www.beradio.com October 2002

Radio™

THE RADIO TECHNOLOGY LEADER

Strong and reliable

Robust radio for today and tomorrow

Trends in Technology

Transmitters

Facility Showcase

Universal Studios Orlando

A PRIMEDIA Publication

Innovator Award Recipient - page 22

THE AMAZING LITTLE MIXER

ALM

Routes any INPUT to any FADER...

OR ANY INPUT TO YOUR MONITORS! The new ALM-12d console from Auditronics combines the benefits of a router and a console—all into one cost effective package. It's got everything you need: twelve faders plus two caller faders, four mic pre-amps and of course control room and studio monitoring, built-in cue and headphone amplifiers, and a concealed headphone jack.

It's got the high end features too, like bright LED dot matrix source displays above faders and monitor pots, and 24 bit A>D and D>A ins and outs. Its AES digital inputs have sample rate convertors so it works with virtually any digital source gear you have. It can run your source machines too—up to eight of them—all opto-isolated. It even has DSP digital metering that simultaneously displays VU columns and peak hold full scale digital so you can be assured of pristine performance. It has powerful caller tools that generate MXMs automatically, and you can program any of its four MXMs to be pre or post fader.

Digital so easy you don't install it—you CONNECT it!

And because it's **AUDITRONICS**, it's built tough as steel, and will be easy to maintain.

DIGITAL CAN BE EASY—JUST CALL AUDITRONICS!

tel 252-638-7000/fax 252-635-4857/sales@wheatstone.com
600 Industrial Drive, New Bern, North Carolina, USA. 28562

AUDITRONICS
www.auditronics.com

If you're looking for the best in digital excitement, X MARKS THE SPOT.

extreme digital... from HARRIS

Harris offers one of the world's first commercial IBOC DAB exciters, DEXSTAR. Industry insiders know that Harris is responsible for most of the innovation in radio transmission products for the last 35 years. So it should be no surprise, that Harris is also the leader in IBOC DAB products. The DEXSTAR IBOC exciter is designed by Harris engineering, built to exacting standards in the world's largest broadcast transmitter-manufacturing facility and backed by a service department, recognized the world over for quality and commitment. If you're looking for a digital broadcast solution, from beginning to end, that offers the most advanced performance and reliability, stop searching. X marks the spot for Extreme Digital from Harris.

next level solutions

SERVICE

SYSTEMS

AUTOMATION

TRANSMISSION

HARRIS

www.broadcast.harris.com • 1.800.622.0022

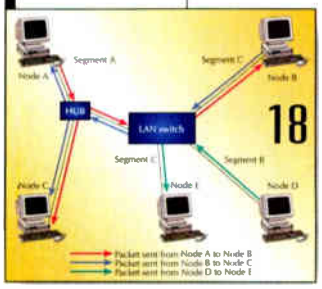
getextreme

Contents

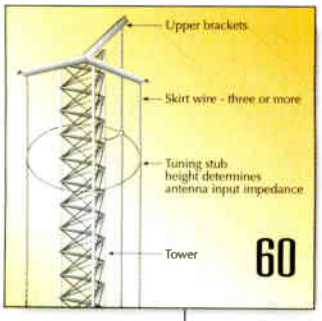
Radio™
THE RADIO TECHNOLOGY LEADER
Radio Magazine
www.beradio.com
October 2002 • Volume 8, Number 10

www.beradio.com

Features

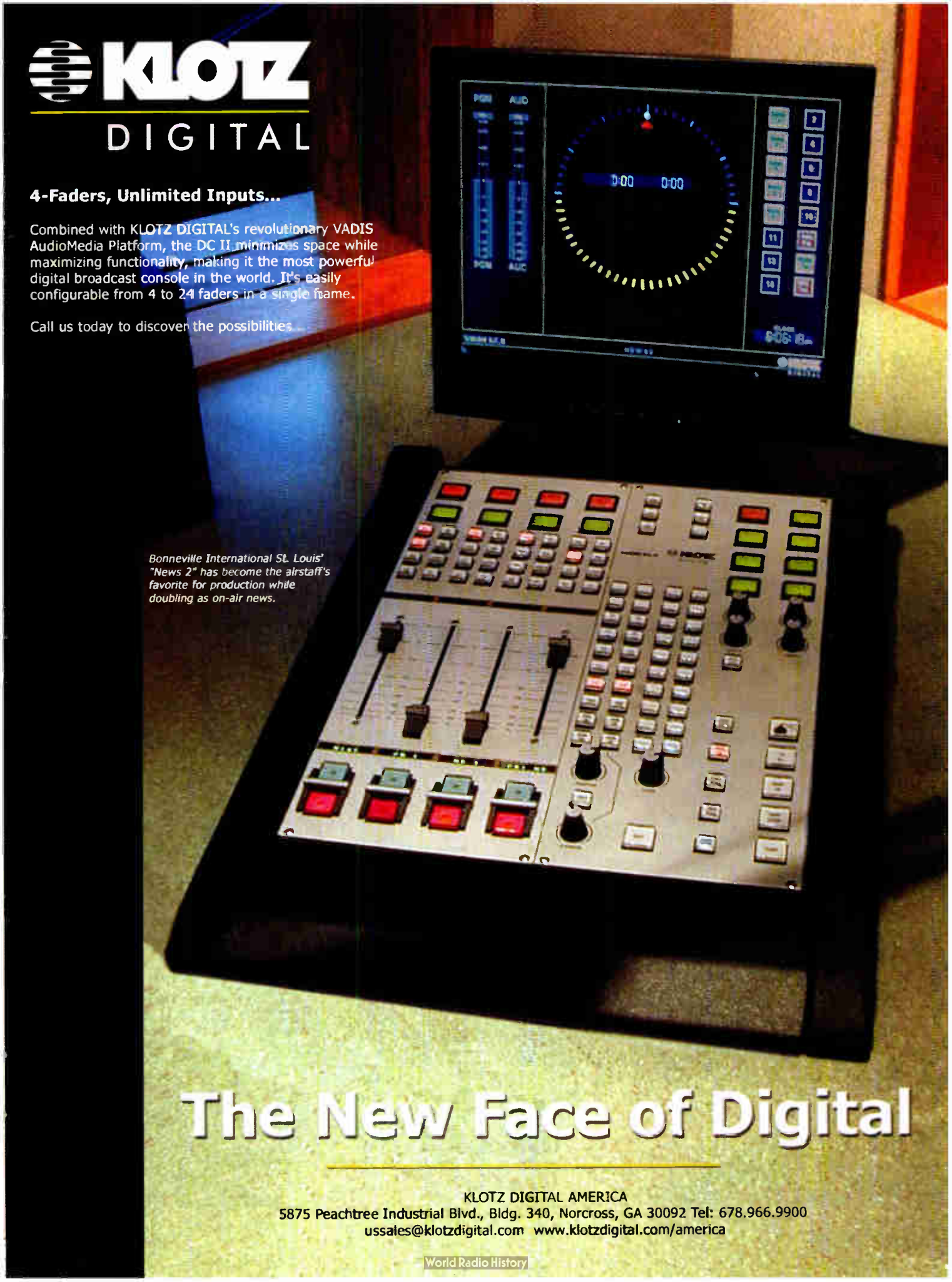


Columns



Departments

ON THE COVER:
The Richland Towers' 1,635' AGL broadcast tower in Dallas houses five TV stations, five FM stations and two communication services. Photo courtesy of Richland Towers
Cover design by Michael J. Knust.



www.beradio.com

Currents Online

Highlights of news items from from the past month

NAB Radio Sees Decline in Attendance

The final count is 3,983 attendees.

Ibiquity Adds Conversion Incentive

Stations that commit to convert by year end will have their technology licensing fees waived.

Radio One Places Harris HD Radio Order

Stations in Los Angeles, Dallas, Boston, Detroit and Atlanta will upgrade to IBOC first.

LPFMs Have One Year to Install EAS

The FCC-certified EAS decoder from TFT gives LPFMs a decoder-only option.

NRSC to Begin IBOC Standard Setting

The first step is establishing a working committee.

Pennington Re-elected SBE President

New board and officers take office in October.

Site Features

Currents Online

All the news and information about radio updated every day. Our weekly e-mail newsletter puts the headlines in your e-mail box.

Engineer's Notebook

A collection of articles from *Radio* magazine's sister publication, *EC&M*, has been assembled to cover electrical basics, and two tools to locate radio stations by ZIP code have been added.

Industry Links

Links to museums, reference material, schools, trade associations and radio history provide useful and interesting information.

Studio Spotlight

See the companion features about the Universal Studios Orlando radio installation, including a tour of the previous installation and photos of the current facilities as they were being built.

Report card

Now at its peak, the fall convention cycle brings learning opportunities closer to you through many regional conventions and expos. I am invited to many of these events and make every effort to go to as many as I can, but attending all of them is nearly impossible.

Preceeding the regional convention wave, one national convention, the NAB Radio Show, was held last month in Seattle. For me, every convention carries a set of standard questions that I hear after the show. The first is usually, "how was the show?"

I have to say that that it was a good show. There were some new product introductions, and I had a chance to begin developing some upcoming articles that will become Field Reports and Facility Showcases.

The big discussion on the show floor and in many sessions was IBOC. Exhibitors that are not directly involved with IBOC development are showing an interest. Attendees who have not been following the subject closely for the past several years were trying to catch up with the technology. For many, this knowledge of what is on the horizon does not help them do their daily jobs. Many take the approach of "I'll wait until it's a standard and I have to implement it, instead of learning and unlearning information and details now." The time is now. If you need to get the basics, read *How it Works* in the August 2002 issue. Ibiquity even distributed copies of our August issue in their booth because of that article.

I also looked at the latest information about the Arbitron Portable People Meter (PPM) project. Data comparing the paper diaries and the PPM results were distributed to show that the new method is viable and accurate.

Streaming as a topic was almost nonexistent this year. Thanks to the rulings and royalties imposed over the last year, most attendeeds considered it a dead issue. Two notable items were that netcasting pioneer KPIG has adopted a subscription service for its webcast and WRAL is working with a system (that is actually rather low-tech when examined) to permission listeners only within the station's coverage contour. Neither of these items is ground-breaking.

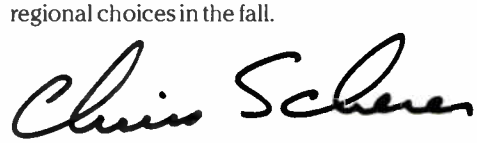
For an exhibitor, a successful show is gauged by the amount of traffic and how this traffic yields sales leads. It's strange that many exhibitors seemed to feel that the attendance was higher than it was last year. In reality, the show floor was smaller, and the NAB reported attendance at 3,983. Compare this to 5,227 at the Radio Show in New Orleans last year. Many exhibitors had low attendance expectations going into the show, so any reasonable showing was a good thing.

For an attendee, the sessions provided several great learning opportunities. While the show floor was not bursting with new products, there was plenty of technology being shown. Because of the lower attendance, attendees had a better chance of spending quality time with an exhibitor without interruption or without having to fight a crowd.

What's the future of the NAB Radio Show? Following the end of the World Media Expo, the Radio Show had promise of being an ongoing success. This success only lasted the first two years (1997 and 1998) and has since faltered.

Some suggested that the Radio Show should be terminated and completely rolled into the spring convention. I disagree. Radio needs its own convention. The spring convention covers so many elements that traditional broadcasting itself, let alone radio, is only a small part. The fall makes sense for timing to separate it from the spring show, but it is proving to be a hard task for the NAB to pull off. Many exhibitors are not able to financially justify exhibiting. Increasing costs for exhibit space and drayage cannot be offset by resulting sales. Consolidation and station budget cuts result in fewer attendees.

I'm looking forward to Philadelphia next year. I think the location offers several advantages for both attendees and exhibitors. Unfortunately, if next year's show continues its downward trend, we may be left with nothing but the regional choices in the fall.



Chriss Scherer, editor
cscherer@primediabusiness.com

Send comments to: **E-mail:** *beradio@primediabusiness.com*
Fax: *913-967-1905*

All the world's your studio!

Good Day USA's Doug Stephan broadcasts from anywhere — with Comrex.

"I've owned most of the Comrex products on this shirt, including the Matrix, which I use to broadcast from my favorite studio — my farm."

Doug Stephan,
Host, *Good Day USA.*

From London to LA, from Moscow to his Massachusetts farm, talk show host Doug Stephan never goes anywhere without his Comrex codec. "Since my first STLX in 1986, I've relied on Comrex equipment to deliver high-quality broadcasts from my local studios and remote sites worldwide."

A constant traveler, Doug and his morning show co-hosts are rarely in the same state, let alone the same studio. Using Comrex equipment they can broadcast from any spot on the planet and sound like they're all sitting together. With Comrex in your lineup, broadcast from anywhere and sound great everywhere.You can bet the farm on it.

Let Comrex help you broadcast from anywhere. And we'll give you the shirt off our back.

Mail us the warranty card from the purchase of your next Blue Box, Matrix, Vector or Nexus. We'll send you a handsome Comrex shirt like the one Doug is wearing (retail value $65) FREE. Plus, we'll extend your warranty to two years. Act now. No matter where you are.

For a dealer call 800-237-1776 or visit www.comrex.com

BLUEBOX

MATRIX

VECTOR

NEXUS

COMREX

19 Pine Road, Devens, MA 01432 USA
Tel: 978-784-1776 • Fax: 978-784-1717 • Email: info@comrex.com

The art of the contract

By Mark Krieger, CBT

While everyone recognizes the fundamental purpose and principles behind contracts, it is a topic rarely discussed on the engineering side of broadcast radio. This is an unfortunate lapse, considering the variety of contracts most engineers draft and endorse during their careers. What constitutes the nuts and bolts of an effective contract in a broadcast engineer's context?

Dispelling myths

There are a couple of common fallacies about contracts. Chief amongst these is that only written contracts are enforceable. Not so. Offers made and accepted verbally or in written form (letters, notes or e-mails) may constitute a contractual agreement and could come into play should litigation later arise. Having a specific written contract that confines both parties to the terms within it will avoid this pitfall. Be careful and precise regarding your promises and requirements, while paying close attention to your client's expectations in return—and put it in writing.

Contracts are designed to protect the interests of the parties involved.

Another dangerous misconception is that a good lawyer will find a way to remedy a disagreement after entering into a poorly written contract. While this is a possibility, it invariably becomes a question of how much it's going to cost. A contract is a legally binding agreement between two parties, and any misunderstandings or vague terminology at the signing will remain for the duration. Thus, the time to get legal advice is before, not after the damage is done.

In the end, every contract is about protecting the vital interests of both parties. An ethical businessperson should take every step necessary to do just that when writing a contract.

The main ingredients

Every contract an engineer writes or signs should contain some basic elements. First is a list of the goods and services he commits to providing to the client. This would cover quantity and quality. For example, the engineer might agree to handle maintenance for a remote transmitter facility. Among the issues that need to be addressed is exactly what systems or pieces of equipment he will be responsible for maintaining. If an ac disconnect switch burns up, taking the transmitter off the air, is he responsible for replacing it or is the client obligated to provide an electrician to perform the service, including all outlets and service disconnects? If an engineer agrees to supply parts, he may want to stipulate that he will provide OEM items at invoice, plus a certain markup percentage. Of course, the minimum and maximum hours of service he will provide under the heading of routine maintenance should also be clearly defined. What kind of reports will the engineer provide? A good maintenance contract will spell these things out.

Another important element of the contract is delivery time frames for goods and services rendered. Some engineers tend to minimize in this area, believing that if they don't specify schedules, they can't be held to them. While vague language may buy the engineer a certain amount of flexibility, it can also bring problems. The law provides for certain standards of timeliness as deemed professionally appropriate. If a client believes that the service was inappropriately slow and the contract doesn't clearly specify those terms, they may have some legal basis for litigation. It is best to specify some mutually agreeable range of parameters.

