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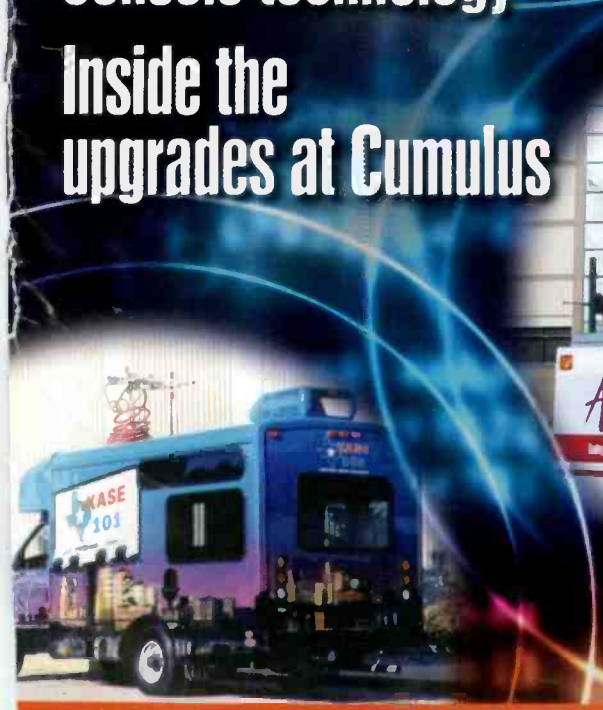

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Find the Mic Sweepstakes winners - page 37

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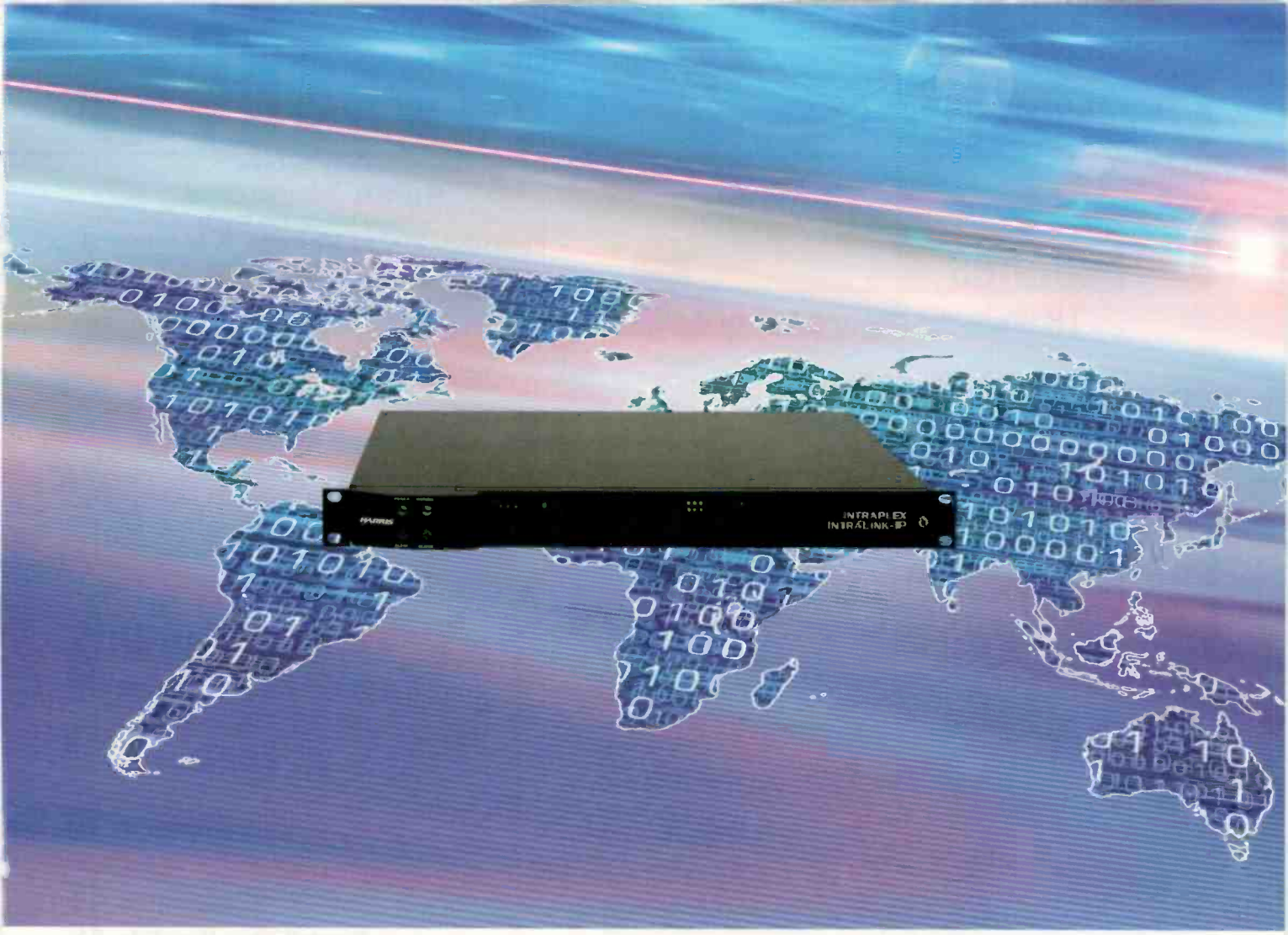

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Value
Style

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Currents Online

Highlights of news items from the past month

Whad'ya Know Gets an MH4

Wisconsin Public Radio installs a Soundcraft console for studio and live use.

Dielectric Acquires Flash Technology

The Tennessee-based tower lighting group is sold by American Tower.

Supreme Court Approves Copyright Extension

The Congressional extension is supported by the U.S. Supreme Court in a 7-2 decision.

Rosen to Leave RIAA

After 17 years with the RIAA, Hilary Rosen announces plans to leave the organization.

Broadcast Electronics Adds Staff

Criss Onan becomes key accounts manager, Steve Schott and Ellis Terry take on regional sales duties and Lowell Smith is added to customer support.

WGAB Evansville Offered on Ebay

The owner lists his stations with an opening bid of $50,000 and a Buy-it-Now price of $2M.

Site Features

Engineer's Notebook

Grady Moates shares his pseudo-binary interface to monitor tower lights. Select the Electronics tab.

Stolen Equipment Alert

KWRO-AM, Coquille, OR, reported a stolen Orban Optimod 9200 on Jan. 25.

Advertiser Links

Find easy Web links to the advertisers in *Radio* magazine.

Industry Events

Stay current with all the regional and national shows and conventions.

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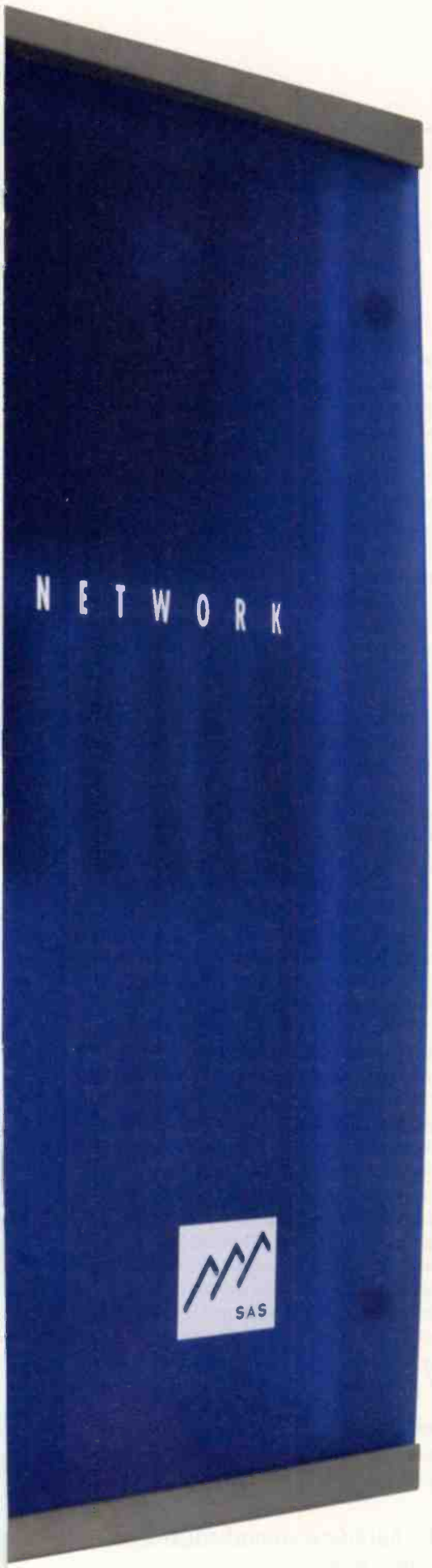

