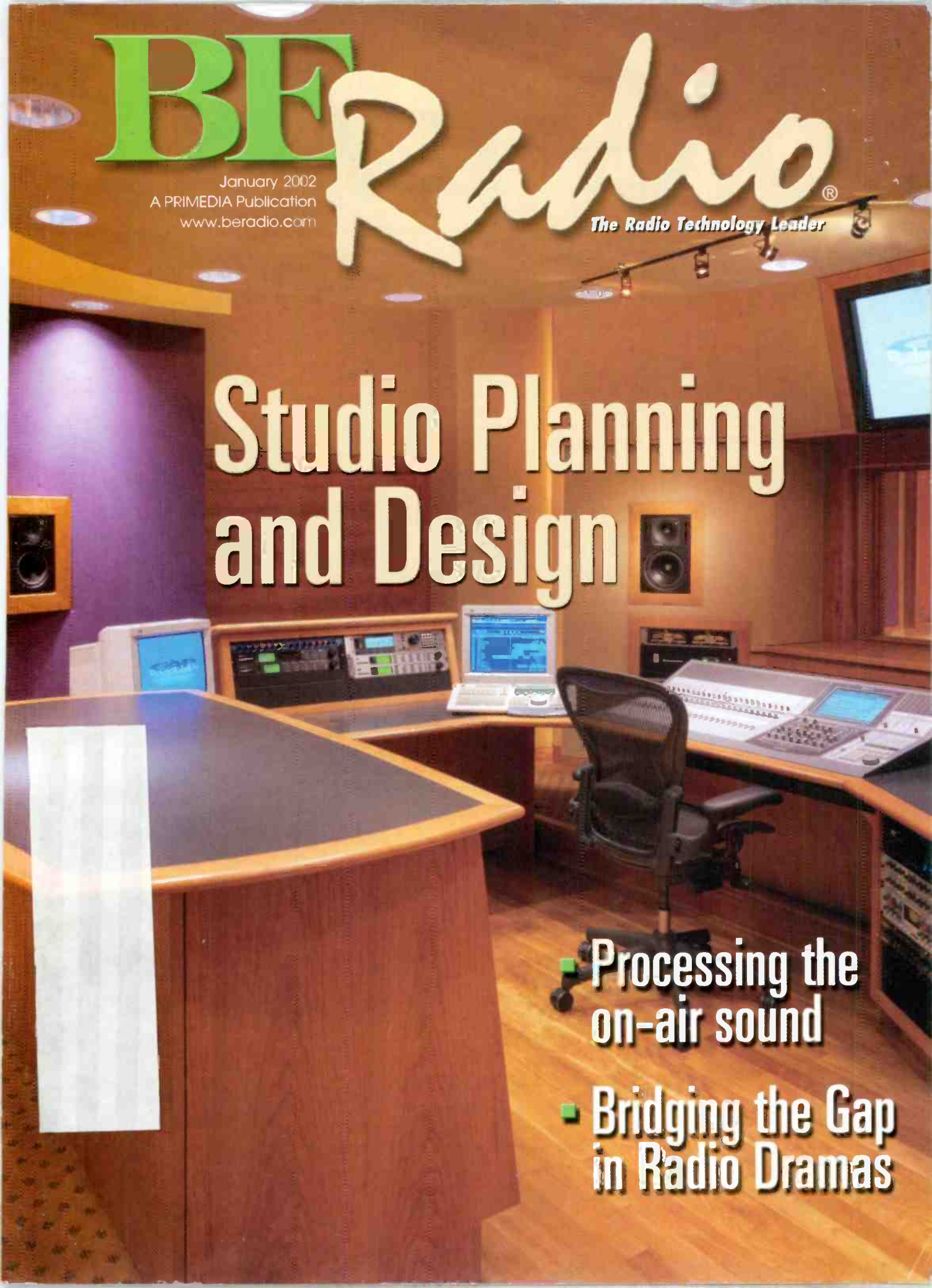
BE Radio®
The Radio Technology Leader
January 2002
A PRIMEDIA Publication
www.beradio.com



Studio Planning and Design

- Processing the on-air sound
- Bridging the Gap in Radio Dramas

BIG EASY

TECHLINE STUDIO FURNITURE

Easy to INSTALL – Easy to AFFORD!

- machine-tapped rack rails
- built-in top and bottom ventilation
- removable doors
- punchblock enclosure available
- compatible with Wheatstone Wiremax System
- available with type 66 or Krone™ blocks
- modular design for variety of configurations
- both standup and sitdown heights
- above counter turret accessories
- fast installation
- generous wireways
- built-in levellers

STARTS at $2900

Available options include prewired punchblocks

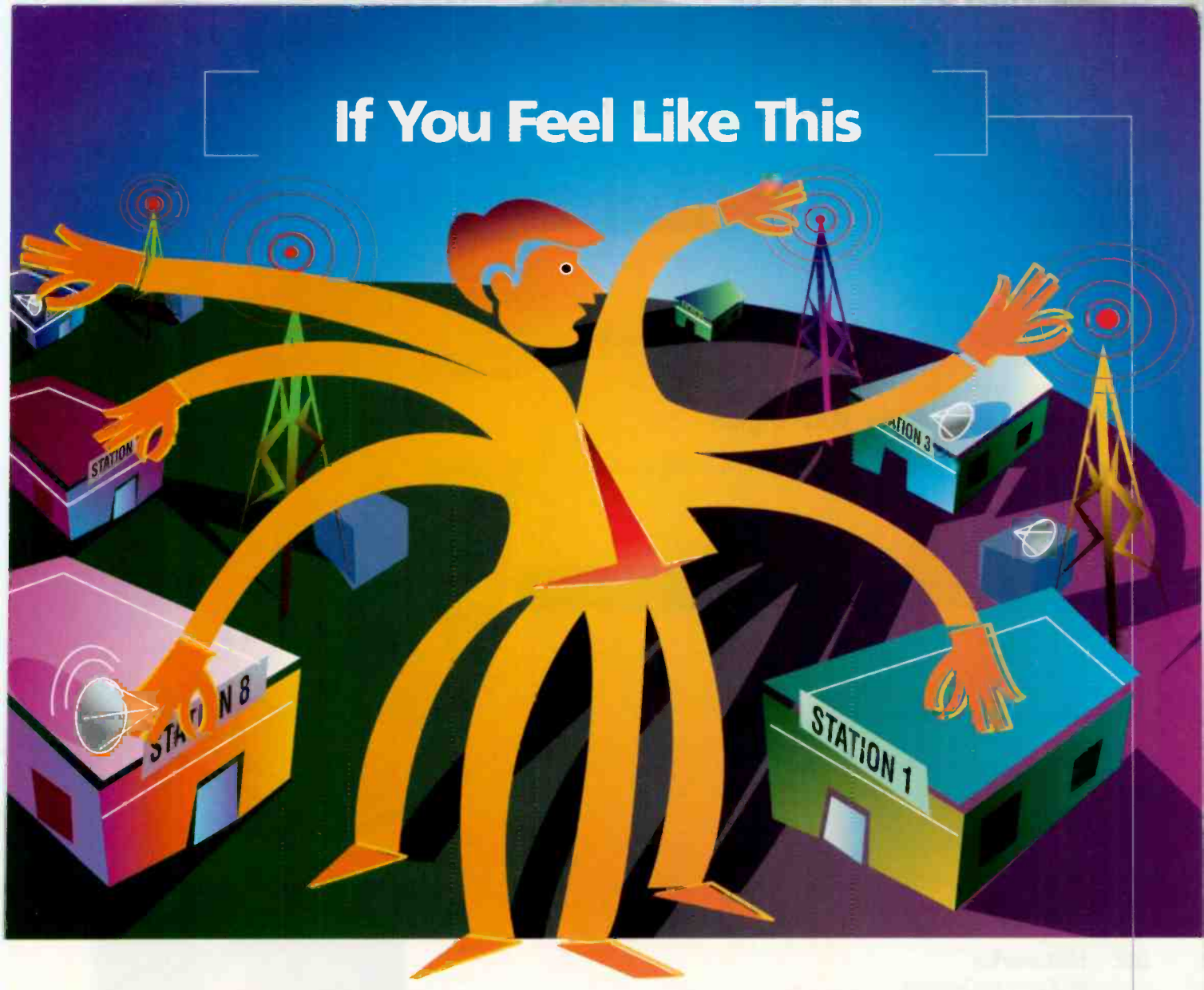
OUR HIGH-STYLE TECHLINE STUDIO FURNITURE
boasts uncompromising **QUALITY** tailored to the **TIGHTEST BUDGETS**, with all the features a well-designed studio calls for.
A TRULY COST-EFFICIENT SOLUTION FOR YOUR NEXT STUDIO PROJECT!

See us at NAB RADIO – Booth #1118!

Wheatstone Corporation

tel 252-638-7000/fax 252-635-4857/sales@wheatstone.com / www.wheatstone.com

If You Feel Like This



You Need This

Looks like you've got your hands full again. Except you're running out of hands. And because you have many facilities you could use a few more legs, too.

Let Harris' Intraplex STL PLUS™ give you a hand getting your new station up and running quickly and profitably or upgrading your station to the best quality digital on-air sound available today.

STL PLUS™ gives you bi-directional program audio transport over a T1 line, fiber or microwave link. So you can interconnect your studios, offices and transmitter sites. And because it's is a digital system, you're delivering pure, crystal clear sound – regardless of the distance. Even if you're surrounded by the highest mountains or tallest buildings.

Now for the PLUS in STL PLUS™: You can also transmit LAN/WAN data, telephone, intercom, and remote control over the same digital line. All of which can rack up some pretty impressive cost savings for your inter-facility communications.

Best of all, STL PLUS™ grows with you as no one else can. It has the industry's largest assortment of plug-in modules. So you can design the perfect system for today and quickly, easily, and affordably upgrade it for tomorrow.

So, contact your Harris representative about STL PLUS™ today. You'll be a leg up on the rest.

next level solutions

SERVICE

SYSTEMS

AUTOMATION

TRANSMISSION

HARRIS

www.broadcast.harris.com

Contents

BE Radio
www.beradio.com
January 2002
Volume 8, Number 1

FEATURES

35 Studio Design
by Brent Fasbinder
Build it right from the start.

44 Trends in Technology: On-air Processors
by Chriss Scherer
When science and art meet

47 Facility Showcase: GAP Digital
by Chriss Scherer
Radio dramas from a mix of radio and recording studios

52 Eye on IBOC
by Jeff Detweiler
The first steps of preparation for the transition

10

COLUMNS

08 Viewpoint
by Chriss Scherer
IBOC gets passing marks.

10 Managing Technology
by William Harrison
Is streaming really worth it?

14 E-casting
by Alison Shapiro
Demystifying the DMCA

16 RF Engineering
by John Battison
Advances in solid-state tower lighting

22 Networks
by Kevin McNamara
Understanding storage area networks

26 FCC Update
by Harry C. Martin
Local ownership rules under review

76 Sign Off
by Cindy Holst

14

DEPARTMENTS

06 Online at www.beradio.com

53 Field Report: OMT Technologies iMediaLogger
by Tim Wright

55 Field Report: Aphex 204 Aural Exciter
by S. Parks Hall

58 New Products
by Cindy Holst

73 Classifieds

74 Contributor Pro-file
Meet William Harrison

16

44

ON THE COVER: Attention to detail can make a studio design project succeed. Photo of GAP Digital Control Room A (Wheaton, IL) by Dave DeJong, courtesy of Walters-Storyk Design Group. Cover design by Michael J. Knust.

Our Secret is Behind the Scenes!

- Integrated platform concept
- Fiber optic networking
- Any audio source, anywhere

KLOTZ DIGITAL's unique VADIS Platform provides the perfect solution for facilities searching for the ultimate in digital audio integration. From single studio build-outs to new mega-facility operations, KLOTZ DIGITAL provides a cost effective and time saving option to traditional analog and digital facility installations. *Our secret is behind the scenes.* Fiber optic based, the VADIS Platform integrates all audio functions, combining operator tasks, reducing the need for traditional wiring, and paving the way for effortless future expansion. And, the elimination of a central router means distribution of "any audio source anywhere at any time!"

Compare the costs for yourself. When it comes to savings, quality and performance...nobody even comes close. That's why the most sophisticated and technologically advanced facilities throughout the world choose KLOTZ DIGITAL.

KLOTZ DIGITAL GERMANY Phone:+49-89-45672-300

KLOTZ DIGITAL FRANCE Phone:+33-1-48874681

KLOTZ DIGITAL ASIA Phone:+60-3-5193233

KLOTZ DIGITAL AUSTRALIA Phone:+61-2-95186795

KLOTZ DIGITAL
5875 Peachtree Industrial Blvd.
Bldg. 340
Norcross, Georgia 30092
Phone: +1-678-966-9900
www.klotzdigital.com

KLOTZ DIGITAL

www.beradio.com

Your online source

for current radio broadcast news

JobZone | Research & Tools | Subscribe to BE Radio | Daily Headlines

BE Radio

BE Radio

Browse Back Issues

December 2001

Site Features
- Find the Mic
- Currents Online
- Currents Webcast
- Weekly E-mail
- Engineer's Notebook
- Studio Spotlight
- Demo Room
- Subscribe

- Free Info

BE Radio Info
About the Magazine
Contact the Staff

For Advertisers
Editorial Calendar
Magazine Media Kit

Contents

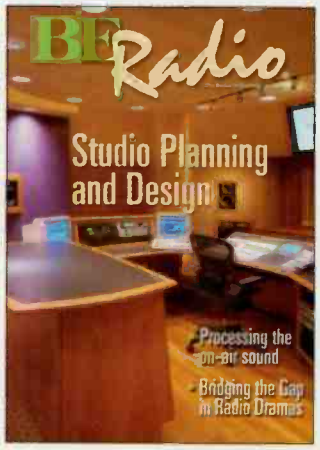
Currents

- FCC Seeks Comments on NRSC Report

Comment is sought on the NRSC report, conclusions, and recommendations concerning the Ibiquity hybrid mode FM IBOC DAB system, as well as on the Ibiquity FM IBOC test results, with respect to the Commission's stated DAB policy goals and selection criteria.

- Partnership For Public Warning Forms
- Shure, Sennheiser Bust Counterfeiters
- Audemat wins TDF Tender
- TC Group Offers To Purchase TGI
- Arbitron Advances With U.S. PPM Trial
- Murphy Joins Harris Broadcast
- Kneller Selected for IAAIS Board
- Klotz America Adds Crump
- Sadie Celebrates 10 Years
- SiteShell Corporation Transfers Biz
- FCC Takes Another Try at EEO Rules
- Klotz Awarded Guangdong Contract

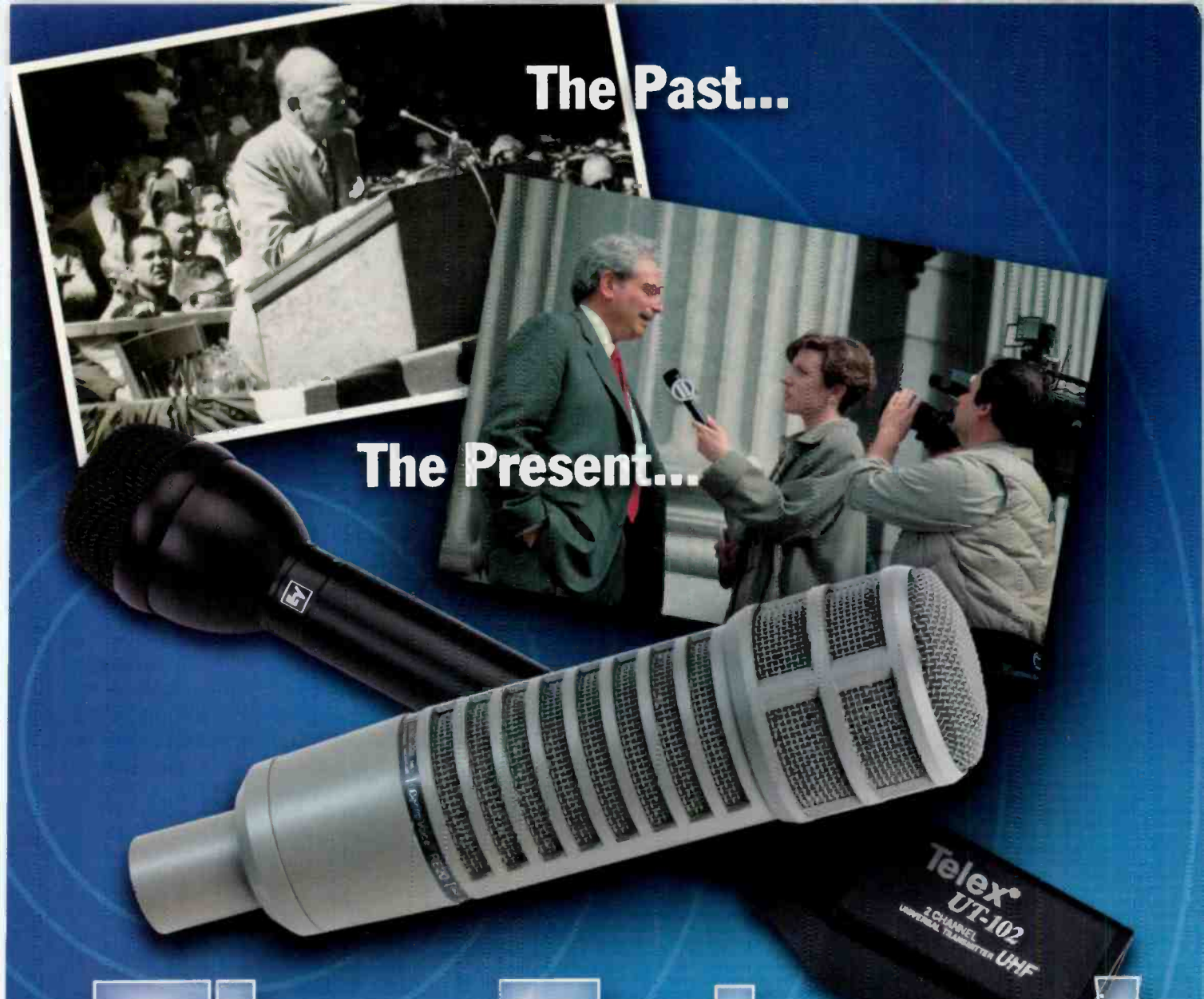
January in BE Radio: *Studio Design & Planning*



Currents Online Headlines Mailed Weekly

Receive the latest radio technology news and information every week via e-mail. Stay on top of what is happening in the radio industry with the Currents Online weekly headlines. Go to *www.beradio.com* and follow the link to subscribe.

Where's the mic? Enter the Find the Mic Sweepstakes. Details in the December issue and online.



The Future!

We've been there, we are there, we'll be there!

In 1953, when Gen. Dwight D. Eisenhower became the 34th president of the United States, EV microphones were there. Today, when the news is happening and broadcast quality audio is important, professionals turn to EV and Telex for their wired and wireless microphone needs. For the future, EV and Telex stand ready with new technological innovations and a complete line of professional broadcast microphones. **So when the news breaks, you'll be ready!**

ENG 100 Wireless Electronic News Gathering System

This rugged compact receiver offers 100-channel frequency agility, Posi-Phase diversity, tone coded squelch and side mount controls. Matched with the UT-102 frequency agile plug on transmitter and the industry standard EV, RE50 microphone, EV and Telex offer the perfect solution to today's newsgathering demands. The ENG-100 is also available with the 100 Channel LT-100 bodypack transmitter for lapel microphone applications.

Call today! **1-800-667-3968** www.telex.com

EV

TELEX

Making the grade

At the end of November, the National Radio Systems Committee released its report recommending that the FCC authorize Ibiquity Digital Corporation's FM In-band On-channel (IBOC) digital radio broadcast technology as an enhancement to the current analog FM broadcasting system in the United States. The data reviewed was collected by Ibiquity, the Advanced Television Testing Center and Dynastat from eight stations in Annapolis, MD, Baltimore, MD, Columbia, MD, Las Vegas, New York, San Francisco, and Washington, DC.

The wording used by the NRSC to give its stamp of approval states that the IBOC system provides a "greatly reduced impact of multipath interference (for mobile, portable and fixed receivers alike); superior resistance to co-channel and adjacent channel interference; support for enhanced data services; [and] improved audio quality." The recommendation to the FCC was that an FCC approval of the system would be "charting the course for an efficient transition to digital broadcasting with minimal impact on existing analog FM operation and no new spectrum requirements."

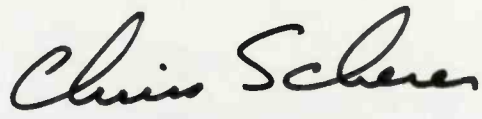
I think most people were expecting the NRSC to give the thumbs up to FM IBOC. The concept of an IBOC system has been in the works for the past 10 years. I believe the NRSC did a thorough and honest job in making its evaluation. I don't even want to think about what would be happening right now had the NRSC found IBOC to be less then favorable. Once the AM report is made, the day will shortly follow when the FCC makes a ruling on IBOC.

Once word spread that the report was released, I started watching several discussion lists and talked with several people. IBOC is a topic that on its own can incite heated debates, and the news of the report fuels the fires. Some people were quick to point out flaws they saw in the test data. Since only a few stations broadcast a hybrid IBOC signal, some feel that the test does not represent a real-world demonstration for evaluating multipath, co-channel and adjacent channel interference. Others stressed that the tests used the AAC algorithm for the audio encoding, while Ibiquity plans to use a form of Lucent's PAC algorithm for the final system.