Payment rates and methods should also be unambiguously specified. Otherwise, the engineer may have completed a project for a client, only to find that the client wishes to pay them with barter items.

Designate a particular individual who will serve as the point of contact with the client. This person should be responsible for evaluating work performed, authorizing purchases or additional expenses, and providing you with all necessary information and feedback from that client. Furthermore, the engineer should define his status as an independent contractor, including his qualifications and capabilities, as well as a basic description of what tools and specialized equipment he will (or won't) provide. Suppose a problem develops and a TDR

or spectrum analyzer is needed to diagnose the problem. Who will be responsible for the rental costs? Putting it in writing will eliminate these potential problems.

Finally, there are issues of indemnification to address. Both sides need to be protected; the client from damages and claims resulting from the engineer's errors, negligence or omissions and the engineer, from damages, fines or losses resulting from the client's failure to act on recommendations or information he provided. In addition, the engineer should provide a statement regarding his liability insurance policy. Include something known in legal-speak as a force majure clause, which is a statement that acknowledges the possibility that forces beyond the engineer's or the client's control, such as terrorism or acts of god, may serve to excuse the engineer from what would otherwise be considered as a timely execution of the contract's provisions.

Resources

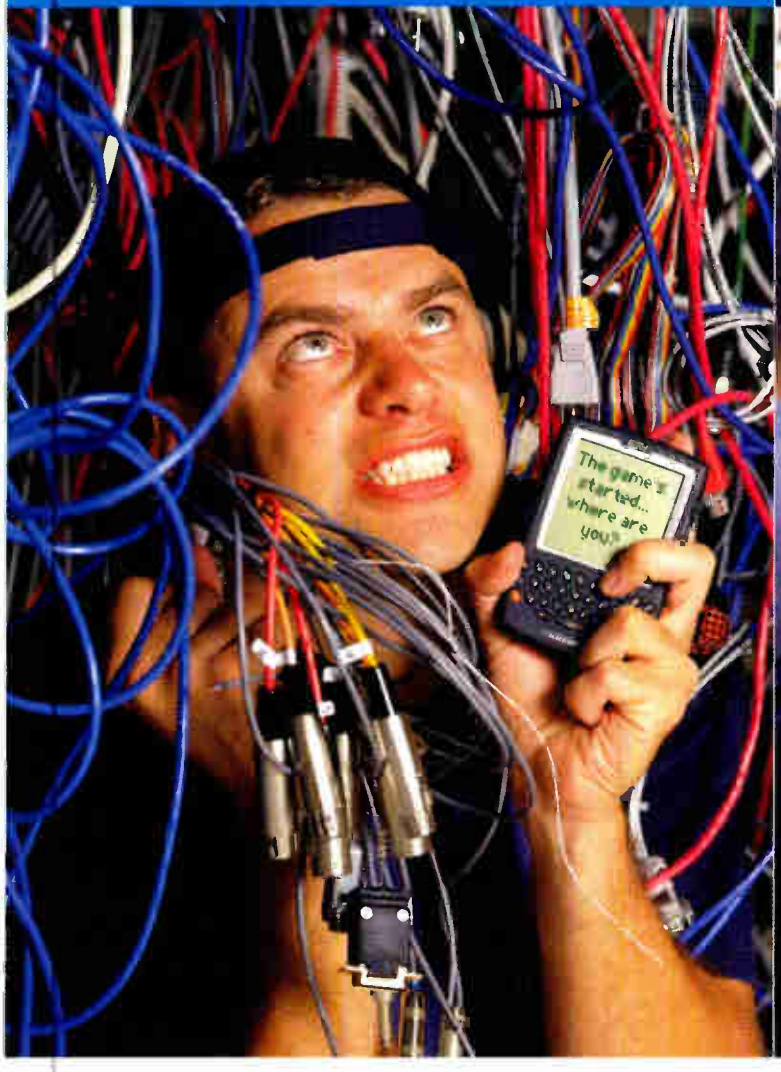
Remember that because every job is different, every contract may have some unique clauses that address the special needs of both parties. In some cases, the engineer will be called on to assume all engineering duties for a station. Naturally, this will necessitate a somewhat broader contract. A sample contract is available through the SBE at no cost to SBE members. Although not intended for use as is, the SBE sample contract makes a great template for the engineer, the client and the attorney to work from.

If you don't have an attorney already, it's time to find one. The cost of having a contract reviewed can vary, depending on the attorney's hourly rate and the complexity of the document, from as little as $200 to $1,000 and up. It's a smart investment, especially if you think of it as legal preventative maintenance.

Krieger, Radio's consultant on contract engineering, is based in Cleveland and can be reached at mkrieger@drfast.net.

Trapped at the station?

You need iMediaTouch.



Is your digital audio delivery system keeping you from the big game?

Since 1984, over 500 radio stations around the world have trusted iMediaTouch broadcast automation software. With a host of award winning features designed to save both time and resources without breaking the bank, the iMediaTouch digital audio delivery system is easy to use and dependable time after time.

iMediaTouch broadcast automation software.
Big market dependability. Small market affordability.

iMediaTouch

To find out more call us
Toll Free 888 665 0501 or visit www.omt.net

omt technologies

Multitenant towers

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

As wide-open areas suitable for tower erection decrease in availability, vertical real estate is becoming increasingly attractive to potential broadcasters. The use of somebody else's tower can be attractive, but before rushing into a contract with an existing tower owner, consider all the problems that can occur as well as the FCC requirements and rules.

Adequate and comprehensive insurance is essential. There must be no question as to liability of the landlord or of the tenant in the event of catastrophe attributable to technical operation.

From an existing tower owner's point of view, renting space may offer an opportunity for tax write-offs by donating tower space to religious broadcasters and other charitable institutions. When properly handled, it might turn the engineering department into a profit center. This would earn the respect and appreciation of the general manager who would be pleasantly surprised to see money flowing into the engineering department instead of out.

Urban growth and an increased need for vertical space has made tower space more valuable. In addition, most communities frown on building new towers despite the increased need.

On the other hand, a new station might find leasing space on an existing tower to be preferable to a large capital expenditure. Lease renewal options are important and long-term leases are essential for stability. If you had difficulty finding a suitable site in the first place, it is not likely that any more suitable sites will become available as time passes. On the contrary, normal industrial and urban growth will continue to consume open areas, and FAA and zoning restrictions are likely to become more difficult as time passes. These factors can only increase the value of a tower.

A 20-year lease with renewal options would be ideal, but is not always possible. There is nothing worse for a licensee than to have his antenna site taken from him. I recall the case of a station with a four tower, widely-spaced rectangular array on land that used to be a desert. The land suddenly became valuable as a potential mall. The original lease had an option to renew but there was no price protection. As a result the station went dark and the mall was built.

What can happen if an existing AM operator is preparing to rent space on his tower to an FM broadcaster? This situation is fraught with complications if the AM general manager and his chief engineer do not sit down and prepare a list of technical problems that must be solved and completely covered in the contract. The general manager and the station's attorney must also draft a satisfactory and comprehensive lease. At this point, the chief engineer should be involved in all the technical requirements. If this procedure is followed there should be no difficulty in consummating a satisfactory tenancy.

Responsibilities

Responsibility for tower lighting is often the cause of FCC violations. Proper understanding of the new tower registration requirements and the divisions of responsibility for lighting in the Commission' s new rules should eliminate confusion.

A large amount of money will be spent adapting the AM tower to carry the FM radiator. Isolating the tower and feeding the new FM antenna can be accomplished by using an isolating coil or converting to a grounded folded unipole radiator. The former method is less costly, but the latter provides the possibility of added revenue without further expense, if the tower can support additional radiators.

Provided that the tower can support the additional antenna and the weight and wind loading of a folded unipole, the grounded tower is optimal because lightning problems should be greatly reduced, signal improvement may be noticed and the potential exists for additional tenants without the need for any additional antenna changes.

Another important point that can be overlooked is "down time." The FCC requires that non-ionizing radiation be reduced or eliminated during work on antennas and towers. This means completely shutting down all transmitters or operating with reduced power.

The AM transmitter will have to be powered down while the AM tower changes are being made. Who will pay for this lost time? Converting to a folded unipole will take longer and require even more down time. Installing the FM antenna and transmission line can be performed while adding the folded unipole.

If another AM station is to be added to the existing

Introducing

cool edit | pro 2.0

- 128 stereo tracks
- Powerful integrated wave editor with mastering, analysis, and restoration tools
- More than 45 DSP effects and tools
- 32-bit processing
- 24-bit/192kHz and higher sampling rates
- Real-time effects and EQ in multitrack
- DirectX plug-in support
- Scripting and batch processing
- MIDI and video playback support
- Loop-based song creation, including session tempo and key matching
- Access to thousands of free loops and beds from Loopology.com

loopology .com

At only $249, there's a miracle waiting to happen inside every PC.

More powerful than ever, Cool Edit Pro version 2 is packed with the latest and greatest features that the digital audio industry has to offer, yet it retains the ease of use that has won the favor of a growing community of users worldwide. With enough professional effects and tools to fill a room full of effects racks, Cool Edit Pro has all you'll ever need for recording, editing, and mixing up to 128 high-quality stereo tracks with just about any sound card. Sure, you could pay more for a recording studio, but why on Earth would you ever want to?

Download your copy today from www.cooledit.com.

Syntrillium Software

P.O. Box 62255 | Phoenix, AZ 85082 USA | 1.888.941.7100 (toll-free sales, USA and Canada) | tel: +1.480.941.4327 | fax: +1.480.941.8170 | sales@syntrillium.com | www.syntrillium.com

operation (i.e. diplexing), problems of down time should be fewer. No antenna changes will be required, and new transmitter and coupling equipment construction can continue without interruptions to the existing AM operation until the time comes for the eventual connection and tuning. Such diplexing will result in additional cost to the landlord in the provision of filters and system retuning. In addition,

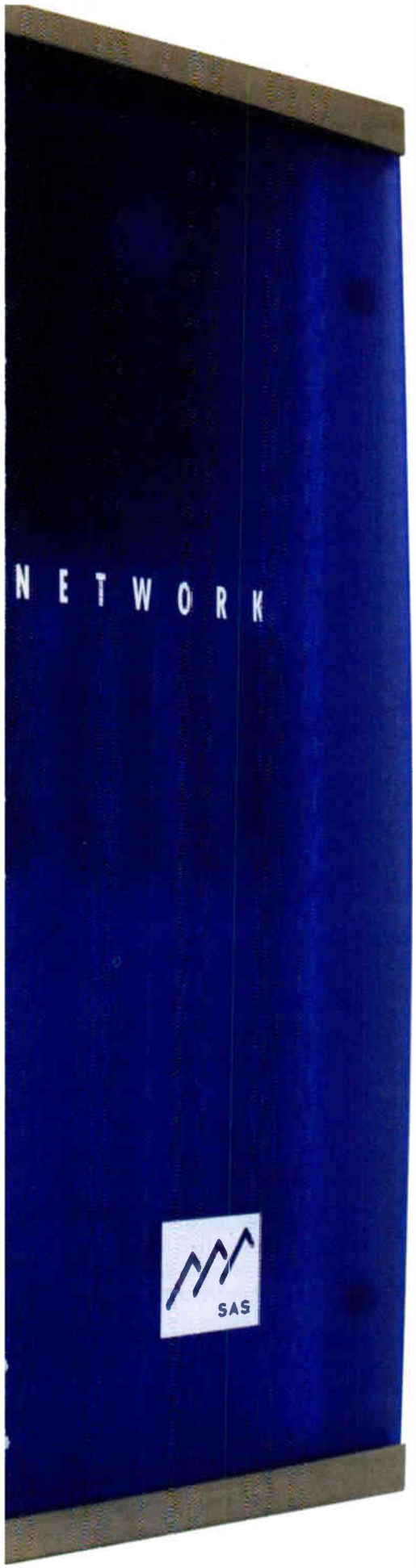
While AM towers can be used for additional tenants, additional costs will be incurred.

the cost of the landlord's lost air time will have to be covered in the leasing agreement.

Adding an FM antenna to an existing FM tower involves a tower study to make sure it's safe. If using a wideband common antenna and transmission line, be sure to spell out the individual responsibilities and performance requirements in the event of RF problems. Such a proposed installation requires thorough engineering examination prior to drawing up contracts.

It seems that the trend is toward multiple tenants on towers. Certainly in cases of antenna farms and specific tall buildings, multiple tenants have a long history of successful operation. For smaller stations in individual markets, multiple tenancy is becoming a viable solution to the lack of open space, FAA restrictions and shortsighted state, county and local zoning boards that bow only to the public utility denominator.

E-mail Battison at batcom@bright.net.



Rhapsody in Blue.

Digital Core Routing System

Scalable Up to 4,096 Channels

Digital & Analog 24 Bit I/O

Mix Multiple Inputs to Any Output

IFB-Talk to Remotes

Integrated Intercom Functions

Introducing the new 32KD Digital Audio Network from Sierra Automated Systems.

This modular, digital-core routing system processes more audio, routes more signals, and provides more user control than any other system in its class.

Routing, mixing, signal processing, IFB, mix-minus, and more, run simultaneously without conflict. All this functionality is readily accessible via PC, mixing boards, or dedicated control panels. And the performance? Like music to your ears.

For more details about the impressive capabilities of the 32KD, give us a call or visit our web site.

SAS. Doing more for radio. Again.

SAS

SIERRA AUTOMATED SYSTEMS

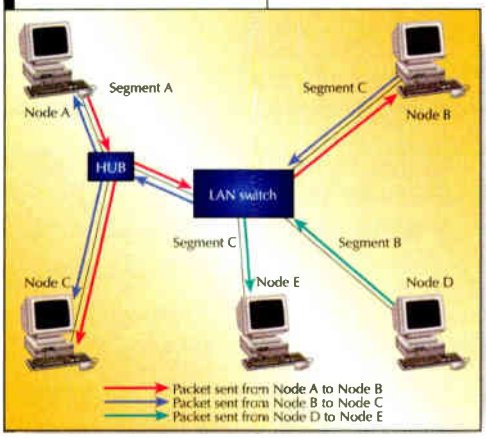
818-840-6749
sosaudio.com

Switched networks

By Kevin McNamara, CNE

You may recall that Ethernet networks are based on a protocol called Carrier Sense Multiple Access with Collision Detection, commonly known as CSMA/CD. This means that data packets from the various devices connected to the network are broadcast over a common network backbone. If two or more devices send a packet at the same time, a collision occurs and the packets are not able to reach their destination.

If the packets collide, then each device will wait a random period of time to resend. The device will continue to resend the packet until it reaches the destination. While Ethernet is an effective means to transfer data between devices, it is inefficient, particularly as a network grows. Consider that a moderately loaded 100Mb/s Ethernet network will only provide about 25Mb/s throughput, which will deteriorate as traffic increases. Switched networks reduce the potential collision of packets by establishing a virtual connection between two devices attached to the network.



Whereas a hub sends data packets to every node on a network, a switch sends the packet to just the intended recipient.

How it works

Network switches replace the passive hubs that were common to older traditional Ethernet installations. Passive hubs are simply a signal splitter that distributes or repeats, packets to all ports simultaneously. Network switches examine each packet and establish a dedicated connection between the two devices, similar to that of a traditional telephone connection—when you dial a number, you are routed to a specific destination based on the telephone number dialed; once the person on the other end picks up the phone, a virtual connection is established.

In many ways switches operate similar to that of a bridge that is operating at OSI Layer Two, which is the layer that deals with network addressing. When a packet arrives at a port of a network switch, the packets are examined to determine their source and destination. The switch will handle the packet in one of three ways:

1) If the packet is local to the segment (i.e. connected to the originating device before the switch), it will be filtered (or ignored) and not retransmitted through the switch.

2) If the destination address of the packet can be identified within the switch's database of addresses, it will forward the data to the proper port.