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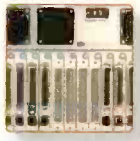

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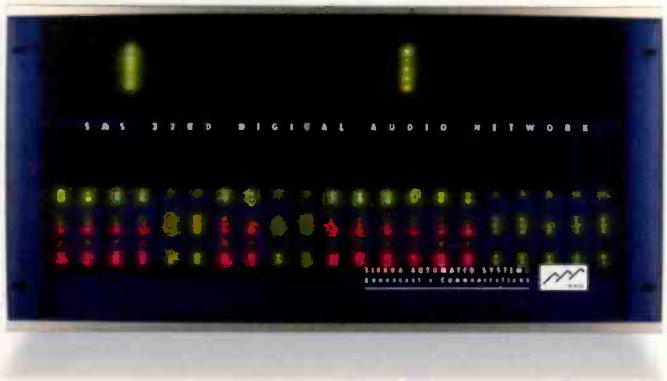

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The path to IBOC

Now that CES is over and IBOC has made its splash as HD Radio, many new questions are being raised just as broadcasters begin to understand the answers to the existing questions.

I'll skip ahead and bypass the elements of creating the digital signal in a hybrid transmission mode. *Radio* magazine has already covered this in many ways, and we will continue to do so as new developments arise. Now that stations are beginning to install IBOC systems on their own, the focus changes from how to install it, to how to do what might come next.

Beyond the technical issues, several existing questions remain. Return on investment is the primary concern, which covers a broad scope. The simple formula weighs the costs of installation and operation of an IBOC system with the eventual benefits. Ibiquity touts the improved audio performance, a greater immunity to transmission interference and the potential to transmit additional data services as a source of revenue. Let's look at these points with an eye to the future.

One audio plus is that IBOC removes the audio pre-emphasis and de-emphasis in the transmission system, which improves high-frequency clarity. IBOC also offers a wider audio frequency bandwidth than existing analog services.

The main audio drawback is that the system uses a data compression algorithm to cram the bits into a comparatively narrow pipe. It won't be linear audio. While the codec being used (Lucent's Perceptual Audio Coder, or PAC) sounds good, it's not perfect. This is not a fault of the algorithm, it is the design of all perceptual encoding methods. One advantage is that consumers are growing accustomed to data-reduced audio sources.

Depending on your preference, the severe data reduction carries an extra benefit or added nuisance. Heavy data reduction does not work well with high levels of audio compression. Stations that heavily process may need to rethink their processing approach. I have looked into this as part of my pre-NAB planning and have found that Harris has been working on this behind closed doors and will discuss these plans at NAB2003.

In addition to the new approach to processing, there will be no more pushing the modulation limit. The digital limit has no red zone. Full-level digital is full level and no more.

At some point we will see the IBOC equivalent to the modulation monitor. For now, the stations that are on the air follow the "if you can hear it, the levels are OK" approach. In IBOC, carrier deviation will not buy loudness, but stations will need a way to monitor occupied spectrum, bit-error rates and encoder accuracy. The system has limitations, but we will want to get the most from what we have.

What about the data? This is an area of development in its infancy. While FM has been able to transmit data with RBDS, this never really caught on in the United States for several reasons. It was a solution looking for a problem that never really worked well with the broadcast model in North America at the time it was introduced.

Now we have a data pipe and a software-driven transmission method. As features are added, stations can load updated operating systems, audio encoding algorithms and data standards as they are developed. The difficulty in making these changes to an existing consumer receiver base ensures that the advances must be backward compatible.

The IBOC rollout will take some time. Because it is not mandatory for stations to make the conversion, those who oppose the system can choose not to implement it. For now it supports only one audio stream and limited data. There are no formal plans to do more, but this continues to be a work in progress. As acceptance grows, transmitter manufacturers and data-capacity developers will work with Ibiquity to continue the evolution.

We're currently watching the rollout of IBOC 1.0. As the technology evolves, later upgrades may quell the current shortcomings, real or imagined. It's possible that a future technology will take us on another course as well. For now, watch the stations that are making the move. Learn from their experiences and continue fine-tuning your own plan for the future.

Chriss Scherer, editor
cscherer@primediabusiness.com

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The changes to EAS

by Chuck Wolf

Broadcasters will benefit from the FCC's changes to the Emergency Alert System (EAS). Among the changes: Stations now have more time to rebroadcast the required monthly test, new event codes for emergencies and the ability to save lives as well as increase ratings.

More time to rebroadcast

The FCC adopted a Report and Order (FCC-02-64) on Feb. 22, 2002, that increased the time period for rebroadcast of the required monthly test from 15 minutes to 60 minutes. The increase allows stations to more easily fit the 30-second test into their normal programming. Download the entire Report and Order from the FCC's Electronic Document Management System (EDOCS).

Unlike the required weekly test that each station airs, the required monthly test is initially broadcast by the state or local primary station for the EAS operational area. All broadcasters and cable outlets must log receipt of the required monthly test, then rebroadcast the test within 60 minutes.

There are a few important details. A station's air staff cannot read the required monthly test script; it must be rebroadcast as carried by the local primary station. Because stations are required to monitor at least two EAS sources, a station may receive another required monthly test when the alternate LP-2 station rebroadcasts the LP-1's test. This test should be logged.

Clarifying codes

The FCC adopted 20 new event codes. Until now, all state and local emergencies were lumped together under one event code called Civil Emergency Message. Air staff often had to listen to the entire contents of each CEM message before deciding whether or not to rebroadcast it.

Now representatives from local broadcasters and cable systems can meet with their local and state offices of emergency management and the National Weather Service to jointly select the event codes that may affect their area. For example, the Houston Local Emergency Communications Committee (LECC) recently voted to replace the generic CEM event code with six new event codes that take effect in March 2003.

The major manufacturers of EAS equipment are offering hardware or software upgrades for the new event codes. All EAS equipment manufactured after Aug. 1, 2003, must be able to selectively receive, display, transmit and log the event codes. Stations that replace their EAS equipment after Feb. 1, 2004, must install EAS equipment with these capabilities.

Child abduction emergency

The Child Abduction Emergency event code was adopted to meet the tremendous growth in state and local AMBER (America's Missing: Broadcast Emergency Response) Plans. The Association of Radio Managers in Dallas started the nation's first AMBER Plan in 1996 after the abduction and murder of nine-year-old Amber Hagerman.

In 2001, the National Center for Missing and Exploited Children started a campaign to expand AMBER programs nationwide. Today, there are 66 local, regional and statewide AMBER Plans across the nation. Twenty-four of those programs are operated on a statewide level. Most use a combination of EAS, website and e-mail distribution, highway message signs and broadcast fax to disseminate Amber Alerts to the media and general public.

Boost your ratings

Stations that agree to voluntarily broadcast state and local EAS messages may not only save their listeners' lives, but also could increase their ratings, listener loyalty and public service image.

One advantage of transmitting the EAS codes is that the codes will activate tone-alert EAS receivers available to consumers. For example, ASI Industries manufactures the tone-alert Emergency Alert Sentinel receiver that can be tuned to any AM or FM radio station, whether you are the local primary station or not. Anytime the station activates EAS, the receiver will tone-alert and then play the message.

Another image booster idea is a sales promotion where local advertisers donate EAS receivers to local schools, day care centers, hospitals, nursing homes, government agencies and other at-risk facilities.

Wolf is chairman of the Houston, Texas-area LECC.

More online

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Houston AMBER Plan
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NCMEC
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Often-forgotten FCC rules

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

The FCC creates and enforces the rules that radio stations live by. Inevitably, it seems that the chief engineer is regarded as the fount of all FCC knowledge.

Long ago, when stations had engineering staffs, a station would have a chief RF engineer and also a chief audio engineer. Talent weren't allowed to touch a disk, and with eight-hour shifts at the transmitter with a complete set of readings taken every half-hour, the chief engineer was an important person.