Informed, intelligent discussion is vital to coming to an educated conclusion. While the negative points do raise some good questions, these are points that have been considered along the way. These are tests and simulations, which take these factors into account. The key to the report is that it finds IBOC provides an improvement to the existing analog system. It does not claim that IBOC is the perfect system.

We are closer to an IBOC DAB standard, but we're not there yet. The promise of digital radio is wonderful. The AM report should be issued very soon, and I'm confident that the NRSC will also apply its seal of approval. In the end, the AM band has a more obvious gain than FM in improved fidelity.

I believe that for IBOC to be adopted by all stations, the FCC must require its implementation with specific dates to mark its transition. Without a mandate such as this, IBOC will flounder. The cost to stations for the hardware alone will be more than most are willing or able to pay. In addition, stations are still not enlightened with the licensing fees that will be passed on to them to use the technology.



Chriss Scherer, editor
cscherer@primediabusiness.com

What do you get when you cross a Matrix with a HotLine?

The BlueBox:

The audio quality of the Matrix at a fraction of the price.

Order yours today!

15 kHz on a single POTS (Plain Old Telephone Service) line for $2800!

Want to save even more $$$? Buy a **HotLine** for just **$1995** while they last!

Comrex Corporation, 65 Nonset Path, Acton, MA 01720 USA
Tel: (978) 263-1800 Fax: (978) 635-0401 Email: info@comrex.com
Toll-free in North America: **(800) 237-1776**

COMREX
www.comrex.com

Streaming costs and benefits

By William Harrison

On-air personalities love it, younger audiences seem to demand it, and many stations are afraid not to provide it if their competitors are already online. To stream or not to stream, that is the question. Just a short while ago, that question did not exist. If the content was there, stations found a way to stream it. There was potential to reach a larger audience, and that was all that mattered.

But as online listening increases and costs follow, the decision is no longer simple. Everywhere in the online streaming world, companies are still trying to figure out if streaming media is a viable business. Streaming is very different from the traditional broadcast model. The traditional model has a fixed cost for reaching listeners: transmitter, tower, and electrical usage costs stay the same whether there are 1,000 or 100,000 listeners. With online streaming, however, costs go up incrementally with each additional user. In these times of reduced budgets, it's hard to deny that on a per-listener basis streaming is expensive, and the benefits are difficult to quantify.

Branded players reinforce the station's identity and offer additional areas for revenue generation and listener services.

Streaming costs boil down to a not-so-simple equation. Add the prices of the hardware, the streaming server software, any content licensing fees and the amount of bandwidth that will be used. There are hidden costs too, such as tech support for users who can't receive the stream or answering e-mail about why one format was chosen over another and at the rate chosen. It adds up quickly.

The hardware piece is simple to estimate—nearly any generic server will do. Software costs are almost as easy, usually coming down to a choice between RealServer or Windows Media Server (although more and more companies are using Windows Media (WM) since the software is free). There are benefits and drawbacks to all the formats, such as the unavailability of a WM player for Linux systems, but in the end it comes down to what is best for each situation.

More fees

Content licensing will depend on what will be streamed. It seems everyone wants to get an additional fee if their material goes out over a wire as well as the air. (*See E-casting on page 14.*) ASCAP and BMI want fees for exposing an audience to their material over the Net. AFTRA wants fees if their talent voices the spots that are streamed. Even APWire wants a fee if on-air personalities read a story that goes out over more than just one air signal.

Bandwidth, however, is a different matter. In a nutshell, bandwidth is the number of people a station reaches simultaneously, multiplied by the quality of media they receive. For instance, if the desire is to reach 100 simultaneous people at 16kb/s (fairly run-of-the-mill), it will cost a certain amount. Reaching 200 people requires twice the cost for the same quality.

Many times, bandwidth is limited by what is available. A single dedicated line from the facility will have a fixed monthly cost, but only a certain number of concurrent streams can be served. If it is not acceptable to limit the number of users, you could outsource to a company such as Akamai and enjoy unlimited bandwidth, but even that can be a bad thing. Case in point: many people went online for information after the September 11 tragedies, including the website for KQED, San Francisco. Many visitors were outside the KQED listening area. Consequently, KQED's September bandwidth costs came in at $12,000; four times the normal cost. It's difficult to plan a budget for surges like that.

Globalization can also be a benefit. The Web has removed geographic boundaries from our audience. Suddenly, a streamed spot is no longer just reaching a local audience. Marketing might be able to offer that as a benefit to any potential sponsors, underwriters, or advertisers.

There are alternate ways of getting into the streaming market. Free services, such as Live365 or Warp Radio, will stream audio for free (with a decent Internet connection and 24/7 connectivity, and a dedicated encoding machine), but the users are forced to view banner and pop-under ads, and some services will interrupt audio to play a streaming ad. They have to pay for it somehow. If, like so many other dot coms, their business model fails, a station may suddenly find itself off the Internet airways.

Supplemental revenue

There are other ways to offset the expense of streaming audio on the Web. A streaming underwriting announcement can be played before the user connects to

Strike one, you're out.

A single bolt of lightning can throw you off the air for hours — even days.

Even if your grounding exceeds minimum requirements, you could be in for some major league problems. One New England TV station lost $140,000 in equipment costs, plus untold amounts in revenue, from lightning damage. A midwestern FM station was tossed off the air for several weeks, costing them thousands of dollars. And lightning doesn't affect just commercial stations. Virtually every transmission tower — whether for police and fire stations, 911 call centers or telecommunications — is at risk.

The only way to play it safe is to upgrade your grounding system to 1-5 ohm resistance, as recommended by IEEE. At a fraction of what it would cost to repair and replace damaged equipment, you can get a correctly sized, properly installed copper-based grounding system. It's what these two stations did. And lightning hasn't been a problem since.

Learn how to protect your station from striking out — get our Power Quality CD-ROM and case histories today. Call CDA at **888-480-4276**. Or visit us at ***http://powerquality.copper.org***.

Copper Development Association Inc.
260 Madison Avenue • New York, NY 10016

the actual stream. Ad substitution can be used on the Web stream, to sell Web ads at a different cost. There could be a higher charge for an ad with a very targeted audience.

Conventional broadcasting suggests that listeners will go to a site when mentioned, but only online listening can guarantee it. With technologies such as SMIL, the user can be sent to each sponsor's site when its particular spot is being streamed.

Ad insertion allows the streamed ad inventory to be sold separately from the terrestrial inventory.

There are other streaming models in use, such as subscription and pay-for-play, where the user must pay before he can receive the stream or pay for a higher quality stream. There are also sites that force a user to complete an action before being allowed to listen, such as a taking a survey for a stream sponsor. Underwriting, sponsorship, and grants can help cover the costs of streaming, but odds are slim they will ever come close to covering the entire costs.

Tracking users online can be easier than tracking radio listeners. The station's site can set a cookie on the user's machine, and after five visits requesting audio, open a survey for the user to complete. The station gets survey results from a user who has already proven to be a repeat listener—no wasted time for a first-time user, or biased information returned in the questionnaire.

Perhaps the largest benefit of streaming is listener loyalty. Someone who listens in the car as they go to work may not be able to receive the signal once inside a heavily reinforced concrete and steel office building. Online listening reinforces brand recognition and loyalty.

Streaming can help to build online communities as well. Many users log on to get Web-only content, such as discussion boards. Streaming adds another feature that will help draw an audience to a station's site, and make them feel special since they are receiving something that terrestrial listeners are not. Additional money can be made in other ways from this added traffic, if not directly from the stream itself.

Perhaps the best piece of advice I can give is to let listeners and users know that there is a significant cost involved with streaming media. Ask them to listen to a broadcast signal if they can, instead of resorting to the stream. They will get a better quality audio, and most likely have fewer problems with it.

Undoubtedly, there will be new business models, and people will find ways to make streaming more cost effective, but for now each station must carefully weigh the possible return from advertising or other existing business models. In the end, it comes down to a question of whether there is a strategy for the station that provides enough of a return on the investment (in loyalty, corporate image, or cash) to make signing that monthly check for bandwidth tolerable.

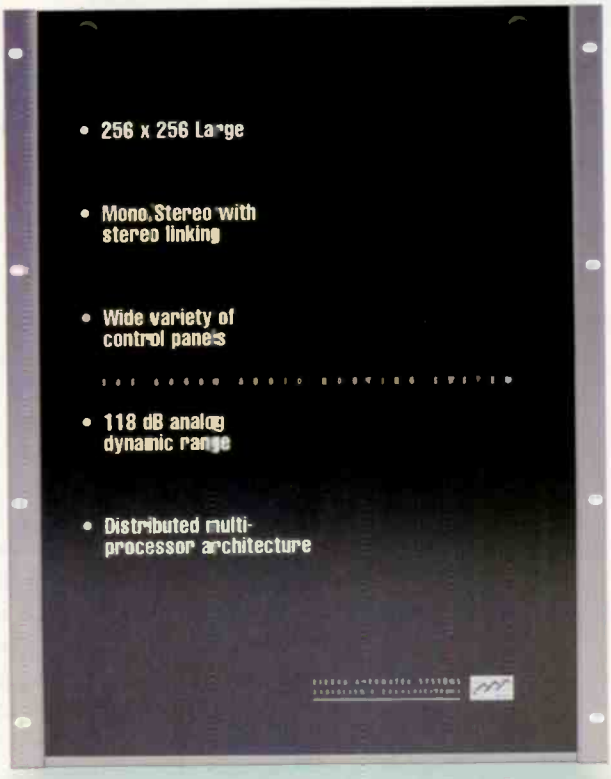
Harrison is manager of Web technology for WETA-FM and WETA-TV, Arlington, VA.

SAS64000 AUDIO ROUTING SYSTEM

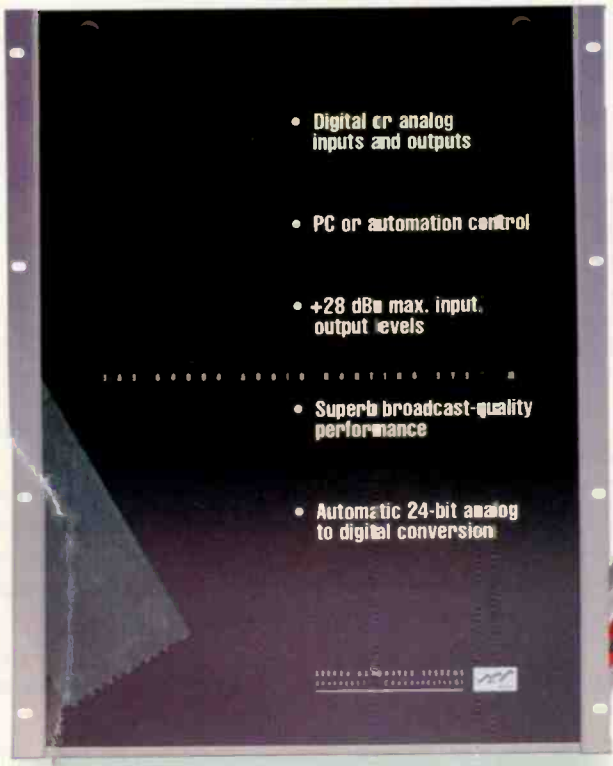
IN If the migration to digital is in your future, then this is the route to take. Introducing the large size, big performance analog router that also speaks fluent digital. A true hybrid that allows you to scale the number of analog and digital ports as needed, now and in the future. Best of all, the SAS64000 Audio Routing System creates a path to AES/EBU digital audio without creating analog obsolescence.

This means you can mix your analog and digital I/O in the same router frame. Go direct analog to analog, or digital to digital. Mix it up with automatic 24-bit conversion analog to digital and vice versa.

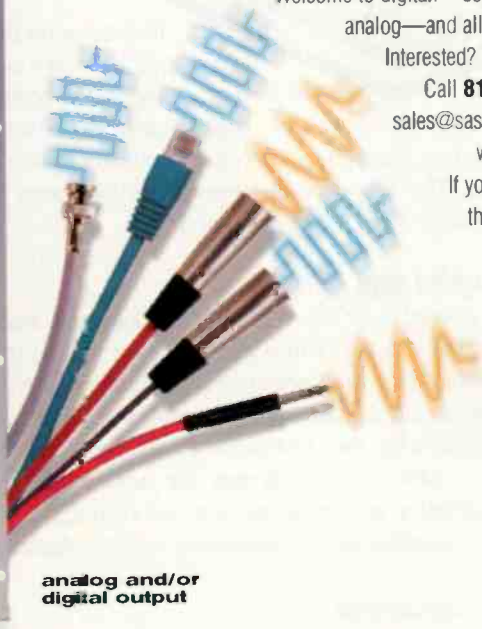
Either way, this unique architecture sports uninterrupted signal integrity and non-blocking flexibility.



Mix-and-!



OUT And the SAS64000 is wonderfully simple to integrate, upgrade and put into service. Just plug in our new digital port expander and that's it. Welcome to digital!—co-existing flawlessly with analog—and all in the same framework. Interested? There's lots more to tell. Call **818 840 6749**; or e-mail sales@sasaudio.com; or check our website at sasaudio.com. If you're moving into digital, then the SAS64000 Audio Routing System is your conduit to the future.



SAS

SIERRA AUTOMATED SYSTEMS

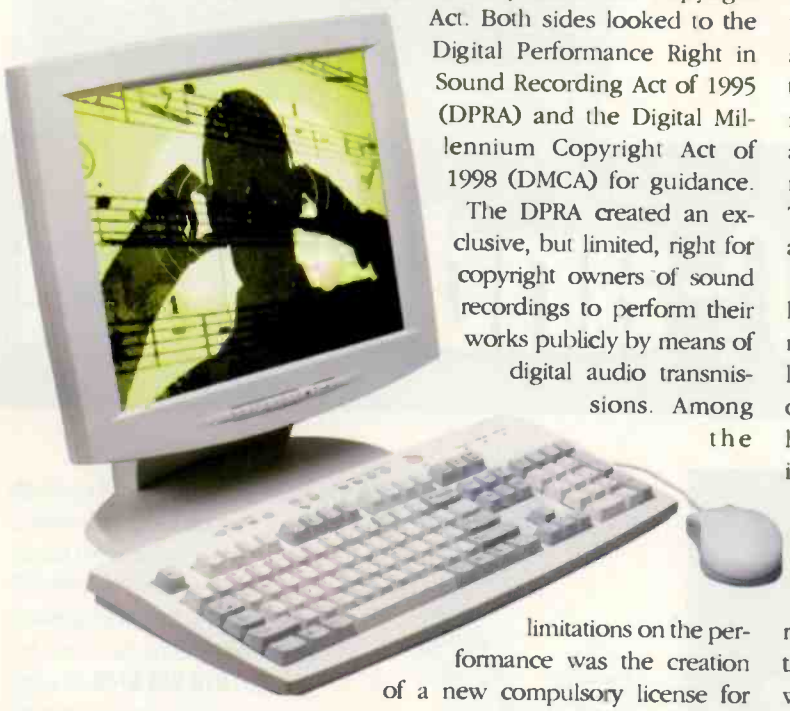
sasaudio.com

Understanding the DMCA

By Alison J. Shapiro

On October 1, 2001, the NAB and several broadcast entities filed a lawsuit in the U.S. Court of Appeals for the Third Circuit appealing the U.S. District Court for the Eastern District of Pennsylvania's August 2001 decision regarding streaming. The NAB's appeal seeks a declaratory ruling to overturn the Copyright Office's rule, which requires radio broadcasters streaming their signal on the Internet to pay royalties to the record companies.

In March 2000, the Copyright Office initiated a rule-making proceeding seeking comments on whether a broadcaster's transmission of its signal over the Internet is exempt from copyright liability under the Copyright Act. Both sides looked to the Digital Performance Right in Sound Recording Act of 1995 (DPRA) and the Digital Millennium Copyright Act of 1998 (DMCA) for guidance. The DPRA created an exclusive, but limited, right for copyright owners of sound recordings to perform their works publicly by means of digital audio transmissions. Among the limitations on the performance was the creation of a new compulsory license for nonexempt, noninteractive, digital subscription transmissions and an exemption for certain nonsubscription transmissions. The scope of this exemption has been under dispute since the DPRA's inception.



The digital age

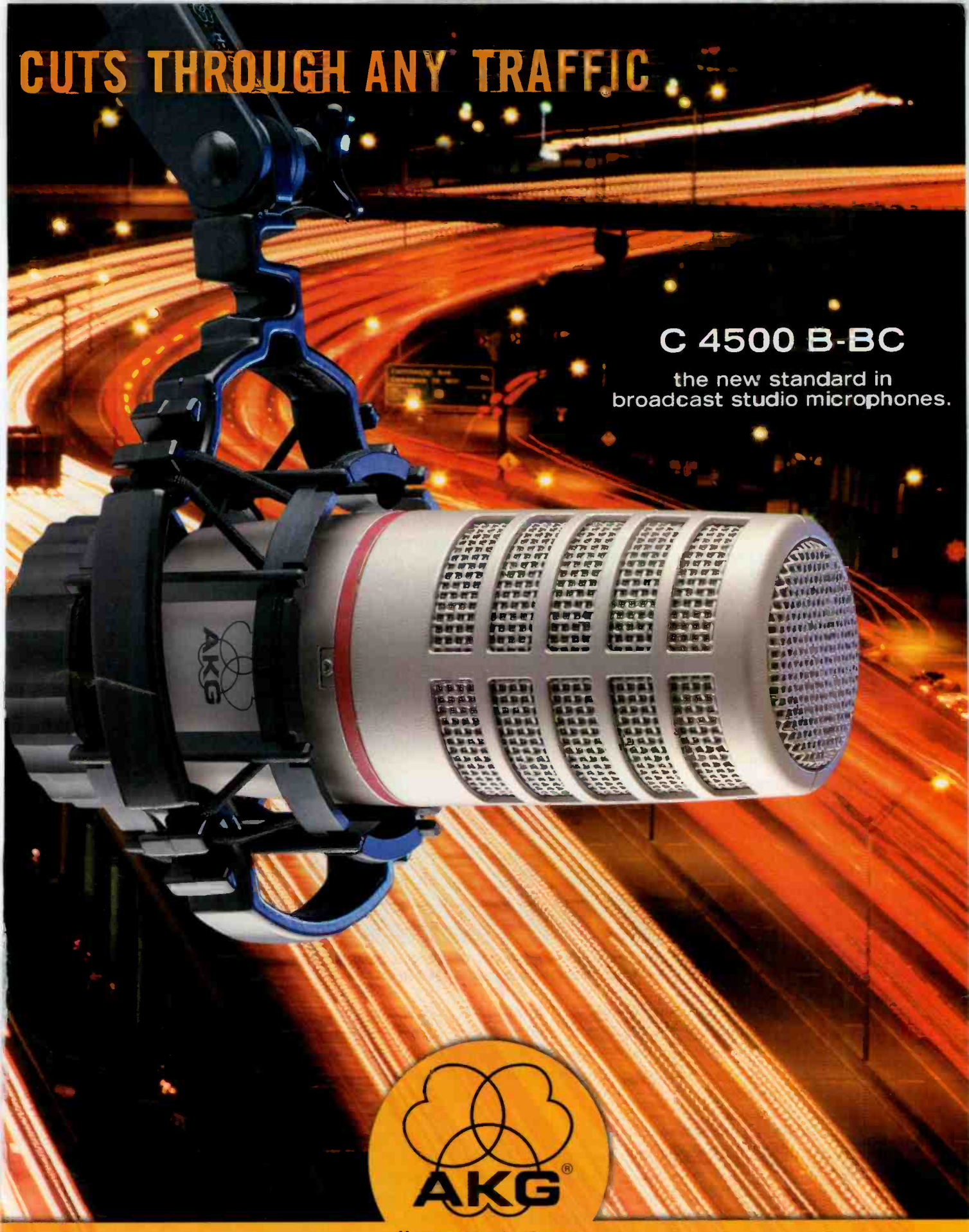
With the passage of the DMCA, Congress amended sections 112 and 114 of the Copyright Act to clarify that the digital sound recording performance right applies to certain nonsubscription digital audio transmissions over the Internet. Specifically, the DMCA amended section 114 by creating a new statutory license for nonexempt eligible nonsubscription transmissions (e.g. webcasting), and nonexempt transmissions by preexisting satellite digital audio radio services, to perform the sound recordings publicly in accordance with the terms and conditions set forth in the new statutory license. The parties disagreed, however, over whether a broadcast transmission, a transmission made by a terrestrial broadcast station licensed as such by the FCC, is a nonsubscription transmission within the scope of exemptions provided in section 114(d) of the Copyright Act.

This means that if you are streaming your over-the-air signal on the Internet, you must either opt for the statutory license and pay royalty fees to the record companies or negotiate license fees with each record company individually. Recently, radio broadcasters reached an agreement with the record companies on the royalty fees that radio stations must pay in return for a blanket license to stream their signals on the Internet. The settlement has not been made public, and the arbiters are under no obligation to accept it. This settlement, if agreed to, only applies to radio broadcasters and not to their webcaster counterparts. The problem remains that the Copyright Office must set a rate that applies to all parties, not just radio stations.

The two major problems with opting for the statutory license were establishing the royalty rate and satisfying a number of conditions in order to qualify for the statutory license. The requirements included: no pre-announcement of songs and the prohibition against playing, in any three hour period, more than three songs from a particular album, including no more than two consecutively or four songs by a particular artist or from a boxed set; identification of the song, artist and album (if displaying such information is possible); if feasible, a webcaster must transmit the copyright management information encoded in the sound recording by the copyright owner that identifies the song, the featured artist and other related information; and a webcaster must accommodate the transmission of certain measures used by sound recording copyright owners to identify or protect copyrighted works (only if it is technically feasible to transmit such information without imposing substantial burdens on the webcaster). Such criteria are difficult for radio stations to meet. Under the settlement, however, the record companies would grant radio stations waivers of certain criteria.