3) If the destination address of the packet is unknown, it will be transmitted on all ports.

Network switches are based on two possible architectures: store and forward and cut through. Switches based on the store-and-forward method analyze the entire packet prior to sending them to a destination. This process takes more time and, more importantly, requires a great deal of hardware memory to prevent a bottleneck of data. Switches based on the cut-through method only read the destination address before forwarding to the proper port, making it a far more efficient method. Improvements in technology have increased the throughput of the store and forward-based switches to nearly that of cut through.

Switch speed

Switches are designed to handle a huge amount of data throughput. To put this into perspective, consider a 10-port switch rated at 100Mb/s. Add the maximum speed of each port: 100Mb/s x 2 (duplex operation) x 10 (ports) = 2Gb/s. Under fully loaded conditions, the theoretical bus speed must be capable of operating at 2Gb/s minimum. In the real world, the use of each port would not exceed 50 percent, and therefore the bus speed can be reduced to about 1Gb/s.

If the bus speed of the switch is less than that required to sustain traffic at a 50 percent usage rate, then the switch is considered to be blocking, which means that the switch may not be able to pass data under those conditions.

Some manufacturers combine the cut-through and store-and-forward technologies into a switch. These hybrid designs incorporate features of both, permitting a higher level of traffic management.

New network switches are available that operate at Layer Two and Three, also called Layer Three switches. Layer Three switches add the benefit of operating at the network layer, permitting traffic to be switched based on IP addresses. These switches also identify the flow of traffic and are capable of switching those flows at the hardware level.

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 CBNT exam.

FCC clamps down on Longley-Rice

By Harry Martin

In a decision that has drawn relatively little attention, the FCC imposed significant restrictions on the use of the Longley-Rice model for predicting 70dBu city-grade coverage for FM stations.

Longley-Rice is commonly used when the standard prediction method, using the FCC's F(50,50) curves referred to in Section 73.313(c) of the rules, shows a shortfall in city-grade coverage. In recent years, FM allotment rule makings, particularly those involving multiple communities, have been predicated on the petitioner's plan to choose a site as close as possible to a major population center based on the use of Longley-Rice. For this reason, the staff's decision has far- reaching implications for move-ins, drop-ins and changes in the community of license. The ruling will also restrict the ability of stations to reach larger communities through minor change applications that do not require a rule making. One-step upgrade applications are similarly affected.

To use the Longley-Rice prediction method, an applicant must show that the terrain being studied departs widely from the average terrain assumed for the F(50,50) propagation curves. In the past, the FCC had never defined the term "departs widely." This permitted use of the technically liberal Longley-Rice method for demonstrating city coverage in almost any terrain environment.

In a decision issued Aug. 9, the Commission said that "departs widely" means terrain must vary by 20 meters or less, or 100 meters or more from the 50-meter "delta h" standard (the average value for terrain in the United States, according to the FCC) that is used in determining terrain roughness along a radial. In the case before the Commission, the "delta h" terrain roughness values ranged from 39.7 to 45.0 meters. This was insufficient to warrant use of the Longley-Rice alternate prediction method, the agency said, and the applicant was ordered to amend or face dismissal.

While finally setting a clear standard as to when the Longley-Rice contour prediction method will be acceptable, this decision is likely to be appealed given the disruption it will cause to the upgrade and move-in plans of many FM licensees.

Assignment and transfer standards

In August, the FCC decided to relax its contract disclosure requirements for Forms 314,315 and 316 (assignments and transfer applications) to permit applicants to exclude from their applications contract attachments that are not material to the FCC's analysis of the transaction, such as equipment inventories, lists of station contracts, descriptions of station real estate and copies of FCC licenses. Important ancillary agreements such as LMAs, options, notes and security agreements must still be submitted, however.

While the FCC is drafting new instructions and certifications for FCC Forms 314,315 and 316, the agency is giving buyers and sellers discretion in terms of what is relevant. Nevertheless, anything that is omitted from a sale contract must be described in an exhibit to the application and an explanation as to why it is not relevant must be provided.

Pending adoption of new forms:

- Applicants who submit a complete and final copy of a sales contract, including all exhibits and attachments, may respond "yes" to the relevant certification question.
- Applicants who choose to omit certain transaction documents that they believe are not material for Commission processing purposes must respond "no" to the relevant question on the FCC form. These applicants must also submit an exhibit describing each of the omitted documents, stating the specific reason for the omission and the basis for the determination that the omitted documentation is not material to the Commission's consideration of the application.

Political advertising disclosure

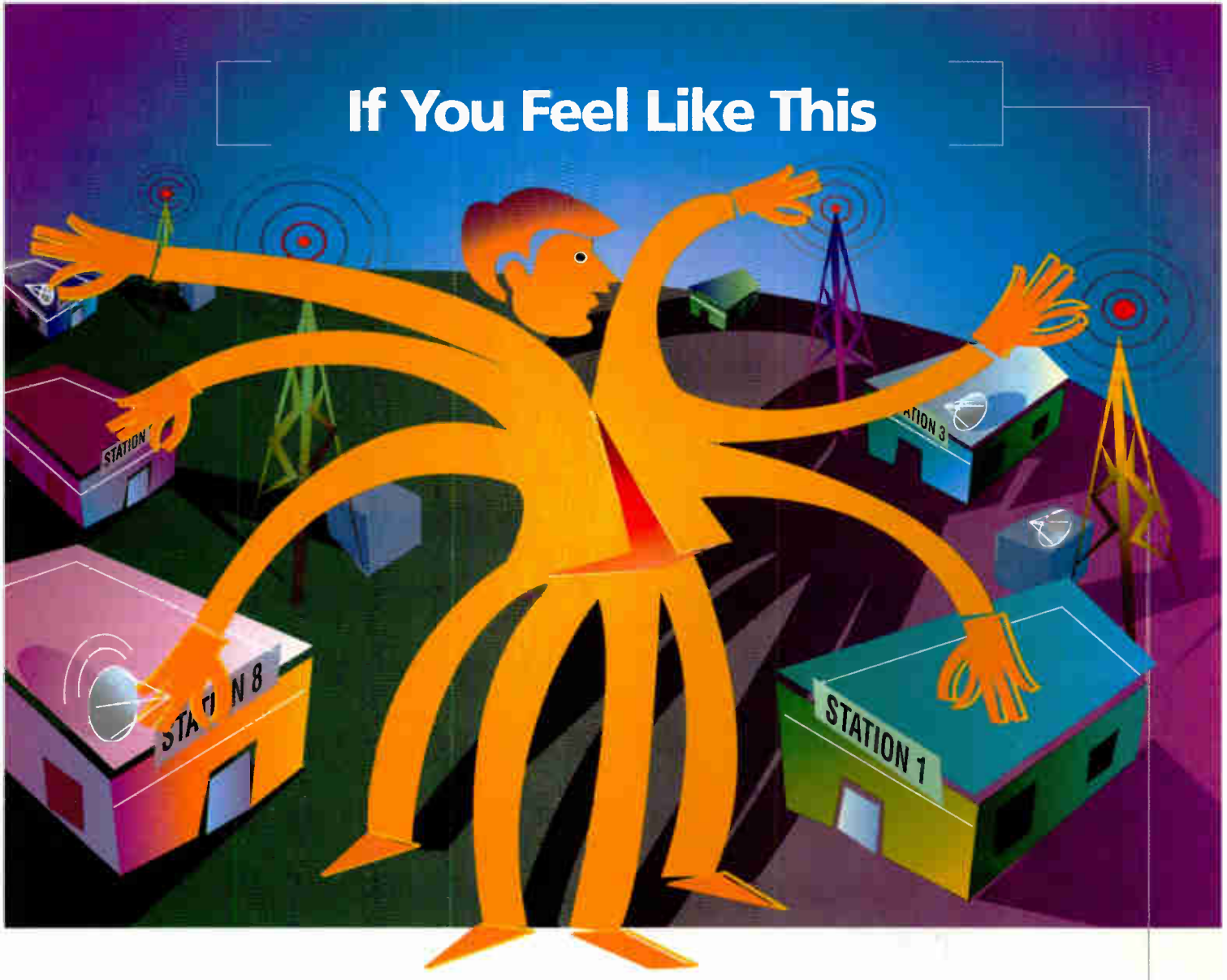
The Commission's political broadcasting rules require that stations supply candidates with all pertinent information about discount privileges available to commercial advertisers, including the lowest unit charges for the different classes of time sold by the station. This can be accomplished by providing the candidates with a written disclosure statement.

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

Dateline:

On Oct. 10, radio stations must place in their public files quarterly lists of community issues and the programs broadcast in response during the quarter ending Sept. 30.

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

www.broadcast.harris.com phone: 1.800.622.0022

HARRIS

The Innovator Award Winner

Jay Brentlinger, chairman and CEO of Orban/CRL accepts the Innovator award from *Radio* magazine editor Chriss Scherer at the NAB Radio Show.


Bob Orban, standing in front of the Orban Retro Rack, proudly displays his Innovator trophy.

Congratulations to Bob Orban for receiving the 2002 Innovator Award.

The Innovator award was created to honor individuals who have demonstrated exceptional creativity and inventiveness in the radio industry. *Radio* magazine readers were asked to cast their votes online on the *Radio* website through an online ballot. *Radio* magazine announced the winner at the NAB Radio Show in Seattle on Sept. 13.

Radio magazine would like to thank everyone who participated in the voting as well as the other nominees, who through their contributions to radio industry are all worthy of receiving the Innovator award.

Graciously accepting

Upon notification that he had received the 2002 Innovator Award, Bob Orban prepared the following remarks.

"I'm pleased to accept this award today, and regret that I had to be back in the office instead of here accepting it here in person. But IBOC waits for no man, and I want to be sure that our IBOC processing is ready for on-air tests scheduled to begin shortly.

"Looking back, it has been an interesting and challenging 27 years since we delivered the first Optimod 8000 in 1975. Orban was still a division of my father's company back then. But it wasn't long before my late business partner John Delantoni and I incorporated. That year, Orban had $300,000 per year in sales. Two years later, it was three million per year, thanks to the radio industry's acceptance of our new systems-oriented way of doing FM processing. I'm grateful to the industry that supported us and helped us grow, and to the people behind the scenes at Orban who played a crucial part in making it happen.

"Since then, our processing technology has completely evolved from analog to DSP. And Orban has changed ownership several times. However, many of our core engineering people have stuck with us through all of the transition and change, and I'd like to think I'm supported by some of the best technical talent in the processing industry. Now, more than ever, processing design is a team effort, and I feel confident in our future engineering because I have an outstanding group of people backing me up.

"So, thank you, *Radio* magazine, and thank you, all of the *Radio* magazine readers who voted for me. It's an honor to accept this award."

Make your move into radio's future:

Otari's New DB-10 Digital On-Air Console.

High-resolution digital audio is now becoming a demanding fact-of-life for today's top-market radio operations. To meet this challenge, Otari introduces the new **96 kHz DB-10 Digital Broadcast Console**. The fully expandable DB-10 is the most advanced and reliable small-format digital On-Air console available, specifically designed to meet the needs of broadcast professionals. Its ergonomically refined control surface features ten (10) fully configurable input channel faders. Choose from Analog Inputs (Stereo and Mono) or Digital Inputs (AES/EBU and S/PDIF) for a maximum of 16 active channel paths in total, with 4 microphone inputs always available on faders 1 to 4. The DB-10 also features the EMG Emergency bypass function, which protects you in the event that one of your digital input sources should fail.

The DB-10 provides 99 password-protected snapshots, and 9 project settings for easy recall. Multiband selectable equalization, compressor/limiter dynamics, 2 AUX, 2 TEL, and 2 PGM busses as well as two digital mix minus (N-1) busses, are available on all channels. The DB-10 handles sample rates from 32kHz to 96kHz using the highest quality sample rate converters. Synchronization can be achieved via internal or external 48kHz word clock, providing a reliable digital lock every time.

Up to 4 DB-10 consoles can be cascaded together to provide additional channel inputs as needed. When cascading DB-10 consoles, both the talkback and Emergency Bypass signals are shared between all consoles, allowing for one man operation. All of this in a compact footprint perfect for small studios, while also being expandable for use in larger facilities. Furthermore, the DB-10's portability makes it the perfect choice for OB trucks.

Need computer backup? DB-10's console snapshots, project settings, and GPIO data can be quickly saved and recalled using a standard PC serial link. The outboard power supply unit supports 100-240VAC and optionally 24VDC. And by adding another optional power supply unit, the DB-10 can be redundantly duplexed for failsafe operation. If your station's been waiting to provide "all digital" content, here's the on-air console solution to take you securely into radio's future. The **Otari DB-10** delivers digital technology today - with the simplicity, reliability and familiarity of analog's past.

Microphone courtesy of Audio-Technica

www.otari.com

OTARI®

Another Otari Indispensible Tool-Of-The-Trade

Otari Corporation • 8236 Remmet Ave. • Canoga Park, CA 91304 • 800/877-0577 Fax: 818/594-7208 • email: sales@otari.com • www.otari.com Otari Southeast • 1211 17th Avenue South • Nashville, TN 37212 • 615/255-6080 Fax: 615/255-9070

Simple solutions for a stress-free system

What makes a transmission system robust?

By Michael Patton

A robust transmission system is one that provides superior signal and audio quality, and provides this superior product even in adverse conditions. The system should also be fault-tolerant, and easy and inexpensive to maintain. Furthermore, remotely located systems should provide accurate and timely information about site conditions to remote users and maintenance personnel so that decisions can be made quickly in emergency situations.

All of these concerns must be addressed in each phase of a project—design, construction and maintenance.