The station engineer is often the person who prepares applications for filing with the FCC, and who is responsible for the safe keeping and exhibition of licenses and associated FCC material. In small stations the chief engineer should be consulted concerning the compilation of the public information file (PIF) because of his familiarity with the FCC. Responsibility for the compilation of the PIF should not be dumped on the chief engineer alone. The station manager, or his responsible delegate, should work with the chief engineer. Only the station manager or his appointees will be familiar with the actions taken to meet local listening area needs, or complaints concerning programming. Often signal interference letters are mailed to the station but are lost on their way to the engineering department.

Keep a current set of FCC rules on hand at every station and familiarize yourself with any changes as they are made.

Many years ago the Commission's rules were divided into logical groups so that technical and administrative requirements were kept separate. However, now that AM, FM and TV technical rules are interspersed throughout Part 73, it becomes important to read every rule.

When the FCC was formed in 1934, the existing rules inherited from its predecessor, the Federal Radio Commission, were incorporated plus additional rules necessitated by expanded broadcast activity. It seems that the number of rules peaked around the 1970–1980 period. Since then they have been decreasing in the old, original technical area, while adding new technical rules as communications science advances in the more esoteric systems.

In the early days of radio broadcasting equipment tended to be unstable and its continuous performance capabilities were unknown. As a result, it was necessary for the FCC to publish strict, and in many ways confining, rules to ensure efficient operation and prevent interference. Most of the old, restrictive rules have been eased, particularly in the area of AM directional antenna operation. It's interesting to note however, that the original AM frequency stability rule of plus or minus 20Hz has not changed.

The modern rulebook

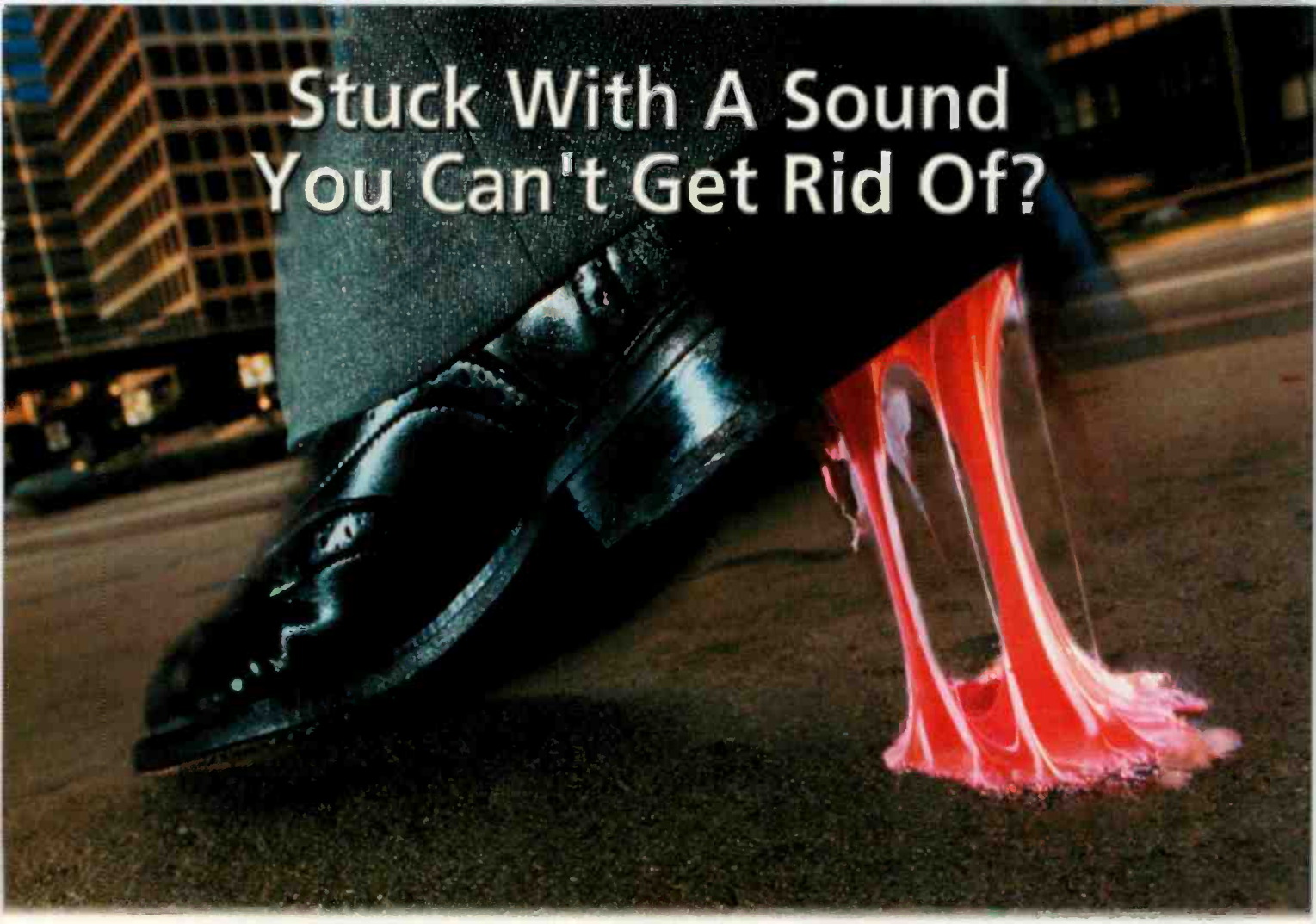
There are a few former mandatory rules that still have big teeth in them. Rules that once had such stern requirement for weekly or daily inspection and verification, now say that these things should be done as needed. Unfortunately (in the sense of being an essential action), the new rules nearly say "...must be made..." I said unfortunately because lacking a specific directive makes it is easy to overlook such instructions. For example, consider rule 73.1580.

Rule 73.1580 requires that regular inspections be made. No specified interval is prescribed, nor is any method of record keeping indicated. Nevertheless, FCC inspection records will be required. Apart from the legality of making periodic inspections, good engineering practice requires that equipment be inspected and its condition noted. Not only is it a requirement, it becomes a useful piece of information when something breaks down.

Rule 73.1590 covers equipment performance measurements. Most of the old, often complicated, demanding and laborious AM and FM transmitter performance measurements have been deleted. The rule lists the circumstances under which equipment performance measurements have to be made. This rule lists a few circumstances that require equipment performance measurements to be made. As a result, such measurements can be overlooked, even when performing one of the operations listed in the rule.

The Commission has re-examined its tower locating and identifying routine. All licensed towers receive a unique identifying number, which must be displayed legibly and clearly on the fence surrounding the tower. Failure to identify the tower in a manner satisfactory to the FCC inspector results in a stiff fine.

E-mail Battison at batcom@bright.net.



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Firewalls and security

By Kevin McNamara, CNE

Computer networks are increasingly vulnerable to security threats, and e-mail is perhaps the most critical threat.

Industry analyst IDC predicts that by 2005 there will be 1.2 billion e-mail boxes and 36 billion person-to-person e-mails each day. Virtual Private Networks (VPNs) permit remote workers to access company networks through high-speed broadband connections such as cable and DSL. The proliferation of remote PCs attached to company networks opens new holes, which can be exploited by hackers.

Security issues

As the complexity of potential threats increases, so must the measures taken to ensure system security.

The reality of Internet security was characterized by CERT, the Computer Emergency ResponseTeam: 1) the expertise of intruders is increasing, 2) the sophistication of attacks and available tools and toolkits is increasing, and 3) the effectiveness of intruders is increasing due to the amount of information passed to less knowledgeable intruders, making them more effective.

CERT lists the following as potential compromises to a network:

1) Trojan Horse (viruses) – There is an increase in incidents involving viruses, which can be difficult to control because users can easily take actions without understanding the consequences. 2) Internet sniffers can intercept traffic over a physical network, which permits intruders to examine network traffic between machines, gather user names and passwords and capture e-mails. 3) Large scale attacks are used by knowledgeable intruders to scan large numbers of hosts for vulnerabilities. 4) Distributed attack tools can scan large numbers of hosts and networks, identify machines with vulnerabilities, compromise the host and install distributed attack tools on the host machine, gaining information such as user names and passwords, which can then be sent invisibly to the intruder. 5) Distributed DoS (denial of service) attack tools amplify the ability of a hacker to propagate sufficient traffic over a network to effectively slow or stop any legitimate communication using multiple computers.

