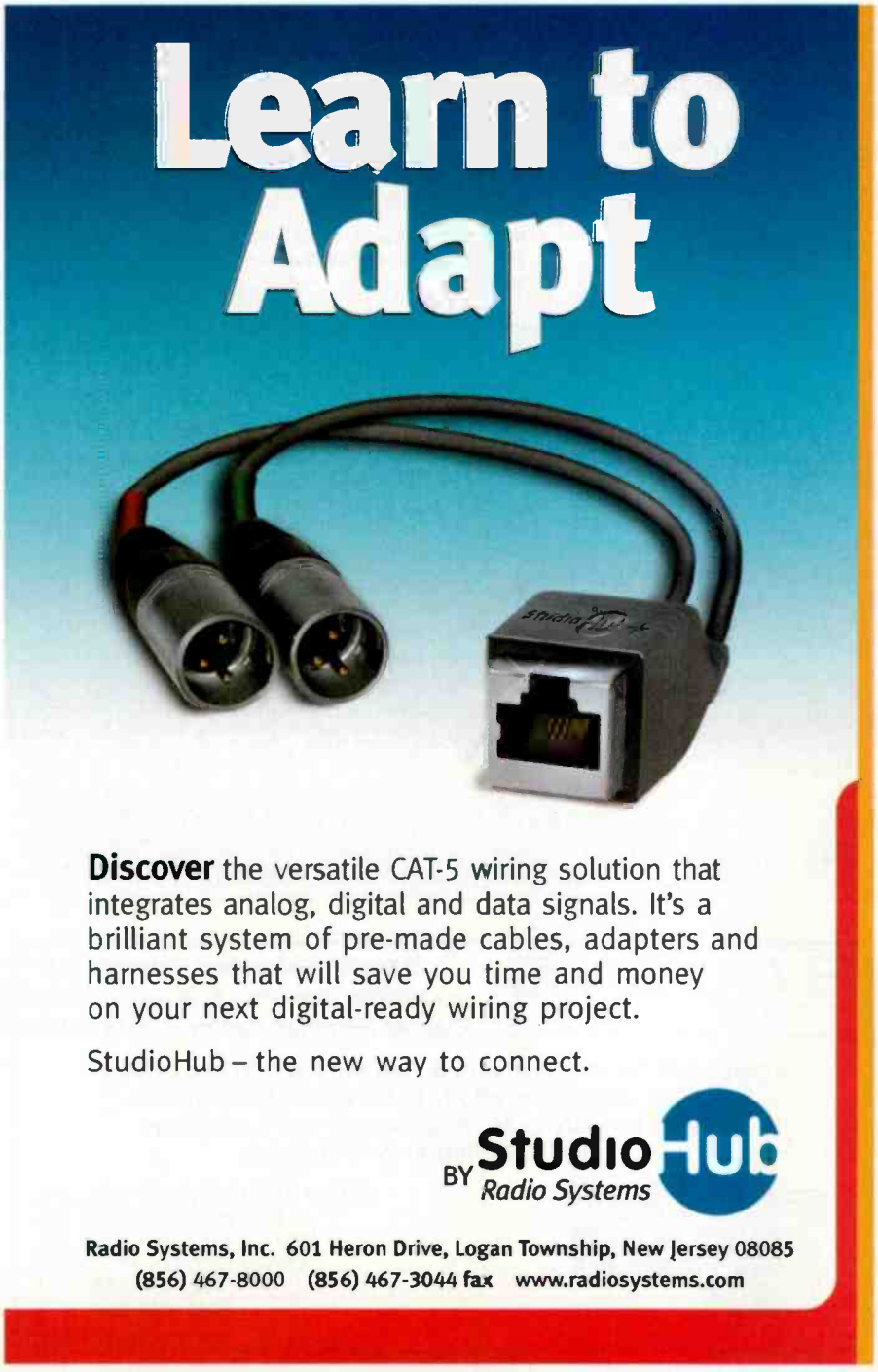

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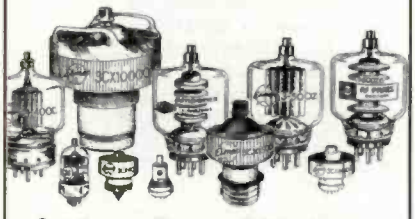

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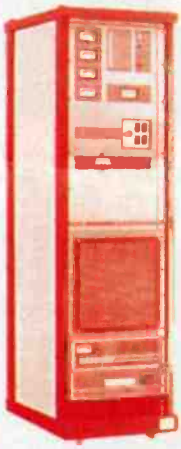

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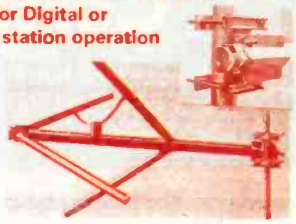

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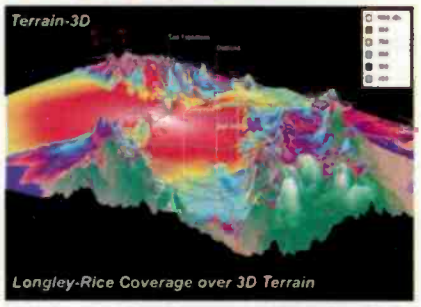

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"These are just simplistic examples from the point of view of what possibilities an interactive radio can offer. The reality is that we don't know which one of these applications is going to stick and be useful to consumers and be cost efficient for broadcasters until we try them."

When asked for his thoughts on digital radio, Chief Engineer Gordon Carter of WFMT in Chicago didn't completely agree with Smith and Maxson. "I think in 10 years they will figure out how to make it work right, but getting it right may be very painful," said Carter. "I think that the current system, while it has a lot of potential, still has a lot of bugs that need to be worked out. But I think they will get there."

"On the other hand, between now and then, who knows what will come along that will be newer and better," Carter said. "From what I've seen, most of the technologies we're working with are less than 10 years old now. I think that's something that we have to be alert to. Technology does change and there is very likely something, or some way that nobody has figured out yet that will make everything we're doing with IBOC right now obsolete."

John Marino, vice-president of science and technology for the National Association of Broadcasters in Washington, DC, believes the digital broadcasting technologies will offer new flexibility for broadcasters. "Data services will usher in a new wave of multimedia radios complete with graphic displays. These new digital radios will offer broadcasters an opportunity to send a variety of information directly to listeners. Such information may include song title and artist, traffic information, emergency warnings, news, weather and other customized data and graphics," said Marino. "The often joked-about radio station in a suitcase may be right around the corner."

According to these professionals, IBOC will become the standard in radio eventually. However, I got the impression that the industry needs to be on the lookout for new technologies that will surpass IBOC in usefulness and clarity in the next 10 years.

Continued consolidation?

My next question for the group dealt with consolidation. Is it over? Is there more to come? If so, where will it happen?

"Radio in the larger and even medium markets is largely consolidated now," Smith said. "I think that consolidation is already seeping down to the very smallest markets.

There may be something out there that will make IBOC obsolete in 10 years.

I think that's probably going to continue. It seems like most of the shouting is over. There will probably be some of the smaller groups that ultimately get swallowed up by some of the larger groups, but I think the majority of the activity in that area, other

New Simian 1.6

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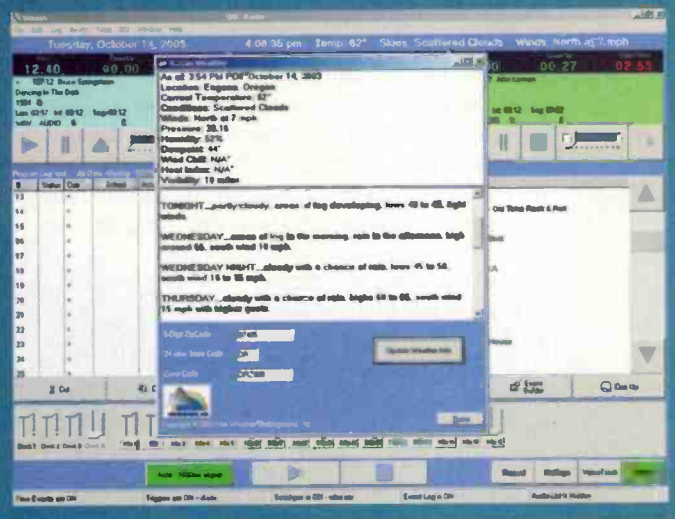

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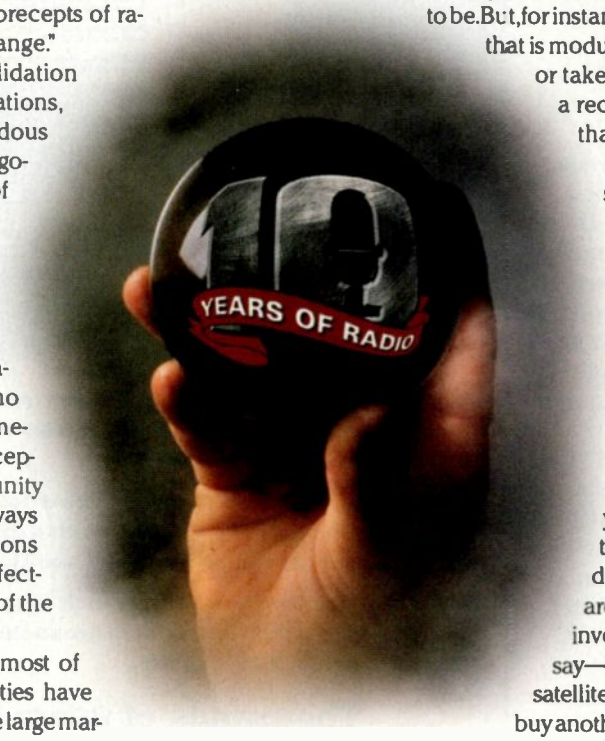
than in the smallest markets, has already transpired."