If a station can comply with the conditions imposed by the DMCA, it is eligible for the statutory license. If the streaming of sound recordings does not comply with these conditions, the extent of liability must be resolved by negotiations with the individual record companies.

Allison Shapiro is a communications attorney with Fletcher, Heald and Hildreth, Arlington, VA. E-mail shapiro@fhhlaw.com.



AKG®

A Harman International Company

914 Airpark Center Drive • Nashville, TN 37217 • Phone: 615-620-3800
Fax: 615-620-3875 • e-mail: akgusa@harman.com • akgusa.com

Solid-state tower lighting

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

For towers that require incandescent lighting, regular tower-light inspection and maintenance is a task that tower owners must undertake. Broadcasting's early days saw many station engineers climbing the tower themselves. The greater availability of qualified tower climbers has turned this into a regularly occurring event. Regardless, the problem of changing a burned-out lamp still remains, tower climbers don't come cheap, and tower lights seldom fail at a convenient time.

I wouldn't go so far as to say that the days of incandescent tower lighting are numbered, but I think the writing may be on the wall. Two major companies are offering solid-state lighting equipment for broadcast towers. At first glance, it seems unreal to consider solid-state light emitting diodes as replacements for the beacon and sidelights on a broadcast tower. However, there is power in numbers.

Solid-state tower lighting is designed to be a direct replacement of the incandescent counterpart.

Dialight and Honeywell, alliance partners for the distribution of Dialight LED products, now offer side-mount tower lighting fixtures that are available in steady burning or flashing format. Both companies offer replacement sidelight and obstruction light units. In addition, Dialight has produced a beacon assembly that uses high-performance LEDs in place of the original incandescent lamp bulbs. Both install in place of the existing incandescent lamp beacon or sidelight, and can use the wiring that is already in place with no or minor modification.

Off the top and sides

Dialight's LED technology offers a range of lighting products that operate over a broad voltage range from 12vdc through 220vac. With a current upper limit of one amp and a total wattage of less than 100 watts, depending on the voltage used, as little as 10% of the equivalent incandescent power is required.

Among the good features of LEDs is the fact that cold does not affect them in the way that it can damage incandescent lamps. Extreme cold and moisture can crack the glass of a regular lamp, stress the filament, corrode contacts and create difficulty in changing units. LEDs continue to function regardless of weather conditions and are expected to outlast incandescent bulbs by many years.

The obstruction light uses 16 LEDs, which provide light output in accordance with FAA requirements. The epoxy encapsulation of the LED provides a primary light beam, and a separate assembly cover has a bulge that forms a Fresnel lens to concentrate the light horizontally. An interesting human convenience feature is the provision of three upward shining LEDs, which are viewable from above. This is to confirm to an observer further up the tower that the light is operating properly and provides the familiar appearance that we have come to expect from a properly working sidelight.

Each obstruction light unit is self-contained, except for the primary power input. When installing one, it is only necessary to remove the old unit, install the new unit in accordance with the instructions and connect it to the primary power. The power supply is contained within the light housing. Either steady- or flashing-light operation is available depending on FCC license requirements, and this option does not require any external connections other than power and the usual flash controller and photo cell.

The LED system is remarkably resistant to static charges and lightning strikes. Protection against lightning strikes and power line surges is afforded by ferrite cores on power interfaces, proper grounding and shielding, and proprietary protection techniques. The radiation of internally generated spurious RF signals is prevented by shielding the encapsulated power supply. This makes this light suitable for receiving installations where high sensitivity receivers are in use.

"The confidence to walk away"

Loren Olson of LifeTalk Radio has been using BSI's digital automation for over 2 years...

December 7, 2001

Broadcast Software International
1925 Bailey Hill Road, Suite A
Eugene, Oregon

As a team leader, I've learned to be happy when my team is happy. When our on-air product was suffering under a sub-standard automation system, we knew a change to something reliable was absolutely critical. We entered the process of locating such a package with a little bit of fear and trepidation, because you can never be sure of what you're getting into, until you're into it. We settled on BSI's digital automation system and have not once regretted that decision. The consistency BSI has brought to our on-air sound is a 200% improvement. Being unmanned for many hours on weekdays and completely automated on weekends, we now have the confidence to walk away from the studios knowing that everything will proceed as scheduled, including satellite records and live feeds.

I've been particularly impressed with the tech support personnel. One night we had to reformat the hard drive and reload Windows. BSI's tech rep was right there with us till 2:30 am, talking as softly as she could so as not to wake up her sleeping little boy. BSI's products, despite their potential complexity, are very easy to learn and work within. And coming from the old radio tradition of manually pushing every button, that's saying something. But perhaps the greatest benefit is the affordable price. Small to medium market stations like ours need something we can reasonably get into. So now my announcers are happy, and my CFO is happy, which makes me really happy.

Loren Olson
Director of Broadcast Operations
LifeTalk Radio Network

Only $1499
including technical support and upgrades

Price, Power and Performance

More than 5000 broadcasters use our software in more than 50 nations around the world. Our $1499 Simian includes one year of 365/24/7 tech support and software upgrades. Simian has amazing features, such as streaming spot substitution, automated online requests and touchscreen compatibility. Runs on Windows 98, NT, 2000, ME and XP.

Test and try before you buy.

www.bsiusa.com **888-bsiusa1**

Broadcast Software International

RF Engineering

LED tower beacon

The top of the tower is the hardest point for a climber to reach, and anything that reduces the number of trips up and down the tower is worth having. LED beacons are designed to be resistant to lightning strikes and other static surges that could burn out a regular lamp filament. However, the LED assembly in a beacon is guaranteed to meet current FCC light output specifications for a period of five years. At this time, the light output will still be usable but may be at the low end of the specified limit.

The initial hardware cost for LED installation is greater than that for incandescent installation, but the savings is quickly realized in the reduced power consumption and longer lifespan.

If one of the two LED lamps in the beacon should fail, its demise will signal the other lamp to shut down also. This action produces an alarm signal, which will be communicated to the station monitoring system for proper FAA notification action. In actual operational conditions, installing an LED beacon is almost a plug-and-play situation.

Protection against electrical surges and voltage spikes exceeding 250 volts, with currents as high as 12,000 amps, is provided by the use of MOVs and careful grounding.

The power supply is incorporated in the design of the beacon and is mounted inside the beacon's array of LEDs, directly behind the LED mounting so that nothing is external to the beacon assembly. The beacon works with an external, installation-provided control and flasher components.

Fortunately, faulty beacon service does not involve finding and replacing the faulty LED among the 640 LEDs used in the beacon. It's not like a Christmas tree light string, where if one goes, they all go. It is only necessary to replace the faulty LED assembly with its built-in power supply to restore full service.

The modules are not intended for end-user servicing. If failure occurs, the faulty module is returned to the manufacturer for replacement. The use of encapsulated and fully-shielded power supplies makes local repair impractical. Another advantage of encapsulation is better cooling. Air is not the best cooling media, and solid sealing material carries heat away better than plain air.

Faulty power supplies are discarded by Dialight. They are so epoxy potted that even the manufacturer can't open and repair them.

The use of LED lighting is growing. Airports are now using LED taxiing and runway lights. Brake lights on vehicles have adopted them. Traffic signals are even being upgraded to solid-state. The humble diode has come a long way from the original crystal detector and a cat's whisker. We wonder today what will be the next item whose appearance and operation is changed by electronic excitation.

E-mail John at batcom@bright.net.

Indianapolis Colts Programming and Production Manager Chris Owens gets the feel of his brand new AirWave Broadcast Console from Harris Pacific in the Colts' new Harris-installed studio.

Installation Profile

The Voice of the Indianapolis Colts Bob Lamey joins Chris Owens in christening the new Harris-installed production studio at the Colts' United Federal Football Complex.

Harris Helps Indianapolis Score

Design/Integration Team

Design Engineering and Testing:
Scott Russell
Installation and Testing:
Paul Araujo
Cabinet Makers:
Hector Maldonado & Adrian Jenkins
Cabinet Design:
John Gomez

Installation Specs

Harris Custom Studio Furniture
AirWave Broadcast Analog Console
Harris Wire and Integration
Sony PCMR500 DAT machines (2)
Tascam 112MKII Stereo Cassette recorder
Audiometrics 16000B Distribution Amplifier
Sony MDS-JB940 Mini Disc Recorder
Denon 961FA CD player
Electro Voice RE20 microphones
Symetrix 528E Voice Processors
JBL Control 5 Monitors
Sony CDRW66 CD Recorder
360 System Instant Replay
Orban Audicy

When Chris Owens joined the National Football League franchise Indianapolis Colts at the beginning of the 2001 season, the new manager of programming and production placed an in-house production studio at the top of his wish list. So it is only fitting that his wish came true a few weeks before Christmas with the installation of a brand-new production facility by Harris Broadcast systems installation experts at the Colts Union Federal Football Center, the football team's offices and training facility.

Owens says the new production studio is not a minute too soon for his production schedule. "We were producing our shows and spots at our flag ship station, WFBQ-FM/Q95 which is about a 45-minute drive from here on the other side of town."

About four years ago, the Indianapolis Colts management decided to bring all their advertising and marketing efforts in-house. Since that time, the need for advertising spots, promos and programming has grown in leaps and bounds. The Colts purchase time from all the media outlets for their TV preseason games, regular season Sunday radio games and programming during the week.

According to Senior Vice President of Sales and Marketing Ray Compton, the Colts are leading the way to the NFL future with their marketing effort. He says, "Jim Irsay, the Colts owner, has been very progressive in his thinking. I guess that you could say that we are at the front end of the wave because of that. And as our sales have grown, we have grown more self-sufficient and expanded our offerings, and this has enabled us to uncover new revenue streams."

Compton says that it will be a big plus having a production studio at the training facility for the marketing team to have increased access to the players and coaches. It also makes it easier to tailor advertising pitches to sponsors who are more than glad to have the football staff involved in their advertising message. Compton says, "In today's economy, you have got to be more competitive. It's nice to be able to offer these kinds of perks."

Owens is responsible for producing: Colts Weekend Warm-up (which Owens hosts), every Friday on Sportsradio WNDE 1260 AM from 6 to 7 p.m. at a T.G.I. Friday's; The Bill Polian Show, Tuesdays from 6 to 7 p.m. on Q-95 featuring the Colts' team president; Colts Daily Update on Tuesday,

The Colts' Harris Custom Studio Furniture combines style and function to accommodate "larger" NFL bodies.

Wednesday and Thursday on WNDE; and the eight-hour game day broadcast on Q-95 (five-hours of game day programming for the Colts' 19-station network). The Colts marketing department also produces a Monday Night television show at 7:30 p.m. on WRTV with the Jim Irsay. And you can add to the list season ticket sales spots, charity promotions, cyber training camp updates, requests from NFL Films and ESPN, and recording news conferences and player interviews for sound bites posted on the web, to programming material that Owens and the marketing department handle.

Owens is also happy to be able to create promotional spots for the many charity events (50 and counting) that the Colts support including the Marines' "Toys for Tots" Program and the United Way. Owens produces a fifteen-minute community segment for each Sunday pregame show that showcases and promotes the charity events during the football season.

When Owens was looking for advice on broadcast systems professionals to equip and install his new studio, he turned to consulting engineers, Scott Fenstermaker and Dan Mettler from the Colts' flagship station, WFBQ. Mettler and Fenstermaker worked with Owens to develop a studio concept, and Harris Broadcast was at top of the list for implementing their ideas. When it came time to choose a console, Harris Pacific made Owens' top choice, the AirWave Broadcast Console, and the decision was fairly simple.

Owens says that the last three stations that he had worked at all had Harris Pacific AirWave broadcast consoles, "I am very comfortable with the AirWave. It's not complicated, and it's easy to use. You never know when ESPN is going to call in looking for interviews, and it's nice to know that if I have an intern to handle it, he doesn't need a big manual to operate the AirWave. Everything is clearly labeled."

Owens also likes that the Airwave's size leaves room for future expansion but doesn't have button overkill. With the Harris Pacific Airwave, Owens has 20 input modules at his fingertips, including modules for the Orban Audicy, cassette machine and personal computer. The console has a Telco input/output module that has manual and automatic selection of mix-minus and offline telco recording and post-production. All the panel modules are hot swappable and can be removed and re-installed while the power is on.

The console also features a microphone preamp module with five high-performance transformerless preamplifiers, each with independent trim, selectable phantom power and balanced line level output, all-electronic audio switching, convection cooled power supply and gate array logic with built-in machine interface.

Since the studio is also Owens' office, the Harris Custom Furniture cabinet is a special design that addresses the needs of an on-air and production studio as well as an office. Generous amounts of open and enclosed storage for books, binders, and computers was provided in addition to the usual complement of rack spaces to hold studio equipment at hand for the Operator. The cabinet accommodates up to three guests. The Colts specified a slighter taller height of the countertop than most sit-down cabinets. Since many of the guests for the programs are NFL players, the need for extra space was very important.

The Harris custom-wiring package installed for the Colts presents a combination of operational flexibility, expandability, and value. The wiring harness was fabricated in the Harris shop. The harness and all the studio equipment were installed in the cabinet, and the system was run through functional testing in one day. With Airwave module audio connectors independent of module logic connectors, adding or changing machine start remote control cables was an easy task.

For the telephone-based system, Owens chose the Telos Zephyr ISDN Audio Transceiver. The Zephyr makes ISDN an easy and effective tool for broadcast and audio professionals, with full bandwidth and equal quality in stereo and mono.

The Zephyr system includes: an ISDN terminal built-in with connection to the telephone network via a single modular cable 50 user-programmed auto-dial sets include codec section settings and the numbers of the remote locations you can dial; and bi-directional, RS-232 serial data at 9.6kb/s for communications and control, which are transmitted simultaneously with the program audio.

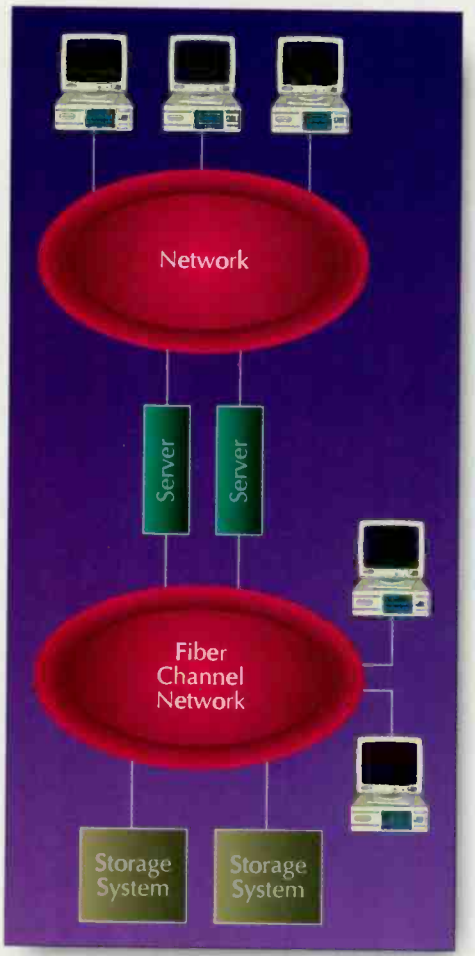
Compton Owens and the Indianapolis marketing staff are glad to have an in-house production facility. Everyone feels that the possibilities are endless when it comes to the advertising and marketing program for the Indianapolis Colts. Ray Compton says, "We are at the beginning of a new era for the team."

Owens adds, "I can't tell you how pleased I am to have this position and the new studio. The Harris people did a great job. I'm the luckiest guy in the NFL...until Super Bowl XXXVI that is." ■

Storage Area Networks

By Kevin McNamara, CNE

In the life of any network environment, it is not uncommon for hardware to be replaced as technology improves. The item that is most likely to be replaced, whether due to improved performance or simply from an inadvertent failure, is the workstation. The concept for Storage Area Networks, or SANs, was born out of the need to protect the most essential byproduct of a workstation or network server—the data. SANs serve one purpose: to aggregate data storage resources to a single repository. Centralization of data is more reliable and allows a higher degree of scalability than other distributed network models. The cost and time needed to maintain and manage large numbers of distinct storage devices is significant. As the number of servers across the network increases and companies increase reliance in data-intense applications, traditional storage models fall short because access to a peripheral device (such as the hard drive) is slow and lacks the flexibility afforded by SANs.



A Storage Area Network is a separate network that is isolated from the client and server connections.

SAN vs. NAS

Though probably aware of SANs, many may be more familiar with Network Attached Storage (NAS) devices. NAS devices attach to existing network backbones such as Ethernet, providing stand-alone storage that can be used for data backup or to increase data storage capabilities. The primary technical difference between the NAS and SAN is at the communication protocol level. NAS communicates over the network using NFS or CIFS Fiber Channel, while SAN primarily uses the Fiber Channel Protocol (FCP).

NAS devices transfer data from storage device to server in the form of files. NAS units use file systems, which are managed independently. Each device manages file systems and user authentication. While NAS is a relatively inexpensive and easy method to add storage to an existing network, the performance of these devices is limited by the speed and amount of traffic carried over the network segment to which the device is attached. It is not advisable to use NAS units in intensive data processing environments.

SANs are typically connected over networks using a Fiber Channel backbone. Data is delivered in device blocks, similar to servers using embedded external RAID arrays. SANs do not require the thin server management overhead needed with NAS, thus eliminating additional latency.

Another distinguishing difference between NAS and SANs is the placement on the network. NAS devices, like workstations and other common network hardware, attach to the network in front of the servers. With the SAN, servers are attached to the storage devices on a second network connection behind, or separate from, the primary network. SANs are isolated from the primary network, where the typical I/O processes degrade performance. SANs have their own unique network connection scheme, typically but not limited to, a ring network. This arrangement permits the interconnection of multiple storage devices.

SANs permit the attachment of numerous storage devices, limited only by the amount of available hubs and switches. SANs also permit heterogeneous connectivity of storage devices with servers operating on different platforms. Some vendors of SAN hardware provide a means of data-conversion that permits data files from one platform to be used with systems operating on another. The software used for this application can only be used with disk arrays that emulate both mainframe volumes and open system *Logical Units Numbers* (LUNs).

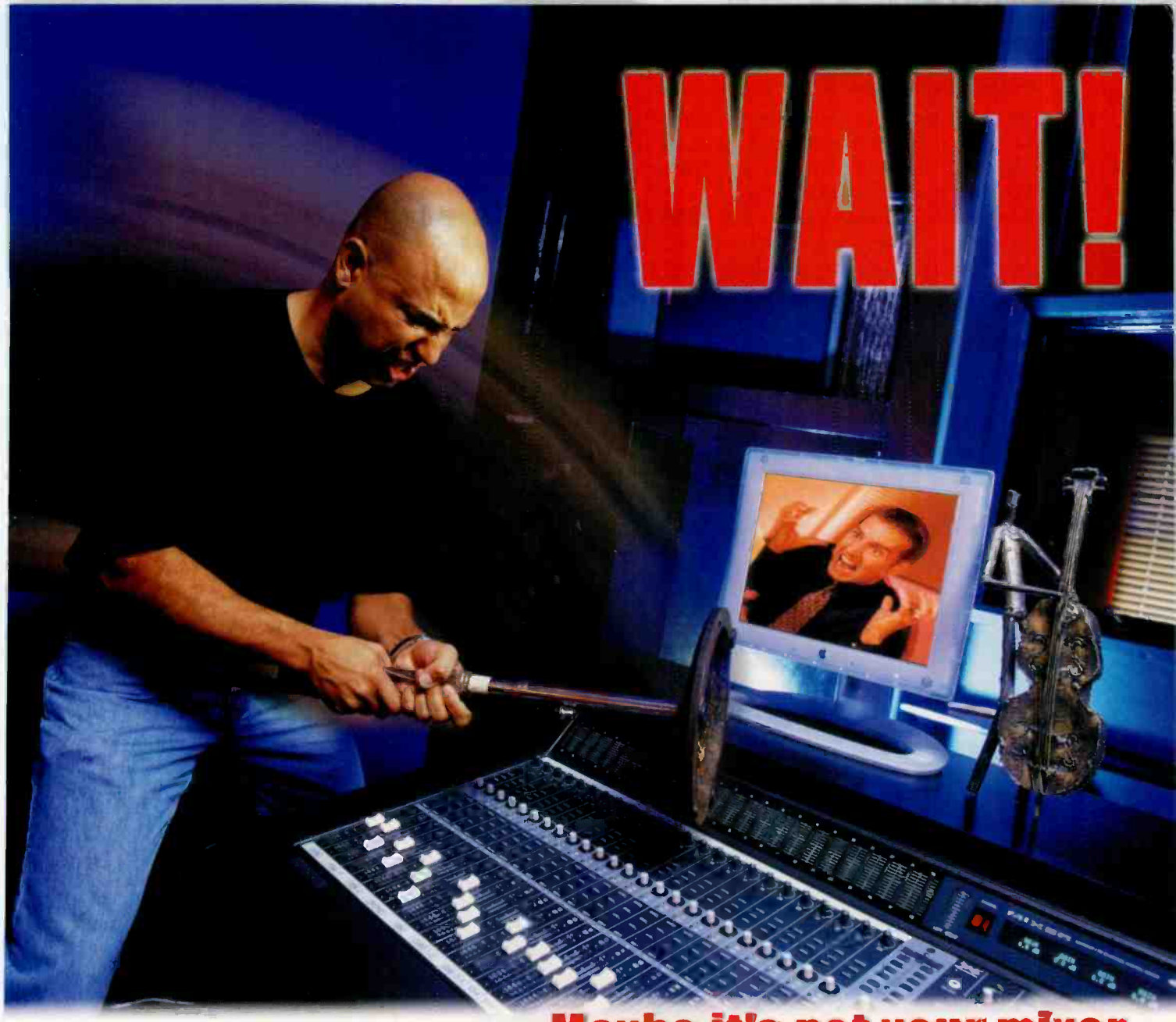
SANs

A Storage Area Network is a specialized high-speed network that provides direct connections between storage devices and servers. In a SAN, the target provides the storage functions, and the side that typically originates the data, usually the network server, is called the initiator.