Network survivability

By definition, survivability is "the capability of a system to fulfill its mission, in a timely manner, in the presence of attacks, failures or accidents." In practice, the result of a system's survivability is determined by the ultimate impact of an event, i.e. server failure, attack, rather than its specific cause.

For the purpose of evaluating the survivability of a network, determine the computing environment in which it operates – bounded or unbounded. Bounded systems are those that the user has total control over, such as a company network that is not connected to the Internet. Unbounded systems are those where each participant has an incomplete view of the whole. Unbounded systems are generally comprised of a connected group of unbound systems, i.e. different networks communicating through the Internet.

Firewall

One of the most effective methods to secure bounded networks that have an Internet connection (unbounded network) is to use a firewall. A firewall is typically a hardware device, but may also be software, which acts like a gatekeeper from the outside world and can filter certain data traffic entering the network. Firewalls can be based on three methods:

Packet filtering. Packets of data are compared to a filter specification. If the data contained within the packets match the criteria, then they may be allowed to pass or be rejected.

Stateful inspection. Uses a connection table to track data traffic over multiple flows of data traffic. Stateful inspection compares key portions of the packet against a database of trusted information. For example, the firewall might compare traffic originating from inside the firewall to incoming traffic.

Application proxy. This firewall does not permit data to go directly through, rather, it acts like a server to clients within the firewall and like a client to servers outside the firewall. This makes the resource within the firewall look invisible to the outside world.

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

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

FCC to crack down on fee delinquents

By Harry Martin

The FCC has proposed new rules that will significantly upsize the downside of trying to stiff the Commission when it comes to paying regulatory and other fees. In particular, the FCC has proposed to withhold action on any application filed by anyone who is delinquent on any filing fees, regulatory fees or other debt owed to the Commission.

It is not immediately clear how the Commission would implement the new rules. The easiest way would be to have the Commission's application processors check for any payment delinquencies associated with the applicant's Federal Registration Number (FRN). The Commission now requires that all applications contain the FRN of the applicant, which should make it easy for the staff to cross check against missing fees associated with any particular FRN. It was inevitable that once the FCC got everyone registered with a unique FRN, it would use that number to track whether the companies it regulates are delinquent in payments due to the agency.

Of course, the FCC's FRN system might not be a perfect way to check, because the Commission permits a single entity or person to have multiple FRNs. So perhaps the Commission will also insist that applicants provide some other unique identifier—their taxpayer ID numbers, for instance—to permit a more reliable check of the files. And, the Commission might also revise its application forms to require the applicant to certify that there are no outstanding fees.

The so-called "red light" rule would have a couple of safety provisions to prevent major hardship or unfairness. For example, it would not apply if the delinquent payment is being challenged or in emergency situations, nor would it apply to fines imposed by the FCC that have not been enforced in court.

Still, the proposal has some scary elements. For example, the FCC proposes to be able to rescind actions on granted applications—even years after their approval—if it discovers that it was owed money at the time the application was granted. Historically, once the Commission has acted, it has 40 days to rescind or modify its decision. If it does not act within that time frame, and if no one seeks reconsideration or review of the decision, then the decision becomes final and the parties subject to the decision can move ahead, knowing that the Commission's decision was final.

But under the concept that the FCC has proposed, parties would never be able to say for sure that an action had been finalized because the Commission would reserve the right to rescind any action at any time in the future, should it determine that money was owed by the applicant at the time of the action.

It also is unclear from the proposed rules whether the taint of delinquency for old debts can spread from the delinquent payer to innocent parties who own the station in the future. For example, if a station owner sells it without paying regulatory fees for several years, would the FCC apply the red light rule to the new owner?

SESAC gets tough

A federal jury has ordered two FM stations in Pittsburgh to pay SESAC more than $1.2 million for playing SESAC-licensed arrangements of "Grandma Got Run Over By A Reindeer" and "Silent Night" without a SESAC license. The damages were awarded against the two stations and the president of the station's licensee corporation as an individual.

The AC and classic rock stations were ordered to pay damages for repeatedly playing 31 SESAC songs. The stations used to have SESAC licenses, but let them expire in 1989.

This was one of the first jury trials involving copyright infringement by a broadcaster since 1998, when the Supreme Court ruled that litigants in copyright cases have a right to jury trial. Before that, judges awarded damages that were typically $1,000 to $5,000 per song. In 1999, the limit on damages per song was raised from $100,000 to $150,000. SESAC reports that a blanket license would have cost each station only $5,000 per year. The jury awarded damages ranging from $1,000 to $150,000 per song.

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

Dateline:

On June 1, 2003, renewal applications are due for radio stations in the District of Columbia, Virginia, West Virginia and Maryland. Pre-filing renewal announcements must begin April 1, 2003, for stations in those locations. In February, the FCC will be sending renewal packets to affected stations.

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When the show takes to the road

By Allen Sherrill, CSRE

Take advantage of lightweight and compact equipment to make your remote broadcasts a snap.

I have a confession to make. In my 20-year radio career, I've discovered that one of the things I dislike the most is setting up and running a remote broadcast. Maybe it has something to do with years of hauling heavy equipment around to multiple remote sites, or all the lousy remote food that's settled around my waist, but I really prefer to keep remote broadcasts at arm's length.

As the technology leader of my stations, it's up to me to figure out how to make our remotes better, faster and cheaper. And who better to figure it out than the guy who hates doing them? Much like the comic-strip character Beetle Bailey, the individual who's stuck with an unpleasant task will come up with the easiest and fastest way to get it done.

When the show takes to the road

When a station owns several vehicles, it helps to standardize their operation as much as possible.

I got in the business a little late to have experienced the joys of lugging a 100-pound remote mixer up several flights of stairs, although I've certainly carted around my share of PA amplifiers and speakers in that weight class. Not only is it physically fatiguing to transport, it's not much fun muscling such equipment in and out of remote venues with small doorways and expensive flooring and furnishings. Inevitably, the engineer's knuckles or the fancy doorway trim take a beating from sharp-edged cooling fins that do not clear the door opening.

The time factor is also part of my personal dislike of remotes. After working a full 40-hour week, it's not appealing to spend most of a weekend setting up one or more remotes, especially if the setup is difficult and complicated. Some years ago I was responsible for a weekly Sunday evening talk show remote at a restaurant inside a mall. Because of technical issues related to the location, this one-hour broadcast required about three hours of setup, teardown and travel time. The setup time was wildly disproportionate to the on-air time.

Invention's necessity

There has to be a better way to do remotes. Thanks to equipment advances over the years, current equipment designs result in remotes that use lighter, more compact equipment that make setup and tear-down simple and fast.

For most radio stations, the usual options for sending audio to the studio from an outside location involve either the telephone company or an RF system. For example, in our cluster of four stations in Tucson, AZ, the majority of remotes are covered with 450MHz RPU equipment. We also have POTS codecs and some ISDN equipment available for those remotes where RPU equipment isn't feasible because of range or terrain limitations. In a pinch or as a last resort, we can fall back to the lowly cellular telephone.

Each of our station vans is installed with RPU-equipment installations that are plug-and-play. This is necessary because the promotions staffers and their interns are, for the most part, enthusiastic about their jobs—but not technically adept. Most remotes involve parking the van in a location that provides a useable RPU signal, and then using a wireless microphone system to connect the radio talent inside the remote location.

When the show takes to the road

This approach does not work in every remote situation, and there are other drawbacks. The dreaded shopping-mall remotes cannot be done easily with most RPU equipment. Because of location issues, security concerns and equipment limitations, we have gone through some interesting gyrations to get an RPU signal from some locations, including placing a transmitter on the mall's roof. A vehicular RPU repeater system would work much better in these situations, and I have used them with great success in other markets. However, they tend to be a little too complex for the typical promotional staffer to be able to set up effectively.

To simplify operation, the RPU in the GMC Yukon used by KZPT The Point is mounted in the cabinetry. This protects the equipment and places it in a convenient location.

Running the RPU transmitter off the stock battery in the vans also presents problems, because the battery will run down quickly if the van's engine isn't running. The extra wear and tear on a vehicle's engine from an idling engine does not make management happy. To eliminate this undesired wear, we installed separate batteries and electrical systems in each of the vans for the RPU equipment, but this approach is fairly expensive.