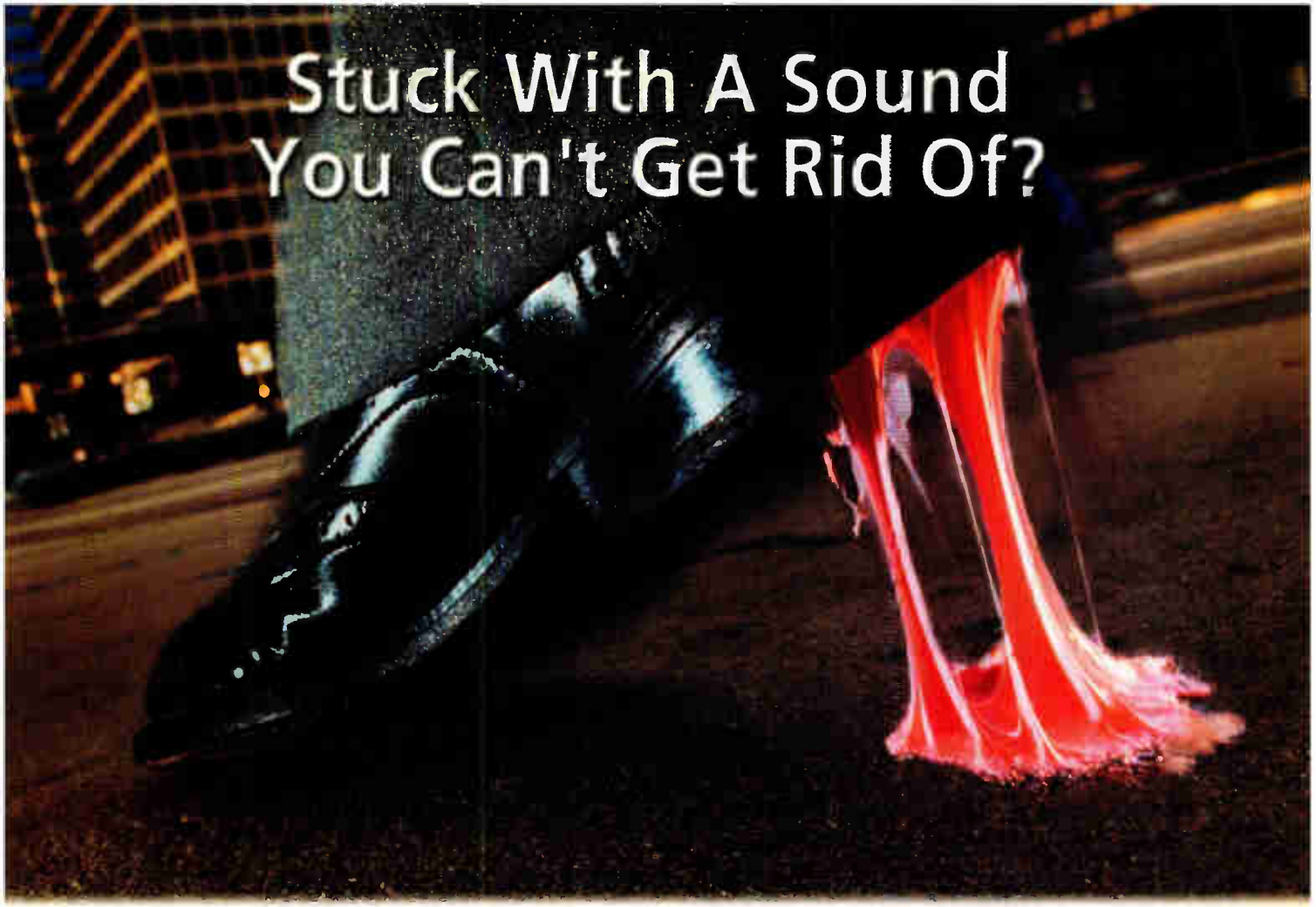
The design phase

Because engineers are usually asked for their input, it is incumbent on the engineer to make his client or employer aware of the relevant issues and their relative weight, so that the client can make good decisions. There are times when the engineer may feel as though he is saving his clients from themselves—and there are times when that is true—but remember that management counts on the engineer to know the issues. Pounding the table once in a while to get a point across is OK; after all, a few bruised egos are better than being stuck with a bad site—but be careful not to sneer at non-technical types. Don't let an ego get in the way, either. I've been too pushy on projects before, and I have gotten myself fired more than once, too. In the end, the client got a bad facility because he hired an easy-to-get-along-with engineer, and I lost the money and the satisfaction of finishing the job after I had laid all the groundwork. This was a lose-lose situation for sure.

The chosen site should provide good coverage of the desired area, which is not always the city of license. The character of the land should be considered with height of terrain being of the greatest interest for an FM station and low, flat land with good conductivity being paramount for an AM station. Use the station's consultant if possible. A good consultant is well acquainted with site selection criteria, and he may have a few tricks, too. He can earn his pay in avoided pitfalls due to his advice.

Remote land is often chosen for transmitter sites due to low acquisition costs, but keep in mind that access roads to remote sites are expensive to clear and maintain, and management may balk at the continuing costs. Another potential problem with remote sites is the quality and availability of commercial ac power. In rural areas, the power company may be unwilling to provide three-phase power (or any power) without high up-front costs, and the station may find itself on the end of a long and unreliable power line with poor regulation, large numbers of surges and poor power-failure response times. Any assessment of a potential site should include input from the local power company and also from other stations in the area or other nearby customers—even residential ones. This is also true for telephone and any other utilities that may be desired at the site. Projects can be delayed at the last minute because management foolishly assumed that anything they needed could be provided in short order by the utility companies. Sometimes utility or access road issues

Photo courtesy of Richland Tower, Inc.



YOU NEED THE NEW APHEX 2020MkIII AUDIO PROCESSOR

Settling for flabby, undefined bass? Buried, clouded, mids? Shrill, annoying high end that you just can't tune out of your current processor? Is your only comfort that some of your neighbors on the dial sound as bad or worse than you do? Then it's time to step up to the new Aphex 2020MkIII.

Radically new processing algorithms and circuitry bring even greater loudness while maintaining clarity and musicality. The bass is tight, deep and resonant, the mids are detailed and forward, and the highs are open and natural. The 2020MkIII is so powerful, yet so clean, it is the only "broadcast" processor used in world class post production and mastering facilities.

With an extensive range of useful controls you can readily achieve your own unique sonic signature ....a sound that you'll never want to get rid of.

Call us today to audition the new 2020MkIII at your station.

APHEX SYSTEMS

Improving the way the world sounds[SM]

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

can swing the tide in favor of a more expensive but more accessible site. Because this is one of the first decisions made for any facility, be sure to obtain the pertinent facts early in the project.

The chosen transmitter site should provide adequate coverage of the desired signal area, which may not necessarily be the city of license.

Make sure that your client or employer knows the issues regarding tower height vs. coverage area vs. price, and number of FM bays vs. coax cable and transmitter size. If an ill-advised decision is made, speak up. I recently had a client decide to diplex a low-band AM station at a higher-frequency AM site with a short tower—too short for that low-band signal. I advised him so, but the client went ahead anyway. The FCC refused the application, citing the short tower height. Now the station owner is building a taller tower, and I believe that this will serve the low-band station better.

Simple but true: Buy good equipment. Of course, it gets complicated in a hurry when faced with choosing between a major manufacturer or a less expensive manufacturer, installing an auxiliary transmitter, STL, antenna, processing, dial-up or dedicated remote control, a coax switch or a dummy load. It's better to have one set of first-class equipment than two sets of substandard equipment.

Budget the essential items first, such as surge protectors, proper tower and building ground systems, generators and radomes. All too often stations try to cut budget corners by forgoing these infrastructure items because they are all but invisible; they

Power beyond the printed word.

BE Radio's ability to help you solve business problems extends beyond the great editorial in this publication.

E-mail newsletters. Get the news you need, as it happens. Sign up for a subscription to our e-mail newsletter, the BE Radio Currnets Online Weekly E-mail. Go to PrimediaBusiness.com and click on "I want to subscribe to a newsletter."

Amplified coverage through our website. Visit www.beradio.com where you'll find a wealth of information to help you do your job better, including:

- Daily news updates in Currents Online
- The Studio Spotlight
- The Engineer's Notebook
- Industry event calendar
- Up-to-date EAS manufacturer info
- Links to important FCC actions

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

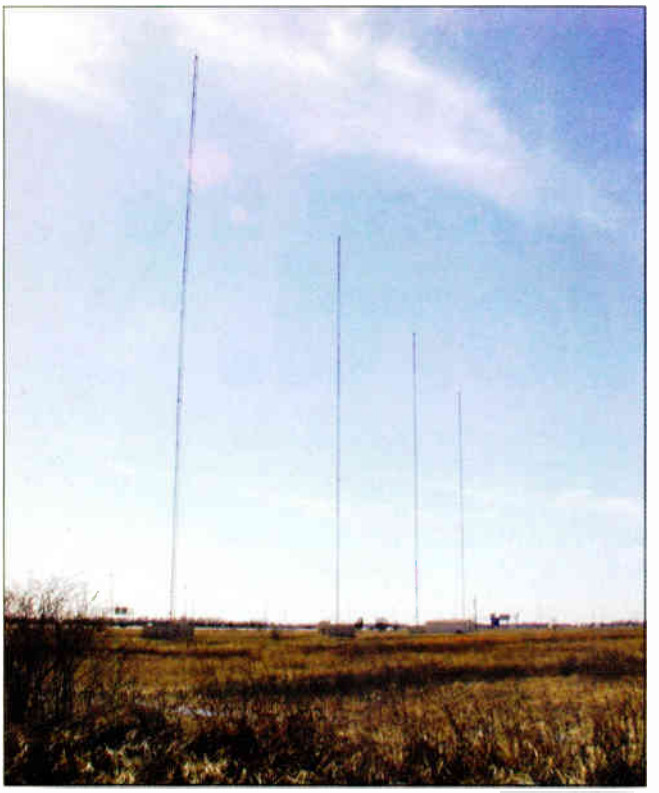
Content for your website. Get the latest industry-specific news automatically delivered fresh to your corporate website, intranet or extranet. Go to PrimediaBusiness.com and check out the Primedia Insight newswire.

Opportunities for Advertisers. We can connect you with the exact buyers you're looking for through newsletter sponsorships, customized online special reports, targeted Web advertising, and more. Contact your [your magazine name here] magazine sales representative, or Rob Shore (rshore@primediabusiness.com or 212-462-3401).

Click or call today to tap into the power beyond the printed word.

Radio™
THE RADIO TECHNOLOGY LEADER
BE Radio Magazine
www.beradio.com

Simple solutions



While remote land may offer an attractive acquisition cost, adding commercial power and access roads may counteract the savings.

add no capabilities and therefore have no champions, no constituencies. If a station doesn't budget for them now, it will have a hard time getting them budgeted later, and then only after the station is crippled and someone may have to take responsibility. Nobody ever wants to hear "I told you so." Do everything possible to fight for these orphan (but essential) items now. Most managers know how hard it is when choosing what to cut from the budget, and they are usually aware of the bad (if delayed) consequences of their actions.

If you can't afford new equipment, consider used equipment. Late-model, good-quality used equipment will almost never turn out to be a lemon, and an engineer can probably save enough money to put some of the extras he thought he was going to have to do without back into the budget.

The more inaccessible the site, the better the remote control should be. This applies to all backup equipment. For a truly remote site, the remote control should have complete control over all transmitters and should monitor everything in sight: full transmitter metering/status including internal overloads shown separately from VSWR; extensive site monitoring with ac power including phase loss, site and outside air temperature, site intrusion and security, full tower light monitoring and STL signal loss and generator monitoring.

No matter how good the equipment is or how carefully the site is selected, the radio transmission system won't be robust if the building itself is falling down. Buildings that are too small don't work well either. Make sure that the building is built well for its location and is big enough to accommodate present equipment needs with enough room for reasonable expansion. Think about concerns such as ceiling height and required RF plumbing before

Proud to be Serving Broadcasters for 60 years

Come to Dielectric for all your FM needs. We have the most complete broadband product line and 60 years of engineering expertise in the industry. You can rely on Dielectric as your one source of responsibility for a successful project from bottom to top.

Towers
- *Manufacturing*
  - *Guyed*
  - *Self-Supporting*
- *Mapping and Inspection*
- *Custom Design & Modifications*
- *Installation and Rigging*

Antennas
- *Top and Side Mount*
- *Multi-Station*
- *Pattern Studies*

Transmission Line

Combining Systems

Dielectric
COMMUNICATIONS
Engineering Excellence Since 1942

DIELECTRIC 1942 2002 60 YEARS OF AMERICAN INGENUITY

CENTRAL TOWER
A Dielectric Company

Call your TEAM today! • 1-866-DIELECTRIC • www.dielectric.com

you are forced to put equipment such as coax switches where they hit you in the head every time you walk past.

The construction phase

This is where all the decisions from the design phase are implemented. It falls on the project engineer's shoulders to make sure that the subcontractors install the subsystems in accordance with the design. Be assertive. An engineer only has to make one subcontractor redo work for word to get around that he is to be taken seriously. Make sure that management backs you up—this is important.

If the project engineer is not going to climb the tower to check their work, use a tower company. Even then, check everything possible from the ground. Make sure that they properly handle items that are small to them, and therefore often easily overlooked, such as grounding kits or tower lighting conduit weep holes. If the subcontractor gets the idea that shoddy work and cut corners won't be tolerated, he is more likely to expect that standard for all the work at the site.

Don't let any subcontractor off the site without double-checking his work. Make sure that everyone knows that they may be called back if problems develop. If possible, arrange for some percentage of their payment to be withheld until the station is on the air and everything has been observed to run properly for some period of time (10 percent for 10 days, for example). This gives them a clear

A backup power generator is an essential item at a transmitter site, particularly in remote locations.

incentive to make sure that the station is happy as a customer.

Arrange for work, such as grounding or wiring in the slab or walls, to be inspected before it is covered. Don't rely on city or county inspectors for this because it isn't their site. Don't forget small items such as fence placement and FCC-required signage.

Maintenance

No matter how well designed or built, a facility has to be properly maintained or it falls apart.

Fighting persistent failures that consume all of the engineer's time and parts budget is not efficient. Lack of good surge protection or grounding, poor-quality or worn-out equipment, or equipment poorly sized for the job are the usual culprits. These issues have to be addressed, and quickly once an engineer is put in charge of a particular site, or else management will lose faith in his ability to solve the problems. If the failures are obvious enough and often enough, then the engineer should not have much trouble making a case to management of proper remedial action. This clearly takes precedence over all other issues, except perhaps pressing legal ones.

Once the facility is in proper working order, establish a good set of site supplies and parts, and a maintenance schedule and budget that provides not just for the upkeep, but also for the improvement of the facility. Never visit a transmitter site without making some improvement in the site's functionality, cleanliness, or supply cache.

If the facility has old equipment, develop a plan for replacing it. To do this the engineer will need to speak the language of management: money.

It pays to go to management with good numbers for any budget, especially for new equipment. Show them the benefits of the new equipment. Does it use less power? How much? Does it take less maintenance? Is it solid-state instead of tube? Show the savings in eliminated tube costs. Make the numbers tell the story. Another thing to consider is whether the equipment be leased? Do the homework. Get programming on your side—even sales. It's hard to sell a product that's not on the air, or that sounds bad. Be creative, even if you're just trying to get a new piece or two of equipment. It never hurts to be perceived as a team player, either.

As with new sites, sometimes the purchase of good used equipment is a smart move. Don't get fixated on the all-or-bust mentality. Compromise is often the order of the day.

It's useful to establish end-of-life criteria for each piece of equipment at a site; some calendar date or failure point after which it is clearly time (and hopefully budgeted) to replace that equipment. Once that date or condition arrives, stick to the schedule. Don't let anything be a sacred cow. Every piece of equipment at a radio station has a useful life span, beyond which trying to maintain it is no longer smart engineering. Don't be afraid

Simple solutions

to put a value on it.

A site should always be thought of as dynamic, never as fixed. This year management may only replace a few parts, but next year the station may need a new audio processor, a new remote control or even a new transmitter or tower. The budgets should reflect this. Don't let management get the idea that the entire equipment set at a site is set and need not be looked at until it comes time to completely rebuild that site. Even worse, don't provide the feeling that the site will last forever. The "state-of-the-art" changes all the time. Look at the number of generations of audio processors developed recently. Budget in such a way that the site is not falling hopelessly behind. Get management to replace something every year at every site, even if it's only to upgrade the firmware in the remote control, so they don't get the impression that they can write off upgrades.

A clean and organized transmitter site makes a more efficient work environment, particularly during emergency maintenance.

The equipment that can't be replaced must be maintained. Get in there and clean. Even at sites without water, it's easy to bring containers of water, alcohol or other solvent or surfactant, large enough to clean any equipment or mop the floor.

Pay attention to how a transmitter is vented and what effects that has had on its level of cleanliness. In terms of transmitter cleanliness, it pays not to use an externally-vented air system, but instead to install a sufficient air conditioner to handle the heat load of the transmitter, keeping the transmitter in a closed system. This reduces the dirt in the transmitter—dirt that ends up in the tube socket and on the HV supply wiring or gets

Transmitter site maintenance goes beyond the transmission equipment. Vegetation, like this section of tree that grew into a guy wire, must be cleared from the site regularly.

sucked into blower bearings and deposited onto heat-sink fins.

The older the equipment, the more aggressively it needs to be maintained. Don't forget to change old electrolytic capacitors, old relay contacts or old bleeder resistors. Keep all the indicator lights working. Sometimes this requires coming up with innovative ways of doing that, such as using solid-state light bulbs, reduced voltages or shutting off the voltage to the indicators when no one is there to see them.

Site and building maintenance

Be proactive. Look for things like peeling paint and rotting boards before the whole TX building wall is sagging. Don't let weeds become overgrown. Keep the road passable. Don't let locks get rusty or else they will break a key at 3 a.m. in the rain.