The SAN topology provides three features:

1) Storage is not directly connected to network clients.
2) Storage is not directly connected to the network servers.
3) Storage devices are interconnected.

The SAN is a real network and is expected to evolve over time using a variety of different network connectivity



Maybe it's not your mixer

You know how impact and detail get lost through recording and mixing. And you just can't EQ, compress or mix the life back in. When you're at wit's end, the Aphex Model 204 can save your sanity.

The Model 204 renews and vitalizes your sound. The Aural Exciter® restores and improves definition and detail. At the same time the Optical Big Bottom® solidifies and strengthens the bass without hogging all the level.

If you need professional and impressive sound you owe it to yourself to get a Model 204. You'll probably save your sanity and a lot of perfectly good mixers. You've got a problem - We've got the solution!

The all new Aphex Model 204 Aural Exciter and Optical Big Bottom

APHEX SYSTEMS

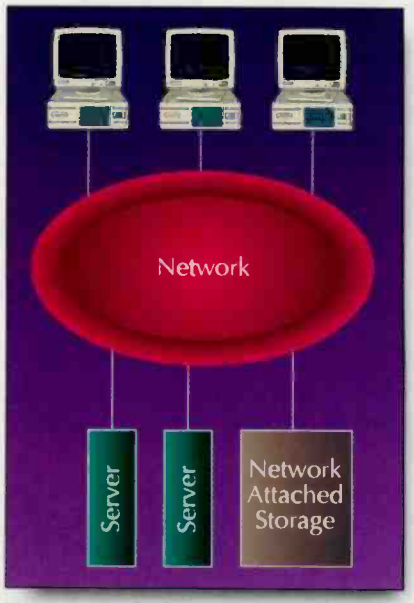
SOLUTION DELIVERY SERIES

11068 Randall Street, Sun Valley, CA 91352 U.S.A • 818-767-2929 Fax: 818-767-2641 www.aphex.com

options. While the de-facto network connectivity method used for SANs is Fiber Channel, other options are beginning to appear, including iFCP, the IP over Fiber Channel standard and Internet SCSI, also known as iSCSI. The main goal of a SAN is to integrate traditional storage subsystems, such as RAID, and data archival systems that provide data backup for short and long-term periods. Fiber Channel networks will move data with speeds up to 2Gb/s depending on hardware used and are currently the dominant protocol used with SANs.

SAN Interconnection methods

SAN networks are built upon the Fiber Channel Arbitrated Loop (FC-AL). Fiber Channel can support up to 126 devices, but in practice is limited by the number of ports available on a hub. Fiber Channel also uses the shared-polling contention method, which can cause a decrease in performance when too many devices contend for bandwidth within a loop.



Network attached storage shares the same network as the application clients and servers.

Fiber Channel switches, also called fabric switches, are becoming popular alternatives to the classic HUB. Fabric switches permit the simultaneous routing of traffic through the loop, preventing data bottlenecks.

SAN distance limitations

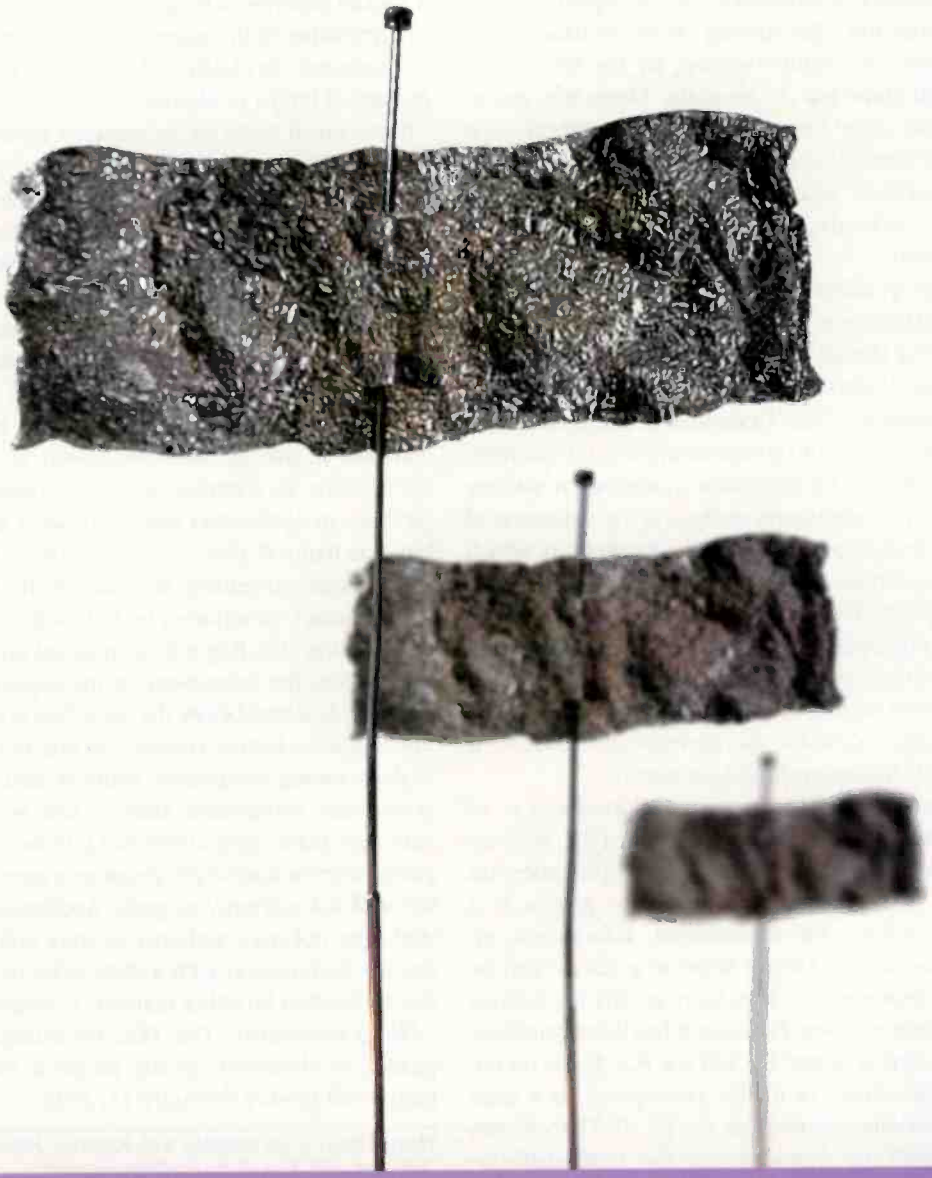
The distance of devices attached to a SAN are not necessarily limited to the same room as the primary network servers. In some cases, SANs can operate over a private Wide Area Network (WAN), in which storage devices can be located across the country or globally. The distance limitation placed on SANs is determined by the design of the Fiber Channel loop. Fiber Channel hubs can be purchased as short-wave (500m) or long-wave (up to 10km).

While SANs are still a little pricey for the typical broadcast environment, new applications, particularly those requiring safe, secure and massive amounts of storage, may soon be the killer app that we've been waiting for.

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

All of the Networks articles have been approved by the SBE Certification Committee as suitable study material that may assist your preparation for the SBE Certified Broadcast Networking Technologist exam. Contact the SBE at (317) 846-9000 or go to www.sbe.org for more information on SBE Certification.

...still running THIS???



OMB Antenna Systems

OMB EUROPE

COMMERCIAL AND T.V. FACTORY
Avda. San Antonio, 41
Phone: 976.50.46.96 (6 lines)
Fax 976.46.31.70
50410 CUARTE DE HUERVA
(Zaragoza)

Antenna and Radio Factory:
Camino de los Albares, 14, bajos
Phone: 976.50.35.80 (6 lines)
Fax 976.50.38.55
50410 CUARTE DE HUERVA • (Zaragoza)
Internet. http://www.omb.es
e-mail: ombcom@infonegocio.com
VideoConference(RDSI) 976 46 32 00

OMB INTERNATIONAL DIVISION

3100 NW 72 nd. Avenue Unit 112
MIAMI, Florida 33122
Ph.: 305 477-0973 – 305 477-0974 (6 lines)
Fax: 305 477-0611
Internet. http://www.omb.com
e-mail: ombusa@bellsouth.net
Videoconference: 1 305 5940991 / 92

Local ownership rules in play

By Harry Martin

The FCC is expanding its pending radio multiple ownership rulemaking proceeding to include a comprehensive examination of all aspects of the FCC's local ownership rules. Among the issues about which the Commission has sought comment are the following:

Congressional authority to regulate. Does the public interest standard of the Communications Act authorize the Commission to conduct competitive and diversity analyses of radio transactions which otherwise comply with the numerical limits on local radio station ownership adopted by Congress in 1996?

What aspects of diversity and competition are important? If the Commission has the authority to go beyond these limits, what should it consider? The FCC has focused on diversity and competition in assessing the impact of proposed transactions. The Commission wants to know what aspects of diversity and competition it should examine.

Defining markets in which stations compete. A starting point in the FCC's competition analysis is the definition of the relevant product and geographic markets in which radio stations compete. If advertising is the focus, is radio advertising separate from other media advertising? As for the relevant geographic market, the FCC has tentatively concluded that that market is local. But the Commission asks, is the current market definition, based upon mutually overlapping signal contours, the appropriate measure? If not, what other definition should be used?

Measuring market share of stations. Consideration of market share requires a workable mechanism for measuring it. Accordingly, the Commission is seeking comment on how to measure the market share of station groups in a market. According to the Commission, information on advertising revenue or audience share in a market can be obtained from reporting services such as BIA for stations located in Arbitron markets. But once it has those numbers, how should it analyze them? Should the FCC focus on the combined market shares of market participants, as it does in evaluating pending acquisitions via its 50%/70% screen (discussed below), or should it use the Herfindahl-Hirschman Index (HHI)—an index commonly used in antitrust analysis—as a method of comparing pre-acquisition concentration and post-acquisition concentration?

Benefits and harms of consolidation. The FCC also seeks empirical evidence on the economic benefits and harms of permitting greater consolidation in local radio station markets. It wants to know the benefits to stations, advertisers, and the public. It asks what harm to advertisers and consumers consolidation might bring.

Numerical limits vs. analyzing each acquisition individually. The Commission has invited comment on how it should analyze radio acquisitions. Should the FCC look to compliance with numerical limits, should it analyze each acquisition individually without regard to compliance with numerical limits, or should it continue to do both?

If numerical limits are to remain a factor, should the FCC retain the current numerical limits and modify its market definition, or should it modify the numerical limits, and if modification of the limits is in order, what should the new limits be? As one alternative along these lines, the Commission suggests that it could require the presence of at least three competitive independent broadcasters in the market.

Interim application processing procedures. Prior to the completion of the rulemaking, the FCC will examine the competitive effects of radio transactions. In doing so, it will continue to use its 50%/70% screen to determine which applications to examine in detail. Under that screening process, an application that proposes a radio station combination that will give one group 50% or two groups 70%, of the radio advertising revenue of the relevant Arbitron metro market, as reported by BIA, will be flagged for close examination. The flag will be included on the public notice announcing the acceptance of the application for filing.

For applications below the 50%/70% screen, the staff will not conduct a further competitive analysis unless a petition to deny raising competitive issues is filed, at which time a preliminary competitive analysis will be made. The staff may then grant applications that it finds consistent with the public interest and which propose a level of concentration the staff has authority to grant. Applications for which the staff does not have authority to grant will be forwarded to the full Commission with a draft order recommending that the application be either granted or designated for hearing.

Filing comments. The FCC encourages all interested parties to comment on the issues it raises. Such comments will be due February 11, 2002.

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

Dateline

On or before January 10, 2002, all stations were required to place in their public files copies of their issues and programs lists for the fourth quarter of 2001. The next required issues/programs list filing date, covering the period January 1 to March 31, 2002, will be April 10, 2002.

Power

E-Mail Newsletters.

Get the news you need, as it happens. Sign up for a subscription to one of our e-mail newsletters. Go to PrimediaBusiness.com and click on "I want to subscribe to a newsletter." Or, sponsor one of our targeted newsletters to reach buyers in your market. Contact Rob Shore (rshore@primediabusiness.com or 212-204-2622).

the

Supplier Directory.

Find a product or service in our multi-industry Supplier Directory. Go to PrimediaBusiness.com and click on the Supplier Directory link.

Custom online "special reports."

Our editorial content and your sponsorship can help you increase your sales. Contact Christina Julian (cjulian@primediabusiness.com or 212-204-1411).

printed

word

Banners.

Properly created and targeted Web banners can actually be incredibly effective. Target by audience or content. Contact Rob Shore (rshore@primediabusiness.com or 212-204-2622).

Industry news, delivered.

Get the latest industry-specific news automatically delivered fresh to your corporate Web site, intranet or extranet. Go to PrimediaBusiness.com and check out Primedia Insight newswire.

Build it once

By Brent Fasbinder

and build it right

Make the right decisions before and during the design process

The passing of the Telecommunications Act in early 1996 saw radio stations merging at the speed of light. Mom and Pop operations quickly gave way to larger, corporate entities, many of which were charged with finding the most efficient way for their expanded operations to function as one.

The first step in achieving this efficiency is to relocate all the radio stations owned by a single company to one central location. Determining a suitable location is easier said than done. Station managers and engineers have to consider a new set of organizational and logistical issues. Simply finding a new building suitable to accommodate the operation of several radio stations with different formats can pose its own unique challenges.

A perfect fit

The ideal building to house a broadcast facility is a single-story warehouse-type structure. A one-level building allows for greater interaction between departments. With multiple floors, functions are broken up, tending to impede the flow of business. Also, with on-air studios on the main floor, no sound can penetrate the booth from below, eliminating one direction by which studios can be disturbed.

The high ceilings in warehouses are also beneficial for acoustical reasons. A greater floor-to-floor distance simplifies the task of installing the station's required infrastructure. Air conditioning, ductwork and other utilities are notorious for introducing studio noise. Elevated ceilings provide ample space for mechanical needs and minimize the undesired effect they can create.

Once a building is chosen and acquired, new logistical issues become apparent. Departmental interaction, power requirements and room layouts move to the forefront. Many companies are just now beginning to address such issues. An architect will most certainly bring such considerations to the attention of station personnel during the design process. However, giving consideration to these things ahead of time can save time and money when working with a design specialist and will enhance the end result.

The topics that define an architectural construction project are scope, cost and schedule. The scope is the extent of construction and can be highly specialized for a radio facility. Determining scope involves understanding the organizational, mechanical, electrical, acoustical, and aesthetic needs of the project. A designer will first gather the statistical information such as the number of employees, workstations and studios that will be needed. This information is used to determine the typical size of each area and will become the foundation to begin the process of designing and organizing the facility.

Photo by John Robledo

Build it once

Organization

The primary design issue for any radio station is the organization of the programmatic elements in a way that promotes efficient operation. The architect must understand how the facility is intended to function and what the important relationships are between stations, departments, staff and support.

At a basic level, the management of all consolidated radio facilities must make a choice on whether to emphasize the individuality of the stations, emphasize the larger company entity, or something in between. Does the past culture of a premiere station warrant separate areas within the building so that it may maintain a complete sense of identity?

On one of our projects, a general manager had four stations moving into one building. The GM wanted each station to perform individually and to appear as though each was an independent entity. The prevailing consolidated approach, however, is to combine manpower and integrate people into departments that reach across station boundaries, allowing free idea exchange. For example, grouping the account executives for several stations can promote additional services through the exchange of leads. As always, complete integration can lead to staffing efficiencies. In many cases one traffic or accounting department can provide the services for many stations. Management of a consolidated radio facility has the opportunity through design to create a greater sense of community that can lead to a better and more profitable product.

Functional studio space is only a small part of an efficient facility design.

The interaction of departments will help to determine the layout of operations, but layout will also affect the atmosphere of the facility. If traffic and sales have a relationship, their proximity becomes important. If continuity constantly deals with production, then their adjacencies need to be maintained. If administration deals with accounting, then they need to be located accordingly. The promotion staff is generally the link between sales and programming.

The necessity of all these departmental relationships must be weighed against the physical constraints of the

Photo by John Robledo

and build it right

building. This can be particularly challenging when dealing with a facility spread out on several floors, and in some cases the building itself can strongly influence layout. At the five-floor offices of Clear Channel's Denver facility, the final solution required the division of the programming and production departments, with FM on the third floor and AM on the fourth floor.

Finally, personal preference can affect the location of departments. Many general managers prefer to be near the department with which they are more oriented. Some, on the other hand, may feel more comfortable away from day-to-day operations in an effort not to show favoritism.

The type of work performed often influences the intradepartment organization. Accounting staffs have very structured jobs, and their office spaces tend to be ordered and direct. Spaces, however, can be designed to bolster camaraderie between staff at stations that were formerly competitors. At Clear Channel's Denver facility, the general managers were intrigued by a concept used in advertising agencies that often had wide-open spaces where employees could hang out, have meetings and brainstorm in bigger groups. A living room was designed with sofas and oversized chairs arranged around television and video equipment. The area was designed as a fun and informal environment for the programming staff to interact and develop creative material for the on-air personalities.

The organization of the support spaces plays a critical role in the efficiency of any operation. An important logistical issue for radio conglomerations is increased traffic in the lobby. For one station, the solution to help control the flow of people was to create separate entrances based on function. One entrance was dedicated for loyal listeners to come and pick up prizes; one was dedicated for staff entry, and the third for guests

Photo by John Robledo

In a multistation cluster the lobby can be a high traffic area. It must be designed to accommodate prize winners, staff and guests.

Build it once

and visitors. This configuration allowed a central group of receptionists and operators to manage all three areas while keeping the reception area from becoming too congested with clients, staff, and listeners.

Consolidation can allow for special support spaces that were previously not feasible for facilities. In San Diego, a separate performance studio with a 10'×12' stage was constructed for visiting artists to perform live, complete with seating for up to 25 contest winners. The stage was assembled and dismantled as needed, so the rooms could be used for different functions. This space becomes possible because the cost of the leased space and its construction is shared by all the stations and is more likely to be used with many stations around.

A rack room is a functional necessity, but it can also be a showcase within the facility.

One of the central support spaces of any radio station is the rack room. Consolidation has made these equipment and computer rooms increase in size extensively. When the Clear Channel Denver office combined its three AM and four FM stations into one building, the equipment requirements, including a new audio storage and playback system, necessitated a larger rack room—with 51 racks. (For a look at the Clear Channel Denver facility, see the December 2000 issue of *BE Radio*.)

Ideally it's more efficient to have all the racks in one room. This simplifies the power and temperature needs. It also creates a natural facility hub for equipment and technical personnel. When placed nearer the studios, wire and cable runs can be reduced, which saves money and time.

At the Clear Channel Denver facility, it wasn't possible to put all the rack components in one centrally located room. As an alternative, one large rack room was installed in the basement with a vertical connection made to the studios above. Smaller, mini rack rooms were positioned close to the on-air studios on higher floors.

Overall, there is no strategy that works for everyone. The process is very much a give and take between the functional goals of management, the restrictions of the building, individual preference, and potential economic savings.

Mechanical

As perhaps the single most important room in a radio station, the rack room poses its own unique set


Photo by James West.

of mechanical and electrical issues. It is imperative that some measures are taken to protect the equipment during a power or mechanical system failure, power surges and any other unwanted event.

Heat loads from the equipment can be significant. The ideal temperature for computer equipment is 68 degrees to 70 degrees. Major deviations can be disastrous. Redundant cooling systems are often employed to provide automatic backup. A further benefit of one large rack room is that 100% redundancy is easier (and less costly) to achieve than it is for smaller, divided rack rooms. A group of studios can have a similar redundant system so that the failure of one piece of mechanical equipment is localized to affect only a few studios.

One consideration that many engineers and station managers don't often think about in a rack room is flooding from water pipes and sprinkler systems. With mechanical piping, it's typically just a matter of routing water lines to avoid the rack rooms, but sprinkler systems are sometimes unavoidable. One cost-effective solution is a dry pipe or preaction sprinkler system in which the pipes don't fill up with water until there is a perceived problem and then don't discharge or spray until it's unquestionably a fire danger.

Electrical

Probably the biggest fear of any station engineer is losing power—a concern heightened by last summer's rolling brownouts in California. Designers have begun implementing a combination of uninterrupted power supplies (UPS) and back-up generators. The UPS will maintain the power source during the few minutes it takes for the generator to get up and running. A UPS also filters the power and maintains a consistent level.

While the entire facility may not be fed by generator power, it is important to identify the key equipment areas that must have emergency power available. The rack room and studios are the obvious choices. Air conditioning, technical workspaces, traffic and accounting computers, and lighting are areas often overlooked.

Acoustical

Limiting or even eliminating background noise is a major design consideration for any broadcast facility. Studios should be designed to achieve an ambient noise criterion of NC 20 to NC 25. The construction of studio walls, ceilings and floors are often specialized to prevent the transfer of undesired noise to the studios.