In some locations, the permanently attached RPU antenna on the van roof does not provide an adequate signal into the studio receiver, and we have to connect an external yagi antenna for additional gain. We have constant problems with these antennas and with connecting cables being damaged by inexperienced crews. I have a stack of yagis on my bench that are unusable because the center pin on the N connector has been destroyed by clumsy handling, even after we have taken pains to permanently attach adapters in an attempt to protect the N connector from rough treatment.

At some locations where the use of RPU equipment is difficult, we've had some success using POTS codecs where phone lines are available. These early-generation models tend to be persnickety about line conditions, and they won't always work consistently on a given phone line. In some locations, we have had to run phone wires a considerable distance across hallways and open areas to get a phone line to the desired location.

However, in many instances the POTS units are just the ticket for simple remotes. They are easy enough for non-technical people to set up and use, and they are light and fairly easy to pack. We've been able to

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	$650
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

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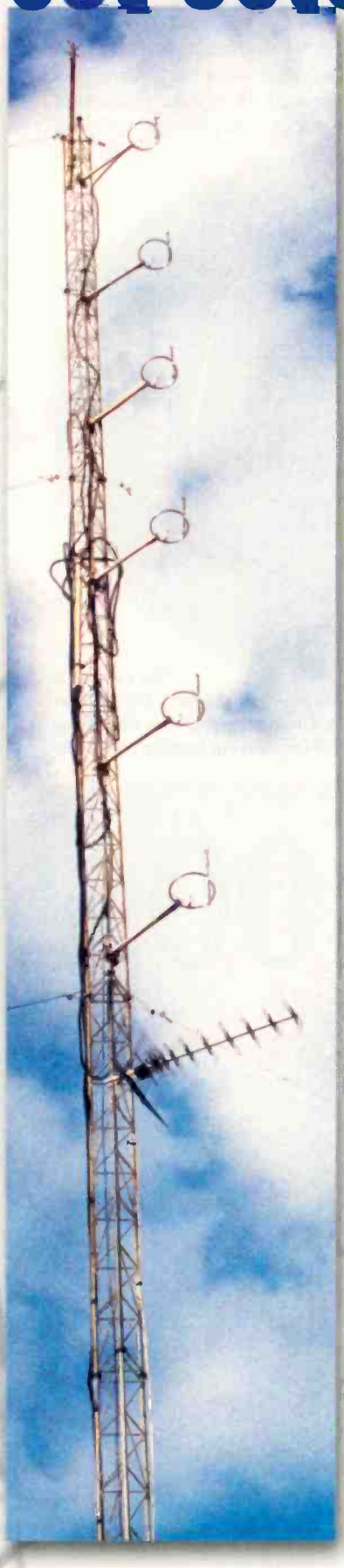

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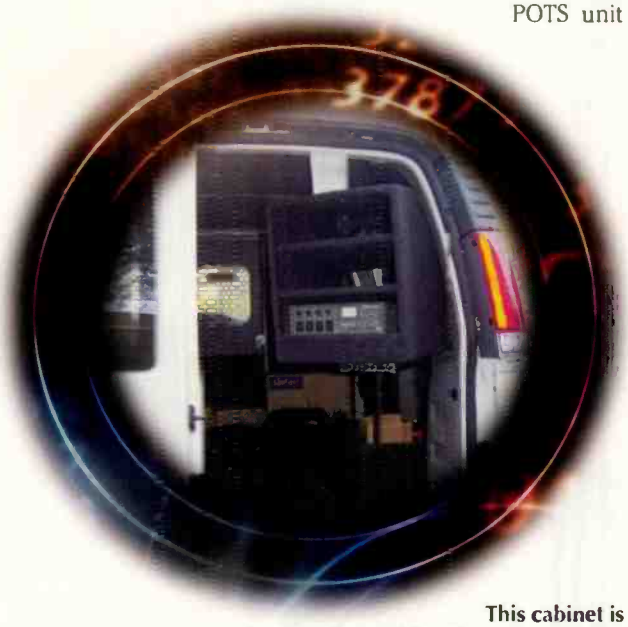
get them to work in some less-than-ideal conditions. I set up a Las Vegas hotel room remote recently where the only accessible phone line was the fax port on the room phone. Surprisingly, our older POTS unit worked without any trouble with this arrangement. Note that first, we were really lucky, and second, analog ports on hotel phone systems are not necessarily appropriate for use with a POTS codec. In some cases, equipment damage can result if a codec is connected to the wrong phone jack.



This cabinet is mounted off the floor of the Chevy Express van used for KFFN-AM. This mount provides clear floor space for stowing heavier materials.

ISDN is an effective way to get remote audio to the studio. Once the hardware and the ISDN lines are in place, the ease and audio quality of ISDN remotes are hard to beat. I first began to use ISDN for talk-show remotes on an AM station years ago, and it was a monumental improvement over the noisy RPU system we had been using. Not only that, but the return audio from the studio available with the ISDN system was indispensable for cues and call screening purposes. Previously, the station had been using cell phones for this purpose, back in the days when cellular airtime was much more expensive than it is now, and having a return path from the studio was a convenience.

The downsides of ISDN are the expense of the equipment, and the expense of the ISDN phone lines. In our situation, it's not practical to install ISDN circuits for most remotes, because the expense is not justified for a one-time broadcast. We do a weekly remote from a local nightclub where dance music originates from the club and broadcast over one of our stations, in stereo. ISDN has proven to be ideal for this purpose.

Look ahead

Always keep an eye on emerging remote broadcast technologies. Anything that allows us to do remotes with less physical effort and less setup time is a potential winner, if the cost and practicality are right. A couple of items in this category are Part 15 digital audio

The weakest point of an RPU antenna is the RF connector. Careless handling will significantly shorten their useful life.

transmitters and audio transmission via TCP/IP. Unfortunately, neither of these categories has produced equipment that has reached a stage of comfortable maturity.

The smaller/faster/lighter requirements also carry over to all the other stuff we are usually obligated to bring out on remotes. Probably nothing in the remote kit is more difficult to transport than a PA system, but usually it's a must-have item to make your remote stand out above the noise on location. We have been using the Fender Passport portable PA systems with great success at our remotes. They are reasonably light and mostly self-contained, and (the best part of all) they are easy for non-technical personnel to operate.

One of the best ways to reduce remote setup time is to package separate pieces of equipment together using a rack case. If your station is doing lots of complicated talk-show remotes, it makes the job a lot easier if the audio mixer, headphone amplifier, and codec of choice are all mounted together in a rack case. The interconnecting cables can be pre-connected, so that the only on-site setup required is to hook up ac power, microphones and headsets and the phone line. I created remote kits in this manner at one station cluster, packaged for different remote situations (using either RPU or ISDN/POTS equipment). Make sure that the equipment is securely mounted within the racks. If a piece of remote equipment has a heavy back end and isn't supported correctly, there is a good chance you will get the case back with broken equipment inside. This also applies to those ubiquitous wall-wart and power-line lump ac supplies, which have a tendency to work loose inside remote equipment cases.

In my career, I've set up radio remote broadcasts involving everything from giant boomboxes to giant cash machines, popcorn machines, blimps and banners. Even though I don't do many remotes anymore, I'm always on the lookout for equipment that will give my stations a competitive advantage in the remote arena. In a crowded radio market, remote broadcasts are an important tool for pushing your station's brand above the clutter. Making remotes better, faster and easier is one way I can help our guys win.

Sherrill is chief engineer for the Journal Broadcast Group/Tucson Operations.

All About Audio Consoles

by Gordon S. Carter, CPBE

Even in these days of automation and consolidation, the console is still an important part of the radio station and serves as the heart of the operation.

Through a greater degree of integration, the console surface can display more information to the operator.

The audio console serves as the central control point for all audio passing through the radio station. Depending on the station's needs, it may be a simple device with only a few controls or a mammoth console with enough controls to make any techno-geek happy. The controls range from simple level (volume) controls to sophisticated response equalization. It may contain controls for multiple auxiliary sends for mix-minuses and IFB. It may even contain the control panel for a routing switcher and on-air telephone system.