Contrary to some radio industry professional's opinion, Maxson doesn't agree that consolidation of ownership has reduced the number of radio choices. "Ownership isn't ruining radio. My experience is from being here in Boston, and Boston really never had a country station until there was consolidation. Boston has seen some experiments with different kinds of formats. For example, when the fourth or fifth station of a group that has always had moribund ratings and is looking for a new way to do things. A group owner can take more of a risk with that station and try a new format."

Ownership isn't ruining radio.

"Radio attempts to appeal to a large enough audience to make it economically viable. Radio is about reaching a target audience with what they want to hear. And that has implications into how you program a station and how you energize your audience. Those basic precepts of radio are not going to change."

"While there is consolidation in the major radio stations, there is also this tremendous clamoring that's been going on for a couple of decades for specialized, local outlets for programming. I think we will see further loosening of the spectrum for these small bands of radio freedom fighters who want to broadcast something that, in their perception, is in the community interest. There will be ways for these low-power stations to proliferate without affecting the economic base of the industry," said Maxson.



While Smith believes most of the consolidation activities have already taken place in the large markets and is now seeping into the smaller markets, Carter believes that the radio industry will see its continuation and that it will remain mostly in the larger markets. "It becomes a matter of money," Carter said. "They're going where the money is, or where they perceive the money is. I think we're going to see the consolidation being played at a slightly lower level, where the medium-market groups are going to start making a move for a bigger share of the pie."

"I also think we're going to see a resurgence of the ma and pa stations, especially in the small markets," Carter said. "Where the big groups just don't have the incentive to put the money in because they can't take the money out. I hope it happens because I think that's what makes radio exciting—the localism of it. That's something that even our friends at Clear Channel will say they can't provide that well."

After listening to these opinions, it's clear that consolidation has several potential paths to take. One person thinks it's almost over, while another thinks there there's still a lot of consolidation to be done. One person thinks local radio is dying because of consolidation and another thinks consolidation makes radio more diverse. My head was spinning.

Personally, I believe consolidation will continue throughout the next 10 years, however it won't happen with such fervor. I also believe that local radio stations will never go away. There may be fewer of them in time, but in the end, if that's what people want, that's what they will get.

Radio vs. ?

My final question for the group was about competition. Do they think radio will be able to not only compete with other media, but also continue to be the leader in audio entertainment in the next 10 years?

"I think satellite is starting to get its pace a little bit," said Carter. "I don't know if economically the companies can hold out long enough to really get established in their niche the way they need to be. But, for instance, I just saw an ad on TV for XM radio that is modular so it can be plugged into your car or taken into your house and plugged into a receiver there or an appliance. I think that's the sort of thing it needs."

"I think it would really make a lot of sense, though I realize there are several issues involved, if terrestrial [and satellite] digital radio could all use the same decoder. And I think we need to see better cooperation with the various proponents. It would make sense to me to see that sort of convergence."

Carter continued, "You see it happening now with TV where you're using the same box to look at TV and your computer and all kinds of other things. Whether it will happen or not, I don't know. It's hard to tell because there are so many special interests groups involved. I think consumers are going to say—wait a minute, we just bought our satellite digital receiver, now you want me to buy another digital receiver for my radio? I don't think so."

Smith agrees with Carter that satellite radio does not appear to be going away. "Even though the listenership is still miniscule compared to commercial over-the-air radio, it's not zero. It's growing and that's something we need to be cognizant of. I think the ability of broadcasters to transfer to a digital platform is going to be a big help there," said Smith.

"However, the largest threat is not satellite radio and it's not Internet radio. The competition lies in the ubiquitous roll out of wideband wireless 3G and beyond, where is it possible for any mobile individual or vehicle to have access to a big pipe, in terms of data. And because

of the existence of that big pipe, that data can be anything, including audio entertainment. So I've always thought that the real threat to radio broadcasting is wireless broadband. I think that has a likelihood of being out there in less than 10 years, but definitely in 10 years it will be well established. It's obviously going to take whatever form based on what its consumers are looking for, but as I say, one of those forms could look a lot like radio. And that does give me some cause for concern," Smith said.

The largest threat is not Internet radio and it's not satellite radio, it's wideband wireless.

After talking with Smith, I was concerned too. I had considered the obvious competition, such as Internet radio and satellite radio, but I hadn't thought about wideband wireless applications being a formidable competitor for radio listeners. 3G is about connectivity to end users, which could definitely impact radio.

Going nowhere

All in all, from these professional's responses, it sounds as though there will be some big changes happening within the radio industry during the next 10 years. But no matter what technological advances are made, or how many radio stations a particular company owns, they all believe that radio will still be the dominant audio entertainment medium.

"Radio is still a wonderful medium and it's a unique medium," said Smith. "It's still the only truly portable medium. The satellite people are trying to get their product to that extent, but there are 900 million consumer radios in the country at this point. It can be as small as a walkman and its ubiquitous in virtually every car and every home."

"There's no other medium that enjoys that kind of penetration, nor is there any other medium that enjoys the kind of listenership that radio has in an average week," said Smith. Something like 95 percent or 96 percent of all Americans sten to radio every week. That is pretty impressive stuff. I think the consumer very much wants and needs a portable audio entertainment and information medium, and from what I am seeing so far, radio really is the medium that best fills that requirement."

"I think there will be some minimal inroads from satellite, and some from wireless broadband depending on what form it takes, but I see radio as still the core primary audio entertainment medium for most Americans through at least the next 10 years."

I couldn't have said it better.

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Eventide Clockworks Legacy

By Ed LaComb

Did you ever hear that expression, "What's old is new again?" Never has that expression been truer than with the latest Protools plug-ins from Eventide—the Clockworks Legacy package. The first question that may pop into your mind is: "What is the term Clockworks all about?" Well, that borrows from history, back when the Eventide company was called Eventide Clockworks and located on West 54th Street in New York City.

Performance at a glance

- Software plug-ins of classic effects
- Five different effects included
- Multiple instances can be loaded
- Works with Pro Tools
- Software recreations of hardware effects offered in the 70s and 80s
- Free trial download available

I first laid hands on an Eventide piece of equipment 25 years ago. It was called the Omnipressor. Sitting in the rack, with a big, bold, black face, the Omnipressor looked impressive. After tweaking it, it became clear that there was more to this box than good looks. It sounded impressive. Fast forward to today: the Omnipressor returns in virtual form as part of the Eventide Clockworks Legacy plug-in package. I was excited to hear that the Omnipressor would be part of the package and I couldn't wait to see if it sounded like my old friend that I first met 25 years before. It did. I'm always a little skeptical about emulators trying to pretend to be something that they can never be, but Eventide has done an outstanding job in bringing the Omnipressor back to life within the Protools environment. Eventide could have stopped there as far as I was concerned, but there's more.

The Clockworks Legacy package contains five plugs for your listening and tweaking pleasure: The Omnipressor, the Instant Phaser, the H910 Harmonizer, the Instant Flanger and the H949 Harmonizer. Each of these plug-ins is based on an Eventide original piece of audio processing gear, and each one lives up to the reputation that preceded it.

The Instant Phaser is the plug-in based on the first phasor: a single function analog processor that features a sweeping filter bank. The effect that it creates on vocals in a radio production is awesome. The H910 plug is the virtual recreation of the first Harmonizer effects processor. Any studio worth it's salt in the 70s and 80s had the original H910 box in a rack somewhere in the control room, and if you were a radio station lucky enough to have one, your production clearly stood out from the rest. The Instant Flanger is a cool tool, again based on the original that recreates that swishy, flanging sound. The plug-in gives you the capability to choose or combine modulation sources together including the LFO or input signal, or a manual sweep, which can be controlled by MIDI. Finally, the H949 plug takes pitch changing ever further by recreating the unique random feature, which produces slight variations in delay resulting in a less mechanical sound. Oh, and lest I forget, each graphical user interface on these plugs

actually looks like the original, so if your heart longs to see and not just hear your old Eventide favorites, you'll be quite satisfied.

Eventide has plans to produce the Clockworks Legacy plugs for the Digidesign TDM (Mix and HD systems)

spin. They may just be the foundation or spark for a new, creative idea to really spice up your production.

LaComb is president of Ed LaComb Audio Imaging, Syracuse, NY.

exclusively. No other platforms are supported at this time. Further, they only run on Mac's running OS 9.2.2 or OSX 10.2.4 or better. If you have a Protools system running on a PC, you're out of luck. All five plug-ins support 48kHz and 96kHz sample rates, and the Instant Phaser, Instant Flanger and Omnipressor also support 192kHz sampling frequency. MIDI and plug-in automation are fully supported. The Eventide Clockworks Legacy plugs are piracy-protected with the new Ilok dongle from Pace. The package is sold with a single authorization card which uses a slightly smaller than postage stamp-sized authorization chip that inserts into your Ilok, thus depositing the asset or authorization permanently into your Ilok.