Airborne sound transmission is prevented through separation, mass, and absorption. Walls are constructed like a box within a box. Inside drywall and metal studs are separated

continued on page 42

Installation Profile

Ward-Beck puts an R2K in the Hard Rock Café

The Hard Rock Café is known for its mix of rock n' roll in a restaurant environment. Each of its more than 100 restaurants around the world are a tribute to rock n' roll, and each location is a museum of its own, full of memorabilia from the people and bands that have shaped the musical genre. Radio played a major role in creating rock n' roll, but until recently, radio has been missing from the Hard Rock's menu.

When the Hard Rock Café in Toronto remodeled its facilities, a new element was added. The restaurant, which reopened on November 26, 2001, added a street-level radio studio as a regular part of its operation. CILQ-FM (Q107) now uses the studio weekday afternoons and early evenings and every Saturday evening for live broadcasts.

The studio looks onto Yonge Street, which holds the title of the World's Longest Street. This high profile location provides the radio studio with a unique opportunity to interact with street traffic. There is even an intercom system built in, so passersby can talk to the radio station staff.

The Hard Rock Café contracts with TechnoMedia Solutions of Orlando, FL, to design and install its audio and video systems for the restaurant locations. Ken Nickels, field engineer and site supervisor for TechnoMedia Solutions, supervised the project. TechnoMedia Solutions works with local contractors for installation and service of the various Hard Rock locations, and HP Services of Toronto

was brought in to complete the installation of the studio equipment. Gary Hooper supervised the project for HP.

The facility is owned by the Hard Rock Café, but Q107 was able to provide input for some of the studio's design. For the center of the studio, Hooper chose a Ward-Beck R2K console. Hooper was impressed by the console's overall quality, from the complete product down to the individual components, such as the faders and switches.

"The console has a clear layout that is easy to understand, and maintenance will be easy because of the hot pluggable modules," says Hooper. While this is a remote studio and the operators will be station announcers, it was important to provide a console that would stand up to regular use. "Overall, it's a well-made product," Hooper added.

In addition to the console's impressive specifications, its appearance fit in naturally with the image of the Hard Rock Café and Q107. The black and green color scheme fit well with the modern look and feel of its environment.

HP Services installed the studio equipment in less than one week. The studio measures 50 square feet, and getting four technicians in there to complete the work was tight. The R2K uses Phoenix connectors for all of its connections. HP Services was able to prewire most of the studio offsite. The installation required only the final connections to the Bix terminal blocks through 25-pair cable harnesses. The Phoenix connectors will allow future changes to be made easily.

The R2K console is available in four frame sizes for 8, 12, 20 or 28 modules. The Hard Rock studio uses a 20-module frame. Other console features include A/B input select on all modules, four stereo program outputs, two assignable mono mix buses, six telephone clean feeds, a complete control room and studio monitoring section including talkback, event timer and clock that supports all time code standards, a digital shaft-encoder control room monitor level control, and a rack-mount power supply frame with dual redundant power supplies.

Even though the studio is a remote location, it required full control of and integration into the station's on-air audio playback system, a Computer Concepts Maestro. In addition, the Hard Rock operates a club on the second floor, which currently has tie lines running to the radio studio. Future plans call for a Ward-Beck R257 control turret to be installed in the club for complete remote operation of the console including monitor selection and IFB. ■

Photos by Patrick Lyver of Blind E Productions, Toronto.

Build it once

from the outside drywall and metal studs by ½" air space so that sound vibration will not pass through the wall. In most cases, mass is achieved through the use of five or six layers of ⅝" drywall. All the layers are taped, and joints are staggered. Partitions are filled with 3lb/ft³ heavy-duty glass or mineral fiber insulation for absorption.

The building structural system, columns, beams, and floors can also transmit sound into the studios. This can be relieved through the use of flexible connections. Walls can be placed on neoprene pads or laid in a bed of sealant to prevent the transfer of vibrations from the floor to the partition. Transfer of vibration from above is avoided by using resilient clips to attach the top of partitions to the roof or floor above.

Designers will attempt to minimize the number of openings in walls for electrical wiring, outlets, sprinkler systems and mechanical ductwork. The more holes in the drywall, the more opportunity there is for noise to find its way into the rooms. Each item that penetrates the partition, pipe or ductwork, needs to be isolated and carefully caulked so as not to transfer sound to the partitions. Drywall ceilings suspended with spring isolators and floors floating on neoprene pads can further protect the studios from building noise. Everything is sealed and caulked to create an airtight space.

Photo by Scott Frances.

Mechanical, electrical, acoustic and aesthetic elements are all important in creating a studio space that meets both form and function demands.

Noise created by mechanical systems for heating, ventilation, and cooling (HVAC) needs to be carefully controlled. Air handling units with low noise levels need to be selected and located as far from the sensitive studios as possible. Ductwork should be insulated and contain 90 degree bends to deaden both the sound emanating from the air handler and other background noise that might enter the ductwork. Duct silencers can be used to further prevent noise

and build it right

from the units reaching the studios. The velocity at which the air travels within the ductwork also needs to be carefully controlled, and should not exceed 300 feet per minute at the diffusers.

Aesthetics design

The interior design of a facility is not the most critical element to the function of a business, but it does represent the culture and image of the organization and provides the first impression to visitors and potential clients.

The image of the facility generally represents the attitudes of the clients. Some organizations tend to be more conservative, suggesting dark wood, bronze finishes and traditional moldings. Others may opt for a more progressive atmosphere with vibrant colors, stainless steel fixtures and patterned glass. Either way, it's important that there is fluidity in the design instead of a hodgepodge of themes.

Ambiance has also proven to affect work efficiency. A sea of gray-toned cubicles tends to feel oppressive. A good example of opposing philosophies on designing work areas can be found in sales. Some managers view the sales area as a place where potential clients can be brought to make a strong impression. Others feel that sales functions are best performed outside the office. The challenge is then to strike a balance between a purely aesthetic space and a purely functional space.

Generating excitement in a room that houses not much more than a mass of cubicles can take a certain amount of effort and care. Creative use of shape, color and texture can emphasize design and produce dramatic results. At Clear Channel Salt Lake City, six skylights were used to provide natural light, with drywall soffits in the ceiling to accentuate the skylights. Angled walls running through the center of the space were painted deep burgundy and highlighted with an orange ceiling to break up the visual monotony of the office workstations.

Sometimes the local culture and attitudes can provide a direction for the interior image. In Denver, the design emphasized an earthy theme to reflect the culture of the city: the outdoors, the mountains and nature. In San Diego, cooler colors such as blues and greens were used to represent a beachcomber aesthetic. Overall, the interior design decisions are at the discretion of the architect and client. The only steadfast rule is to maintain some flexibility to allow for change at a later date.

Once the needs and desires of the station are understood, the schematic plans are developed, and the mechanical and electrical engineering criteria are established, the architect uses this information to estimate the cost of construction for the project based on historical dollars per square foot data. The station still has to consider project costs outside of construction such as site acquisition, office equipment, phone systems, computer equipment, broadcast equipment, wiring, furniture and leasing fees. The estimate and the station's budget are compared to determine whether any adjustments to the proposed scope are necessary. Once the architectural drawings are completed, the general contractor or builder will determine the actual cost to the station.

The designer is responsible for gaining an understanding of his client to come up with the best solution to meet the station's needs, taking into consideration the extent of the project, the available funds and the required time frame. However, the more thought a station manager gives to the station's best interests, the more successful the end result will be.

A good first step for the station manager and engineer is to visit several locations that have already built new facilities and get an idea of what they like and don't like. Determine what should be different, and consult with a good design firm to take those thoughts and put them together on paper in an organized way.

Brent Fasbinder is an associate with the Lawrence Group Architects, St. Louis.

On-air processors

Part science, part art, pure radio

By Chriss Scherer, editor

Establishing a station's on-air sound can be a subject of great debate. The original purpose of audio processing, preventing overmodulation and adding pre-emphasis, is still a primary function. Peak level control is even more important for online signals. The point at which general level control ends and the creation of a unique sound begins divides the science and the art. True success is achieved when the two are used together to create an art based on science.

A common pitfall is to use audio processing to compensate for shortcomings in a station's signal path. Be sure that the audio path before and after the processor is the best that it can be. The STL and first RF stage of the transmitter can also affect performance.

Processing an online signal takes a different approach. While the concern of staying below a maximum level still exists, the transmission medium is different. The quest for on-air loudness does not exist online. This is partially due to streaming being a new medium where listeners do not punch around the dial, but is mostly because streamed signals rely on some type of data reduction of the transmitted signal. The commonly used streaming formats do not work well with signals that have been heavily compressed or clipped. This is the main reason why it is not a good idea to use an off-air signal to feed an online audio encoder.

Separate processing of a direct feed for an online stream involves several cost issues. For more on this, see *Managing Technology* (page 10). Stations must decide on the appropriate investment for an online stream. Those issues aside, different streaming formats and transmission bandwidths should be processed independently. Compromises can be made along the way.

A better way

Digital signal processing (DSP) has created a new way to design audio processors. By placing the horsepower into software, settings can be created, saved, recalled and modified at the push of a button. DSP also allows new methods to be applied that were not possible or practical with analog circuits.

DSP requires a finite amount of time to perform its function. In some cases, this time may result in an audible delay of the audio signal. In these cases, a separate monitoring path will be necessary for stations normally monitoring an off-air signal.

One change from an analog to a DSP-based processor is acquiring a new set of skills. It seems everyone has his own set of modifications for an analog on-air processor. The skill in using a DSP-based processor is in understanding the design philosophy and the method of signal control.

While DSP processors have gained popularity, analog processors are still widely used and offer valuable features. A compromise between analog and DSP is digital control. Digital control allows precision changes to be applied and repeated. Settings can be copied and saved, and schedules can be created to change processing presets for different types of programming.

Digital control has opened new possibilities by adding external control through a serial port, modem, network card or the Internet, and the ability to upload software revisions as they become available.

Many models are available, each with its own features. Because a processor must be evaluated over a period of time, most manufacturers will arrange a demonstration or short-term loan.

Marketplace

IDT

Digital Band Processor
(AM, FM, Internet)
Digital Band Processor in DVP (FM, Internet)
Digital Virtual Processor (AM, FM, Internet)
Peripherals
Digital Encoder Plus (AM, FM)

+33 472 18 19 20; +33 472 18 19 21 fax
www.idt-fr.com; mail@idt-fr.com

Orban

8400 (FM)
8200 (FM)
6200 (DAB, Internet)
6200S (Internet)
2200 (FM)

9200 (AM)
9100B2 (AM)
1100 PC Card (DAB, Internet)
Peripherals
8218 stereo generator
8200ST studio preprocessor
222A stereo enhancer

510-351-3500
510-351-0500 fax
www.orban.com
info@orban.com

Waves

MaxxStream LX (Internet)
MaxxStream M100 (Internet)
MaxxStream M200 (Internet)
MaxxStream PCI card (Internet)

865-546-6115
865-546-8445
www.waves.com
sales@waves.com

Broadcast Technology Company

Tri-Maze (AM, FM)
Ultramod UM-2000 (FM)
Ultramod FM (FM)

Peripherals

CP-4013 composite processor
CP2013 composite processor
TXL-110 filter/limiter
TXL-210 filter/limiter
DSG-2001 stereo generator
DSG-2001 Ultramod stereo generator

719-688-1439
620-271-7493 fax
www.broadcasttech.com
sales@broadcasttech.com

Omnia Audio

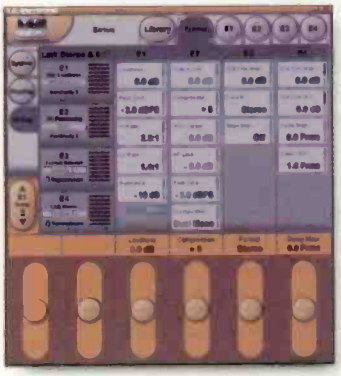
Omnia6 (FM, AM, Internet)
Omnia3 (FM, AM , Internet)
Omnia.fm (FM)

Peripherals

Dividend composite filter
SG Stereo Generator
Omnia plug-in modules

216-241-3443
216-241-4103 fax
www.omniaaudio.com
info@omniaaudio.com

TC Electronic



DBMax (FM, AM, Internet)
DB-8 (Internet)

805-373-1828
805-379-2648 fax,
www.tcelectronic.com
infous@tcelectronic.com

On-air processors

Aphex

2020 MkII
(FM, Internet)

Peripherals

320A Compellor compressor/leveler
323A Compellor/Aural Exciter
720 Domniator II peak limiter
722 Domniator II peak limiter with pre-emphasis
204 Aural Exciter
250 Aural Exciter

818-767-2929; 818-767-2641 fax
www.aphex.com; sales@aphex.com

Solid Electronics Labs

Peripherals

DCP-1A composite processor
610-353-9449; 610-356-8449 fax

Inovonics

Omega_FM (FM)
WebcCaster (Internet)
222 (AM)
235 (AM)
250 (AM, FM)
255 (FM)
260 (FM)
716 David II (FM)

Peripherals

708 stereo generator

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

CRL

Millenium (FM)
Amigo FM (FM)
Amigo AM (AM)
Amigo Talk (AM talk)
AM-4 Mono, includes AGC-400, SEC-400 and PMC-450 (AM)

Peripherals

SG-800A stereo generator
SG-300B stereo generator
AGC-400 mono level controller
SGC-800 stereo level controller

602-438-0888
602-438-8227 fax
www.crlsystems.com;
crl@crlsystems.com

Modulation Sciences

Peripherals

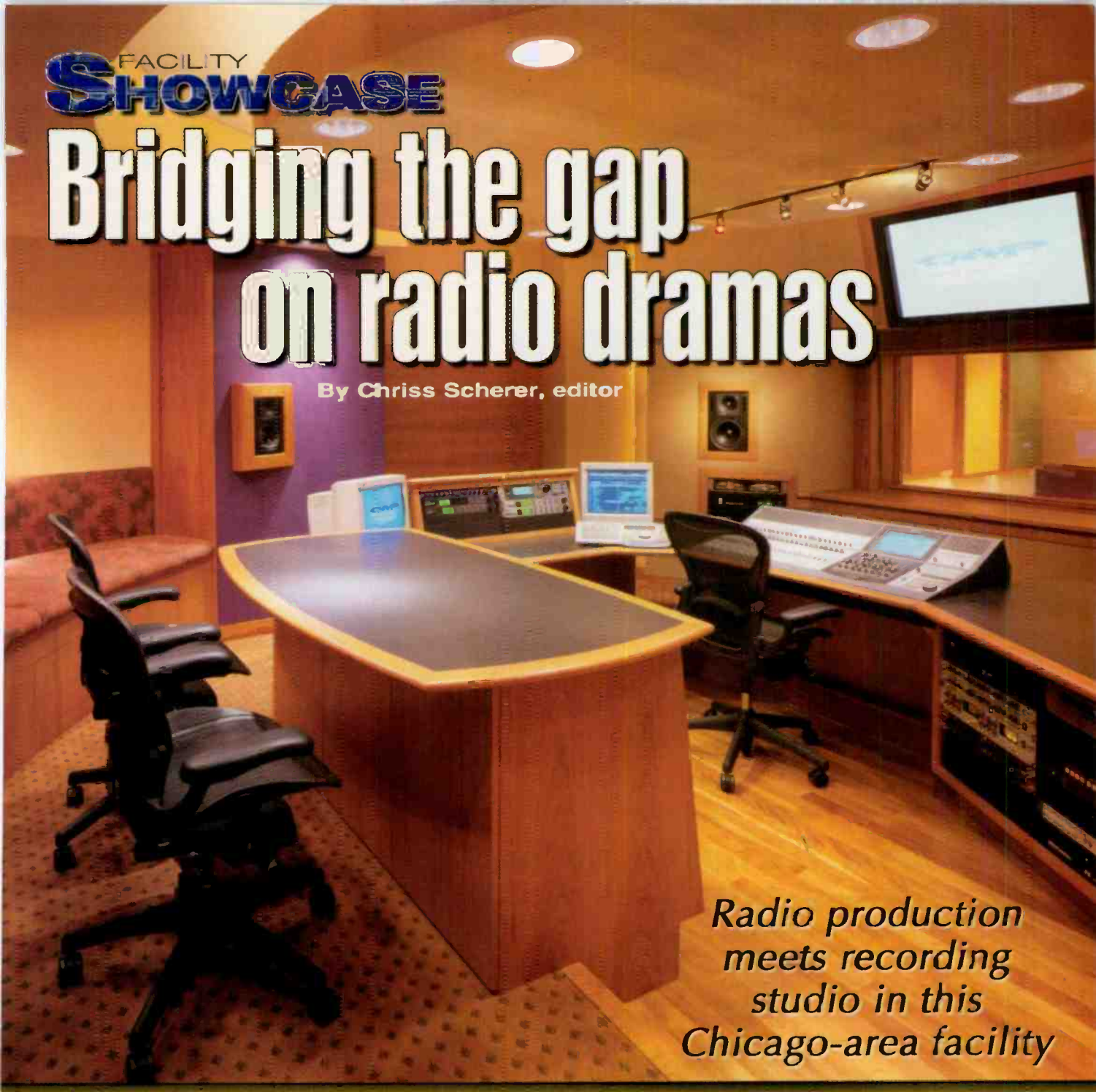
CP-803 composite processor (FM)
StereoMaxx stereo enhancer
CLD-2504 composite distribution amplifier (FM)
CLD-2500 composite line driver

732-302-3090
732-302-0206 fax
www.modsci.com;
sales@modsci.com

FACILITY SHOWCASE

Bridging the gap on radio dramas

By Chriss Scherer, editor



Radio production meets recording studio in this Chicago-area facility

Long-form radio programming was once a staple part of radio entertainment. This style of radio carries the listener into the story through a sonic canvas to create the mental imagery. GAP Digital, a recording facility in the Chicago suburb of Wheaton, thrives on creating long-form radio dramas and talking books for radio. The facility recently underwent a complete redesign and rebuild to make the most efficient use of its space and take advantage of newer equipment choices and their flexibility.

The 3,000 square-foot facility houses three unique control rooms, two studios, a central machine room, and client lounge and support areas. The three control rooms are designed for very different applications, as the designs show.

The two-story building has a history in radio. The previous tenant operated a radio production facility. When the owner decided to sell the building, he wanted it to remain a recording facility, and Todd Busteed, owner and chief engineer of GAP Digital, was eager to continue this tradition.

The existing facilities worked, but they were not the best they could be for their desired use. GAP called on Walters-Storyk Design Group for help. WSDG was chosen because of the company's reputation and its attention to a facility's aesthetics. Then the work of determining GAP's needs and evaluating the physical space began.

When a complete redesign is proposed, it is common for the designer to step in and begin from scratch. A fresh start removes the constraints that may be a result of designing something based on the way it's always done. GAP Digital began at this point. But after determining the limiting factors, such as door and entry locations, and structural pillar positions,

Bridging the gap

GAP Digital president Todd Busteed at work in Control Room A

it was realized that the existing layout was nearly the best it could have been. Nothing was taken for granted with the old design. With a few modifications from the old design, the new plans were set.

While the layout proved workable, everything else went. The entire space was stripped to bare concrete and steel. The studio space is in the basement area of the building. This space has concrete foundations that are one foot thick. While this mass and its partially underground location were an asset to the facility's immunity to outside sound, one additional step was taken to eliminate any unwanted sound or vibration of the outside world from getting in. All live spaces were floated, mechanically separating them from the rest of the building. The main concern was the Union Pacific rail line that passes within 96 feet of the facility. Now that the construction is complete, the trains run on time, but they are never heard or felt within the GAP studios.

In business since 1980, GAP Digital has created scores of radio dramas, including programs based on classic stories such as Victor Hugo's *Les Miserables*, C. S. Lewis' *Chronicles of Narnia*, and George Eliot's *Silas Marner*. The facility is currently producing 144 half-hour episodes of a drama series titled *Left Behind*, which is based on the best-selling book series of the same name. *Left Behind* is being broadcast on more than 700 radio stations.

A view of the rooms

One design goal was to create a functional space, while providing a stage for the performers. Because of

their lively sound, the old studios required the radio drama performers to be separated by gobos. This created small spaces where the performers were restricted and sometimes were not free to interact or express themselves fully. Even though radio dramas are being produced, there is a level of physical interaction and expression that accompanies any performance.

The three control rooms all serve specific purposes. Control Room A looks into the performance studio. Control Room B looks into the foley and radio drama studio. Control Room C is a composition studio where original music scores and tracks are created.

During the facility reconstruction, GAP's business had to continue uninterrupted. This required some temporary accommodations to be created and moved during the process. Control Rooms A and C were the first to be completed.

Control Room A and its studio are the primary tracking rooms in the facility. In addition to the actor VO sessions, music and walla (or crowd backgrounds) are recorded here. The control room is also set up to support audio for video production. For viewing ease, the 44 inch plasma screen can be lowered to a position squarely in front of the console. The control room itself is basically symmetrical, allowing an accurate listening environment for the producer and engineer. The back of the room is designed to accommodate guests.

While it is behind the surround monitors, the staff has been surprised at how guests still get a sense of the surround field. Also found in the back of the room is the first major break from symmetry in the room. Designer John Storyk wanted to apply flair and personality in this less acoustically critical space. This was accomplished dramatically with a curved, built-in couch.

Control Room B and its studio occupy a smaller space. The approach used in designing this control room and studio was more like that of a film post-production facility than a traditional radio facility. The studio can comfortably hold about six people at one time. The studio also doubles as a foley stage and custom sound design studio for the radio dramas and has a closet in which to house the equipment needed for this function. With so many possible sound effects needed for any production, it is not practical to purchase a sound effects library to cover all the needs. Most of the sounds are custom created for their specific purpose.