The audio consoles of today can be divided into two groups: analog and digital. Analog consoles are popular and are still widely manufactured. Analog consoles tend to be less expensive than digital consoles, but this is changing rapidly. If a need calls for a small console, analog consoles are more cost-effective, and possibly the only solution available. There are few small digital consoles available, and most of those are not intended for broadcast use. As your needs grow into larger and more complicated consoles, the likelihood of finding a cost-effective digital console increases. The primary reason for this is the development cost of new products. Generally, new technology is introduced at the high end of the price range, and gradually trickles down to the lower-priced units as the initial development costs are defrayed. At last year's NAB, prices for high-end digital consoles were just beginning to be cost-competitive with comparable analog consoles. It won't be much longer until digital consoles will be considerably cheaper than comparable analog consoles.

The analog consoles that are available now possess incremental advances on previous technology. While most don't look much different than older consoles, they often incorporate advanced features such as surface-mount components and modular construction. Many of these advances contribute to better initial performance and better reliability. Many are even providing indicators that never need replacing during the life of the console through the use of LED lamps or LCD displays. Electronic switching also helps improve reliability by reducing the problems associated with dirty switch contacts.

A seasoned change

The real changes have been in the area of digital consoles. For the uninitiated, digital consoles accept digital signals or convert analog sources to digital, then manipulate these signals by altering, mixing, processing and controlling them with no degradation (assuming the digital system has been designed properly). With the proliferation of digital sources in the radio stations today (CDs, computers and digital satellites), the digital console has the advantage of not having to convert all these signals back to analog and then to digital again. The digital source can remain digital throughout the entire system, all the way to the transmitter.

Digital console manufacturers have opted to follow two design paths. Some have patterned their digital consoles after a typical analog console. These consoles are self-contained with the possible exception of the power supply. The audio (analog or digital) is brought to the console housing and controlled in dedicated console sections.

The other approach provides a unit that houses most of the electronics. The audio comes to and from this central unit, often called an audio engine, which does not have to be at the console operator's location. A control surface is connected to the engine through a digital connection, usually a serial or CAT-5 cable. The control surface issues digital commands to the central unit that tell it what to do with the audio.

The Best Digital Systems

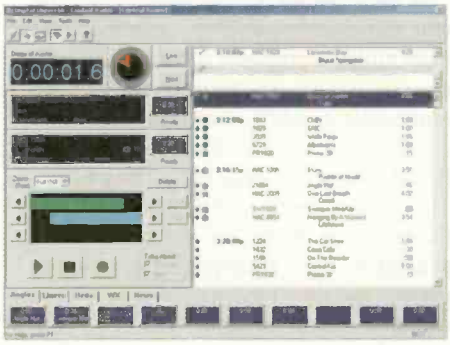
It's a fact: 4,325 U.S. stations use 11,800 Scott digital workstations. One reason Scott sells the most is that Scott systems are the *easiest to use.* They're simple, straightforward, intuitive and powerful!

Another reason for Scott Studios' popularity is that we offer *more choices*, so your Scott system is tailored to *your* needs and *your* price range.

More U.S. stations use Scott Studios' on-air digital systems than the #2 and #3 brands combined!

Scott systems have radio's most robust hardware, including redundant power supplies, back plane rack cases and easy to open ball bearing pull-out rack drawers.

Good — Digital Universe



Digital Universe software that CBSI and Wicks Broadcast Solutions sold for $9,000 is now owned, updated and improved by Scott Studios. And it can now be yours for *only $1,495!* Digital Universe radio automation includes on-air software with full capabilities for music on hard drive, including Voice Tracker, production recorder and CD ripper. Simply add your own computer and an inexpensive non-proprietary sound card. Or, for a small labor charge, Scott Studios will install Digital Universe on Dell computers at *no hardware markup* over factory prices.

All Scott Studios' systems feature "wet" Voice Tracking, where announcers hear music heads, tails and segues in their headphones. "Wet" Voice Tracking makes recorded shifts sound smoother than the "dry" recordings of other affordable software. For $249 extra, any computer in your station can be a Digital Universe Voice Tracker!

Scott Studios also offers pre-dubbed Digital Universe music libraries, on-site training and satellite format capabilities. For details, go to digitaluniverse.com.

Better — Maestro

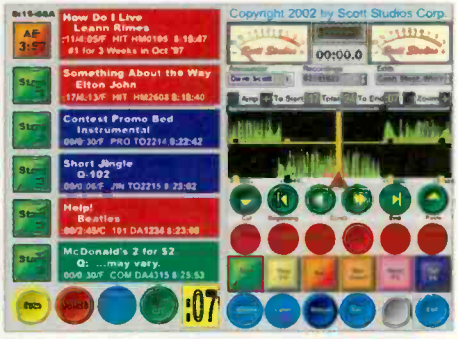
Computer Concepts' Maestro—and its predecessor, DCS—are widely regarded as *radio's most robust* and *most reliable* automation systems. Many are still in daily use after 13 years. (Computer Concepts is a wholly owned subsidiary of Scott Studios.)

Maestro leads the industry in unattended local spot insertions in network shows, and walk away automation for satellite formats. Maestro is very powerful at handling multiple background recordings and time shifting of programs.

Maestro has one of live radio's best phone recorder/editors, automated satellite or Internet distribution of spots, music, liners and news for hub-and-spoke clusters, and a sophisticated *ability to think* and *make informed decisions* during automated shifts. You can *relax*, knowing Maestro is handling every situation as you desire.

Maestro integrates seamlessly with our Voice Tracker, pre-dubbed music on hard drive, and famous NewsRoom copy and audio editor. Maestro 3.3 now includes the industry's best CD ripper, Cart Chunk compatibility, and records and plays WAVE files.

Best — SS32



Scott Studios' SS32 is both the best and best-selling digital studio system—regardless of brand—because SS32 has the *best user interface* and is *easiest to use*. Also, SS32 offers virtually *every feature* radio stations want!

SS32 offers an Invincible hot standby with hands-free auto-transfer. It switches in less than a second, picking up at the exact syllable where the first one left off. It's one reason why so many stations in New York, Chicago, Los Angeles, Houston, Boston, Dallas and many other major markets choose Scott.

SS32's built-in phone recorder has an easy-to-use jog wheel and adds auto-sequencing features you can't get anywhere else.

SS32's Voice Tracker also leads the industry with convenient features for local and distant city use.

You also get Cart Chunk and News-Room compatibility, auto-fill for network breaks, macros to simplify schedules, Power Fill so programming ends as specific times and remote control over the Internet.

For more info, go to scottstudios.com, or call toll-free: 888-GET-SCOTT.

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Scott Studios Corp
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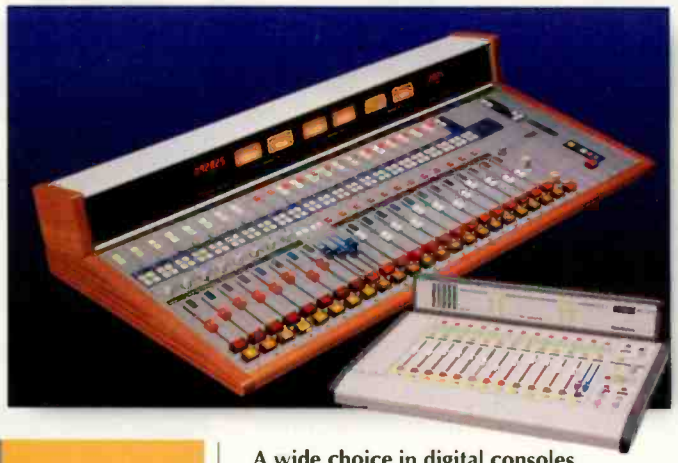
Dallas, Texas 75234 USA

All About Audio Consoles

All of this wizardry of the high-end digital consoles is made possible by integrating the console with a digital routing switcher. In most cases, the console surface and the router are from the same manufacturer, but there are some choices that combine one manufacturer's surface with another's router. The router capability greatly expands the capability of the console, allowing control of audio from multiple sources and destinations with a limited number of console channels.



A wide choice in digital consoles exists to fit small and large installations.

As the console is more fully integrated with the routing switcher it is possible to have multiple consoles (control surfaces) operating with one routing switcher, so audio sources can be easily shared among control rooms without the use of additional wiring and distribution amplifiers. The audio source is connected directly to the router. If the source is digital, it goes straight in. If it is analog, it is converted to digital (usually in the router) and is then available to the system. One or more control rooms can use this source at the same time with no additional work, since the router takes care of it all.