As with any new product, the best way to determine if it's right for you is to try it. Eventide makes it easy to do so by offering a seven-day demo that is available for download from its website. The seven-day authorization is directly deposited into your Ilok account and then you're ready to go.

So, if you're like me and sometimes find yourself longing for the cool sounds of yester-year, take the Eventide Clockworks Legacy plug-ins for a

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Blue Mouse

By Flawn Williams

The quest for the perfect announce microphone has driven dozens of designers to distraction. How to accommodate the proximity of the announcer who wants to rest his upper lip on the microphone, and still make it sound good for shy people who stay a foot away?

Mainstream manufacturers and boutique tweakers alike are striving to find the perfect tonal emphasis to create the next old faithful. One of the latest entries is from Blue Microphones. It is called the Mouse.

For starters, discard any previous associations you have for the word mouse. This mic is no kin to the mic mouse foam screens sold for mics resting on floors or tabletops. And it's not a mic that doubles as a mouse for the now-inevitable computer in the control room. Instead, it's a clever way to rig a large condenser mic diaphragm in a swivel yoke that gets the mic element out of the housing and into the air. If they were trying to be more visually descriptive, they could have called it the "Biscuit in a Slingshot" mic, but imagine silkscreening that on the side of the mic.

Performance at a glance

Cardioid pattern
20Hz to 20kHz frequency response
150Ω impedance
Shock mount and pop filter available
Transformer or transformerless outputs

Swiveling the capsule allows the mic to be used as a side-address or end-address or anywhere in between. This provides positioning flexibility. Two tiny stubs prevent turning the capsule through more than one rotation, to protect the wiring that links the capsule to the body.

Although the capsule can pivot in the yoke, the yoke is firmly attached to a cylindrical metal body about the size of a soup can, so any rotation in other directions must be done by moving the mic body.

At the opposite end of the body is an XLR output jack, plus a handy 5/8" threaded hole for easy attachment to a boom arm or floor stand. This mount is serviceable for quick setups, but for greater isolation from structure-borne noise use the optional elastic spider-web shock mount. This cage needs to be strong enough to support the weight of the mic, which is equipped with a hefty output transformer; so generic isolation mounts probably wouldn't be much help. Visually the mic is low profile, but it's no lightweight contender. The Mouse is also available in a transformerless model.

The mic was installed in Studio 4B, home base of NPR's *Performance Today* and other music shows. *PT* host Fred Child put the mic through its paces alongside that studio's old faithful host mic, a Neumann U87, which has had aftermarket optimizations for announcer voice by microphone guru Klaus Heyne. The immediate results were impressive. The Blue Mouse provided a tailored response similar to the modified U87. The Mouse had somewhat more bottom in the lower bass voice register, and the placement of its presence boost was a bit higher up the frequency spectrum than its counterpart.

Its output was lower than the Heyne-mod U87, needing 6dB more mic preamp gain for equal subjective loudness, but its self-noise was still inaudible after raising the gain. The lower output would be an advantage for many broadcast consoles where preamp clipping is a greater concern than noise when dealing with close-miked voices.

But the most important factor was that Fred sounded clear, warm and assured, just like we want him to sound. Having passed that test and listening trials with other voices, the Mouse took to the road with *Performance Today* for an interview/music performance taping with the Shanghai String Quartet at the studios of public radio member station WCVE in Richmond, VA. Here, the mic would be used for Fred's hosting voice in front of a studio audience.

Performing live

The Mouse has an optional accessory pop screen to diffuse the focused windblasts of popping Ps and other plosive consonants, but this wasn't included with the review mic. After our initial checks in Richmond, I opted not to add a generic mesh screen in front of the mic, and instead miked Fred from a bit off to the side, out of the fairly narrow range of his plosive blasts. In a couple of instances Fred caught me (and the mic) by surprise, turning directly into the mic just as he let out a loud breathy laugh. But apart from those moments, the mic did fine with only its built-in pop protection. Note for future use: get the stylish-looking custom screen or use a generic mesh pop stopper.

Typically we're miking spoken voices at 6" to 8" distance, with the mic about 30 degrees off the axis of the mouth, but with the mouth on the axis of the mic capsule. To see how the mic would fare in the more typical jock announce environment, I performed listening tests with the voice much closer to the mic.

The proximity effect of the mic behaved well when worked as close as 3", with the bass buildup becoming more noticeable, but not overwhelming the tone of the voice. Worked closer than that, the mic started sounding a bit tubby on male voice. For such close miking, some bass response tailoring may be needed to compensate for the proximity effect. No roll-off switch is provided on the mic.

Overall, this mic brings the sonic advantages of a large diaphragm cardioid condenser in a much lower profile package than many of its competitors. That's a virtue for studios where many mics block the announcers' line of sight to their scripts. Also, its tailored response makes it useful for many instrumental miking needs as well as great-sounding announcers.

Williams is the technical director for music and entertainment programs at National Public Radio in Washington.

Also available are an optional shock mount and pop filter.

Blue Mouse

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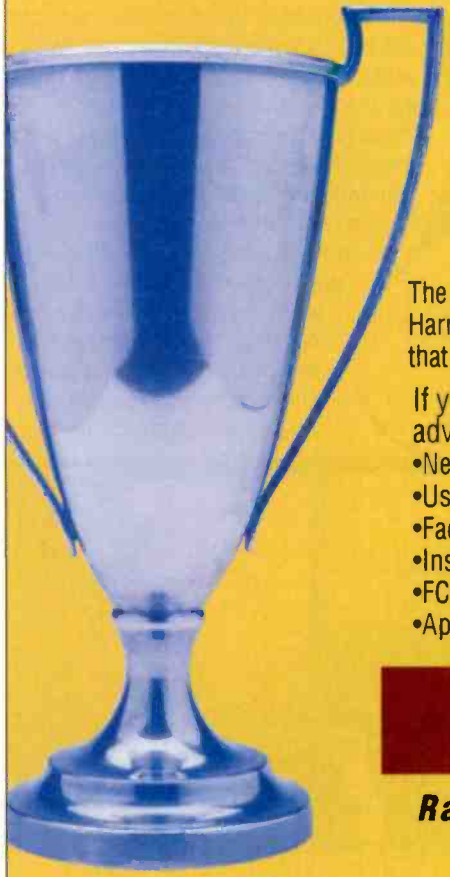

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Comrex Matrix GSM module

By Ed Bond

One morning this summer, our adult contemporary FM station, WHMS, took the morning show out for a remote. But this particular broadcast hardly stood still for one minute—literally. By the end of the show, we had traveled more than 130 miles, from our Champaign, IL, studios to downtown Chicago, broadcasting live all morning from a train car.

Performance at a glance

Fully compliant GSM connectivity
Completely mobile operation
Accepts standard GSM SIM
Increased power output
7kHz audio response
Useable worldwide

The idea for this mobile remote had been brewing for weeks. One of our salesmen had made a deal with Amtrak and was looking to promote the rail line connecting Champaign to Chicago. He came up with the idea to broadcast live from the train on a cell phone.

I had heard about the new GSM wireless module for the Comrex Matrix and thought it might be our answer. When I ran this idea by Comrex, they discouraged me from risking the broadcast. Being conservative, they don't recommend traveling while the Matrix is connected, as switching between cell towers at 80mph may drop the connection. At least the network coverage was in our favor: the train tracks connecting Champaign-Urbana to Chicago parallel a thick line of coverage on the GSM maps. With nothing to lose—the hand-held phone was our only other option—we decided to try the Matrix.

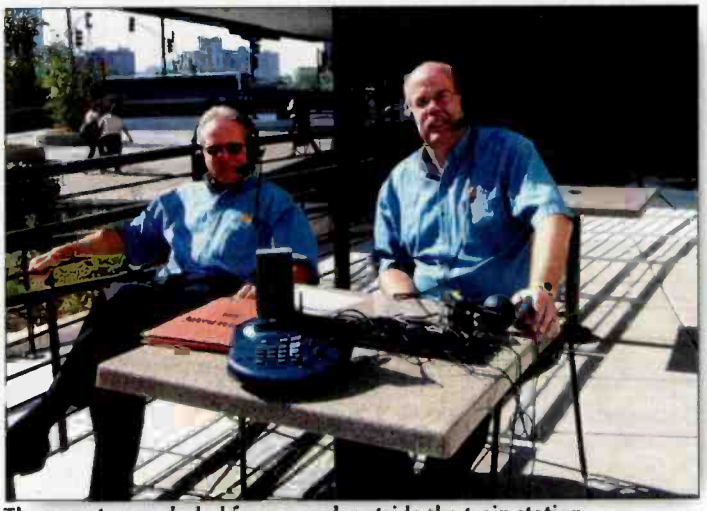
Getting ready

Bench testing the Matrix at our studio was difficult because our two transmitters in the building generate enough RF interference to block phone calls from the Matrix or any GSM phone. But leaving the building, we didn't have to go farther than the parking lot to make a successful connection.