To accomodate these functions, the back wall opens, revealing storage for every conceivable type of material and device, including various fabrics, switches, latches and knobs, for

Bridging the gap

the creation of custom sounds. The floor design incorporates covered pits containing sand, gravel, leaves, concrete, and other surfaces used in the process of walking foley.

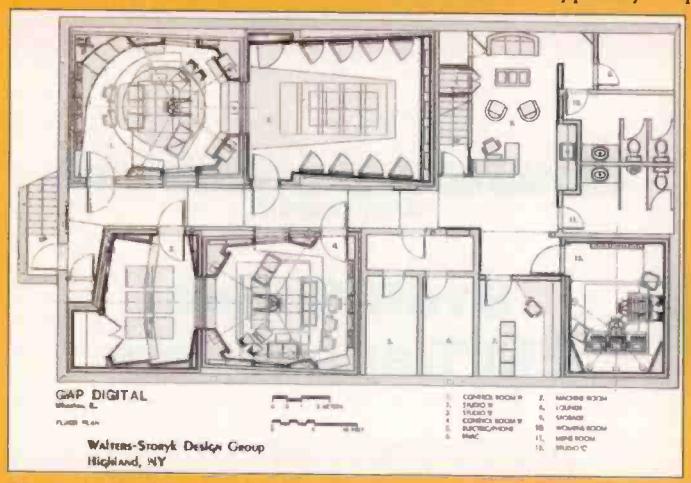
Most of the audio tracking is done from Studio A, primarily because it is a larger space, and it is better suited for performance use. Studio A can accommodate about 15 performers.

Variation on radio

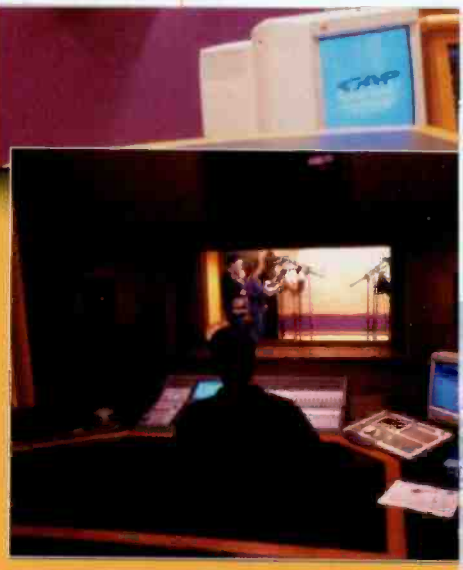
Traditional radio drama, the foundation on which GAP Digital has built the dramatic audio production style, typically captured everything live. The complexity of the newer format necessitates the use of automation. For this, GAP Digital chose Sony's DMX-R100 console.

Each studio has input panels that feed each control room, so any studio can house performers for any control room. In addition, the Sony console is capable of routing audio sources from the rack room, so there are limitless possibilities of distributing audio resources throughout the facility.

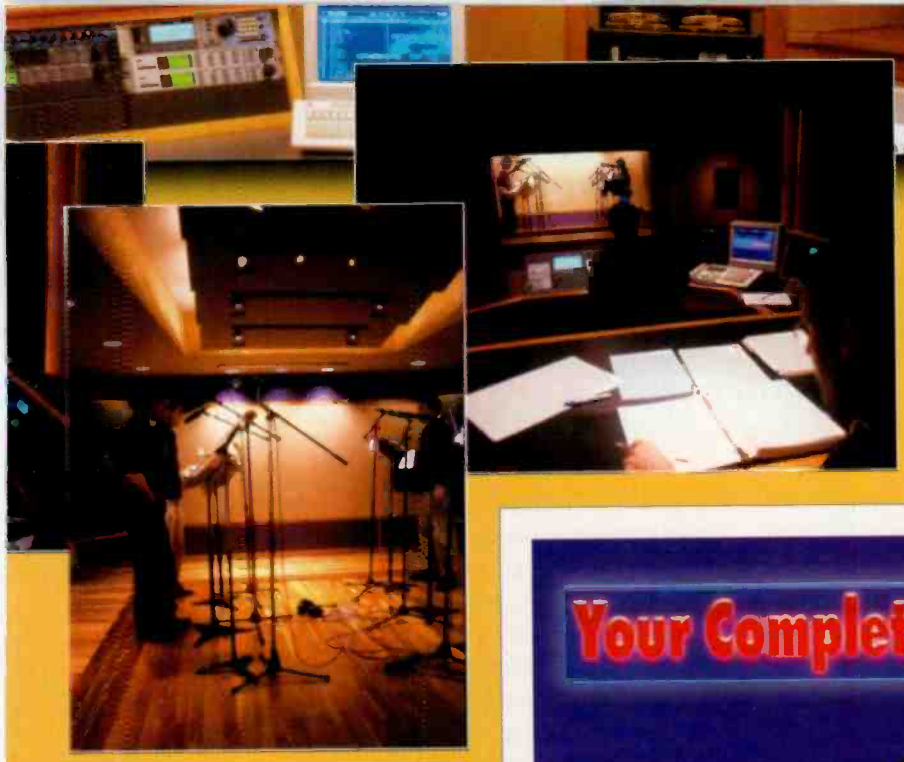
As GAP's business grows, there are plans to occupy the upstairs portion of the building. The additional 3,000 square feet is currently



The entire facility occupies just 3,000 square feet of space.



The facility's attention to aesthetics helps make performers more at ease and fosters creativity.



being used for traditional office space, but when it is convertec, it will undoubtedly add a new dimension to GAP's business.

Photos on pages 47 and 48 by Cave DeJong, Chicago.

Equipment List

Aardvark SyncClock and SyncDA
AKG 480 mics
AKG 414 mics
Bag End Elf subwoofers
Crown D-45 and D-70 power amps
Eventide DSP-4500
Eventide Orville
Fairlight MFX3Plus DAWs
Fostex D10 DAT
Furman IT1220 balanced power transformers
Gefen Extendit video, keyboard, mouse extensions
Gefen SFXNet
Genelec 1030A and 1031A monitors
HHB 850 and 850Plus CD recorders
HHB PortaDat
Medialink network
Megami Star Quad cable
Musicam CDQ Prima ISDN codec
Neumann TLM-103 mics
Neutrik connectors
Night Technologies EQ3 and EQ3D
Sanken CSS-5 mics
Sennheiser 416 mics
Sony 7506 headphones
Sony DMX-R100 consoles
Sony PCM R500 DAT
Sony PCM2600 DAT
Studio Technologies StudioComm
TC Electronic Finalizer Plus
TC Electronic M2000
TC Electronic M3000
Toshiba XL1400 UPS
Valley 730 Digital compressor

EYE ON IBOC

IBOC implementation

By Jeff Detweiler

As the sole developer of IBOC technology, Ibiquity Digital fields a lot of questions from broadcasters about the technical requirements to convert AM and FM stations to digital broadcasting. The single largest factor in the cost of such conversion, the transmitter, is the subject of the majority of inquiries. IBOC conversion, especially on FM stations, offers several upgrade options. Ibiquity's experience with field testing on several dozen stations indicates that many stations will be on the lower end of the projected cost range of $30,000 to $200,000 for IBOC conversion.

FM stations considering IBOC conversion have three basic transmission options, each requiring an IBOC exciter: high-level combining, low-level combining or separate antennas.

High-level combining, the option used most frequently in Ibiquity's field testing, combines the station's existing transmitter with a new, but lower-power, digital transmitter to create the hybrid IBOC waveform (with analog and digital components). This approach requires a power overhead of about 0.5dB in the existing analog transmitter to account for combiner loss. It also requires a linearized transmitter with an IBOC power output of 10dB below the analog transmitter's TPO to generate the digital signal. High-level combining is possible using any existing transmitter with the necessary headroom.

Ibiquity also used low-level combining successfully in the field. With this method, the hybrid signal is formed before amplification and passed through a linearized transmitter. FM stations with a modern, solid-state transmitter and about 20% power overhead are candidates for low-level combining with modifications to the amplifier modules. Low-level combining using an existing transmitter is the least expensive option to convert an FM station to IBOC.

Separate antennas for the analog and digital signals may provide another method for conversion. A separate antenna approach uses separate transmitters feeding separate transmission lines and antennas. No overhead is required in the existing analog transmitter, and the linearized transmitter needs a power rating of 20dB below the analog transmitter's TPO. While Ibiquity has not tested this method, several manufacturers are taking steps to field test this approach.

Necessary changes

Every FM field test conducted by Ibiquity on an FM station used the station's existing transmitter for the analog transmission. For most of Ibiquity's test stations, high-level combining was used. In these cases, a linearized IBOC transmitter was obtained from one of Ibiquity's manufacturing partners and installed at the site. An Ibiquity IBOC test exciter was used to generate the digital component of the IBOC waveform and in turn fed the linearized IBOC digital transmitter. The output from the existing analog transmitter was then combined with the output of the digital transmitter using a custom injector/combiner supplied by another manufacturer. One station in the test group is using a single linearized transmitter for analog and digital combined at a low level.

Stations with analog STLs were upgraded to either a digital RF path or T1-based Telco channelbank. While not required for the conversion to IBOC, changing the STL allowed for a better evaluation of the audio performance without STL-induced limitations.

AM stations considering IBOC conversion have fewer options because combining the analog and digital components of the AM IBOC waveform is not an option. However, AM stations that possess modern, solid-state transmitters will only require an IBOC exciter and minor modifications to their existing transmitter. Converting these stations may actually cost less than their FM counterparts.

In most cases, Ibiquity targeted AM stations with existing IBOC-compatible transmitters for field-testing. In general, the hardware installations at the AM stations were easier than at the FM stations. Most of the AM test stations had antenna systems capable of supporting IBOC bandwidth requirements. Generally, if an antenna will support C-QUAM AM Stereo, it will support an IBOC transmission.

The test stations that were operating in delay for live talk or listener call-in segments were already set up to deal with IBOC's audio delay. However, the stations that needed to interact with live traffic reports or remote broadcasts had to establish a return audio path via an IFB. Many of the FM stations were able to use their SCA channel for this function. All the AM stations, and the FM stations with occupied SCA spectrum, were able to use bi-directional ISDN phone circuits to handle the IFB.

Ibiquity's experiences in field-testing underscores the relative ease with which AM and FM broadcasters can transition to digital. Replacing a station's main analog transmitter will be unnecessary in the majority of IBOC station conversions—especially stations likely to convert in the early years. By modifying the existing transmitter or adding a smaller digital transmitter, most stations will be able to transition to IBOC affordably and with relative ease.

Detweiler is technology manager of Ibiquity Digital.

OMT Technologies iMediaLogger

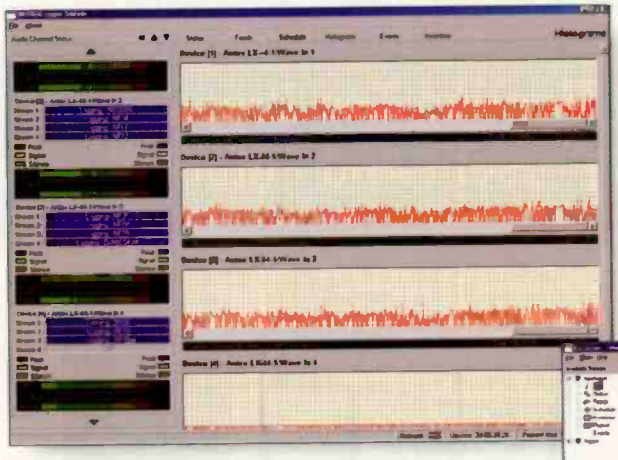
By Tim Wright, CPBE

When I inherited the engineering responsibilities of WVAZ about five years ago, the station was logging off air audio with a pair of reel-to-reel tape machines. A year's worth of log tapes was kept on a large shelf. Quality of low speed analog recording left much to be desired. This was a problem because of the space needed to store the tapes and because we were logging to get air checks for clients. The audio was awful.

With input from the production and sales departments, it was decided that a modern solution was needed, so a DAT/hard drive system designed for 911 logging was purchased.

Drawbacks to that system were soon discovered. We took care of the space problem by getting rid of the reel tapes, but did nothing to improve the fidelity of the logged audio. In addition, we caused another problem. It took a long time—minutes—to eject the tape, and even longer to find the logged audio to make those air checks, and someone still had to dub it to cassette. Something was needed to make logging a less time-consuming project.

At NAB2000, I was introduced to the iMediaLogger, a software-based audio logger with an HTML user interface. It is supported under Microsoft Windows 98 and Windows NT 4.0. It can record a variety of audio formats (MP2, MP3, WMA, ADPCM, PCM, and RealAudio) using nothing more than Windows-approved soundcards. It can act as a logger, skimmer or background network recorder and will record up to four simultaneous streams in different audio formats from one physical audio input. Recording can be continuous, controlled by external closure or based on the clock. The software can access the Internet for NTP time packet data and become the NTP master server for an entire facility.



Getting started

My first system was based on a PII 450 clone PC, running Windows 98 SE, an Antex LX44 sound card, and a 40GB data storage drive. I configured the audio format as MPEG Layer 3, 22.05kHz, 16bits, mono and 32kb/s for the logging channel. File length was chosen for 15-minute intervals. This combination gives AM quality audio, 120 days of logging and file lengths that fit a 15-minute segment on a 1.44MB floppy.

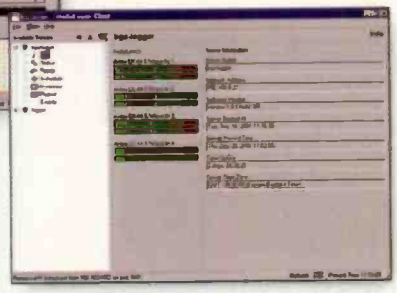
After a few months, an opportunity arose to use the background recorder functions for a remote broadcast from South Africa. The clients wanted copies of the interviews we did. I set the second stream of the logging channel to record PCM, 44.1kHz, 16 bits, mono, 128 kb/s, and sent the files to the extra 10GB I had available on the PC system drive. The recorder started at a predetermined time each day and stopped after four hours, at the end of the remote.

When I returned, I downloaded the files on the LAN using the HTML interface, imported them into Cool Edit Pro, edited the interviews, saved them in PCM format and burned audio CDs. The audio never left the digital domain, the quality was great, and the clients were pleased.

The success of that experience led me to begin using the timed background recorder for capturing network feeds in the early morning for the news folks to use. We record a 5-minute block using Mono PCM at :44 past the hour for three separate hours each weekday morning. We autopurge the files every other day. The news director pulls the file off the logger using the HTML interface, puts the cuts into Cool Edit Pro, breaks them into individual sound bytes, and saves them back as files named 1, 2, 3, etc. The files are then imported into the Oplog2000 database, which is set up to template the showlogs looking for cuts 1, 2, 3, etc., so all she has to do is fire them off with the touch screen in the studio by the number.

Performance at a glance

- HTML Access to logged audio
- Multiple audio formats
- Uses any Windows soundcard
- Skim, Log, and Network Tape delay
- Remote administration client



The next step was to log all of the Clear Channel stations in the market. I thought it would be beneficial to make the HTML available via our Web pages for listeners to go back and hear something they may have missed earlier, but our company banned streaming audio due to the AFTRA affair. I kept the HTML access behind the firewall on the WAN.

The HTML screen provides IP file access to users through an intranet or the Internet. The second screen shows a file playing through Windows Media Player.

the group's six stations 12.5GB of drive, enough for five weeks of audio. The operating system is a Microsoft Windows NT 4.0 workstation. I use two Antex LX44 audio cards for a possible total of eight independent mono channels. A seventh station can be added using the balance of the computer's drive space, but it is not recommended that audio be stored on the system drive. I use this logger as the NTP timeserver for our station and point all servers and workstations to the logger to get the time via login scripts. A bank of tuners completes the market logger setup.

A second logger uses a PIII 933 with 512MB RAM, a 14GB system drive, and two 40GB data drives, partitioned into three segments each. This gives each of

I recommend the product. The single station logger running on Win98SE has been stable, only requiring one restart in a year. The NT-based logger has only been shut down for software upgrades. OMT-MediaTouch support staff is stellar. Suggestions for product improvements are taken seriously, and system upgrades are easily downloaded and installed. I would like to see a bit more control of the HTML, so I can customize with company logos and limit user access to the inventory pages if desired. I have suggested, and seen implemented, control over HTML colors.

OMT Technologies

P 888-665-0501
F 204-783-5805
W www.omt.net
E omt@omt.net

Tim Wright is chief engineer of WVAZ, Chicago.

Editor's note: *Field Reports are an exclusive* BE Radio *feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company. These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested. It is the responsibility of* BE Radio *to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* BE Radio.

Aphex 204 Aural Exciter and Optical Big Bottom

By S. Parks Hall

In our world of ones and zeros, we tend to overlook the analog devices still in use throughout the broadcast and recording industry. Not only is analog not dead, many audio professionals seek its use in specific areas. Even vacuum tubes are used in microphone preamps and audio processors in many leading facilities for the perceived warmth and presence they provide.

Few products intrigue an analog enthusiast more than a piece of equipment that may contain a little audio black magic. Enter the latest enhancement of the Aphex Aural Exciter, the 204 with Optical Big Bottom. The ancestor of the 204 dates back more than a quarter of a century. When first released in the mid '70s, it took the recording industry by storm. Many album liner notes boasted of its use. One even boasted of not using it. To this day, they are ubiquitous wherever audio and electronics come together. The 204 was preceded by the Model C2, introduced in 1992, and was the first unit to incorporate the added Big Bottom circuitry.

The back cover of the owner's manual lists no less than 21 audio environments in which the Aural Exciter may be found useful. Our focus will be where and how to use this product within the radio broadcast environment and to what success. But first, what is it supposed to do?

Aphex believes that electronic sound recording and reinforcement diminishes critical harmonic detail that is at the center of the difference in recorded and live audio sound. The Aural Exciter's mission is to restore lost detail and nuance by recreating these lost harmonic features.

The 1RU device has two independent channels, each with six front-panel controls: three for Big Bottom and three for the Aural Exciter. Also included is a process bypass pushbutton switch for each channel. For Big Bottom, the controls are *drive*, which sets circuit input level, *tune*, which sets process operating frequency range from 50Hz to 190Hz, and *mix*, which sets the amount of processed audio that is combined back in with the overall audio content. A green LED indicates the optimum setting of the drive control.

The controls for the Aural Exciter circuits are similar to those for Big Bottom. The tune control sets the corner frequency of a high pass filter, which establishes the frequency region within which the enhance process will be applied. The range is roughly 600Hz to about 6kHz. A *harmonics* control sets the degree to which harmonics are generated from the selected fundamental frequency operating range. These are primarily second-order harmonics.

The mix control varies how much enhanced audio is mixed back into the original audio signal. The 204's rear panel allows balanced or unbalanced inputs and outputs using either XLR or ¼" TRS jacks. Separate -10dB or +4dB operating level switches are provided for each channel.

Processing enhancements for Big Bottom and the Aural Exciter take place in a side chain. The results are combined with the original audio in a summing circuit. Since the basic Aural Exciter has been around for years, its use and technology are more readily understood than the more recent Big Bottom. Big Bottom provides the perception of dramatically increased bass power with little or no increase in peak energy. In the Big Bottom side chain, a sample of the original audio is delayed slightly and then recombined.

Performance at a glance

- Simple controls
- Broad range of effect
- High- and low-frequency enhancement
- +4 or -10dB switchable operating level
- XLR and ¼" I/O

Going to work

Using Chattanooga-based Brewer Broadcasting's Urban AC station WMPZ-FM, the Model 204 was placed at the input of an uncompressed digital STL. A pre-processor leveling amp precedes the 204. At the transmitter, overall final processing is accomplished with an Orban 8200. Listening off air while adjusting the Aphex 204 demonstrated just how powerful this tool is. I have used many types of equalizers but none have enhanced the bass region in such a musical manner as Big Bottom. I ended up with the tune controls at about 130Hz and the mix at 12 o'clock. A little bit of Big Bottom goes a long way. I recommend no bass or high frequency enhancement in the global processing. Let the 204 do the work. As for the Aural Exciter, a sense of air and revealing openness can be achieved with careful adjustment. I ended up with the tune control set for about 2kHz with harmonics set at one o'clock and mix set at two o'clock. However, I never felt I could achieve optimum results without the highs sounding a little brittle and on the harsh side. From this experience, one might conclude that the 204 seems more at home when combined with

purely analog processing, as this negative side effect did not show up in future pairings.

Using Brewer's Mainstream Urban WJTT-FM, the 204 was inserted in the air chain between the output of Gentner Audio Prisms and the Orban 8100A with the Card 5. The Big Bottom frequency ended up at about 80Hz. with the mix at 11 o'clock. At times, the bass seemed to pass right through the body, and it was clean. The Aural Exciter was set for about 4kHz, with harmonics and mix both at one o'clock. The effect in the higher region was a nice unveiling of the more subtle instruments and voices with none of the earlier harshness. The impact of the Aphex 204 was so positive here that I hated to take it out for further testing.

To test the unit as a microphone enhancer, it was placed between the output of a Valley 401 mic processor and the input to the Logitek digital console. Each of the 204 channels was used for separate RE-20 mics positioned in front of the console. Male announcers used the mic processed with Big Bottom, and female announcers used the mic processed with the Aural Exciter. With careful adjustment while listing to the individual DJs, standout presence could be achieved. Unfortunately, best results called for different settings for each air talent. Good results could be achieved, however, using settings derived from the average of the individual settings.

In the production area, the 204 was placed into the input of a digital audio workstation. The 204 was best used for providing sound enhancements to individual tracks before the final mix. It was particularly helpful in improving the clarity of agency spots or those recorded with less than full care at another station. Using the 204 on the voice tracks can render results that make the announcer's voice ear-catching.