Spending time at transmitter sites is usually not fun, and all too often management's attitude seems to be that if the engineer isn't at the studio, he isn't working. But it pays to stay ahead of the curve. An engineer who only visits his transmitter sites when there is an emergency is just asking for trouble.

Any budget worth the paper it's printed on should take into account building maintenance, tower painting and other infrequent occurrences. If management is reminded that these items are on the horizon, even if it's not this year or next, they'll be much more willing to budget the money when the time comes than if it's sprung on them.

A robust transmission system is not just within the reach of big-city engineers. I have seen nicely equipped sites in small towns, and I have seen some poorly maintained sites in big cities. Creating a first-class site is possible with a little help from management. Attitude will go a long way toward obtaining that help. So, next time you go to a transmitter site, bring some fuses, and a bottle of water, and a flashlight, and ...

Patton is president of Michael Patton and Associates, Baton Rouge, LA.

The Right Choice in transmitters

By Chriss Scherer, editor

Weigh the options to make the right transmitter decision.

The basic functions of radio broadcasting can be divided into two areas: creation and distribution. The creation process covers the production and on-air elements up to the final audio output. The input to a station's STL or Web server begins the distribution process. While a station's operation was long considered to be a singular function, dividing the process into these two areas has become an operational focal point.

There are several factors to keep in mind when it's time to select a new transmitter. These factors vary by power level, type of service and a station's individual needs.

Tubes or solid-state?

At one time, high-power applications were limited to tube amplifiers. While solid-state designs are increasing in popularity (and may be the only choice in some cases), tube designs are still functional and reliable. One advantage is that tube designs can be more forgiving with changes in the antenna load from weather or damage.

In the case of an AM transmitter, the only choices from the major U.S. manufacturers are solid-state amplifiers. For FM, there is still a price point that divides the arena. Tube designs can be less expensive at power levels over 5kW, while solid-state designs tend to be cheaper.

The person charged with maintaining a transmitter may have a personal preference for tubes or solid-states based on his experience. Solid-state designs operate at lower voltages than tubes. Younger technicians who are not comfortable with tube designs will likely find greater comfort with transistors than tuned cavities.

For a 10kW solid-state FM transmitter, the added premium over the cost of a tube transmitter is small enough to justify the purchase unless the transmitter is intended for backup use.

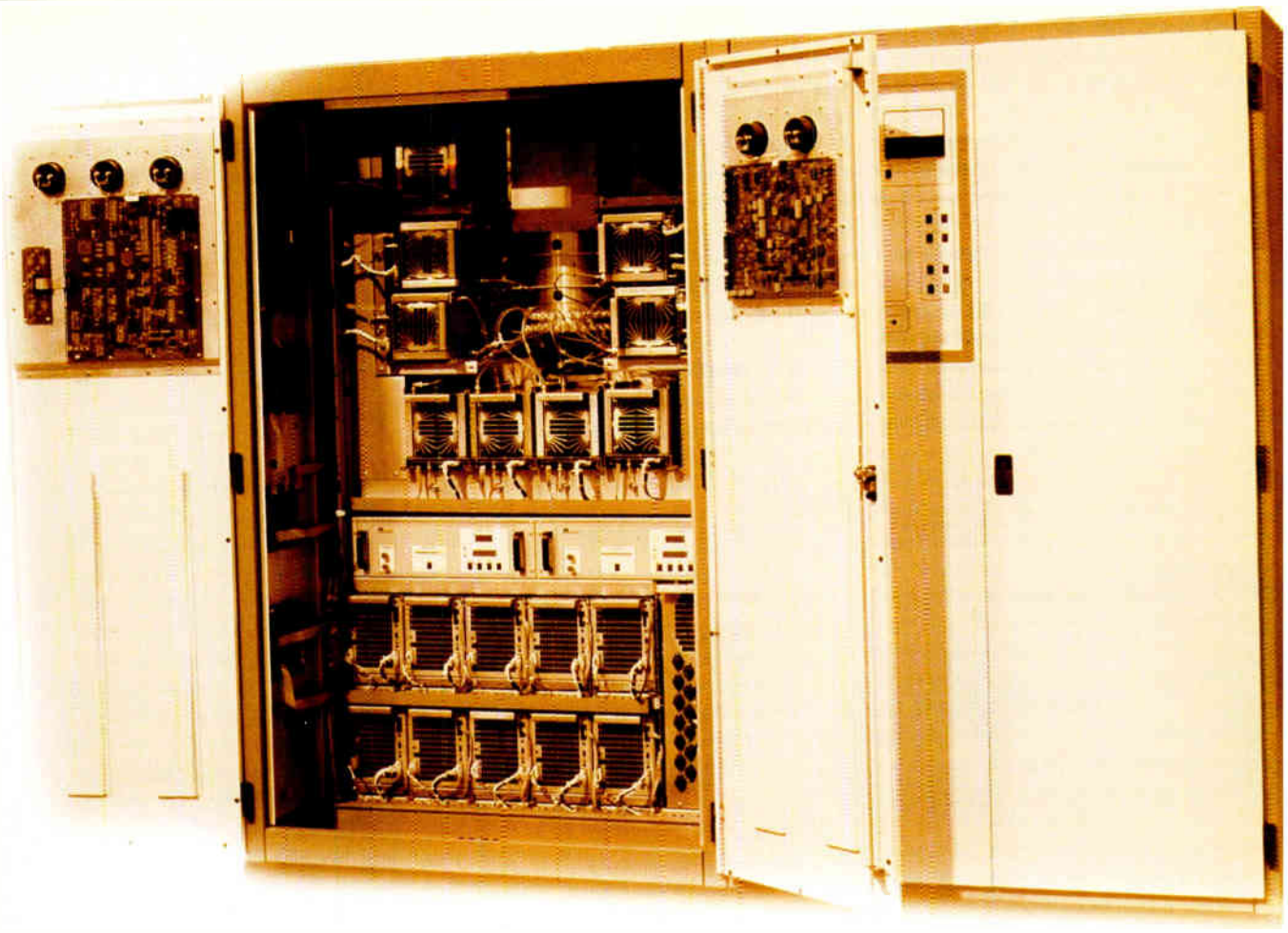
In most cases, the additional capital expense for a solid-state design can be offset by the electricity savings and the ongoing maintenance costs. Not only are the transmitters more efficient, they produce less heat, which results in a reduced load to a building's HVAC system.

A better mouse trap

While the underlying principles of RF transmission have not changed, the methods of creating and controlling a modulated signal have improved. The advances for the AM band have provided cleaner, more reliable transmission methods. About 10 years ago, digital techniques were applied to amplitude modulation when pulse-duration modulation and pulse-width modulation became standard practice.

The latest advance in AM generation is direct digital synthesis, which harnesses the power of digital signal processing to provide better performance and improved distortion specifications.

The most recent improvement for FM exciters came nearly 10 years ago when the first digital exciters were introduced. Once again, digital technology provided a more stable and reliable foundation for generating the RF signal. While the exciter and power amplifier structure of an FM transmitter was always looked at as separate systems working together, the improvements in exciter design extended this view. Stations would take advantage of the incremental upgrade of replacing one of the two parts at a time.



40,000 Watts
Solid State FM Power.

The Nautel Q20/20 comprises two 20 kW stand-alone FM transmitters fully integrated to operate as a 40 kW active reserve transmitter system. For more than 30 years Nautel has built the best radio transmitters by blending solid state technology and innovative engineering design. The Q20/20 provides reliability and peace of mind through built-in redundancies — in all the world you won't find its equal.

Each Q20 features:

- redundant Power Amplifiers
- redundant Power Supplies
- dual Digital Exciters
- dual IPA & Power Supply
- dual Low Voltage Power Supplies
- 68% overall efficiency

nautel

Simply the best engineered transmitters

Contact Nautel for more information about the benefits of our full range of solid state FM and AM transmitters.

Nautel Limited, Hackett's Cove, RR #1 Tantallon, Nova Scotia Canada B0J 3J0 Phone: (902) 823 2233 Fax: (902) 823 3183 Certified ISO 9001
Nautel Maine Inc. 201 Target Industrial Circle, Bangor, Maine USA 04401 Phone: (207) 947 8200 Fax: (207) 947 3693 Certified ISO 9002
E-mail: info@nautel.com or visit us on the Web at www.nautel.com

The Right Choice

Buying an FM transmitter as a system offers the advantages of integrated features and control. There will most likely be a cost savings as well.

While digital exciters offer several advantages, analog designs are still capable of providing reliable service and a quality signal. They also tend to cost less than their digital counterparts. Regardless of the path chosen, provide power to the exciter through a direct ac feed and not a feed from the transmitter. The ac from the transmitter can suffer from line losses. Additionally, power the exciter through a UPS if possible, particularly if it is a digital exciter. This control can be tied to the interlock string to prevent exciter damage during antenna switching or when the transmitter is turned off.

Size matters

As with any technology, as it advances it tends to decrease in size. The high-powered

Resource Guide

AEV SRL
+39 051 950 350
info@aev.net
www.aev.net

Armstrong Transmitter
315-673-1269
sales@armstrongtx.com
www.armstrongtx.com

Aztec Radiomedia
703-875-9100
contact@aztec-radiomedia.com
www.aztec-radiomedia.com

Bext
619-239-8462
sales@bext.com
www.bext.com

Broadcast Electronics
217-224-9600
bdcast@bdcast.com
www.bdcast.com

Commercial Communication Associates (CCA)
770-964-3530
info@cca.ws
www.cca.ws

Continental Electronics
800-733-5011
sales@contelec.com
www.contelec.com

Crown Broadcast
800-294-8050
broadcast@irec1.com
www.crownbroadcast.com

DB Elettronica Telecomunicazioni SpA
+39-49-8700588
sales@dbbroadcast.com
www.dbbroadcast.com

Ecreso - RFTS Broadcast S.A.
+33 556 675 454
sales@ecreso.com
www.ecreso.com

Energy-Onix
888-324-6649
energy-onix@energy-onix.com
www.energy-onix.com

Goodrich Enterprises
402-493-1886
cgoodrich@tconl.com
www.goodrichenterprises.com

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

Itelco USA
303-464-8000
tvsales@itelco-usa.com
www.itelco-usa.com

Kenneke Communications
541-928-4552
kenneke@kenneke.com
www.kenneke.com

Larcan
905-564-9222
srichmond@larcan.com
www.larcan.com

LPB
610-825-4100
lpbinc@aol.com
www.lpbinc.com

Marti Electronics
817-645-9163
marti@flash.net
www.martielectronics.com

Nautel
207-947-8200
info@nautel.com
www.nautel.com

Nicom
619-477-6298
info@nicomusa.com
www.nicomusa.com

OMB America
305-477-0974
OmbRadioTv@aol.com
members.aol.com/OmbRadioTV

PTEK
408-448-3342
sales@ptekpower.com
www.ptekpower.com

QEI
800-334-9154
qeisales@qei-broadcast.com
www.qei-broadcast.com

Ramsey Electronics
800-446-2295
sales@ramseymail.com
www.highpowerfm.com

SBS
352-622-7700
sales@sbsfm.com
www.sbsfm.com

Silicon Valley Power Amplifiers
800-986-9700
sales@svpa.com
www.svpa.com

Superior Broadcast Products
800-279-3326
jjoynt@superiorbroadcast.com
www.superiorbroadcast.com

Transcom
800-441-8454
transcom@amfmtv.com
www.trcorp.com

behemoth transmitters of yesterday are now replaced with one or two racks of equipment. A smaller footprint means more space around the transmitter to work (when it replaces an older transmitter) or perhaps a reduced rate on floor-space rental.

With the reduction in size also comes a reduction in operating costs. Current designs are usually less complex than older models, thus requiring fewer custom parts. Also, the move to modular design, present in solid-state designs, helps reduce a spare parts count.

This modularity also provides additional backup. Most modular transmitters will operate at reduced power levels with less than their full compliment of RF modules. Most solid-state transmitters are also designed to have their modules removed and inserted with power applied. This can further reduce any downtime.

FACILITY SHOWCASE

UNIVERSAL STUDIOS ORLANDO

A SHOWCASE INSIDE A PLAYGROUND

By Chriss Scherer, editor

THIS FACILITY IS BUILT ON A CAMPUS UNLIKE ANY OTHER. TALK ABOUT A FUN PLACE TO WORK.

When designing or renovating a facility, attention is primarily paid to the facility's function. Generally, the desire to create a visually appealing space is a secondary priority. When a company's prime business is the visual attraction, form and function share equal importance. Such is the case with Universal Studios Orlando, which recently rebuilt the radio studios in its central Florida theme park.

The best selection

FM Educational Circular Polarization antennas.

Model	No. Bays	Max. Input Power	Price
MP-1	1	500 W	$250
MP-2	2	800 W	$850
MP-3	3	800 W	$950
MP-4	4	800 W	$1,250
MP-4R	4	2000 W	$1,750
MP-5	5	3000 W	$2,250
MP-6	6	3000 W	$2,700

FM Low Power Circular Polarization antennas.

Model	No. Bays	Max. Input Power	Price
GP-1	1	1500 W	$350
GP-2	2	3000 W	$1,350
GP-3	3	4500 W	$1,800
GP-4	4	6000 W	$2,500
GP-5	5	6000 W	$2,900
GP-6	6	8000 W	$3,500

FM Medium Power Circular Polarization antennas.

Model	No. Bays	Max. Input Power	Price
SGP-1	1	3000 W	$650
SGP-2	2	6000 W	$2,450
SGP-3	3	8000 W	$3,500
SGP-4	4	8000 W	$4,300
SGP-5	5	8000 W	$5,100
SGP-6	6	8000 W	$5,900
SGP-6R	6	15000 W	$6,500

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

TV & Radio antenna systems

EUROPE

Commercial & T.V. Factory:
Avda. San Antonio, 41
Teléfs.: 976.50. 46.96 (6 lines)
Fax 976.46.31.70
50410 CUARTE DE HUERVA
(Zaragoza)

Antenna & Radio Factory:
Camino de los Albores, 14, bajos
Teléfs.: 976.50. 35. 80 (6 lines)
Fax 976.50. 38. 55
50410 CUARTE DE HUERVA • (Zaragoza)
Internet. http://www.amb.es
e-mail: ambcom@infonegocio.com
VideoConference(RDSI) 976 46 32 0[illegible]

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: ambusa@bellsouth.net
Videoconference: 1 305 5940991/92

UNIVERSAL STUDIOS
ORLANDO

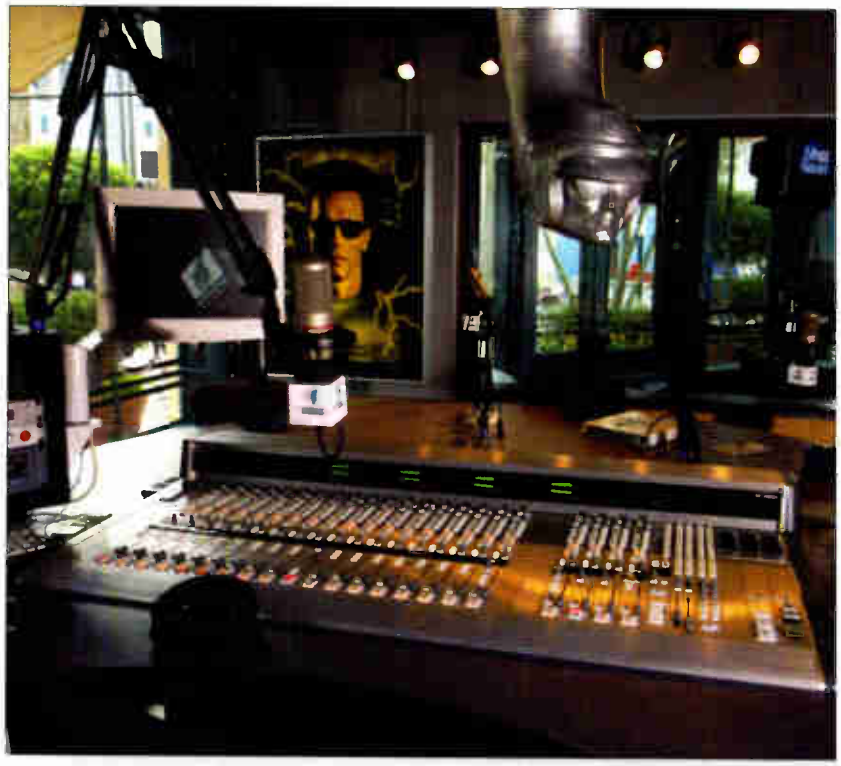
The radio studios occupy a small space next to the Brown Derby Hat Shop on Rodeo Drive, not far from the entrance to the Universal Studios theme park. At first glance, the building facade blends with the surrounding decor and could be easily overlooked as you walk down the street. Once inside, however, the décor speaks for itself.