On the morning of the remote, we woke up early and arrived at the Champaign-Urbana train station armed with two headset mics, a battery, a backup cell phone, a blank steel rack panel to be used as an antenna ground plane, and the Matrix. Most of our fellow passengers were still asleep when we boarded at 6 a.m. Many had traveled all night from New Orleans, so we had little competition for a table in the lounge car.

We mounted the three-inch antenna on the rack panel, powered the Matrix and dialed the studio. Once we connected, our morning team went live from the train car. Mike Haile and Steve Kelly followed the normal talk-heavy format from the train car. Despite the manufacturer's warning, the connection was stellar all morning, with only one disconnection in more than two hours. Once we got into downtown Chicago, however, our connection faltered again as the train passed through tunnels and under buildings, so we temporarily gave up.

Steve Kelly, left, and Mike Haile during the remote in progress at 80mph.



The remote concluded from a park outside the train station.

Leaving the train in Chicago, we found ourselves underground in Union Station, so we went outside on the patio for the end of the show. I remember how long and tedious it was to use RPU antennas, but in Chicago we were reconnected within seconds, and Mike and Steve finished the morning show there, sitting on a park bench in the sunshine.

As the flagship station for University of Illinois athletics, as well as many other local sports games, our AM station carries a heavy remote schedule. While the university arenas typically have ISDN lines available, many local high schools do not even have regular phone lines at the fields. We have relied on bag-type cell phones for years, but with the GSM Module, we will be able to deliver high sound quality from those venues as well.

We are also looking into the sales potential of this technology. We have a monthly remote from a local cell phone store, which is a perfect candidate for a tie-in. This flexibility allows us to be more creative, so our sales team is busy brainstorming ideas for exciting new remotes. We've already purchased the GSM Module for our own Matrix units; the module just arrived and we are already dreaming up new ways to use it.

Bond is chief engineer of WHMS, Champaign, IL.

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Enter by carefully using the online form at *www.beradio.com* or by typing or hand writing the following information on your company letterhead or a standard 8½" by 11" sheet of paper: 1. Your name, job title, company name, address, telephone number and e-mail address; 2. A complete and accurate description of the location of the mic icon on each the following issues of *Radio* magazine from 2003 (Volume 9): January, February, March, April, May, June, July, August, September, September Product Source supplement, October, November, December. Please be as specific as possible in describing the location of the necessary mic icons from the 2003 issues of *Radio* magazine. Click submit for the online form, or mail your entry to *Radio* magazine Microphone Sweepstakes, 9800 Metcalf, Overland Park, KS 66212 or fax it to (913) 514-7201. If you do not have all the necessary issues, you may obtain issue-cover copies by sending a self-addressed stamped envelope to *Radio* magazine Cover Request, 9800 Metcalf, Overland Park, KS 66212.

All entries (mail and online) must be received by January 17, 2004. Multiple entries are not permitted. One entry per person per mailing address and per e-mail address. Sponsors are not responsible for late, lost, damaged or misdirected mail, faxes or e-mail. Submitted entries will not be returned and become the property of Sponsors. Entries will be reviewed by the *Radio* magazine Sweepstakes committee ("Judges") for completeness and accuracy. All decisions of the Judges are final and binding in all matters relating to the Sweepstakes.

Winner Selection and Notification:

Three (3) winners will be chosen at random from all correctly submitted entries (entries with 13 correct answers) on or around January 21, 2004. If there are no entries with all 13 correct answers, three (3) winners will then be chosen at random from all correctly submitted entries with 12 correct answers. Winners will be notified by phone or mail on or about January 22, 2004. Odds of winning depend on the number of correct, eligible and legible entries received.

Prizes:

The first winner chosen will receive a Neumann BCM 104 microphone (approximate retail value $999). The second winner chosen will receive a Sonifex RB-MA-2 (approximate retail value $890). The third winner chosen will receive a LPB Silent Mic Boom and riser (approximate retail value $179). **The total approximate retail value of all prizes is $2,068.** Cash will not be awarded in lieu of prizes. Prizes are not transferable or exchangeable. Substitution of prizes will not be permitted except by Sponsors who reserve the right to substitute a prize of equal or greater value if indicated prizes are not available.

Eligibility:

Sweepstakes open to all current subscribers of *Radio* magazine in the United States as of December 10, 2003 and excludes the employees and immediate family (spouses and parents, siblings, children and each of their spouses) of Sponsors, the prize manufacturers, their parents, affiliates, subsidiaries, advertising agencies and any other company involved with the design, production, execution of the sweepstakes.

Timing:

Sweepstakes begins at 12:01 am on December 6, 2003 and ends at 12:01 pm on January 17, 2004.

Miscellaneous:

Winners release the Sponsors, the prize manufacturers and each of their parents, affiliates, officers, agents and employees from any responsibility or liability in connection with any loss, accident, or death incurred in connection with the use of or the installation of the prizes won in the Sweepstakes. The winners hereby consent to the use of his or her name and/or likeness by the Sponsors for advertising purposes without additional compensation unless prohibited by law. The verified winners will be required to sign an Affidavit of Eligibility and a Publicity/Liability Release. Any requested materials must be returned within ten (10) days of the date of notification. Failure to comply within any request in the allotted timeframe will result in disqualification and the selection of an alternate winner. Any tax liabilities are solely the responsibility of the winner. All federal, state, local, municipal and provincial laws and regulations apply.

By participating, entrants acknowledge and agree to be bound by these rules, and the decisions of the Judges, which are final. Sponsors do not make and are not responsible for any warranty (including fitness for particular purpose) or guarantee with regard to any prize or portion thereof.

To obtain the name of the prize winners, send a self-addressed, stamped envelope after January 25, 2004 to "Mic Sweepstakes Winner," *Radio* magazine Microphone Sweepstakes, Primedia Business Magazines & Media Inc., 9800 Metcalf, Overland Park, KS 66212.

Other Terms and Conditions:

Sponsor assumes no responsibility for any error, omission, interruption, deletion, defect, delay in operations or transmission, communications line failure, theft or destruction or unauthorized access to, or alteration of entries. The Sponsors are not responsible for any problems or technical malfunction of any telephone network or lines, computer online systems, servers or providers, computer equipment, software failure of any e-mail or entry to be received by Sponsor or congestion on the Internet or at any website, any combination thereof or otherwise, including any injury or damage to entrants or any other person's computer related to or resulting from participation or downloading any materials in the Sweepstakes.

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

FM Low Power Circular Polarization Antennas

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

FM Medium Power Circular Polarization Antennas

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

Please Contact the OMB America Sales Department for other antenna systems configurations

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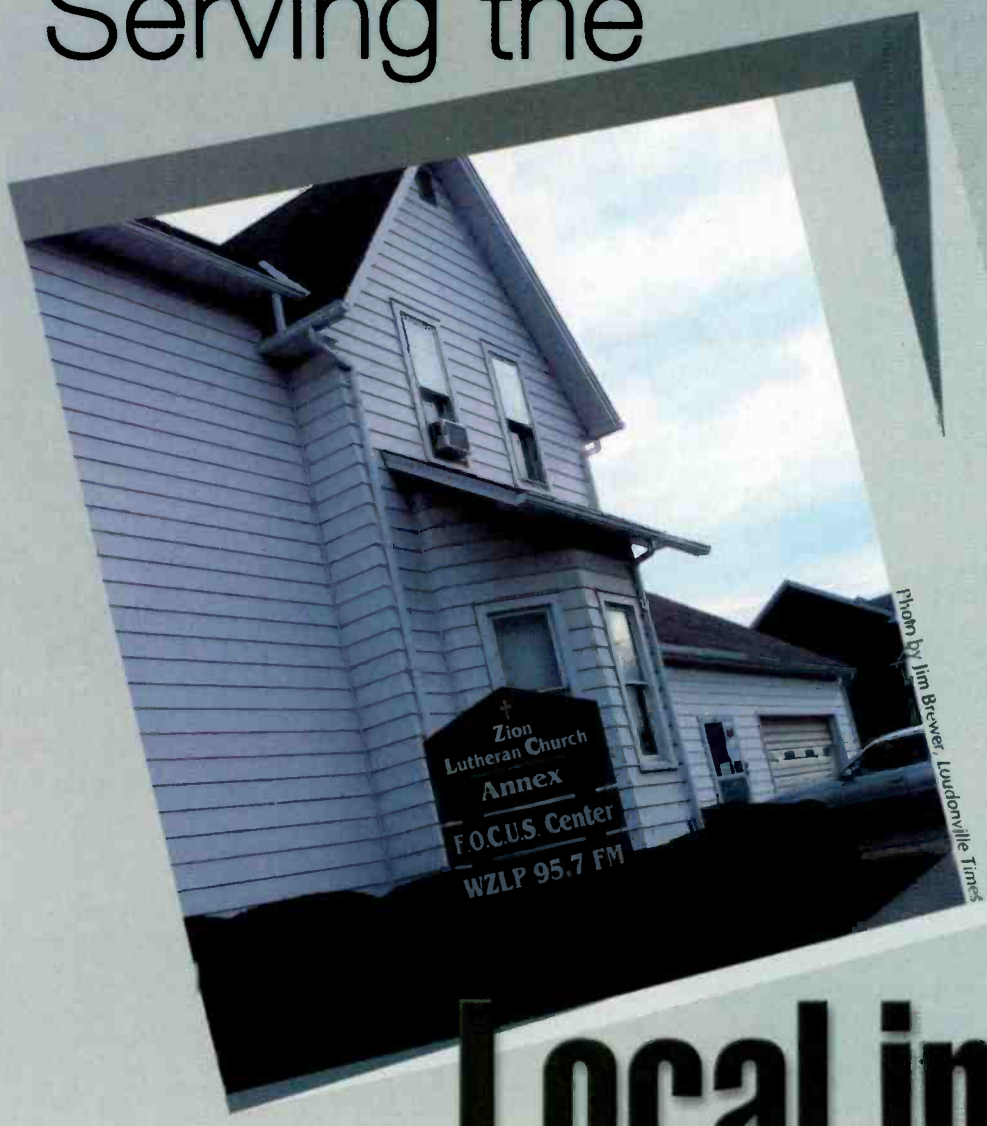

Photo by Jim Brewer, Loudonville Times

By John Battison,
technical editor, RF

Local interest

A new low-power FM station takes to the airwaves.