The Aphex 204 is a real bargain of process power and versatility that is useful in multiple locations. However, obtaining the results I have mentioned takes time, patience and objective listening. Personnel must be trained in its use. Otherwise, a good thing can be misused, resulting in bad sound.

Aphex

P 818-767-2929
F 818-767-2641
W www.aphex.com
E sales@aphex.com

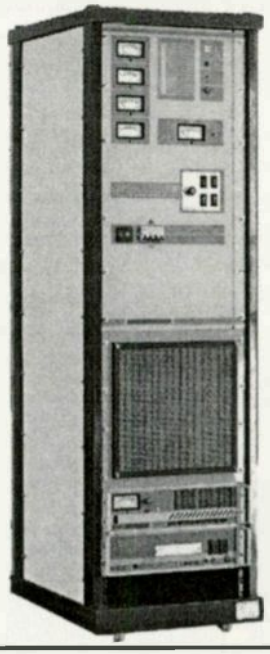
S. Parks Hall operates a contract engineering service in Chattanooga, TN.

Editor's note: *Field Reports are an exclusive* BE Radio *feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company. These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested. It is the responsibility of* BE Radio *to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* BE Radio.

Superior Broadcast Products

FM Transmitters

All Power levels 20 watts to 30,000 watts
100% Solid State or Grounded Grid



Grounded Grid Models Feature

- Solid State High Performance Exciter
- Solid State Driver
- Ease of Installation
- Fast Delivery
- Motor Driven Tuning
- Complete Front Panel Metering
- Low Pass Filter
- Soft Start Up
- Cost Effective Pricing
- Financing Available
- LED Read out on front panel shows operating parameters

Solid State FM Transmitters

Featuring the latest Cold Mos fett Design
Models range from 20 watts to 10,000 watts

20 watt Exciter	850.00
100 watt Transmitter	2,000.00
250 watt Transmitter	3,000.00
350 watt Stereo Transmitter	3,500.00
500 watt Transmitter	4,000.00
1,000 watt Transmitter	7,000.00

Many other models to choose from

Transmissions Line

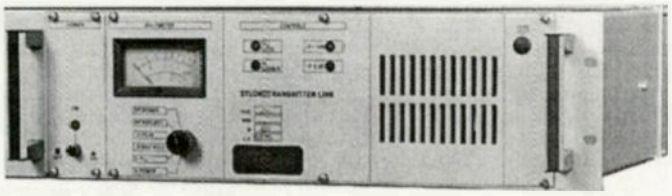
Superior Broadcast Products offers a wide range of transmission line and accessories

1/2 inch Foam Coax as low as	$1.40 per foot
7/8 inch Foam Coax as low as	$3.50 per foot
1 5/8 inch Foam Coax as low as	$8.50 per foot
2 1/4 inch Foam Coax as low as	$12.00 per foot

Call for prices on other sizes

High Performance Digitally Synthesized FM Exciter

Studio to Transmitter Link
Frequency Agile Composite Transmitter and Receiver



Both Transmitter and Receiver $3,500.00

Transmitter	Receiver
10 watt output	Active band pass filter
Stereo or Mono	Full Metering
Full Metering	Fast Delivery
Two SCA inputs	Two SCA outputs

One year limited warranty

FM Antennas

Power Levels from 500 to 20,000 watts per bay

One bay	500 watt input	495.00
Two bay	500 watt input	1,200.00
Four bay	2,000 watt input	1,990.00
Six bay	3,000 watt input	3,500.00

Broadband Medium Power

Two bay	3,000 watt input	2,400.00
Three bay	3,000 watt input	3,400.00
Three bay	10,000 watt input	4,000.00
Four bay	3,000 watt input	4,400.00
Four bay	10,000 watt input	4,800.00
Six bay	3,000 watt input	6,250.00
Six bay	10,000 watt input	7,000.00
Eight bay	10,000 watt input	9,500.00

Many other models and power levels

Contact Jimmie Joynt 17194 Preston Road, Suite 123-297 • Dallas, TX 75248
Ph. 800/279-3326 • Fax 800/644-5958 972/473-2577

New Products

By Cindy Holst, associate editor

Amplifiers
Crown Audio

XLS series: This series includes the XLS 202, 402 and 602. There is a selectable high-pass filter (30Hz/15Hz/Off) on each channel. Each housed in an all-steel 3RU chassis, the XLS models use a forced air fan to prevent excessive thermal buildup. Front panels sport dual, precision detented level controls, a power switch and four LEDs, which indicate clip for each channel, power and fault conditions. Rear panel connections include two electronically balanced XLR inputs and touch-proof binding post outputs. XLS products are backed by a three-year, no-fault, fully transferable warranty. Power ratings (per channel) on the Crown XLS Series amplifiers are as follows: XLS 202: 250W/2Ω, 200W/4Ω, 145W/8Ω; XLS 402: 570W/2Ω, 400W/4Ω, 260W/8Ω; and XLS 602: 840W/2Ω, 600W/4Ω, 370W/8Ω.

800-342-6939; fax 219-294-8250; www.crownaudio.com

Alarm voice response
Broadcast Tools

AVR-8: This device automatically reports changes detected on any of its eight digital inputs to a remote telephone and/or pager. After reporting, the AVR-8 allows the user to give it commands through a telephone keypad. Functions include telling the AVR-8 to report on the input state of any of the eight digital inputs, commanding the AVR-8 to pulse any one of its four SPDT relays for 750ms and/or turning any one of the relays on or off. In addition to initiating a call out when inputs change, AVR-8 monitors its telephone line to receive a call-in from a remote location. When a call is received, the AVR-8 speaks a greeting message and is then ready to receive and execute commands to report on its inputs or change to its relay outputs.

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

Headphones
Sennheiser Electronics

HD 280: Designed to deliver exceptional isolation from ambient noise with precise and linear sound reproduction at high SPLs, the HD 280 Pro combines high fidelity with practical design and maximum comfort. The HD 280's form-fitting, ergonomically designed circumaural

earpieces remain comfortable for long periods of listening and can be rotated for flat mobility and space-saving transport. Single-sided coiled cable gives users maximum flexibility on the job. Easy replacement of all wearing parts ensures long-life and functionality.

860-434-9190; fax 860-434-9022
www.sennheiserusa.com
lit@sennheiserusa.com

Wireless codec
Comrex

BlueBox: This codec delivers the audio quality of a Matrix or Vector (15kHz on a single dial-up line). The BlueBox is compatible with all existing Comrex POTS codecs, including the Matrix, Vector and HotLine. The BlueBox also provides GSM wireless operation to improve the audio quality of GSM phone feeds. Additionally, the BlueBox can connect to the hands-free port on mobile phones and place calls to telephone hybrids (no codec is required on the receiving end of the call). The BlueBox includes one mic/line switchable input, one headphone output and one line level output. An additional -10dBu tape input allows connection to a minidisc or DAT player. There are no special circuits to order and no distance limitations. With the introduction of the BlueBox, the HotLine has been taken out of production.

800-237-1776; fax 978-635-0401; www.comrex.com; info@comrex.com

Connector enhancements
Neutrik

NC3FXCC: This new XLR connector features a coaxial ground spring and coaxial hex crimp ferrule at the cable entrance for accurate and reliable transition of the shield to the shell. The NC3FXCC provides continuous (360°) ground connection between the cable shield and the connector shell, which is essential when transmitting digital audio signals. The connector includes a coaxial ground spring, which provides an accurate connection to the mating shell and features excellent screening up to 1.3GHz of min55dB. The NC3FXCC also incorporates a better shield (ground) connection than standard female XLR cable connectors.

732-901-9488; fax 732-901-9608; www.neutrikusa.com; info@neutrikusa.com

New Products

Voice processor
IDT Impact Developpement

Virtual Voice Processor: Applying FFT to voice processing allows the voice to have the same depth and warmth as the music. Gone are the problems of sibilance, pop and all different annoying forms of noise. The FFT analyses the signal, concentrates on the frequencies of the voice, adding the programmed effects, yet working efficiently on the removal of the unwanted parts of the spectrum. A user-friendly interface on a PC allows customization of presets to bring the best out of each announcer's voice. All the parameters can be stored on a compact flash card and inserted into any other VVP (password protected). The VVP is fully compatible with any other product of the IDT range. Features include processing at 96kHz, 40-bit floating point; a noise gate; a sibilance gate; a variety of plug-ins; multiple user selectable parameters; and a flash card to store and transfer parameters.

+33 472 18 19 20; fax +33 472 18 19 21; www.idt-fr.com; mail@idt-fr.com

Four-channel mixer
Samson Technologies

S vox: This mixer features four-inputs with analog and digital outputs. Channels one and two feature microphone preamps. For direct input of condenser mics, 48-volt phantom power is provided. A phase reversal switch allows two channel micing. Channel controls include 3-band EQ with sweepable mids and an in/out switch that provides toggling between equalized and non-equalized modes. Channels one and two also use an optical compressor with selectable threshold. Insert points are provided. Two 5-segment LED meters show accurate information of input or output signals. Channels three and four provide line inputs matched for keyboards or other processors. They can also be used to return a stereo sub mix. All channels offer volume and pan controls. S/PDIF inputs and outputs digitally connect the S vox to a digital audio workstation. Rear panel ¼" TRS balanced mixer outputs are provided for analog recording. Control room/phones analog outputs can also be used to monitor the signal before or after it enters the DAW.

516-364-2244; fax 516-364-3888; www.samsontech.com

New Products

Mic preamp
Sound Devices

MM-1: A high-performance, transformer-balanced, single channel microphone preamplifier with a flexible headphone monitoring function, the MM-1 produces low-noise, low-distortion gain at all switch positions. Its dual-stage limiter and high-pass filter prevent occasional signal extremes from overloading down-stream equipment. Flexible microphone powering provides phantom (48V or 12V) or 12-volt T-power. With its headphone monitoring function, the MM-1 is an advantage in applications where communications channels or mix-minus feeds need to be monitored in headphones. The user can monitor both microphone audio and external audio sources in headphones with level control.

608-524-0625; fax 608-524-0655; www.sounddevices.com; info@sounddevices.com

Portable codec/mixer
AETA Audio

Scoopy: A reporter model audio codec, the Scoopy packages all four transmission systems (PSTN, ISDN, GSM and INMARSAT) and all the required compatibility protocols into an ultra-compact, lightweight case (1.5kg including batteries). The unit is also useful in distribution (sound is sent from a radio or television station to the transmitter) and contribution (sound is transmitted from the reporting site to the station) applications, allowing for mobility in live news and sports reporting anywhere in the world.

973-659-0555; fax 973-659-9555; www.aetausa.com; info@aetausa.com

Shelters
Andrew

IBC 2000 Seismic option package: Customers can order Andrew shelters that will meet IBC 2000 Seismic Option code requirements. For states adhering to IBC 2000, this option is necessary if the shelter site is in a location with mapped spectral response acceleration greater than 50%g. The Andrew IBC 2000 Seismic Option package guarantees that Andrew-manufactured equipment shelters will meet or exceed all the new code requirements, up to the maximum mapped spectral response acceleration of 300%g.

800-DIAL-4-RF; fax 708-349-5444
www.andrew.com
rose.wolski@andrew.com

New Products

Sound cards
Digigram

VXpocket440 and VXpocket v2: The VXpocket 440 features four balanced analog inputs at microphone or line level, four balanced analog outputs, one stereo SPDIF input and output accommodating direct digital transfer, and an LTC (SMPTE) time-code input. Also provided is a breakout cable with XLR connectors, phone (CINCH) connectors, and a mini-plug headphone output. The VXpocket 440, like its companion VXpocket v2 stereo card, offers 24-bit performance with PC applications using Microsoft's WAVE protocol, as well as PC and MAC applications using ASIO. Enhancements for the VXpocket v2 include new cable that adds a connector for a headphone output and the inclusion of free SFX software. Stage Research has produced a basic version of its SFX software that works exclusively with the VXpocket v2. The software is included on the VXpocket installation CD-ROM.

703-875-9100; fax 703-875-9161
www.digigram.com; input@digigram.com

New Products

Power protections
MGE UPS Systems

Pulsar Ellipse: Available in power ratings from 300VA to 1200VA, these units have enough battery power to keep PCs running for 10 to 60 minutes or more. Microprocessor controlled charging extends battery life up to 50 percent, while smart battery management assures advanced warning when batteries need replacement. All models include smart communication capabilities that protect data in all major operating platforms in the event of an extended power outage. USB-equipped Pulsar Ellipse models rated at 300, 500 and 800VA feature integration with Windows 2000. Software for USB-based Macintosh computers is also available. Ellipse models in 500, 650 and 1200VA ratings use an RS-232 port that allows communication with Solution-Pac software for Windows 95, Windows NT, Red Hat Linux, Novell NetWare, SCO UNIX and Unixware. Additional features ensure maximum protection for all connected equipment.

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

Microphones
Audio-Technica

30 Series: Three models comprise the 30 Series: the AT3035 large-diaphragm side-address cardioid condenser microphone, and the AT3031 cardioid and AT3032 omnidirectional small-diaphragm condenser microphones. The AT3035 has a fixed cardioid polar pattern and features a flat, extended frequency response (20Hz to 20kHz); SPL handling capability of 148dB (158dB with the 10dB pad); and an element yielding low self-noise (12dB SPL). The AT3035 requires 11V to 52V phantom power and has a switchable low-frequency roll-off (at 80Hz, 12dB/octave). The AT3031 cardioid condenser and AT3032 omni condenser microphones offer a frequency response of 30Hz to 20kHz; SPL handling capability as high as 148dB (158dB with the 10dB pad); 48V phantom power operation; and a switchable roll-off (at 80Hz, 12dB/octave).

330-686-2600; fax 330-686-0719
www.audio-technica.com; pro@atus.com

New Products

Product update
Dalet Digital Media

TeamNews: Fast-Talk's Phonetic Preprocessing Engine (PPE) and Phonetic Search Engine (PSE) have been incorporated into Dalet TeamNews, the digital content factory. Fast-Talk's phonetic preprocessing engine will enable Dalet customers to pre-process live feeds and digital audio/video to create a searchable phonetic track. Using the phonetic search engine, customers can search processed media to find words, phrases and quotes without the need to first convert audio into text. Using Fast-Talk's Phonetic Search Engine technology, customers can search at more than 36,000 times real-time (10 hours in one second) to find what's needed more quickly and accurately.

212-825-3322; fax 212-825-0182
www.dalet.com; sales@us.dalet.com

Digital audio recorder
Nagra/Castlewood Systems

▲ **NAGRA-V:** Developed to replace its analog reel-to-reel recorders, the NAGRA-V incorporates Castlewood's ORB 2.2GB ultra high-speed removable cartridge drive for a faster, easier, lower-cost recorder that helps achieve industry-wide compatibility. The NAGRA-V records just once to the Castlewood ORB drive, at a transfer speed that is four times faster than DVD. Production sound recordists can record more than two hours of 24-bit digital audio recorded at 48kHz sampling frequency. Castlewood's ORB drive provides the highest storage capacity at the lowest cost per megabyte. The ORB offers one-step recording, 10 times faster recording than optical and 2.2GB capacity. The ORB was developed specifically for MAC and PC products.

615-726-5191; fax 615-726-5189
www.nagra.com; contact@nagra.com

New Products

Multitone analyzer
NTI (Neutrik Test Instuments)

RT-2M: This multitone analyzer may be integrated in network administration systems and can be remote controlled. The RT-2M allows the testing and quality control of audio program channels while on air. The short (160ms to 960ms) multitone burst may be used as time tone, or be inserted into the program for minimum notice ability. Multitone testing with RT-2M gives the broadcast engineer complete performance tests with plots of level, distortion, noise, phase and crosstalk vs. frequency. The transmitting and receiving Rapid Tests handle the 50mu pre-emphasis and de-emphasis required by the CCIR standard. Test signals are resistant against enhancement and compression. The receiving RT-2M device captures, stores and sends back the test results to the transmitter where data is analyzed.

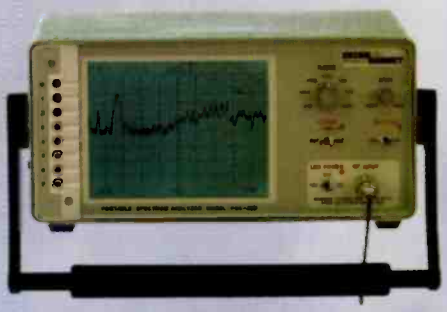
800-661-6388; fax 514-344-5221; www.nt-instruments.com; info@nt-instruments.com

Logger control software
Eventide

◀ **ArchiveReview:** Now, original archive media recorded on an Eventide logger can be searched and played off-site with neither a physical connection to the recorder nor the need to rerecord the data to analog audio tape or digital PC format. This new software also eliminates the need to own expensive and bulky play-only logging recorders. Original archives recorded on an Eventide logger are virtually tamper-proof. ArchiveReview software, in combination with the appropriate DVD-RAM or DDS archive drive, can be installed in any PC or laptop computer. It looks and loads like other Windows-based programs and requires a minimal amount of hard disk space. Eventide supplies an optional foot control that works with ArchiveReview and the user's choice of word processor to facilitate the transcription of programming archives.

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

Satellite spectrum analyzers
AVCOM of Virginia



▲ **PSA-45 series:** These spectrum analyzers are redesigned to incorporate a high contrast LCD display and battery power in an 8 pound package. Frequency coverage is 950MHz to 1450MHz (L-band); selectable LNB power (+12V/off/+18V) is provided through the input connector. The series includes two models: the PSA-45A and PSA-45B. The PSA-45A was designed for the inexperienced technician, with fixed span (950MHz to 1450MHz). The power switch and LNB power selector (+12V/off/+18V) plus soft keys for backlight and contrast adjustment are the only controls. The PSA-45B adds adjustable span and center frequency tuning. Amplitude can be displayed in dBm or dBmv. A ride peak function tracks peak amplitude; manual cursors allow non-peak amplitude measurements. The AC power supply accepts 85VAC to 264VAC.

804-794-2500; fax 804-794-8284
www.avcomofva.com
sales@avcomofva.com

New Products

Product upgrades
RCS

Selector XV and Linker XV: These products are significant new version releases of two products used throughout the world of radio programming, Selector and Linker. The upgrades are called Selector XV and Linker XV. The success of Linker promo scheduling has paralleled the growth of Selector music scheduling. Applying Selector-like rules to liners, promos and jingles came as a result of Selector users wanting the same tools to manage the promo and sales liners. Selector XV and Linker XV share a common interface and integration. Some of the newest enhancements in both programs include newly designed quick Windows navigation, increased capacity, customizable browses, drag and drop editing & clock construction, packets with names, chart editor and instant analysis in policy.

914-428-4600; fax 914-428-5922; www.rcsworks.com; info@rcsworks.com

Mic processor
Helicon Vocal Technologies

Voice Prism Plus: A full solution vocal processor for stage and studio, the Voice Prism Plus features Voice Modeling technology. Voice Modeling is essentially realtime resynthesis and reshaping of the human voice. It offers a variety of ways in which to process the vocal input, including the ability to add breath, growl, rasp, head and chest resonance, inflection or vibrato. The VoicePrism Plus provides Voice Modeling features for the lead vocal channel, and a full range of effects, harmony and backing channel vocal processing under preset control for subtle to extreme vocal processing. The VoicePrism Plus also provides the ability to go directly from a phantom powered mic into its 48V mic preamp to access any of the onboard processes. Inputs and outputs include ¼" analog, 24-bit AES/EBU and S/PDIF digital I/Os.

805-373-1828; fax
www.tc-helicon.com
info@tcelectronic.com

Connectors
Switchcraft

HP75BNC Series: These BNCs are true 75Ω, designed for the broadcast industry, or wherever true 75Ω BNC connectors are needed. Made of high-quality machined brass, with 50MI gold-plated center pins, they meet the most demanding requirements for 75Ω BNC connectors. The HP75BNC Series is available in seven different configurations for the most popular cable sizes and types. All can be terminated with standard BNC crimping tools.

773-792-2700; fax 773-792-2129
www.switchcraft.com sales@switchcraft.com

Internet access partnership
Simpleaccess.net

Radio Revenue: The primary objective of this program is to provide radio stations across the nation a way to privately brand Internet access. This is accomplished by combining the services offered by SimpleAccess.net with the advertising vehicle of American radio. SimpleAccess.net is a wholesale provider of dial-up Internet access. The program would require each company to provide a resource; the radio stations role is to solicit its listener base and SimpleAccess.net's role is to provide the service. (Internet access, customer service, technical support, billing and sales.) The goal of SimpleAccess.net is to be invisible to the end-user/listener; the radio station will be able to privately brand the service with their name. SimpleAccess.net will provide the service and the support, but the radio station will get the credit, brand recognition and a piece of the revenue.

480-325-4342; fax 480-860-0800
www.4radio.net

New Products

Racks
Raxxess

ROTR series: Available in 35 rack spaces, the Captive ROTR rack consists of a rollout 22-inch deep rack frame on four-inch casters and a 16-gauge welded steel housing. A ball-bearing swivel base sits between the caster base and the reinforced 12-gauge rack frame, allowing 90-degree rotation when the rack frame is at full extension. Heavy-duty 28-inch full-extension telescoping sliders allow the rack frame to move smoothly in and out of the housing. The three-inch wide cable passage cutout in the roof combined with ample cable tie-off points in the rack allow for easy cable management. The racks are available in two (ROTR-2) or four (ROTR-4) slide formats capable of supporting 150 and 300 pounds, respectively. The rack extends twenty inches from its frame and can rotate 90 degrees in either direction. The system locks in the closed position with security panel and screws provided. A cable management system and an eight-space rear rack rail are included.