There are five rooms for the studios. Visitors are first welcomed into a green room with couches and a kitchenette. This area helps visiting stations feel at home during their visit. It also allows the station to handle large groups of people that visit the studio. From the green room, a short hallway leads visitors to the remaining four rooms: two on-air studios, a rack room and an office.

It's not the most expansive space, but it offers plenty of room for this operation.

The two studios have been given themes from famous Universal movies. The smaller studio pays tribute to one of Universal's biggest stars, the shark from the movie *Jaws*. The larger studio is a tribute to the futuristic movie villain from the movie *Terminator 2*.

While not critical to the regular operation,



The room decor already carried a futuristic, high-tech look. The new studio equipment complement this existing design.

the treatment from the ceiling in both rooms is unlike any other interior decoration.

In the T-2 studio, a long metallic shaft curves downward with the head of the T-1000 Terminator at the end. This can be positioned to face anywhere in the room so that operators can have a captive audience or a sentinel. On the walls are back-lit schematics of the 800 series Terminator.

The Jaws studio has a recreated scene of a female swimmer about to be attacked by the great white shark. What's unique is that the swimmer and shark are above you, as if you were underwater. The detail of the frothing and bubbling saltwater around the aquatic, life-size figures is interesting. The only thing missing is the Florida license plate in the shark's mouth.

The studios were built in 1993 by Pacific Recorders and Engineering. While only small changes have been made throughout the nine years of faithful service, Universal felt that the time was right to perform a complete upgrade. Now that the renovation is complete, the overall form of the studios has not changed much from the original design, but the technology behind the equipment certainly has.

The radio studio engineers were pleased with the work that PR&E did originally. Over the years, Universal worked with Harris on equipment upgrades as well. When Universal decided to renovate the studios, the radio staff turned to the same people for help. Now that PR&E is a part of Harris, the decision was simplified.

Replace or retain?

The new facilities are a combination of existing and new equipment. Most of the regularly used equipment has been replaced with digital counterparts to provide a digital foundation. Still, some analog sources exist.

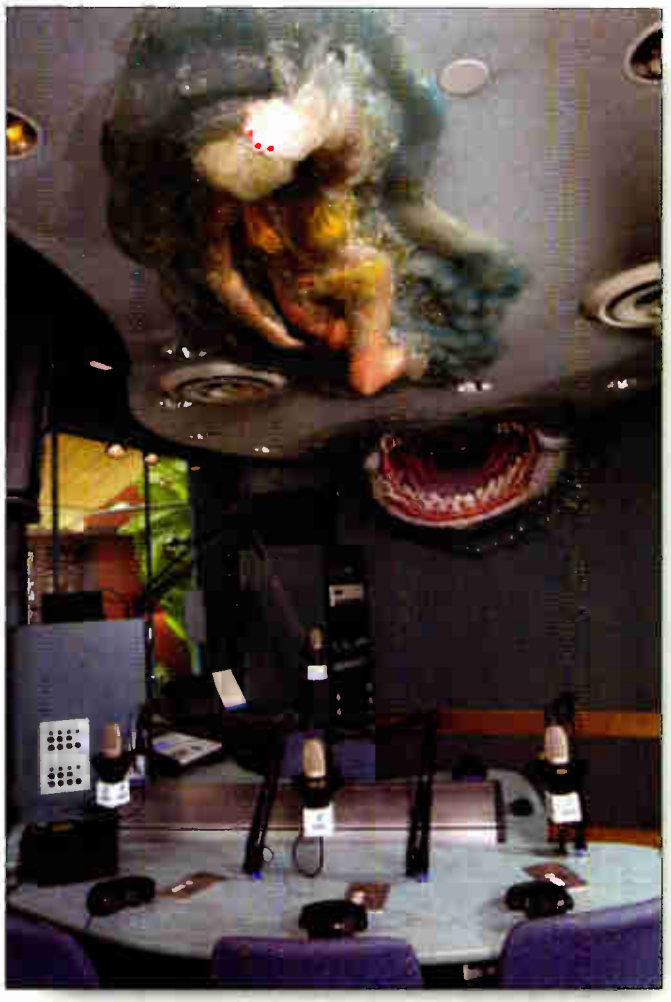
The new equipment selections were based on feedback from Harris' systems division. Universal dictated the function and specified operation while Harris developed the form. The studios themes did not change, but Universal did update

UNIVERSAL STUDIOS ORLANDO

the room décor. The result is a mix of technology and theme park.

One major design goal was to reduce visual clutter in the studios. The previous layout had a cart machine overbridge. This placed the cart machines in a convenient location for the operator, but sometimes it got in the way of looking at guests. In addition, carts have lost their dominant position as an audio source. A video

The Jaws studio sees more use as a production studio than an air studio. Despite this fundamental shift in focus, it is well-suited for use on air and for interviews.



Amplified coverage.

BE Radio's ability to help you solve business problems extends beyond the great editorial in this publication.

Visit www.beradio.com where you'll find a wealth of information to help you do your job better, including:

- Daily news updates in Currents Online
- The Studio Spotlight
- The Engineer's Notebook
- Industry event calendar
- Up-to-date EAS manufacturer info
- Links to important FCC actions

Tap into the power beyond the printed word.

Radio™

THE RADIO TECHNOLOGY LEADER

BE Radio Magazine

www.beradio.com

screen can display most of what an operator would need to see in significantly less space.

Equipment removed from the studios is still in working order. One possible plan is to build satellite studios in the Islands of Adventure park using the extra equipment.

Design strategy

The entire facility is designed for digital audio. The trunk cables between rooms are CAT-5 cable.

Gepco supplied a cable made to CAT-5 specs in a traditional mic-cable configuration. This provides flexibility and durability for any exposed cable runs.

One unique element is the guest headphone controls. The guest panels have a linear fader next to the mic cough button. This is a level control, but not for the mic. It is the headphone level control for the headphones. Using the same materials as the console, custom fabrication of parts was eliminated. The panels also naturally match the console.

A CAT-5 cable connects the panels to the console and headphone distribution

With so many other attractions seeking attention in the park, the radio studio can be easily overlooked among the buildings on the street.

system. This new system does not rely on the headphone level control to dissipate excess power as heat. Instead, the level control varies the signal at the headphone distribution box, minimizing wasted power.

The monitors in the T-2 studio are hung from the ceiling. As part of the attention to clearer sight lines, these monitors, Hafler TRM-6 active monitors, are considerably smaller than the monitors they replaced. To enhance the sound from their diminutive appearance, a subwoofer was placed on the floor under the studio furniture.

The monitors in the Jaws studio are not placed on either side of the console. This room is used for production more than for on-air use, so the monitors were placed on either side of the Orban Audicy. This placement is not a problem during on-air use because the monitors are not used for critical listening at that time.

While studio furniture is not usually considered a high-tech element of a new studio, the furniture Universal chose includes several new design elements. First, the laminate material on the surfaces is something that is not commonly found on furniture, but it may sometimes be found under it. The surfaces are covered with a material called Marmoleum, manufactured by the Dutch linoleum manufacturer Forbo. Because of its design for use as a floor covering, it is durable and can withstand the use and abuse of serving as a cabinet fish. It comes in rolls measuring 12' wide, so it is possible to create seamless surfaces while using materials that are less expensive than some solid-surface designs.

Once cut and covered, the surface edge is fitted with a flexible T-molding to withstand bumps and provide a smooth edge.

While the furniture in the Jaws studio is functional, the furniture in the T-2 studio offers a unique characteristic. Using the same construction materials, this furniture implements Harris' Hydraflex feature, which debuted at NAB2002. This allows the furniture height to be adjusted from 30" to 38" at the push of a button with a hydraulic lift system fitted into the legs. This allows the operators the flexibility to adjust the furniture height to their liking. At the 30" height, the furniture is also ADA compliant.

To maintain the open feel of the T-2 studio, the furniture support has open spaces with cable raceways instead of having a solid-block construction. Although subtle, the room does have a more open feel and the design helps with ventilation.

Behind the scenes

In the rack room, the biggest change was the removal of all the patch bays and the installation of an SAS 32KD router. Because of the demand for flexibility in 1993, the patch bays were a natural and safe choice. While the demand for flexibility has not changed, the digital router handles this need with less effort. The router is also integrated into the Harris consoles so input scenes can be recalled and input source labels can be changed.

The original installation also used PR&E Molex blocks for termination. A few still remain for analog sources, but several rows of Krone blocks have been installed for digital audio and data uses.

The fourth room is used as an office for the radio studio staff. Affectionately called the dungeon, this room can be used as a studio if needed. It has the necessary cabling to make it an active space with the addition of the required audio equipment that can be rolled in as needed.

UNIVERSAL STUDIOS ORLANDO

Step outside

Interaction between the operators in the studio and the park visitors outside was important to Universal in the planning process, so monitor speakers were placed over the windows to feed audio. PZM mics were also mounted outside to pick up street noise or to allow the studio to talk to park visitors. To add to the interaction capability, a wireless mic and IFB system is available with enough range to cover the street in front of the studios and well beyond the visual range of the studios.

Because this is a self-contained campus, the Universal IT department can install ISDN lines anywhere on the Universal grounds. Visiting stations can also broadcast from anywhere in the park with a portable mixer and ISDN codec.

The park is open year round, and during the peak season the studios are used almost every day. The associated parks offer visitors plenty of entertainment, and the new radio studios offer visiting stations a modern and efficient space from which to broadcast. It truly has combined form and function in unique way.

Thanks to Harris and Universal Studios for their assistance in preparing this article.

Interested in broadcasting from Universal Studios Orlando? For complete details contact Ross Marvin at (407) 224-7291 or Ross.Marvin@universalorlando.com.

Equipment list

AirTools PH-500 Mic Preamp/Processor
BMXdigital 30 console
Denon DN-M991R Minidisc player/recorder
Eventide BD-500 delay
Eventide DSP-4000B+ effects processor
Fostex D-5 DAT player/recorder
Fostex RM-1 rack mount powered monitor speaker
Hafler TRM10.1 Active subwoofer
Hafler TRM-6 Active monitor speakers
Harris Hydraflex furniture
Harris/Henry World Feed Panel
Harris-Pacific 3×6 headphone amp
Harris-Pacific producer turret
Henry Matchbox
Henry Superelay
LPB silent mic boom
Middle Atlantic rack panels
Orban Opticodec 7000
Orban Opticodec 7400
SAS 32KD Router, interfaced to BMXdigital consoles
SAS AXC-8 XY Router control panel
SAS DSS-8 single output router selector/monitor panel
SmoothLine custom cabinet
Symetrix/Airtools 6100 delay
Tascam 202MKiii dual cassette deck
Tascam CD-RW2000 CD-RW player/recorder
Telos 2×12 broadcast phone system
Waves MaxxStream codec

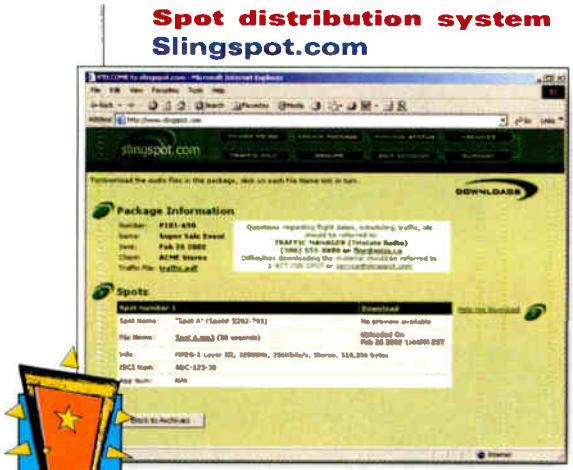
More Online

Visit the Studio Spotlight at www.beradio.com for photos of the Universal Studios radio studios before they were remodeled as well as a special look at the construction of the new studios during the remodeling.

New Products

By Kari Taylor, associate editor

Spot distribution system
Slingspot.com



Audio Delivery Network: A method of moving radio commercials and audio clips, this service brings recording studios, advertising agencies, radio stations and clients together to reduce the workload of spot distribution and trafficing. This system allows recording studios, duplication facilities and advertising agencies to send radio spots quickly to hundreds of radio stations across North America. This product was developed to accommodate all aspects of spot distribution including integrated scheduling, dual notification, proof of delivery and archiving. Users create a package, choose the recipients, traffic and then pass the package to Slingspot.com for delivery.

877-708-SPOT; fax 416-778-9799
www.slingspot.com; info@slingspot.com

Rack-mount preamp/mixer
ATI Group (Audio Toys)

8MX2: The 8MX2 is a companion for digital multitrack systems. It offers eight high-voltage mic preamps in a rack space, and a stereo mix bus with full monitoring capabilities. Each channel also offers a variable threshold limiter as well as full cueing capabilities with metering of level and limiter attenuation.

Each of the mic preamps features a 41-position detented trim control, a 41-position detented adjustable limiter and a 41-position mix level pot. Other features include 48V phantom power switching, a phase-inverting switch, a ground lift switch and a mix assign and mute switch.

301-776-7879; fax 301-776-8117; www.audiotoys.com; sales@audiotoys.com

Audio module
Harris

Intraplex PT/PR-353: For use in the Intraplex STL Plus, the PT/PR-353 IBOC audio module provides digital transport of as much as 22.5kHz bandwidth, CD-quality stereo and uncompressed audio with sampling rates of 32kHz, 44.1kHz and 48kHz. The STL Plus combines audio signals with other audio, voice and data traffic for transport over T1, E1 and other high-speed digital lines. With no data compression used in the process, the effects of encoding and decoding algorithms are reduced.

800-622-0022; fax 513-459-3890
www.harris.com; broadcast@harris.com

Microphones
OKM
Soundman

PX and PXS: The Pop (PX) microphones and the Pop Studio (PXS) microphones are designed for above-average SPL. The Pop Studio mic offers a channel difference of less than 0.5dB. This range of stereo headset microphones, which is useful for mini recording systems (DAT and mini-disk), provides a quality stereo image. These mics plug into any computer sound card, mini recorder or camcorder.