When the LPFM application window opened in Ohio, an opportunity was nearly missed. The matter had been discussed among the churches but at first no one expressed enough interest to proceed.

Loudonville is the second-largest city in the County of Ashland with a population of about 2,800 people. This community lies at about the midpoint between Columbus and Cleveland, near Mansfield. There is an FM station licensed to Loudonville, however, it has no presence in town, only an 800-number to call. Its studio is in Mount Vernon, which is about 20 miles away. A radio station that would truly serve the town was needed.

The pastor of the Zion Lutheran Church, Reverand Terry Ruther, was approached with the suggestion that his church apply for a construction permit for a low-power FM station. The goal would be for the station to serve his church, the city and local area. A basic initial plan was developed and he applied for a construction permit. The plan called for an antenna to be mounted on a pole on the church spire and to locate the transmitter and studio in a church office, thus keeping costs low and placing everything close together.

The construction permit was duly issued and all seemed well until someone noticed that the CP showed an effective radiated power (ERP) of 1W. The FCC Form 318 was electronically filed by a volunteer, but the height above ground in the filing was incorrectly entered as 290m instead of 29m. A quick modification led to a new CP with the desired 100W ERP.

During the time that elapsed between the application and the grant of the CP, the church congregation's interest grew and ambitious plans began to make this truly a local station. Construction, programming, operation, financing and staffing committees were formed. Meetings were held with the school superintendent,

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

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Serving the Local interest

Looking into the control room of WZLP.

the director of the public library and the city officials, all with the objective of including these sources in the station's programming. As a result of all this pre-programming activity,it was decided that effort should go for broke and take the time to find the best available transmitter site. After finding a better site,the CP was modified and WZLP was on its way to getting on the air.

Selecting the equipment

Time passed quickly, and the 18 months allowed for construction had elapsed to leave about six months remaining. The church was fortunate to have several members who had some broadcast experience and who took over the problems of obtaining equipment and installing the station. A budget of $50,000 was envisioned, and a retired former Christian station program director was hired to oversee construction. Once again, good fortune stepped in and contact with a nearby Christian station resulted in the purchase of a 100' self-supporting tower for $5,000. The price

The talk studio can accommodate as many as three guests.

included removal, transportation and the erection of the antenna, transmission line and tower at the site, which was not an easy job because of the local terrain.

Considerable site work was required in bulldozing and clearing the site and a path to it. All power and telephone lines were buried. An 8' × 10' cinderblock building was constructed on a concrete slab and a 10' security fence erected around the building and the tower. The area is fairly remote and vandalism is not unknown in Loudonville. A C-band dish was also installed with its output feeding a switcher inside the transmitter building. Satellite programming switching is remotely controlled from the studio and is fed directly into the transmitter input.

Inside the building, a Crown 100W transmitter operating at 112W output (the transmitter is rated at 120W,and the church insisted it meant that 112W continuous will work) drives a Shively two-bay 6812 antenna.

A little knowledge is a dangerous thing, and it was necessary to explain to the eager beaver church member "engineers" that an STL was not the same as an RPU, and could not be used for remote pickup at football games. This having been explained many times, a stereo loop was ordered from the telephone company together with two regular phone lines for remote control and communication. Fortunately, an incredibly low rate was available for the telephone services, making the STL option moot.

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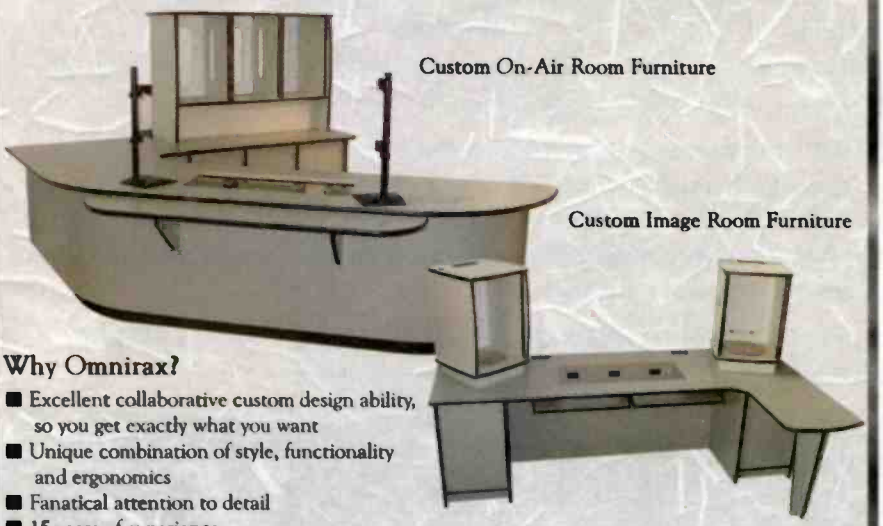

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WZLP's first remote broadcast was an away football game less than six weeks after going on the air. A simple installation using a Conex Flip Jack 2 was used via a POTS line. As far as is known this was the first local live remote broadcast of a Loudonville high school football game, although a local commercial station has been in existence for 10 years.

The basic, simple, low-power FM installation plan that was originally envisioned had long since been discarded. The congregation's excitement and acceptance of the proposed station produced a surprising amount of donations and grants. By now more than $50,000 was available for construction. This meant that new equipment, in most cases, could be purchased and although many offers of used equipment had been received comparatively little was actually used. But heartfelt thanks were offered to the generous potential donors.

The studios are compact, but they are functional.

Inside the studios

The studio is located across the road and in a house that is owned by the church. This building is used as an annex and contains conference rooms and young people's recreational rooms as well as a counseling service. The area allocated to the studio is about 12'x12' and it was recommended that this be used as a combination control room and studio. This would provide adequate space for several program participants plus the operator and studio equipment and makes for comfortable talk shows. A production studio was planned for the future and there is ample room in the building.

However, the experienced members of the committee wanted a real radio studio, with a separate control room and studio. The result is a small control room and a small studio. Adequate soundproofing was installed; air-conditioning is provided by a window unit that is turned off when necessary.

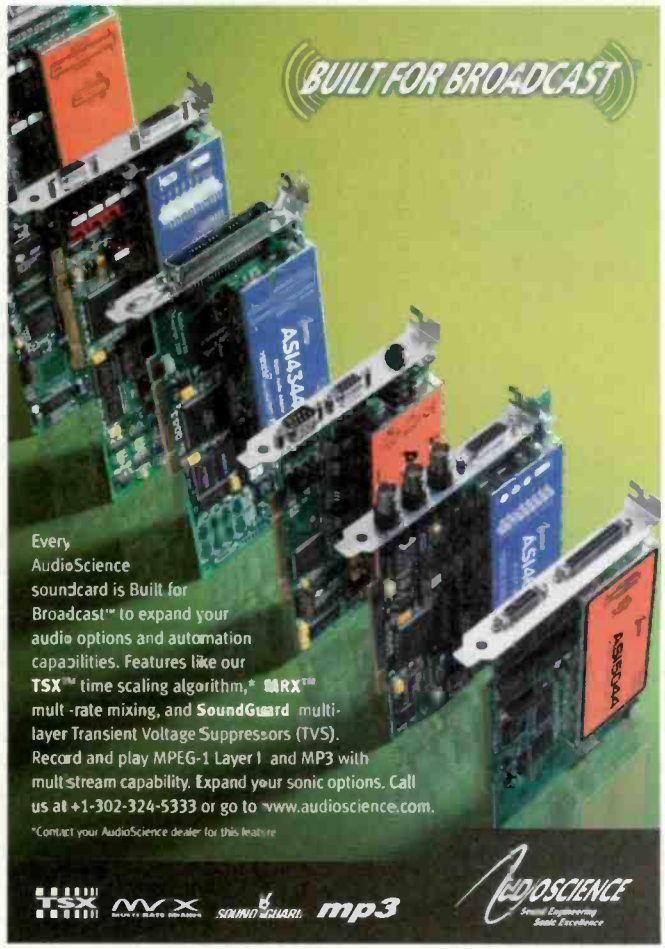
The studio layout is convenient, although it will probably be changed as time passes and more equipment is added. Suitable switching has been installed to allow the console and master control to be used as a production studio while a live studio program is on the air.