The same can be true for outputs from the console. Most consoles have several outputs, usually identified as program, audition, auxiliary, utility, sends and mix-minus. The way in which it is used defines the primary difference between any of these outputs. They are all audio outputs, but the compliment of sources assigned to them gives them greater flexibility. By using a routing switcher to multiply the capability, digital consoles can appear to have more outputs than they physically have.

The addition of the routing switcher has now expanded the capability of the system, making the console a virtual chameleon, able to change character at a moment's notice. This feature alone has made digital consoles more attractive to radio owners with more than one station in a market. Once a system is set up, resources can be shared and the facility's entire operations can be consolidated.

Another new feature available on digital consoles is an expanded display. Some digital consoles no longer use dedicated meters, but use a computer monitor instead —often a flat-screen display—to indicate audio mix levels, the time and count-up or count-down timer. When the auxiliary controls are activated, these monitors will display information corresponding to

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these controls. Some even show a graphical representation of the equalization or compression settings on the screen. Because all the audio is being processed digitally, this sort of advanced display is a logical progression. When a display like this is used, more monitors can be added for automation and news systems to create a fully integrated appearance in the control room.

Some console designs use video display for system functions and metering. These displays can also be used for other equipment displays, minimizing the clutter in the studio.

Cost and effect

By now you are probably thinking that all of this is going to add up to a lot of money, and you may be right. However, remember that you are buying more than just a console with these high-end systems. You are buying multiple consoles and a routing switcher. When you do a detailed cost comparison, you may find it is less expensive than you thought.

The purchase decision goes beyond price, features and performance. Most manufacturers will provide a user list on request. Manufacturer support is also an important aspect. Make sure the company provides the kind of support the stations need. Look into parts and costs for replacement items, especially lamps and indicators, switches and other mechanical items that will wear quickly.

Don't let the variety of consoles intimidate you. Yes, there are lots of options, but you will quickly find that many are not a good fit for your station. Eliminate them one-by-one and you will eventually come down to a few choices that will be right for you.

Gordon Carter is chief engineer of WFMT-FM, Chicago.

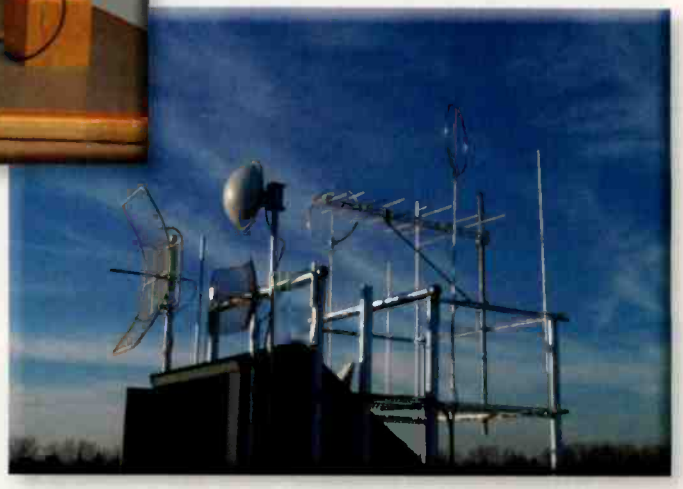
More online

Looking for console manufacturers to help you plan your next project? A complete list is available in the online version of this article at www.beradio.com.

Building a National Radio Network:

An Examination of Cumulus Media Strategic Planning

By Gary Eskow



Expanding market share in the highly competitive radio market requires a carefully considered formula and the flexibility to alter this recipe on a case-by-case basis. Cumulus Broadcasting, a division of Cumulus Media, owns FM and AM radio stations that serve mid-sized markets throughout the United States and the Caribbean. Cumulus is currently in the midst of an expansion. What factors go into the blueprint it brings to each new market it seeks to penetrate, and what are the nuances that allow each geographical area to establish its own identity?

For starters, when Cumulus enters an area it looks to acquire a diverse group of stations that cater to a cross section of the advertising market. Establishing high quality programming is paramount, but how is this goal achieved? Strategically choosing those areas that are most likely to reap the benefits of capital investment, the Cumulus business plan calls for an aggressive improvement in signal quality and plant equipment.

Now more than ever, radio stations need to realize that the bar has been set high with regard to audio quality. CDs and greatly improved home-theater systems have made the average listener accustom to a digital sound quality that is far superior to the product delivered less than a decade ago. As a result, whether retooling an existing facility or designing one from the ground up, Cumulus insists on an all-digital pathway.

The place to start

Atlanta-based Cumulus relies on architects working in the area to bring a cohesive look to the entire fleet of stations, but input from the people who will be most responsible for the sound and feel of a local station, including on-air talent, local engineers and market, production and program managers, is carefully considered. Everything from a detailed equipment list to the color of carpet is discussed at this initial stage. System integrators from each local area are hired to execute the design work. Cumulus also has a group of six regional engineers on staff. Depending on the location, a staff engineer may also be involved in the day-to-day execution of this design work. One example is Dave Supplee, of Harrisburg, PA, who was a logical choice to oversee the Pennsylvania project.

Economy of scale purchasing is also a critical part of Cumulus' strategic planning. When the company completed the facility installation in Harrisburg, it centered the operation around a number of Wheatstone digital consoles and Mosley digital STLs. Knowing that they were about to begin work on several stations in Mobile, AL, Cumulus purchased consoles for this project at the same time, and were able to negotiate a preferred rate from the manufacturer as a result.

They may not buy paper clips in bulk to get a discount, but Cumulus does aggressively pursue any area where consolidation can save money, including furniture purchase. The company analyzed the amount of furniture it had purchased over the last several years, projected its anticipated buys for the next 24-36 month period, and cut a deal with European Cabinetry, their preferred vendor, that gave

the Atlanta-based manufacturer the opportunity, based on anticipated revenue, to purchase new equipment. As a result of this alliance, European Cabinetry then passed the savings of several percentage points back to Cumulus. Based on the volume of purchases that Cumulus makes for its three hundred radio stations, buying in bulk applies to its relations with Shure and other microphone manufacturers, as well as vendors who make everything from mini-disc players to distribution amplifiers.

While efforts are made to standardize facilities across the company, individual station needs are still important to the facility's design.

Something old, something new

When Cumulus acquires a new station, existing equipment comes with the purchase. If the equipment is in suitable condition, it will be reused. If not, the company will install a new system. Cumulus is currently completing a facility in Eugene, OR, and has centered the installation around a Broadcast Software International (BSI) Simian automation package. Cumulus Media also owns BSI, which is based in Eugene. The Cumulus strategy is to make this set of radio stations a showcase for the Simian system.

As part of its all-digital planning, Cumulus sizes all of its facilities for IBOC, which it believes will soon become the industry standard. Although compressed digital audio is still often used in many radio stations, Cumulus is building its digital pathway around a non-compressed path that will take audio from digital consoles, through digital transfer links and ultimately to the listener's car or home at the industry standard of 44.1kHz/16bits.

The entire fleet of Cumulus stations is networked, making it easy for an announcer to listen to his or her most recent program along with e-mailed comments from an executive in Atlanta or a listener. Production rooms can also share files for use in promos or for study purposes, because all studios are tied together through an FTP site operated out of Atlanta.

Eventually all the markets will be linked, but at this time 20 company markets are networked together using Eskimmer, a hard disk audio logging system. Each market has its own system. Accessed through the Internet, Eskimmer records every word that is broadcasted from the Harrisburg facility. With a properly secured password, any Cumulus employee can log onto Eskimmer, click on a market and locate an individual station. At this point a calendar pops up. Files, kept active for at least a year, are selectable by choosing a station and the date and hour a program was originally aired or by executing a search based on the name of a announcer.

Building a National Radio Network

For each hour of programming, about 8-10 lines of commentary are listed as initial search points. The searcher can then click on any of them and, using Media Player or Real Audio, listen to the remainder of the hour's audio clips. These files, available as MP3 files for quick playback, can also be extracted as uncompressed .wav files for future production usage.

Proving performance

Cumulus also uses Golden Eagle to monitor the audio and signal parameters of its own stations in real time. Manufactured by the French company Audemat, Golden Eagle also allows Cumulus to monitor other signals in the market. Operating like a remote controlled FM radio, Golden Eagle allows an authorized Cumulus employee to listen to any programming in a given area in real time using Real Audio.