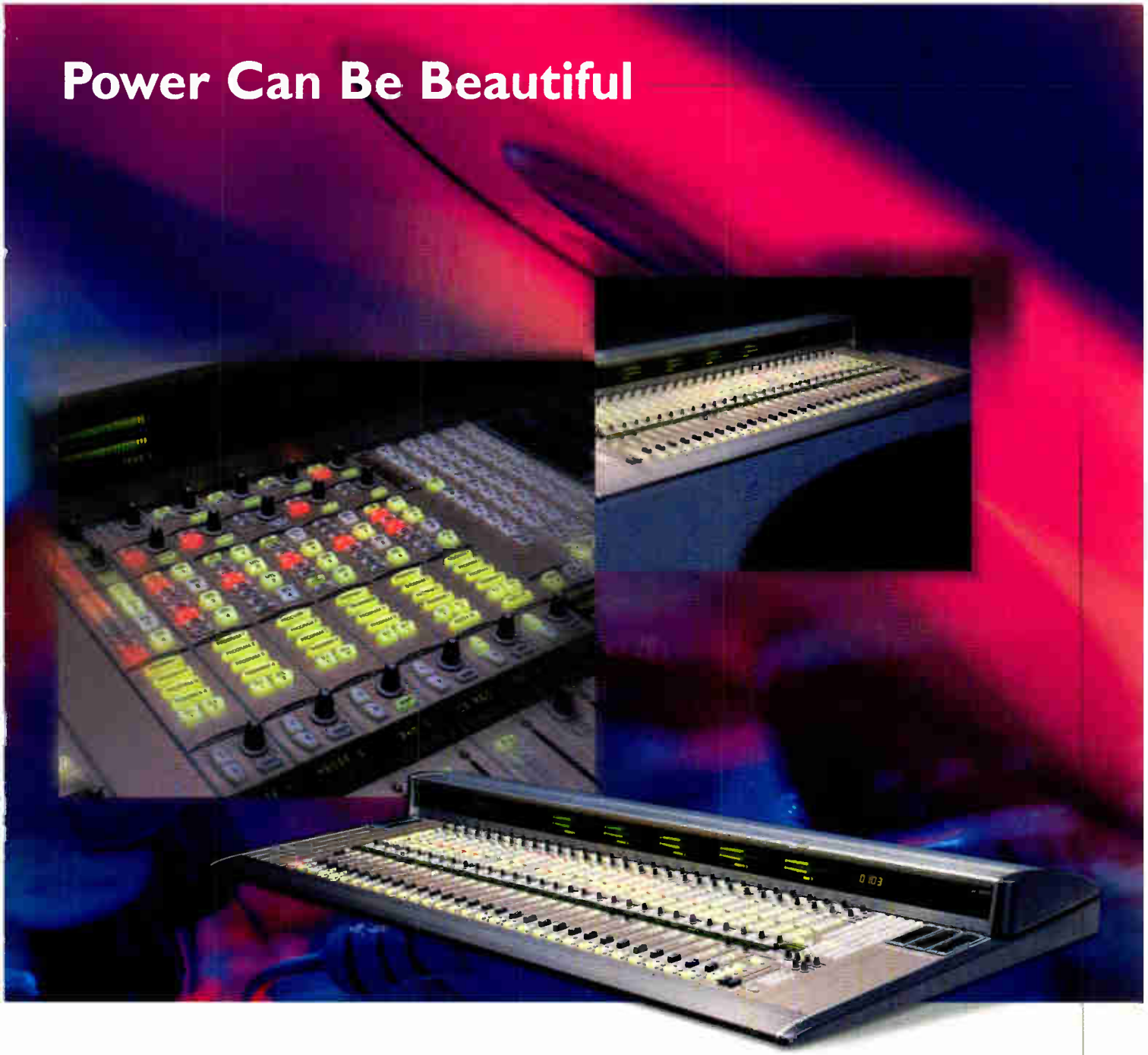
207-773-2424; fax 207-773-2422
www.independentaudio.com; info@independentaudio.com

Vent panels
Holland Shielding Systems

Modular EMP vents: This range of vent panels offer not only EMI shielding, but also protection against electromagnetic pulses (EMP). The modular system can be assembled into frames as long as six meters. The material is zinc-plated steel, stainless steel or aluminum. These panels are also available in a honeycomb structure for smaller sizes in enclosures and cabinets.

+31-0-78-6131366; fax +31-0-78-6149585
www.hollandshielding.com; info@hollandshielding.com

Power Can Be Beautiful



Sure, it's the best looking broadcast console you've ever seen. But beneath the sleek, elegant exterior beats the heart of a true warrior! Harris' BMX*digital* by Pacific has everything you need to win the digital revolution. Whether it's the number of output buses, mix-minuses, off-line mixes, stereo sends, direct IFB's, monitor inputs and outputs, inter-communication paths or logic interface, BMX*digital* offers more.

BMXdigital

Incredible Flexibility including all input modules accommodate analog and digital signals without reconfiguring, swapping, or even removal from the mainframe.

Amazing Adaptability with easy storage, recall and reconfiguration of set-ups for various day parts, and built in connectivity to routing switchers, digital storage systems and other networked sources.

Low Cost of Ownership by design, Harris' BMX*digital* is true cost of installation, operation and maintenance is markedly lower than other consoles.

Legendary BMX Reliability is what you expect in a Harris console by Pacific. The table pounding of your resident shock jock won't faze this beauty.

Harris' BMX*digital* by Pacific. Beauty that's a lot more than skin deep.

next level solutions

SERVICE

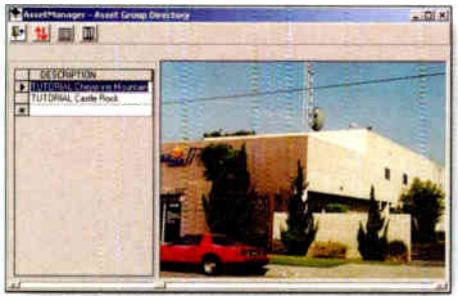
SYSTEMS

AUTOMATION

TRANSMISSION

HARRIS

www.broadcast.harris.com • 1.800.622.0022



Site software
Softwright

Oversite: This software consists of two independent modules that operate under Windows 95/98/NT 4/W2K/XP. The Asset Manager module documents the details of how equipment is cataloged, installed and maintained at fixed radio sites, as well as similar information about mobile units that are being maintained. The Intermodulation Products Module predicts and helps resolve undesired intermodulation products at a radio site. These modules share a common database with the Softwright Terrain Analysis Package software, eliminating the need to rekey information required to do future radio coverage studies.

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

Telco interface
Pulsecom

Program Channel Access Unit: The Apt-X algorithm used by the Pulsecom/APT PCAU provides encoding and decoding, and supports multiple tandem connections without degradation. The Pulsecom/APT PCAU is useful for Secure Link applications. Its Apt-X compression technology delivers secure, encoded audio communication links that make the Pulsecom/APT PCAU useful for protection against Internet hacking, public switched network access and signal pirating. In standalone mode, this PCAU can provide broadband audio over as much as three miles of standard twisted-pair telephone wire, making it useful for a campus, high-rise building or intra-studio applications. Optimized for disaster recovery situations, the unit's clear, crisp audio transport avoids jumbled emergency communications. It withstands Seismic Zone 4 events, is resistant to airborne contaminants and immune to external EMI interference per Telcordia GR-CORE-1089 and GR-CORE-64.

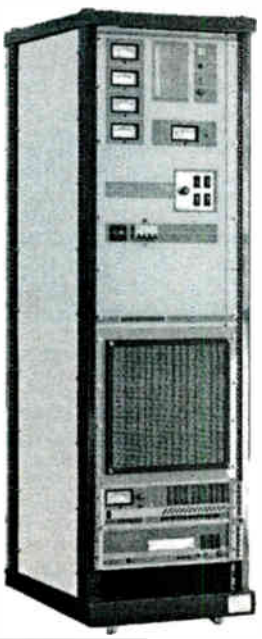
800-381-1997; fax 703-471-2951
www.pulse.com

Coming in December:
The *Radio* magazine Buyers Guide

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

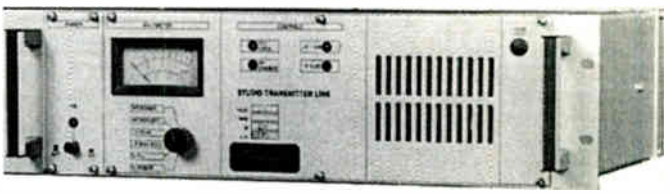
Superior Broadcast Products offers a wide range of transmission line and accessories

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

On-air mixer
LPB

Airmate-Airmate Mixer: Built around low-noise circuitry, this console is a workhorse for the efficient self-op production DJ. Eight triple input modules in a 19" rack mounted, RF-shielded steel chassis offer flexibility. Line B can accept a plug in R.I.A.A. equalized phono pre-amp on each module. Every module has a balanced mic input with phantom power as standard. The front panel on switch is wired in series with the fader start switch to select a fader start or a hard start. Fader start is only active in the line mode of the module. The start jack connector is wired to a completely isolated, sealed reed relay for perfect interfacing with different types of equipment. A level restricted three-band equalizer corrects frequency problems. The aux send is pre- or post-fader jumper able on the PCBs. A jumper on the mic input signal path activates a high cut.

610-825-4100; fax 610-825-4047
www.lpbinc.com; lpbinc@aol.com

Nearfield monitor
Klein + Hummel

O 110 D: This monitor can be directly connected to the digital output of a console and offers all the audio features of the analog model, with a 24-bit word length resolution and a sampling rate of 32kHz–96kHz. It also features a 2 × 4 position room equalization to adapt to various positioning options and is magnetically shielded for installation next to a TV monitor. The cabinet and baffle are made of a low resonance integral molding (LRIM) material that forms an HF-elliptical waveguide into the baffle to achieve good directivity. It also avoids unwanted edge diffraction and standing waves inside the cabinet. This monitor is useful for nearfield monitoring in small spaces. It can also be used as a rear monitor for surround applications together with larger front and center monitors.

+49 711 45 89 30; fax +49 711 45 89 335
www.klein-hummel.de; sales@klein-hummel.de

Radio facility automation

Gangverk ehf

Mayo Radio System: Radio automation adds many new sources of revenue to a radio station including SMS revenue sharing with mobile operators, e-commerce and m-commerce revenue sharing, targeted online advertising, cost savings through automation and demographic knowledge to be used for the targeting of radio advertising. This company helps radio stations develop a Web and mobile presence that provides the station with dedicated listeners and feedback. The website is customizable to a station's look and feel, or can be integrated with an existing website. Through Web or mobile interfaces listeners can view the station's active logs in real time, select music for broadcast, send messages with selections, receive SMS notifications when friends select music, follow their personal top 10 charts as well as those of others and receive SMS notifications before a favorite song, CD or artist is played. The system is split into two components: the informational and music selection components. The informational component consists of all features excluding the listener music selection. Either of the components can be used by existing radio stations without replacing their current radio automation and on-air software.

+35 45 11 12 70; www.gangverk.is

Studio warning light controller
Jasoni Electronics

Kontrollex Model A-1: The A-1 system was designed for use with audio mixers that do not have the capability for muting speakers when live microphones are used in the same studio as monitoring speakers. This system also turns on a warning light at the same time the speakers are muted. The studio warning light can be programmed to illuminate in a solid or flashing mode. An adjustable reset time is set by an outboard control. When the switch's circuit is open the unit will operate, when closed the unit resets. It operates on five to 35vdc. Remove the voltage and the unit resets. If self-powered speakers are used in the monitoring system, RCA jacks are used to loop through the audio send to the speakers. Multiple lights can be used.

702-791-3394; fax 702 732-2200

Digital broadcast console
Otari

DB-10: The DB-10 console's digital audio I/O (four AES/EBU inputs, two S/PDIF inputs, two AES/EBU outputs, one S/PDIF output) supports 32kHz–96kHz sampling. The console offers 10 input channel faders. Channels five through 10 are provided with an input A/B switching function. The four channels of microphone inputs are always connected to channels one through four. The remaining two line input channels, six stereo analog input channels, four AES/EBU input channels and two SPDIF input channels can be routed to the A/B inputs of channels five through 10. This console can store these setups in its internal memory: 99 snapshots, nine projects (console settings) and 20 compressor presets. By connecting the console to an external PC via RS-232, snapshots and projects can be saved and loaded easily. With the password protect function, certain items in the menu system are accessible to only specified users. There are two user levels, and the console differentiates the users by the password used to log in. Also, specified buttons can be locked out to prevent misoperation. If the digital system should malfunction, pressing the EMG button connects one mic path and one stereo line path to the program bus to feed the minimum audio signals to the main output.

800-877-0577; fax 818-594-7208
www.otari.com; sales@otari.com

Data manager
Radio Future

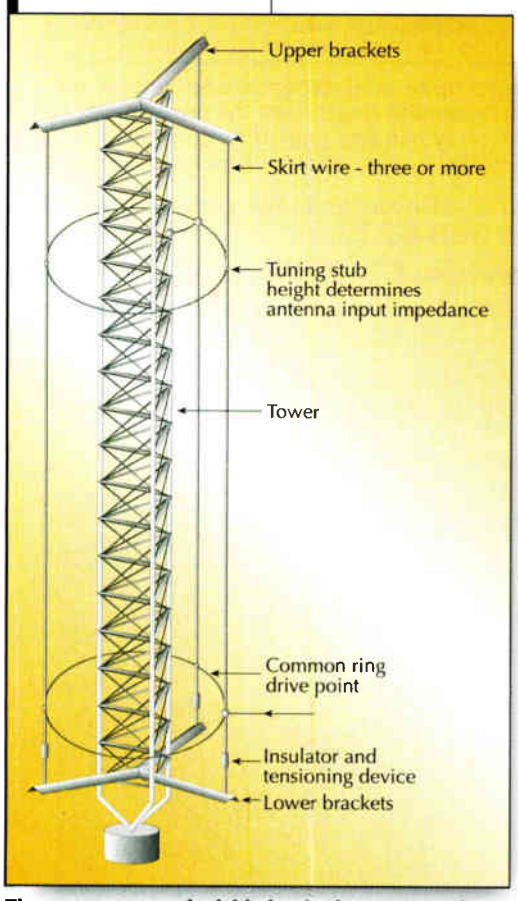
RDS/DAB-Box: This software was created so radio stations can manage, generate and automatically transmit any RDS/RBDS data. RDS/DAB-Box generates cyclic data and sends it to existing RDS coder stations. RDS data is generated automatically using a programmable schedule, or interactively driven by a remote studio. The software converts data from an automation system and delivers it to an RBDS encoder for dynamic RBDS content. It is available in four versions with varying features.

713-874-0820
www.radiofuture.com; info@radiofuture.com

The folded unipole

By Ron Nott

The folded unipole has been in use in AM broadcasting for more than four decades, providing adequate time to view it in retrospect. Perhaps the earliest instance that it appeared in print was in *Radio Antenna Engineering* by E. A. Laport in 1952. The fundamentals have not changed much since then, but experience has provided several improvements as well as some weaknesses. There is more to unipoles than just suspending some wires alongside a tower.



The components of a folded unipole antenna. These are typically sold as a kit and installed by a qualified tower climber.

If the skirt wires are placed too close to the tower, the shunt capacity between them can defeat the advantages. The wires must be placed at least 18" from the face, and preferably 30" except in special cases. Early unipoles were built using guy wire in the skirts, but the steel wire would cause a 20 percent or more loss in efficiency. For good efficiency, the skirt wire must be copper or aluminum clad. The wire should also be stranded to prevent wind vortexing, which causes vibration.

Installing a folded unipole does not guarantee broad bandwidth. In general, retrofitting a thin, series-fed tower will result in an improvement, but if the antenna is significantly shorter than a quarterwave, bandwidth may be limited. If top loading can be incorporated on a short tower, the unipole can be designed to provide support brackets for the top loading as well as the skirt wires. An advantage of the folded unipole on a short tower is that it normally transforms a low drive point resistance upward, which can improve efficiency and provide easier impedance matching.

Years ago, it was believed that the unipole provided antenna gain and circular polarization. Neither of these is true. In some instances, the folded unipole may provide a small gain, perhaps a fraction of 1dB, because of the decrease in the length-to-diameter ratio. This causes a slight reduction in the velocity of propagation within the antenna, which may make the tower appear to be slightly taller than it actually is. In any case, there is no dramatic improvement. In instances where the bandwidth has been improved, there have been apparent improvements in the effective range of the station due to improved sideband VSWR.