The church did not skimp on studio equipment and computerized operation and logging is used. All the live programming at present originates in the studio and consists of talk monologs and discussions. Plans are in place to run a line across the road to the church for live religious service broadcasts and chats from the pastor's office. When this is completed, live church services will be carried regularly. Services from other churches will be carried by means of phone lines. The Loudonville school also provides several local live programs, and school information notices are carried daily through this connection.

The station started its operations the right way. It is an LPFM station, but it is a real radio facility with the kind of operations and programming that used to be found in good commercial radio stations. In the end, construction costs to pass the states' many nitpicking inspections cost almost as much as the radio equipment. Signal coverage is in line with the Commission's anticipated level, and is usable at more than 10 miles in some directions and covers the adjoining village of Perrysville, which is what the church wanted.

Equipment list

Andrew coaxial cable
Broadcast Tools SS8.2 switchers
BSI Simian automation
Conex Flip Jack 2 and single Flip Jack
Crown FM100 transmitter
Electro-Voice 635A microphones
Inovonics 530 modulation monitor
Mackie model SR24•4 console
Marantz PMD320 CD player
O.C. White microphone booms
Shively 6812 antenna
Tascam 302 cassette
TFT EAS 911
Wegener Unity 4000 satellite receiver



New Products

By Kari Taylor, associate editor

www.beradio.com

Solar-powered kits
Kenneke Communications

Radio station kits: The solar-powered system allows stations to be operated where no main power is available. Stations are available in FM, AM and shortwave versions. A kit includes audio sources, microphones, mixer, transmitter, antenna and solar-charging setup. Solar-powered radio stations are useful for remote, rough or undeveloped locations. These stations can be used for remote transmitter and translator sites.

541-928-4552; www.kenneke.com
kenneke@kenneke.com

Security system protection
MGE UPS Systems

1500VA to 3000VA UPS models: For the power needs of sensitive equipment, high-capacity network and storage servers, the 1500VA to 3000VA UPS models address costly power disruptions with their high power density, small footprint and external battery modules for extended backup time. For protecting secure hardware, sensitive equipment and networks as well as network attached storage (NAS) devices, the line-interactive Evolution models have enough battery power to keep three NAS modules running for 30 minutes, or a DLT tape autoloader with 80 gigabyte capacity running for at least four hours. For longer backup times, external battery modules can be added to the Evolution 2200 and 3000 models.

800-523-0142; fax 714-557-9788
www.mgeups.com; info@mgeups.com

Active studio monitor
Tapco

S-5: The S-5 is a compact, bi-amplified monitor that features dual high-precision internal amplifiers providing a total of 120W RMS (60W for the woofer and 60W for the tweeter). A 5.25" woofer delivers bass output and detailed midrange, while a 1" waveguide-loaded silk dome tweeter provides a smooth, non-fatiguing high end. Rear panel controls allow for acoustic tailoring with low-frequency boost and high frequency cut and boost switches. Inputs include 1/4" TRS/XLR balanced and RCA unbalanced.

425-487-4333; fax 425-487-4337
www.tapcogear.com; sales@tapcogear.com

CD duplicator
Verity Systems

PowerTower: These manual duplicators duplicate small to medium quantities of CDs. Available with one, three or seven drives, the one to one duplicator is useful for high speed disc to disc copying while the one to three PowerTower and one to seven PowerTower offer high speed duplication at 24x

writer speed of up to 40 x 650MB or up to 90 x 650MB CDs per hour. All towers operate as stand-alone units and are independent of any PC. If equipped with the optional internal hard drive, as much as 20GB of data can be stored, allowing quick retrieval and duplication of CDs.

800-642-5151; fax 530-626-9395
www.veritysystems.com; ussales@veritysystems.com

KVM cable extenders
Gefen

Ex-tend-it CAT5-1000: These cable extenders are useful for operating a computer from a remote location. It works by using an extension system that consists of a sender unit, a receiver unit and a CAT-5 cable as long as 330' in length. The computer's audio and USB signals are connected to the sender unit. As far as 330' away, the receiver unit is connected to the monitor, keyboard, mouse and up to two USB peripherals. Sender and receiver units are connected with a CAT-5 cable. This product supports two dual-monitor workstations, remotely and locally, which means the sender and receiver units support a local set-up consisting of two monitors, as well as a remote set-up consisting of two monitors and two USB peripherals.

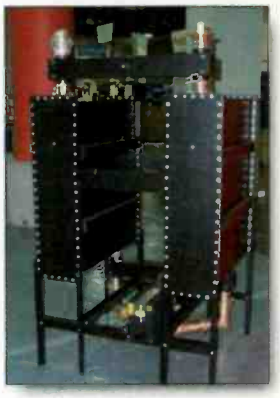
800-545-6900; fax 818-884-3108; www.gefen.com; gsinfo@gefen.com

Cable scanner
Rolls

CS1000: The hand-held unit handles all major connector types including speak on, MIDI five-pin, RJ-11 (telephone type) and RJ-45 (Ethernet and CAT-5). It also sports phantom power, 1kHz test tone, polarity test, level control and a headphone jack.

801-263-9053; fax 801-263-9068; www.rolls.com; rollsrfx@rolls.com

Combiner module
Dielectric



DFC-1000: This constant impedance combiner module enables a number of 12kW FM channels to be combined into one antenna. This module is IBOC-ready through the integration of a circulator on the IBOC input port. Standard configuration designs are for frequency separation of 1.6MHz or greater. The combiner provides isolation between transmitters, while also providing a constant impedance narrow band input for each individual transmitter. The HD Radio version of this unit allows for analog and HD Radio inputs at each module with a high level of isolation between these common frequency inputs.

800-341-9678; fax 207-655-7120
www.dielectric.com; dcsales@dielectric.com

Portable audio codec
Mayah Communications

Merk II: This portable codec and mixer is based on the Centauri product family. While typical portable devices have restrictions on the number of audio inputs and outputs and compatibility, this codec offers four switchable mic/line inputs and four headphone outputs; switchable phantom power 48V with LED indication; one or optionally four ISDN BRI; 10/100 Mb/s Ethernet for audio-via-IP and wireless-LAN; extended mixing capabilities including monitor and control; and flashcast compatibility to most of all available audio codecs. The unit also offers low delay algorithms with Apt-X, ADPCM4SB and AAC low delay, as well as electronically controlled potentiometers for full audio mixing remote control.

+49 0 811-55-17-0; fax +49 0 811-55-17-55
www.mayah.com; info@mayah.com

Plug-in
Eventide

Reverb Plug-in: The plug-in for Digidesign Pro Tools TDM for Mac v5.1.3 or greater, is a multi-effects plug-in that incorporates a pair of delays, pre- and post-stereo three-band parametric EQ, a high-quality compressor and a Lo-Fi effect. The sound quality is compelling, using reverb algorithms from the company's flagship Orville, including halls, chambers, plates and rooms. Each reverb type offers three-band stereo parametric equalization before and after the reverb, reverb contour for built-in tone shaping, a pair of delay lines with filters and a compressor.

201-641-1200; fax 201-641-1640
www.eventide.com; audio@eventide.com

Condenser mic
Shure

Beta 98H/C: A clip-on instrument, this miniature mic can be securely mounted to almost any instrument as a self-contained system. The mic uses a clip-on clamp that still allows for the quick change between instruments. Handling high SPL levels and gain-before-feedback performance, the miniature cardioid condenser unit is low-profile in design, thereby minimizing its stage presence. The mic also offers a flexible gooseneck, a locking windscreen for outdoor use and an integrated isolation shock mount that reduces the transmission of instrument key noise and other mechanical noise.

800-25-SHURE; fax 847-600-1212
www.shure.com; sales@shure.com

www.beradio.com

D/A converter
Sonifex

RB-DAC1: The RB-DAC digital-to-analog converter is a 1RU piece of equipment that produces a stereo balanced XLR or unbalanced phono output from an incoming AES/EBU or S/PDIF digital input signal. There is also a headphone output with volume control for monitoring purposes. The analog outputs have an output level control, allowing full-scale settings selectable from 12dBu, 18dBu or 24dBu. There is

a button to select the AES/EBU or S/PDIF input for the D/A converter, which is located on the rear panel. De-emphasis on the output can be enabled via dipswitch. When operating, the front panel power LED flashes whenever the unit is not synchronized to the incoming digital signal.

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Upgrades and Updates

Harris Distributes Newsboss

Newsboss is a newsroom automation system that runs on Windows. It is a radio-specific automation system that uses a database for management of news data. Newsboss is scaleable and configurable and can accommodate systems from one to 80 users.

www.broadcast.harris.com

KRK Ships ST Series

KRK is now shipping the new ST Series of passive monitors, which includes the ST6 and ST8. The ST Series design incorporates new driver and crossover technologies for precision monitoring. The ST8 features an 8" aluminum woofer and 1" silk tweeter. Both models feature 7/8" MDF construction to control sound reflection and standing waves within the monitor and a double-layer anodized aluminum cones for extremely low distortion.

www.krksys.com

Omnia A/X Software Now Shipping

The software operates on Windows, conditioning and processing audio prior to encoding. It works with most applications that use the standard Windows Wave in/out driver interface, including Windows Media, Real and MP3 streaming encoders.