Golden Eagle also lets the Cumulus engineering staff remotely monitor the signal parameters for each of its stations, checking to see that audio modulation levels, for example, are all within spec. A simple selection lets the user choose between listening to a chosen frequency or monitor TCIP. This is convenient for program directors, who have no use for the technical capability of the system, and for engineers, who rely heavily on them. If a company station located in Beaumont, TX, has four seconds of dead air, an e-mail will be sent to company headquarters in Atlanta and a local engineer to help analyze the problem. Ultimately, the company goal is to devise a master monitoring system that will let the engineering staff in Atlanta monitor and track the technical performance of all of Cumulus' radio stations.

The work behind the scenes is just as important as the studio operations, when it comes to fully networking its various facilities.

Thanks to Gary Kline, corporate director of engineering, Cumulus Broadcasting for providing information used in this article.

Eskow is a composer and journalist who lives in central New Jersey. He is currently a contributing editor for Radio magazine's sister publication Mix magazine. He may be reached via his website at www.garyeskow.com.

Congratulations to our three winners in the *Radio* magazine Find the Mic Sweepstakes. The three lucky readers and their prizes are

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Ross Pierce
KMUW, Wichita, KS

Twelve issues of *Radio* magazine in 2002 had our mic icon hidden on the cover. Did you find all of them? Here are the correct locations in case you need some help:

1. **January:** in the hard wood floor behind the chair
2. **February:** on the side of the building behind the van
3. **March:** lower right hand corner on the lighted sign
4. **April:** on the console, one of the gray knobs
5. **June:** on the back of the seat in the second row
6. **July:** on the right computer screen
7. **August:** halfway down on the side of the Space Needle
8. **Product Source:** in place of the label on the RCA mic
9. **September:** on the box on the desk next to the cart eraser
10. **October:** a green bush above the headline "Strong and reliable"
11. **November:** near the upper lip on the side of the face
12. **December:** on an arrow in the fifth row, second column

Radio magazine thanks all the readers who participated in the Find the Mic Sweepstakes.
Be sure to save your issues so you can enter the sweepstakes next year.

New Products

By Kari Taylor, associate editor

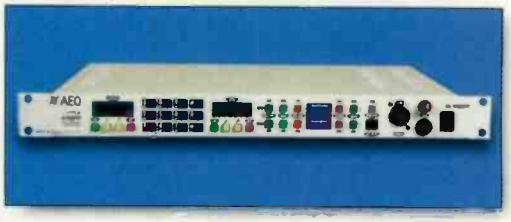
www.beradio.com

Remote I/O interface
Sierra Automated Systems

Riolink: This interface provides remote I/O connectivity for the 32KD digital audio network. A module in the 32KD mainframe occupies one universal slot and interfaces 32 channels of audio in and out, plus data to a Riolink remote chassis. The interface connects to the remote location via CAT-5 or fiber optic cabling. The remote chassis occupies 2RU. Also included are 16 RS-485 remote control ports, 16 isolated contact inputs and outputs and general purpose data ports.

818-840-6749; fax 818-840-6751; www.sasaudio.com; sales@sasaudio.com

ISDN codecs
AEQ



Swing and Eagle: The portable ISDN Swing codec, can connect to U.S. and Euro ISDN networks. The codec , with G.711 and G.722 algorithms and

analog hybrid, can be used simultaneously, with the analog line being used as a main or backup circuit. The mixer has three mic inputs, plus an auxiliary in and out, with a VU meter to monitor input/output and compressor/limiter on the output. The 1RU dual-channel ISDN Eagle codec can also connect to U.S. and Euro ISDN networks. Connectivity is available via G.711, G.722 and MPEG LII algorithms to offer as much as 12kHz audio bandwidth using one ISDN B channel and up to 15kHz joint stereo, or 20kHz mono, using two ISDN B channels. Full input and output monitoring is available via LED bar graph meters on the front panel, along with a mic and headset and an external phone connector.

954-424-0203; fax 954-424-0902; www.aeqbroadcast.com; aeqsales@aeq.es

Analog monitor
ATI

AMM200: The AMM200 analog monitor is a stereo line amplifier and monitor providing balanced XLR line inputs and amplified outputs, stereo headphone drivers and a stereo LED meter. The two-color LED meters are switchable for measuring line input or output levels. Meter ballistics can be switched for peak or average response. Meter range covers -15dB to +12dB in ten 3dB steps. Switched rear-panel RCA jacks allow external self-powered speakers to be controlled from the headphone amplifiers.

215-443-0330; fax 215-443-1394; www.atiguys.com; sales@atiguys.com

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Radio, Volume 9, Number 2, ISSN 1542-0620 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.

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

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Contributor Pro-file

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

Chuck Wolf
Chairman
Houston LECC
Houston, TX

Chuck Wolf is chairman of the Houston Local Emergency Communications Committee (LECC), the group that administers the Emergency Alert System for 13 counties in southeast Texas. Wolf has 30 years of broadcast news management experience at KIKK Houston, KCMO Kansas City, WOW Omaha, KIMN Denver and KONO San Antonio. Wolf is vice president of Media Consultants, a crisis communications firm that serves more than 200 clients worldwide.

Shaping radio today and tomorrow

By Kari Taylor, associate editor

Do you remember?

Philips Consumer Electronics announced its first digital compact cassette player and recorder in November 1992. The DCC900 was an extension of the compact cassette, and connected directly to a home stereo system and came with a pre-recorded DCC music sampler. Two-channel audio signals could be recorded with sampling frequencies of 48kHz, 44.1kHz and 32kHz. The dynamic range was better than 105dB, and the total harmonic distortion, including noise, was less than 0.0025 percent. Recording time was as long as 90 minutes, with provision for 120 minutes if a thinner tape was used.

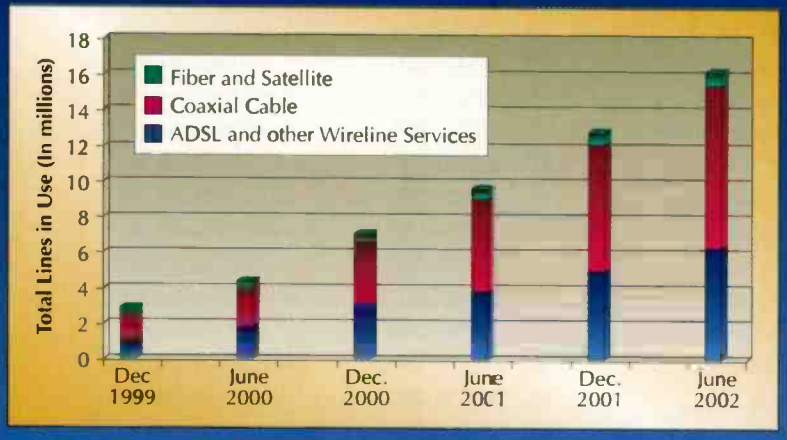
The digital signals were recorded on nine parallel tracks, each 185 micrometers wide with a track pitch of 195 micrometers. The height of the playback heads is 70 micrometers. This offered less sensitivity to azimuth errors than the analog compact cassette.

Two kinds of data could be recorded on the tape: main data in eight tracks and auxiliary data in one track. The format was intended to provide digital recording to consumers in a format that resembled existing analog compact cassettes. The format never caught on.

Sample and Hold

A look at the technology shaping radio

High speed lines connecting homes and business have increased



Source: FCC Study *High Speed Services for Internet Access, Status as of June 30, 2002*

That was then

In the January 1994 issue of *Radio* magazine we reported that USA Digital was submitting two IBOC-FM DAB systems to the EIA/NRSC digital radio tests, which were beginning that month. The second FM system employed a significantly different implementation of IBOC technology.

The receiver for the new system was based on silicon architecture rather than the gallium arsenide processor required by the previous format's receiver.

The company demonstrated its first IBOC-FM system in various stages of development at several national and regional trade events during 1992 and 1993.

Wheatstone Corporation

D-8000

Digital Radio Console

ADVANCED TECHNOLOGY! WHEATSTONE'S fourth generation digital console has what you need: dual-domain input modules that accept both analog and digital sources; built-in router integration with 8-character displays; a choice of features like auxiliary sends, equalization, dynamics control and event memory/recall—all without the aid of an external computer. *The D-8000 is an all-modular design with no active components mounted inside.* And best of all, it uses Wheatstone's exclusive VDIP® setup software, letting you easily configure individual console modules, logic modes and automatic functions. ***Contact Wheatstone—the digital audio people!***

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THINK *INSIDE* THE BOX

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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

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