800-389-RAXX; fax 973-523-5106
www.raxxess.com; sales@raxxess.com

Mic arm and riser
O.C. White

▶ **51900 Deluxe Series UltraFlex:** This series combines the spring-counterweighted 14194 mic arm with a 12-inch riser, providing height, reach, and flexibility, and allows placement of other studio equipment up to 10.5 inches high immediately adjacent. These arms are squeak-free for ultimate on-air performance. 51900 Deluxe mic arms offer exceptional quality, durability and holding power. Heavy-duty springs for larger mics are optional.

413-289-1751; fax 413-289-1754; www.ocwhite.com

Distribution amp
SBS

FlexDA: This unit offers four inputs, sixteen outputs and a flexible routing system in a 1RU package. It is designed to distribute audio sources to multiple loads, each of which may be balanced, unbalanced, mono or stereo. The four inputs have individual front panel gain controls, and drive audio present LEDs for at-a-glance monitoring of signal status. Each output may be individually assigned to any of the inputs, or to one of two internal mix buses. These capabilities allow the FlexDA to operate in standard configurations as well as more unusual situations. The extra pair of inputs allows dual stereo operation, and the user can choose exactly how many outputs are assigned to each source. Inputs (on female XLR-3) and outputs (on male D-type connectors) are electronically balanced and may be individually unbalanced without affecting their level.

+44 14244 45588; fax +44 12424 43388
www.sbsfm.com; sales@sbsfm.com

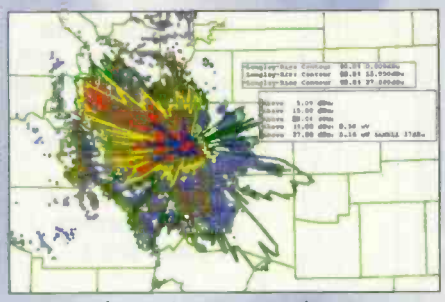
New Products

Plug-in
Waves

L2 Ultramaximizer: This plug-in offers an increased digital resolution wordlength-reduction system with ninth-order noise shaping, which can increase the perceived sound by as much as 18dB. For example, when you start with original sources of 20 bits or more, 16-bit and 20-bit masters may have the perceived sound quality of 19-bit and 23-bit signals. Features include 48-bit processing; sampling rates up to 96kHz; the brick-wall look ahead peak limiter from the Waves L1 software processor; Waves' IDR (Increased Digital Resolution) wordlength-reduction technology (two types of dither and seventh-order noise shaping); and Waves' ARC (Auto Release Control) technology for dynamically controlling release times for maximum level with minimum artifacts.

865-546-6115; fax 865-546-8445
www.waves.com

System design software
SoftWright



Terrain Analysis Package software v4.4: The upgrade pricing for the latest version of the Terrain Analysis Package Software (TAP) for RF system design (version 4.4) has been simplified. Users running version 4.3 will incur a minimal cost to upgrade to 4.4. It is not a function of how many modules a user has. TAP software allows users to have their own radio system design tools in-house. New features include: page layout scale and legend—with the ability to include a scale and a legend of field strength values; autodraw and autoprint—enables users to queue multiple studies to run and send the coverage maps to the default printer; pin function on profiles—users can select locations and mark them with the coordinates and a descriptive label; and boundary filter—enables users to exclude unnecessary information from your plot, resulting in faster plotting.

303-344-5486; fax 303-344-2811; www.softwright.com; sales@softwright.com

Correction

The November 2001 Trends in Technology had outdated information for the products offered by RCS. The updated information appears below.

RCS • www.rcsworks.com
MasterControl • Audio Hardware: Digigram
OS: Windows 2000 • Network OS/Protocol: TCP/IP

RCS Master Control now features Internet Voice Tracking, a patented process allowing talent to run shows from any location over the Web. Also, Real-Feel studio voice tracks, a log-linked Web browser, dayparted hot keys and the Living Log with direct access to/from Selector Music Scheduling are all standard in Master Control.

BE Radio GALLERY

BE Radio CLASSIFIED

PROFESSIONAL SERVICES

FOR SALE

MISCELLANEOUS

PUBLICATIONS

A PRIMEDIA Publication

BE Radio
The Radio Technology Leader

www.beradio.com
beradio@primediabusiness.com

Editor – Chriss Scherer, CSRE, *cscherer@primediabusiness.com*
Technical Editor, RF – John Battison, P.E., *batcom@bright.net*
Associate Editor – Cindy Holst, *cholst@primediabusiness.com*
Sr. Art Director – Michael J. Knust, *mknust@primediabusiness.com*
Assoc. Art Director – Robin Morsbach, *rmorsbach@primediabusiness.com*

Technical Consultants – Harry C. Martin, *Legal*
Kevin McNamara, CNE, *Computers and Networks*
Mark Krieger, CBT, *Contract Engineering*
Russ Berger, *Broadcast Acoustics*
Donald L. Markley, P.E., *Transmission Facilities*
Yasmin Hashmi, *International Correspondent*
Stella Plumbridge, *European Correspondent*

Vice President – Peter May, *pmay@primediabusiness.com*
Publisher – Dennis Triola, *dtriola@primediabusiness.com*
Marketing Director – Patti McKenna, *pmckenna@primediabusiness.com*

Vice President, Production – Thomas Fogarty, *tfogarty@primediabusiness.com*
Sr. Director of Production – Curt Prodes, *cprodes@primediabusiness.com*
Group Production Manager – Freda Vickers, *fvickers@primediabusiness.com*
Ad Production Coordinator – Natasha Franz, *nfranz@primediabusiness.com*
Classified Ad Coordinator – Mary Mitchell, *mmitchell@primediabusiness.com*

VP, Audience Development – Christine Oldenbrook, *coldenbrook@primediabusiness.com*
Circulation Director – Susi Cordill, *scordill@primediabusiness.com*
Circulation Manager – Gayle Grooms, *ggrooms@primediabusiness.com*

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

Member, American Business Media — Member, BPA International

PRIMEDIA
Business Magazines & Media
Chief Executive Officer – Timothy M. Andrews, *tandrews@primediabusiness.com*
President – Ronald Wall, *rwall@primediabuseinss.com*
Chief Operating Officer – Jack Condon, *jcondon@primediabusiness.com*
Sr. Vice President, Business Development – Eric Jacobson, *ejacobson@primediabusiness.com*
Sr. Vice President, Integrated Sales – Dan Lovinger, *dlovinger@primediabusiness.com*
Vice President, Content Licensing & Development – Andrew Elston, *aelston@primediabusiness.com*
Vice President, Corp. Comm. – Karen Garrison, *kgarrison@primediabusiness.com*
Vice President, Marketing – Kristin Zhivago, *kzhivago@primediabusiness.com*
Vice President, New Media – Andy Feldman, *afeldman@primediabusiness.com*

PRIMEDIA Business-to-Business Group – 745 Fifth Ave., NY, NY 10151
President & Chief Executive Officer – David G. Ferm, *dferm@primedia.com*
Chief Creative Officer – Craig Reiss, *creiss@primedia.com*
PRIMEDIA Inc.
Chairman & Chief Executive Officer – Tom Rogers, *trogers@primedia.com*
Vice Chairman & General Counsel – Beverly Chell, *bchell@primedia.com*
President – Charles McCurdy, *cmcurdy@primedia.com*

BE Radio, Volume 8, Number 1, ISSN 1081-3357 is published monthly (except semi-monthly in August) and mailed free to qualified recipients by PRIMEDIA Business Magazines & Media Inc, 9800 Metcalf, Overland Park, KS 66212-2215 (primediabusiness.com). Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canadian Post Publications Mail Agreement No. 40597023. Current and back issues are and additional resources, including subscription request forms and an editorial calendar are available online at beradio.com.

SUBSCRIPTIONS: Non-qualified persons may subscribe at the following rates: USA and Canada, one year, $45.00. Qualified and non-qualified persons in all other countries, one year, $60.00 (surface mail), $100.00 (air mail). Subscription information: P.O. Box 12937, Overland Park, KS 66282-2937.

ARCHIVES & MICROFORM: This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, LexisNexis, and Proquest. For microform availability, contact ProQuest at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at proquest.com.

POSTMASTER: Send address changes to ***BE Radio***, P.O. Box 12960, Overland Park, KS 66282-2960.

REPRINTS: Contact Reprint Management Services (RMS) to purchase quality custom reprints or e-prints of articles appearing in this publication at 866-268-1219, ext. 100 (717-399-1900 outside the U.S. and Canada). Obtain quotes and place orders online at reprintbuyer.com or send e-mail to primediabusiness@rmsreprints.com.

PHOTOCOPIES: Authorization to photocopy articles for internal corporate, personal, or instructional use may be obtained from the Copyright Clearance Center (CCC) at 978-750-8400. Obtain further information at copyright.com.

MAILING LISTS: Primedia Business makes portions of our magazine subscriber lists available to carefully selected companies that offer products and services directly related to the industries we cover. Subscribers who do not wish to receive such mailings should contact the Primedia Business subscriber services at 800-441-0294 or 913-967-1707.

CORPORATE OFFICE: Primedia Business Magazines & Media, 9800 Metcalf, Overland Park, Kansas 66212; 913-341-1300; primediabusiness.com.

Sales Offices

NATIONAL SALES DIRECTOR
Steven Bell
9800 Metcalf Avenue
Overland Park, KS 66212-2215
Telephone: (913) 967-1848
Fax: (913) 967-7249
E-mail: sbell@primediabusiness.com

EUROPE/UK
Richard Woolley
P.O. Box 250
Banbury, Oxon OX16 5YJ5
Telephone: +44 1295 278 407
Fax: +44 1295 278 408
E-mail: richardwcolley@compuserve.com

CLASSIFIED ADVERTISING
Jennifer Shafer
Telephone: (800) 896-9939
(913) 967-1732
Fax: (913) 967-1735
E-mail: jshafer@primediabusiness.com

LIST RENTAL SERVICES
Lisa Dinkel
Telephone: (913) 967-1872
Fax: (913) 967-1897
E-mail: ldinkel@primediabusiness.com

EDITORIAL REPRINTS
Reprint Management Services
Telephone: (866) 268-1219, ext. 100 or (717) 399-1900
Fax: (717) 399-8900
E-mail: intertec@rmsreprints.com

Contributor Pro-file

Meet the professionals who write for BE Radio. This month: Managing Technology, page 10.

William Harrison Jr.
Manager of Web Technology
WETA-FM and WETA-TV
Arlington, VA

Harrison develops content management systems and front-end publishing code for WETA's various websites. He administers the station's Web and streaming audio servers, develops automated encoding and publishing systems, plans bandwidth usage and management, and tracks site and audio stream traffic. Other projects for WETA include developing a bulk e-mail solution for electronic newsletters and a Web-based calendar system.

Advertiser Index

Advertiser	Page Number	Advertiser Hotline	Advertiser Website
360 Systems	24	818-991-0360	www.360systems.com
Acoustics First	63	888-765-2900	www.acousticsfirst.com
Acoustic Systems	38	800-749-1460	www.acousticsystems.com
AEQ	37	954-424-0203	www.aeqbroadcast.com
AKG Acoustics	15	615-620-3800	www.akgusa.com
Aphex Systems	23	818-767-2929	www.aphex.com
Armstrong Transmitters	19	315-673-1269	www.armstrongtx.com
Arrakis Systems	12	970-224-2248	www.arrakis-systems.com
Arrakis Systems	36	970-224-2248	www.arrakis-systems.com
Arrakis Systems	61	970-224-2248	www.arrakis-systems.com
ATI- Audio Technologies	70	800-959-0307	www.atiguys.com
Audioscience	56	302-324-5333	www.audioscience.com
Autogram Corporation	73	800-327-6901	www.autogramcorp.com
Broadcast Software Intl	17	888-BSI-USA1	www.bsiusa.com
Broadcast Tools	50	360-854-9559	www.broadcasttools.com
Burk Technology	19	800-255-8090	www.burk.com
Circuitwerkes	70	352-335-6555	www.circuitwerkes.com
Comrex	9	978-263-1800	www.comrex.com
Continental Electronics	49	800-733-5011	www.contelec.com
Copper Development	11	800-COA-DATA	powerquality.copper.org
Cortano Corporation	82	888-325-5336	
Creative Studio Solutions	66	303-425-5004	www.creativestudiosolutions.com
DPA Microphones/TGI NA	46	519-745-1158	www.tgina.com
Energy-Onix	62	888-324-6649	www.energy-onix.com
ESE	43	310-322-2136	www.ese-web.com
Gorman Redlich MFG Co.	72	740-593-3150	www.gorman-redlich.com
Harris	3	513-459-3400	www.broadcast.harris.com
Harris	20-21	513-459-3400	www.harris.com
Henry Engineering	66	626-355-3656	www.henryeng.com
Inovonics	60	831-458-0552	www.inovon.com
Intermax	61	314-345-1030	www.radiomax.com
Kintronic Labs	18	423-878-3141	www.kintronic.com
Klotz Digital	5	678-966-9900	www.klotzdigital.com
Lightner Electronics	72	814-239-8323	www.lightnerelectronics.com
Logitek	51	800-231-5870	www.logitekaudio.com
Mager Systems	59	623-780-0045	www.magersystems.com
Mediatouch	41	888-665-0501	www.imediotouch.com
Neumann Microphones	45	860-434-5220	www.neumannusa.com/103
Neutrik	63	800-661-6388	www.nt-instruments.com
Nott Limited	70	505-327-5646	www.nottltd.com
OMB America	25	305-477-0974	www.omb.com
Primedia Business New Media	27-34	212-204-2622	www.primediabusiness.com
QEI Corporation	54	800-334-9154	www.qei-broadcast.com
Radio Systems	39	856-467-8000	www.radiosystems.com
Ram Systems & Communications	71	800-779-7575	www.ramsyscom.com
Register Data Systems	19	800-521-5222	www.registerdata.com
RF Engineers.com	69	352-336-7223	www.rfengineers.com
RF Specialties	48	816-628-5959	www.rfspec.com
River Communication	73	800-OKRADIO	
Sierra Automated Systems	13	818-840-6749	www.sasaudio.com
Silicon Valley Pwr Amplifier	64	408-986-9700	www.svpa.com
Sine Systems	38	615-228-3500	www.sinesystems.com
Sound Devices	65	608-524-0625	www.sounddevices.com
Studio Technology	71	610-640-1229	www.studiotechnology.com
Superior Broadcast Products	57	800-279-3326	www.superiorbroadcast.com
Telex Communications	7	800-667-3968	www.telex.com
Transcom	71	800-441-8454	www.fmamtv.com
V-Soft Communications	70	800-743-3684	www.v-soft.com
Ward-Beck Systems	40-41	800-711-2566	www.ward-beck.com
Wheatstone	IFC	252-638-7000	www.wheatstone.com
Wheatstone	IBC	252-638-7000	www.wheatstone.com
Wheatstone	BC	252-638-7000	www.wheatstone.com

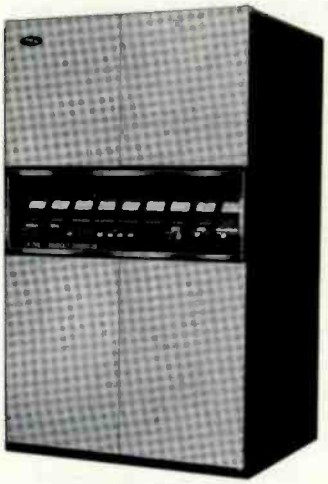
Direct links to the advertisers' websites are available at www.beradio.com.

Shaping radio today and tomorrow

By Cindy Holst, associate editor

Do you remember?

In 1972, American Electronics Laboratories, based in Lansdale, PA, advertised the new FM-12KD and FM-25KD (12kW and 25kW) FM transmitters. These transmitters boasted a two-tube design with a grounded grid final amplifier (3CX15000) and pentode driver stage (5CX1500), automatic filament voltage control, automatic power control, solid-state control circuitry, a solid-state exciter and power supplies, and VSWR protection.



The transmitter was unveiled at the 1972 NAB convention.

That was then

WHAS-AM, Louisville, KY, signed on July 18, 1922. Like most early stations, it changed frequency assignments several times, finally staying on 840. By 1932, the station was licensed for 25kW operation. In 1933, the power was increased to 50kW. In 1938, the station owners built a new transmitter site in Eastwood, KY.

The photo shows the transmitter room as it looked about the time when it was built. On the left is the Western Electric WHAS transmitter. On the right is the FM transmitter for what would become WHAS-FM. This transmitter was likely the experimental station for W9XEK at 45.5MHz. In the middle is the console for the Western Electric transmitter. WHAS, which was co-owned with Courier-Journal newspaper, experimented with transmitting an early facsimile system that would transmit the data to receiver-printers in people's homes. This transmitter, licensed as W9XWT, was behind the FM transmitter.

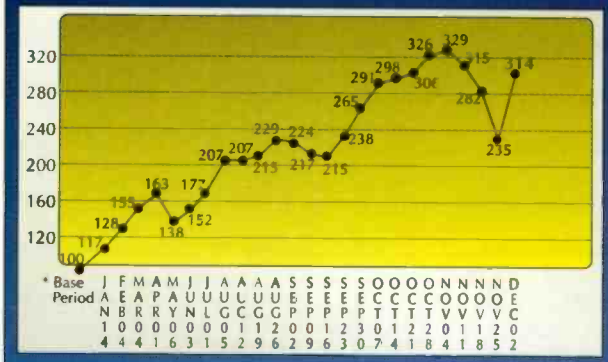
Hanging above the WHAS transmitter are the licenses of all the engineers of the station.

WHAS photos and information provided by Scott Cason. See more at www.qsl.net/wb4wsb.

SAMPLE AND HOLD

A look at the technology shaping radio

Internet radio listening continued to rise in 2001.



* the 10-week base period is an average of the weekly total time spent listening from October 30, 2000 through January 7, 2001.

** Index values are for an entire week ending on the date listed above.

Source: MeasureCast Internet Radio Listening Index 2001

Do you have information and pictures of a station from radio's early days? Tell us about it for an upcoming installment.

AUDITRONICS SERIES 2600

IT'S NEW – IT'S A BARGAIN – AND IT'S *MODULAR*, giving you any combination of mic, line or accessory modules. It's also INSTALLER FRIENDLY, with a hinged meterbridge that opens wide for direct access to connectors, trimmers and logic switches. Onboard cue and headphone amps keep you in budget. BEST OF ALL, it's **AUDITRONICS**, so you know it's **TOUGH** AS **STEEL!**

- *FULLY modular*
- *All electronic switching*
- *Separate mic & line inputs*
- *Eight or twelve input channels*
- *Two stereo Program busses*
- *Two Mono/Mix-minus busses*
- *Full-featured monitoring*
- *Twin VU meter pairs (PGM & switched)*
- *Opto-isolated control logic*
- *Built-in cue and headphone amps*

AUDITRONICS

tel 252-638-7600/fax 252-635-4857/sales@auditronics.com

Wheatstone

DIGITAL AUDIO NETWORK ROUTER

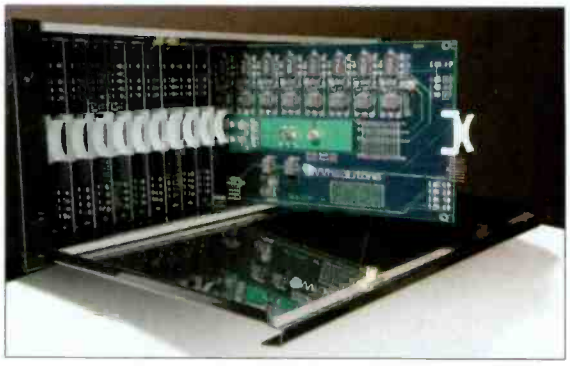
- *BI-DIRECTIONAL FIBEROPTIC OR CAT-5 INTERLOCATION CONNECTIVITY*
- *ALL DIGITAL DOMAIN AES SWITCHING*
- *ANALOG OR DIGITAL (AES SAMPLE RATE) INPUTS*
- *BOTH ANALOG AND AES DIGITAL OUTPUTS*
- *SERIAL CONTROL AND DISPLAY WITH WHEATSTONE CONSOLES*

THE 2001 MAKES AUDIO NETWORKING PRACTICAL. It's simple to install, easy to learn, and certain to reduce system costs. Compact enough for small applications, yet stackable for tremendous growth potential, it's design consists of 7"rackmount digital routing cages, each capable of handling 512 simultaneous audio channels on its backplane.

Units can be stacked to suit particular card complements (analog or digital input and output cards or optical network cards) but more significantly cages can be separated by great distances and network their audio through either bidirectional fiberoptic links or a single CAT-5 wire. ONE INTERCONNECT DOES IT ALL: 64 channels of simultaneous bidirectional digital audio, intercage communication, X-Y controller commands plus auxiliary RS-232 data streams. This single interconnect between your studio and central rackroom can save you tens if not hundreds of thousands of feet of wire in a typical installation.

The 2001's graphic based setup software is intuitive and easy to use, with all the authorization and security levels you could want. And of course we have a full complement of control panels and PC applications to choose from—all designed for straightforward operation and a rapid learning curve.

With 25 years of experience, Wheatstone has the infrastructure in place to help you build your OWN infrastructure. Contact us for answers.



MIXED SIGNAL SWITCHING is easily accomplished with a choice of AES digital or ANALOG 24-bit A>D input cards, and of course 24-bit digital or 24-bit D>A ANALOG output cards, all of which can be serviced from the front of the cage. All signals are routed entirely in the digital domain.

Wheatstone Corporation
tel 252-638-7000/fax 252-635-4857/sales@wheatstone.com