It features a wide range of processing controls, including wideband automatic gain control (AGC), a three-band combined AGC/limiter, high frequency EQ, an adjustable-bandwidth low-pass filter and a look-ahead final limiter.

www.omniaaudio.com

Audio Science Releases Linux ALSA Driver

The ALSA driver allows standard Linux applications to play, record and mix PCM audio using the Audio Science range of professional sound cards. The source code is available as a patch to ALSA driver source from Audio Science's website in the download section. Updates will be made periodically available as new adapters and features are supported. Advanced functions, such as time scaling (TSX) and on-card MPEG audio processing, can still be accessed through the Audio Science HPI interface (also recently released under GPL).

www.audioscience.com

BSI Releases New Version of Simian

Broadcast Software International (BSI) has released Simian 1.6. BSI has incorporated more than 100 user suggestions in recent releases, including improved deckfade macros to increase user control, improved index handling and playback on MP3 files, added control over the Async deck, increased webcasting functions and serial strings, and a Reset Cart command to allow Simian to go back to the first item in a cart, even if all the items have not been played.

www.bsiusa.com

IBOC FM antenna
Electronics Research

Dual-feed IBOC antenna: This dual-input, side-mounted FM antenna is designed for FM IBOC applications and transmits the analog and digital FM signals without requiring a high-loss hybrid combiner or the use of a circulator to attain the required isolation between the digital and analog transmitters. The antenna is a dual-input antenna that excites all radiating elements with analog and digital signals. The antenna eliminates the combining loss that is present in the 10dB hybrid combining method. It is able to achieve 1.05:1 VSWR for analog and digital inputs. The antenna can also achieve in excess of 30dB isolation between analog and digital inputs without using an isolator and circulator.

812-925-6000; fax 812-925-4030; www.ERlinc.com; sales@ERlinc.com

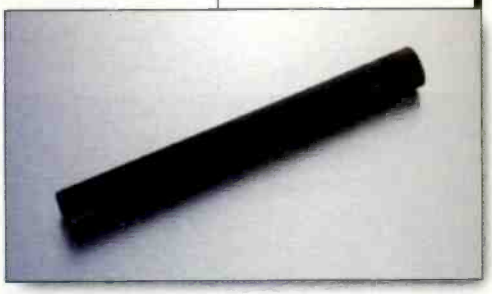
Content management
Dmarc Networks

DRDS: This patent-pending system provides packet-based, centralized radio data service and content management. This system enables FM broadcasters to dynamically schedule, target, deliver and report on RDS text broadcasts across one or multiple stations, all through user-friendly desktop software: the Webmanager 1.0.

949-791-1200; fax 949-640-7065
http://www.dmarcnetworks.com; info@dmarcnetworks.com

Condenser mics
DPA Microphones

4015 and 4016 Wide Cardioid: The 4015 P48 phantom-power and the 4016 130V wide cardioid microphones are transformerless, giving shorter sound paths and cleaner bass response, and are capable of handling high sound levels. Both mics can handle 158dB peak before clipping. An additional 10dB of headroom can be obtained by choosing the 4016 paired with the HMA4000 two-channel, high-voltage microphone amplifier. The 4015 features a linear frequency response from 40Hz to 20kHz and is designed with a soft high frequency boost to offer better sound in close miking applications and a linear response in the diffuse field.



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www.dpamicrophones.com; info@dpamicrophones.com

FM class C amplifiers
Silicon Valley Power Amplifiers

PAB FM series: These broadband FM commercial radio amplifiers offer value and performance in an easy to service EIA standard 19" rack mount cabinet. A newly designed second-generation, computer-based controller allows power setting through front panel display or through an RS-232 serial connector with simple commands. This modular amplifier series uses MOSFET technology for efficient and reliable operation. This fault tolerant system will keep a station on the air by reducing power in any fault condition-VSWR, high temperature or device failure. A modular approach is applied to all RF components and power supply. Output PA modules have connectors and use quick-disconnect fittings for fast hot swapping of modules so the station never leaves the air. Fault tolerance is designed throughout the system.

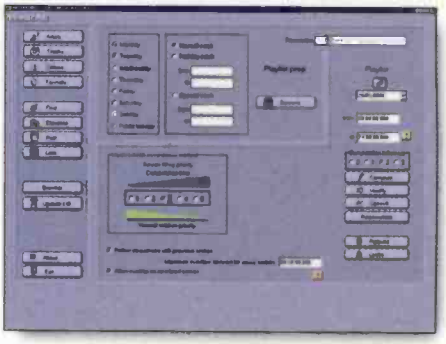
775-DELTA-RF; fax 775-DELTA-FX
www.svpa.com; sales@drft.com

Digital distribution amplifiers
ATI

DDA Series updates: These six digital audio distribution amplifiers are based on ATI's established products and offer lower price points. Retaining most of the features of the company's AES/EBU digital audio distribution amplifier DDA lineup, the DXA offering adds four new models designed to fit in a 1RU space in 1x4, 1x6, 2x6 and 2x12 versions: DXA104, DXA106, DXA206 and DXA212 respectively. ATI has also redesigned the DDA206-XLR and DDA212-XLR. The inputs and outputs of the new DXA series are transformer isolated 110Ω XLRs. The DXA distribution amplifiers process digital audio sample rates from 27kHz to 96kHz with propagation delay of less than 300 nanoseconds. The distributed outputs are de-clocked and regenerated with low jitter (less than 3 nanoseconds peak-peak). S/PDIF models using RCA connectors and 75Ω AES/EBU models with BNC connectors are also available.

215-443-0330; fax 215-443-0394
www.atiaudio.com; sales@atiaudio.com

Radio Assist enhancements
Netia Digital Audio



Music-All: This systems offers a music management tool in the new Radio-Assist 7 range and is designed to manage a station's music schedule with consistency. The user can choose from a wide range of broadcast criteria to define run frequency, mandatory or forbidden sequences and any other relevant constraint. Tracks are mixed and matched by an independent rotation method. It can produce as many as 100 schedules from a single title database.

866-638-4222; fax 973-575-7812
www.netia.net; j.martin@netia.net

AM/FM tuner
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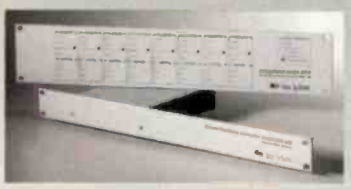
PT-9107S: The 9107S is an AM/FM tuner with 30 programmable presets and an autoscan function. The AM section spans 522kHz to 1,611kHz. Features of this tuner include a stable and reliable circuit; fixed and variable output; autoscan and 30 presets; mute switch and LED; emergency battery operation; and an output level/impedance fixed 300mV/1kohm, unbalanced. The power consumption of this unit is 14W. It weighs 3.5kg and its dimensions are 482mm W x 44mm H x 280mm D.

610-874-8870; fax 610-874-8890
www.inter-m.net; info@inter-m.net

Product Showcase



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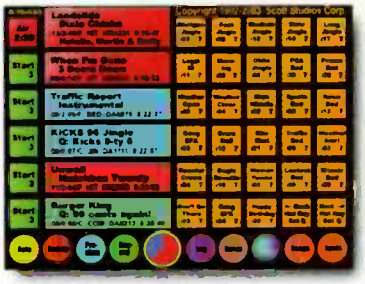

800-SCOTT-77; fax 972-620-8811
www.scottstudios.com; info@scottstudios.com

Stereo mic
Beyerdynamic

MCE 72: The MCE 72 is a compact stereo mic for XY recording with a wide and linear frequency response producing uncolored, high-quality recordings. The mic is suitable for stereo recording in home studio applications, concert recordings with DAT or MD, film and interviewing. The mic features two mic capsules that are mounted in an angle of ±60 degrees to the mic axis to achieve a wide recording range and an accurate reproduction of the sound source. The optional EA 19/25 elastic suspension suppresses footfall sound effectively.

800-293-4463; fax 631-293-3288
www.beyerdynamic.com; salesUSA@beyerdynamic.com

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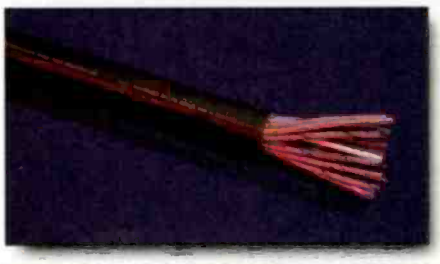
Nemal Electronics



SND2424 and SND1224: These AES/EBU compliant digital audio snake cables can be used in broadcast and other high-end audio applications. These 110Ω cables are available in constructions containing two to 24 pair, and are UL-CM approved. The cables facilitate rapid and neat installation of systems requiring multiple digital audio pairs, and the discrete color-coded individual jackets provide for easy and positive identification.