The folded unipole can be modeled using NEC programs, but this can be time consuming. The late John Mullaney had a program written specifically for designing this antenna that was fast and usually accurate. Two interesting phenomena have been discovered while using this program:

- Bandwidth may be optimized. While other factors are also involved, an antenna height between 105 and 115 electrical degrees may be found to have extremely broad bandwidth. This has been confirmed in practice.
- Impedance of short towers may be transformed upward. When a short tower is retrofitted with a folded unipole, an inductor may be placed across the base insulator that will increase the drive point resistance. In some cases this can improve the antenna efficiency. It must be pointed out that for short antennas with substantial transmitter power, RF current through the inductor may be high.

Another advantage of the folded unipole is that it is installed on a grounded tower, which allows installation of UHF and VHF antennas for rental income on the tower. The grounded structure also eliminates lighting chokes and provides a more direct path to ground for lightning. The unipole performs well in directional antenna service if it is properly incorporated into the design. When installed in an area prone to flooding, it can be designed to continue functioning when series-fed antennas fail.

In some instances, the unipole can allow an FM or communications tower to serve as its supporting structure. If the structure is too tall, the upper portion can be detuned, but bear in mind that the guy wires must be segmented, which may be the most expensive part.

Nott is president of Nott Ltd., Farmington, NM.

Radio Classified

Professional Services

Help Wanted

For Sale

Publications

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 5YJ
Telephone: +44 1295 278 407
Fax: +44 1295 278 408
E-mail: richardwoolley@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
Marie Briganti, Statlistics
Telephone: (203) 778-8700 x146
Fax: (203) 778-4839
E-mail: primedia@statlistics.com

EDITORIAL REPRINTS
Wright's Reprints
Telephone: (877) 652-5295, ext. 106
E-mail: eramsey@wrightsreprints.com

Contributor Pro-file

Meet the professionals who write for *Radio*. This month: Stress-free systems, page 24.

Michael Patton
Owner
Michael Patton & Associates
Baton Rouge, LA

Patton has built more than 125 studios during his career, and he enjoys working on AM directional antennas, rebuilding transmitters and troubleshooting RF and audio equipment. He has built a 50kW AM (a two-tower DA) in Honduras, is building an island-wide chain of transmitter sites in Jamaica, is writing custom software for AM broadband tuning network design and is building the NPR affiliate stations' studio facilities in Houston and Louisville, KY.

Radio™
THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

Radio™
THE RADIO TECHNOLOGY LEADER

A PRIMEDIA Publication

www.beradio.com
beradio@primediabusiness.com

Radio, Volume 8, Number 10, ISSN 1081-3357 is published monthly 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.

SUBSCRIPTION RATES: Free and controlled circulation to qualified subscribers. Non-qualified persons may subscribe at the following rates: USA and Canada, 1 year, $50.00, 2 years, $95.00, 3 year, $140.00. Outside the USA and Canada, 1 year, $65.00, 2 years, $125.00, 3 years, $185.00 surface mail (1 year, $105.00, 2 years, $205.00, 3 years, $305.00 airmail delivery). For subscriber services or to order single copies, write to Radio, 2104 Harvell Circle, Bellevue, NE 68005 USA; call (866) 505-7173 (USA) or (402) 505-7173 (Outside USA); or visit www.beradio.com.

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 2100, Skokie, IL 60076-7800 USA.

REPRINTS: Contact Erlene Ramsey at Wright's Reprints to purchase quality custom reprints or e-prints of articles appearing in this publication. Phone: (877) 652-5295 (ext. 106) E-mail: eramsey@wrightsreprints.com.

Advertiser Index

Advertiser	Page Number	Advertiser Hotline	Advertiser Website
360 Systems	54	818-991-0360	www.360systems.com
AEQ	19	954-581-7999	www.aeqbroadcast.com
Altronic Research	57	800-482-5823	www.altronic.com
Aphex Systems	25	818-767-2929	www.aphex.com
Armstrong Transmitters	38	315-673-1269	www.armstrongtx.com
Arrakis Systems	11, 34, 48	970-224-2248	www.arrakis-systems.com
ATI Audio Technologies	65	800-959-0307	www.atiguys.com
Autogram	62	800-327-6901	www.autogramcorp.com
Bay Country	63	410-335-3136	www.baycountry.com
Broadcast Tools	11	360-854-9559	www.broadcasttools.com
BTSG Systems	65	318-395-8410	www.btsg.com
Burk Technology	57	800-255-8090	www.burk.com
CCA Electronics	50	770-964-3530	www.cca.ws
Circuitwerkes	59	352-335-6555	www.circuitwerkes.com
Clear Channel Satellite Services	58	800-345-8728	www.clearchannelsatellite.com
Comrex	9	978-784-1717	www.comrex.com
Continental Electronics	33	800-733-5011	www.contelec.com
Cortana	64	888-325-5336	www.cortanacorporation.com
Creative Studio Solutions	44	303-426-5004	www.creativestudiosolutions.com
Danagger Audio Works	61	888-892-8346	www.danagger.com
Dielectric	31	866-DIELECTRIC	www.dielectric.com
DPA Microphones	35	519-745-1158	www.dpamicrophones.com
Electronic Associates	50	915-595-3103	www.elecassoc.com
ERI-Electronics Research	64	812-925-6000	www.ERIinc.com
ESE	16	310-322-2136	www.ese-web.com
Fanfare FM	62	800-26-TUNER	www.fanfare.com
Full Compass	7	800-356-5844	www.fullcompass.com
Gorman-Redlich Mfg. Co.	63	740-593-3150	www.gorman-redlich.com
Harris Corp. Broadcast Div.	3, 21, 53	800-622-0022	www.broadcast.harris.com
Henry Engineering	56	626-355-3656	www.henryeng.com
Inovonics	12	831-458-0552	www.inovon.com
Kagan World Media	61	831-624-1536	www.kagan.com/conferences/krs
Kintronic Labs	16	423-878-3141	www.kintronic.com
Klotz Digital America	5	678-966-9903	www.klotzdigital.com
Logitek	51	800-231-5870	www.logitekaudio.com
Mager Systems	30	623-780-0045	www.magersystems.com
Mediatouch	13	888-665-0501	www.omt.net
Mediatron	44	800-779-7575	www.mediatron.com
MIJO Corporation	6	877-708-7768	www.slingspot.com
Mooretronix	62	800-300-0733	www.mooretronix.com
Mouser Electronics	64	800-346-6873	www.mouser.com
Nautel Electronics	37	902-823-2233	www.nautel.com
Neumann Microphones	43	860-434-5220	www.neumannusa.com/103BER
Nott Ltd.	65	505-327-5646	www.nottltd.com
OMB America	41	305-477-0973	www.omb.com
Otari Corporation	23	800-877-0577	www.otari.com
Patriot Antenna Systems	42	800-470-3510	www.sepatriot.com
Primedia Business New Media	29, 47	212-204-2622	www.primediabusiness.com
Radio Soft	39	888-RADIO95	www.radiosoft.com
Radio Systems	49	856-467-8000	www.radiosystems.com
RAM Broadcast Systems	19, 50, 63	847-487-7575	www.ramsyscom.com
RF Parts	61	800-737-2787	www.rfparts.com
rf Software, Inc.	59	352-336-7223	www.rfsoftware.com
Sierra Automated Systems	17	818-840-6749	www.sasaudio.com
Sine Systems	38	615-228-3500	www.sinesystems.com
Spacewise	65	800-775-3660	www.spacewise.com
Stardraw	32	+44-2072-038395	www.stardraw.com/beradio
Superior Broadcast Products	55	800-279-3326	www.superiorbroadcast.com
Syntrillium Software	15	888-941-7100	www.syntrillium.com
TieLine Technology	26	888-211-6989	www.tieline.com
Transcom Corp.	62	800-441-8454	www.fmamtv.com
V-Soft Communications	61	800-743-3684	www.v-soft.com
Wheatstone	2, 71, 72	252-638-7000	www.wheatstone.com
Zero Manufacturing	56	800-547-3960	www.zerocases.com

www.beradio.com

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

Shaping radio today and tomorrow

By Kari Taylor, associate editor

Do you remember?

Did you know that the PC turns 21 this year? IBM launched the personal computer, the IBM 5150, in 1981. But even before the PC, IBM introduced a variety of small computers for individual users. The IBM 5100 Portable Computer is one of the PC's ancestors.

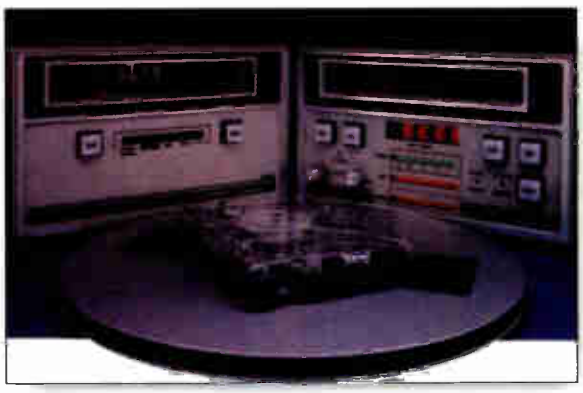
Weighing about 50 pounds and slightly larger in size than an IBM typewriter, the 5100 Portable Computer made its debut in the company's General Systems Division (GSD) in September 1975. This portable computer was intended to put computer capabilities at the fingertips of engineers, analysts, statisticians and other problem solvers. Available in 12 models and providing 16K, 32K, 48K or 64K of main storage, the 5100 cost between $8.975 and $19,975. It was available with APL or BASIC programming languages.

Three Problem-Solver Libraries, contained in magnetic tape cartridges, were offered with the IBM 5100 to provide more than 100 interactive routines applicable to mathematical problems, statistical techniques and financial analysis. The cartridge had a 204,000-character capacity on 300 feet of ¼ inch tape.

Information provided by IBM.

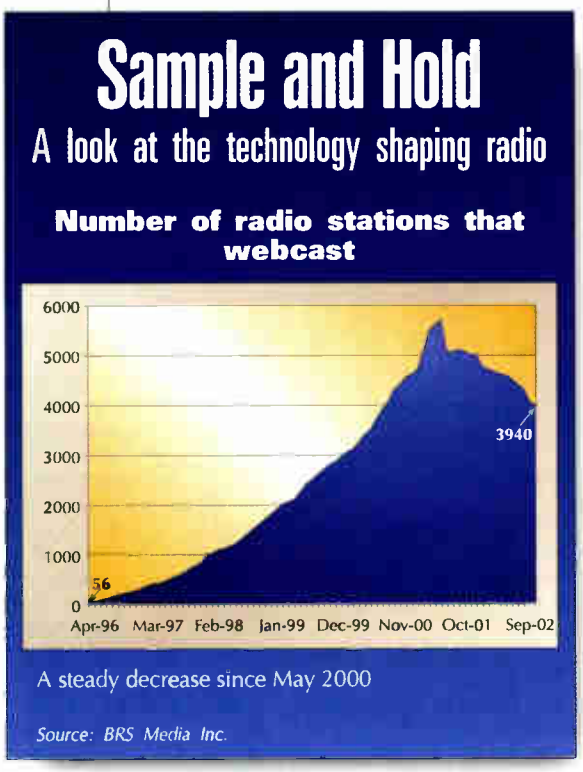
That was then

Intended to solve phase stability and noise problems, the 1982 Phasemaster by Ramko, Rancho Cordova, CA, was a production system that used variable delays in each of the



output channels. A sample of the left program channel was encoded on the cue track, and decoding in the playback cycle was compared to its upper track mate. The signal-to-noise ratio for the Phasemaster was −68dB and it offered a 0.25dB frequency response. The distortion level amounted to 0.3 percent max.

The system offered compatability with all present and previously recorded carts. The transition could be made at the users own pace without having to immediately rerecord the station's entire library. The cost of a Phasemaster started at $1,091 and went up to $1,399, depending on the model chosen.



It's a Good Thing!

Introducing our NEW flagship radio console: the D-8000 Digital On-Air Board

It's NOT just Zeros and Ones...

When it comes to digital, ***EXPERIENCE COUNTS***

WHEATSTONE'S TRADITIONAL CONTROL INTERFACE *gets your operators up and running in minutes — not days.*

THE D-8000 HAS IT ALL:

- **UNIVERSAL INPUT MODULES** accept analog or digital signals — no upgrades required
- **WHEATSTONE'S EXCLUSIVE BUS-MINUS®** gives you an individual MXM feed (w/talkback interrupt) from every Bus-Minus® input module
- **ALL INPUT CHANNELS** have alphanumeric source displays above each fader
- **BUILT-IN SERIAL COMMUNICATION** interfaces with WHEATSTONE BRIDGE network router and many automation systems
- **CHOICE OF MASTER CLOCK RATES:** 32, 44.1, 48KHz or external reference

PRODUCTION VERSION ADDS:

- **PROGRAMMABLE SENDS**: every input generates two aux sends; each selectable pre/post-fader and pre/post-on/off
- **INDIVIDUAL CHANNEL DSP**: each input has its own four-band EQ, HPF, compressor-limiter, ducking and digital level trim
- **EVENT RECALL:** up to 99 preset snapshots of all channel settings

THE WHEATSTONE D-8000

Digital that WORKS!

Wheatstone

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

THINK *INSIDE* THE BOX

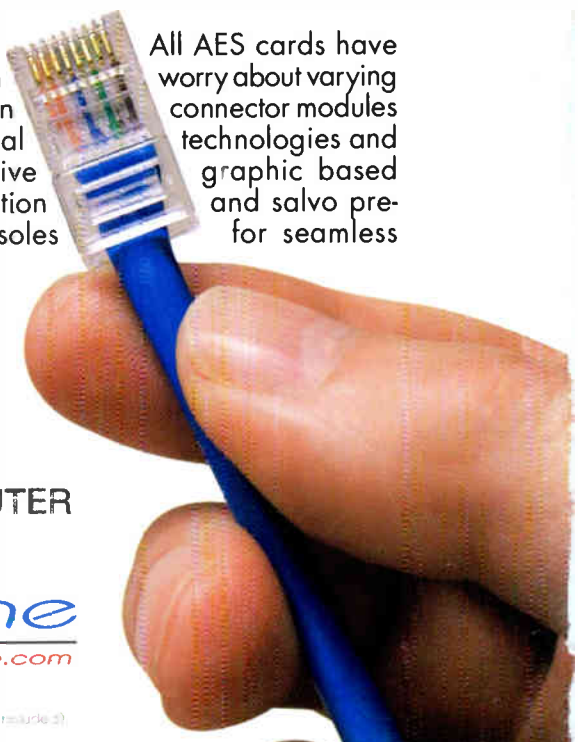
ONE INTERCONNECT DOES IT ALL!

THAT'S RIGHT—ONE DUPLEX FIBEROPTIC LINK OR A SINGLE CAT-5 WIRE = 64 channels of simultaneous bi-directional digital audio, intercage communication, logic signals, X-Y controller commands, plus auxiliary RS-232 data streams. *This single interconnect between your studio and central rackroom can save you thousands—if not TENS of thousands—of feet of wire in a typical installation!*

THE WHEATSTONE BRIDGE DIGITAL AUDIO NETWORK ROUTER can start small with a single cage and only a few cards, or fully populated units can be stacked to form larger systems. Wheatstone's STAR TOPOLOGY ARCHITECTURE lets you connect multiple locations to your central rack room, providing shared resources for all yet still permitting independently functioning studios, each with its own combination of plug-in modules specifically suited for a select set of gear.

SIGNALS ARE ROUTED entirely in the digital domain. All AES cards have sample rate converters on each input, freeing you from worry about varying sample rates throughout your facility. A family of plug-in connector modules makes installation easy, letting you mix varied signal technologies and standards all within the same cage. WHEATSTONE'S intuitive graphic based setup software handles system configuration, matrix selection and salvo presets. All systems interface directly with Wheatstone consoles for seamless source selection and display.

THE BRIDGE
DIGITAL AUDIO NETWORK ROUTER



Wheatstone

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