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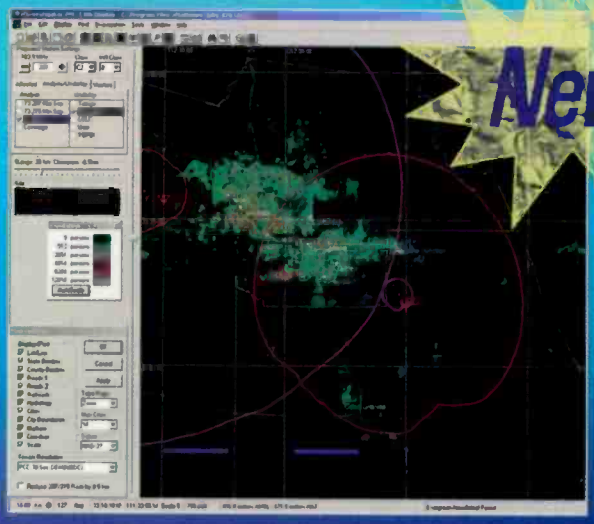

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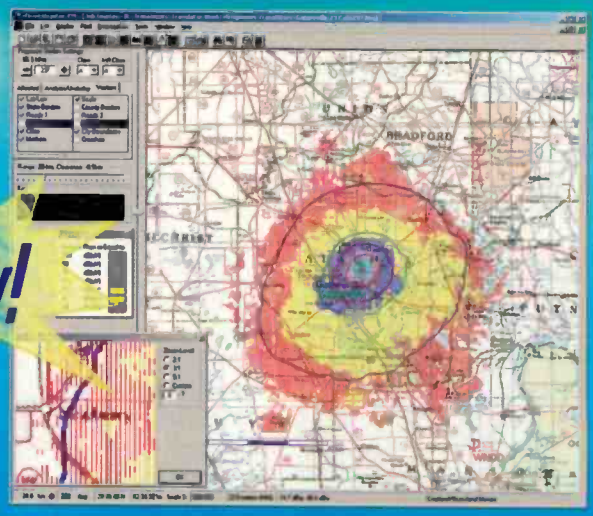

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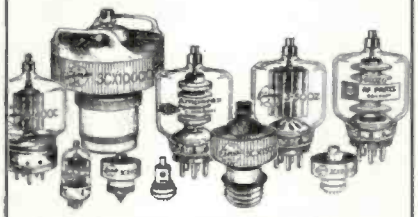

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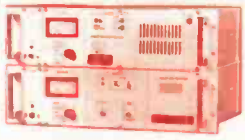

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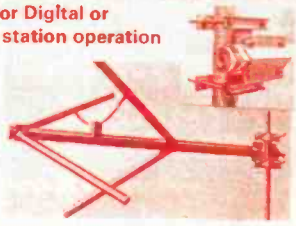

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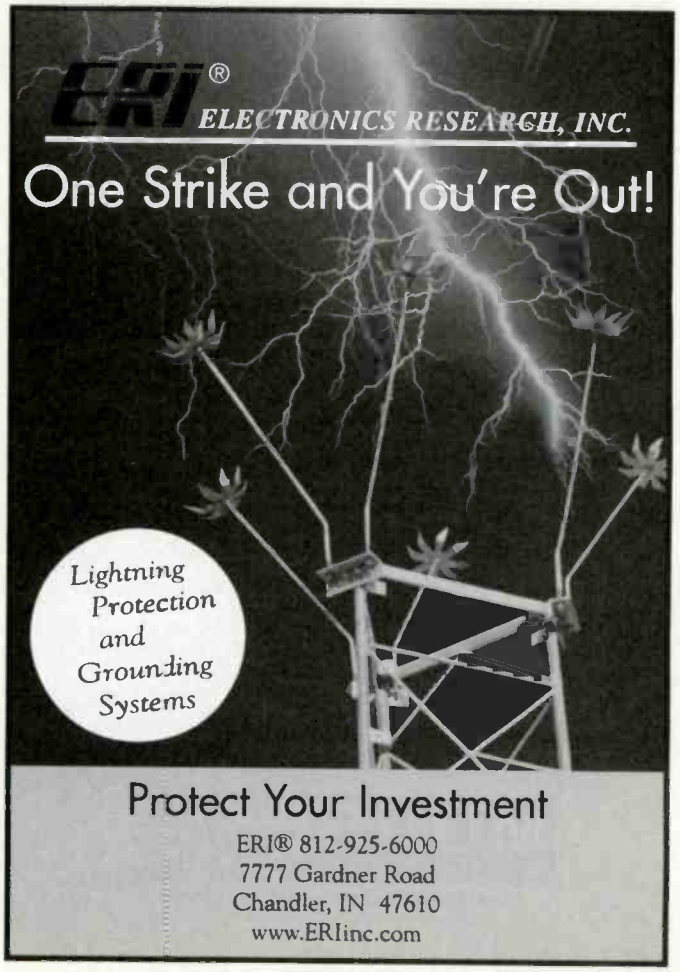

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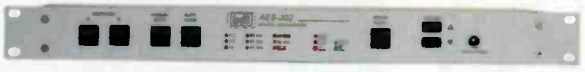

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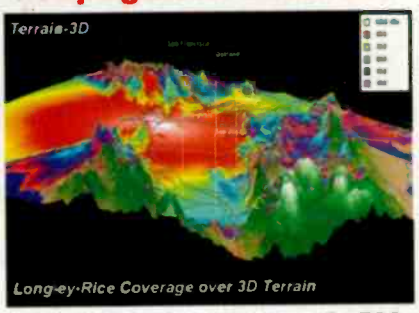

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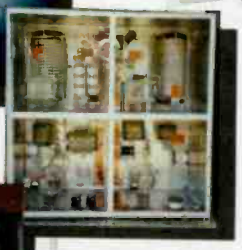

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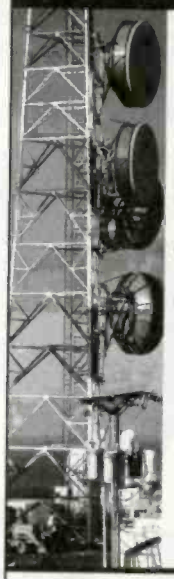

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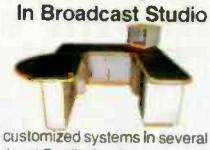

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Editor – Chriss Scherer, CSRE CBNT, *cscherer@primediabusiness.com*
Technical Editor, RF – John Battison, P.E., *batcom@bright.net*
Associate Editor – Kari Taylor, *ktaylor@primediabusiness.com*
Sr. Art Director – Michael J. Knust, *mknust@primediabusiness.com*
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Contributor Pro-file

Meet the professionals who write for *Radio*. This month: Facility Showcase, page 36.

Jay Rose
CEO & Chief Engineer
Jay Rose Broadcast Engineering
Concord, CA

Rose started his career in radio at an early age, gaining an interest in broadcast engineering at eight. His 34-year career includes 13 years at KMEL, San Francisco.

He built his first broadcast studio at age 13 and operated his own lighting company by the time he was 18.

In 1999 he started Jay Rose Broadcast Engineering. He has completed projects for stations throughout California and Nevada and provided engineering services for a number of remote broadcast events around the world.

Radio
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Written for radio professionals

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POSTMASTER: Send address changes to *Radio*, P.O. Box 2100, Skokie, IL 60076-7800 USA.

Shaping radio today and tomorrow

By Kari Taylor, associate editor

Oldest transmitter

The oldest transmitter still in use has been located. WNAH in Nashville began using its Gates BC-1T transmitter in 1960. It is currently used as the station's main transmitter.

This 1,000W AM transmitter was manufactured and sold between 1957-1962. It features an in-built dummy antenna for off-air testing and its RF output impedance matched loads from 50Ω to 70Ω. The transmitter weighs 800 lbs. and has provision for two vacuum-type crystals and holders. The transmitter is encased in a steel cabinet with a meter panel that slopes forward for easy observation.

A selling point of this transmitter was the combination of a cathode follower, a modulation system that modulates the Class C and RF driver amplifiers and overall feedback, which resulted in a new distortion low. The prototype of this transmitter actually produced 50-cycle distortion as low as ½ of 1 percent.

The transmitter's frequency response is 50Hz to 10kHz to balance response losses often found in other parts of the overall broadcasting system. All BC-1Ts shipped with an internal dummy load. It was the first Gates model to include one as standard equipment.

Photo from Gates catalog #93 from the late 1950s, courtesy of Dale H. Cook.

Sample and Hold

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

That was then

This ad graced the back cover of the September 1952 issue of *Complete Baseball*, a "big league baseball magazine." The ad is trying to sell booklets that will teach people how to be radio and TV engineers. At the bottom of the ad is a coupon to send in to get both booklets for free.

"Many students make $5, $10 a week extra fixing neighbors' radios in spare time while learning. The day you enroll, I start sending you special booklets to show you how to do this," the ad reads. "Tester you build with parts I send helps you service sets. All equipment is yours to keep."

"Your next step is a good job installing and servicing radio-television sets, or becoming the boss of your own radio-television sales and service shop or getting a good job in a broadcasting station."

"And think of the opportunities in television!" the ad reads. "In 1950 over 5,000,000 television sets were sold. By 1954 authorities estimate 25,000,000 television sets will be in use. Over 100 television stations are now operating, with experts predicting 1,000."

The prediction fell short. Today, there are nearly 4,500 TV stations, including all low-power stations.

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