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May 2001
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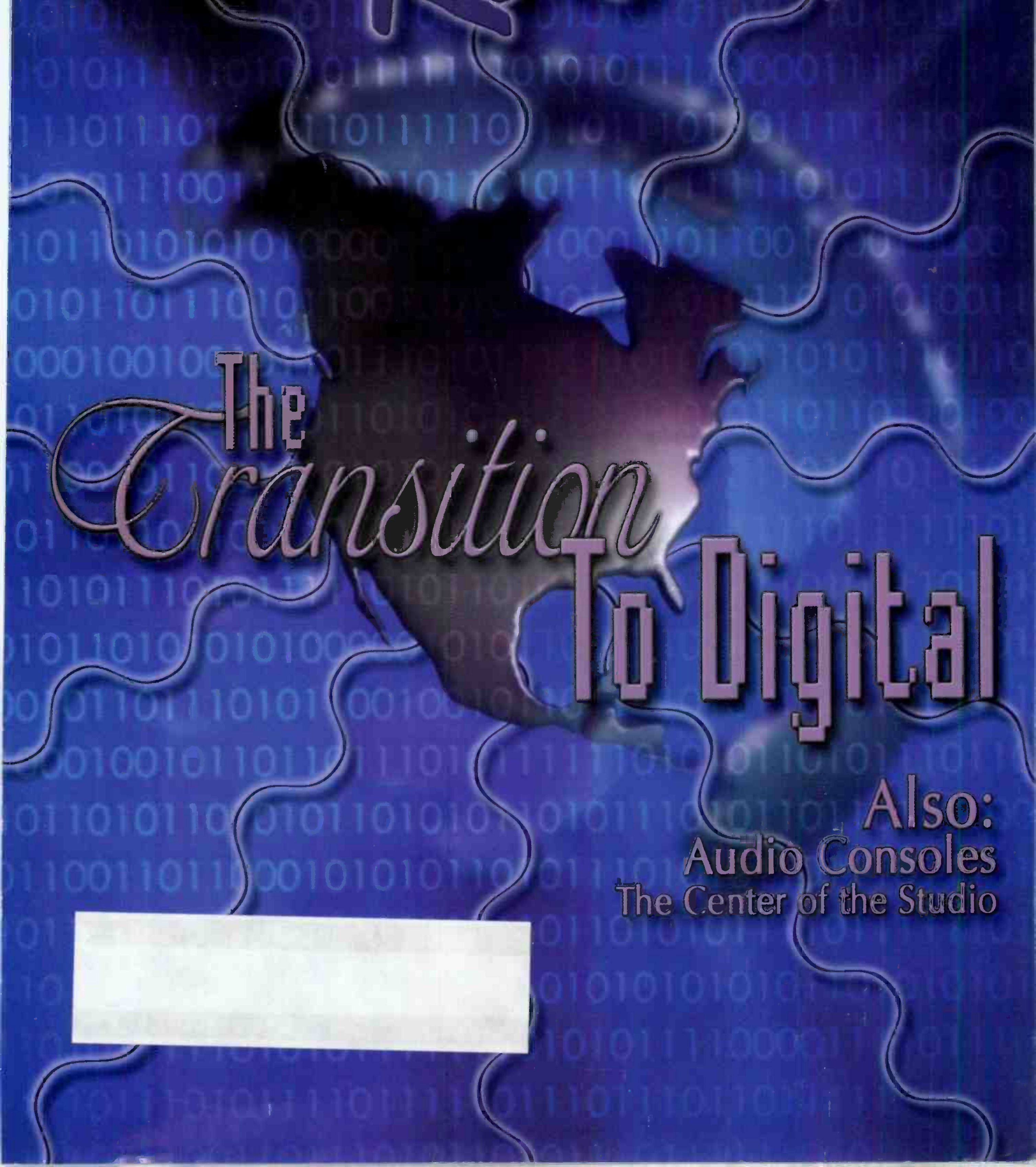

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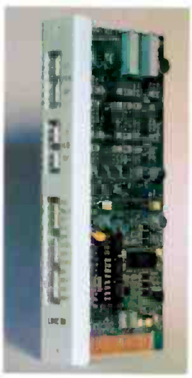

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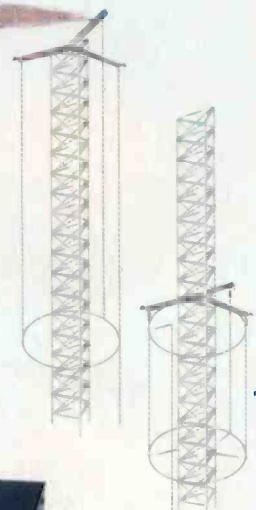

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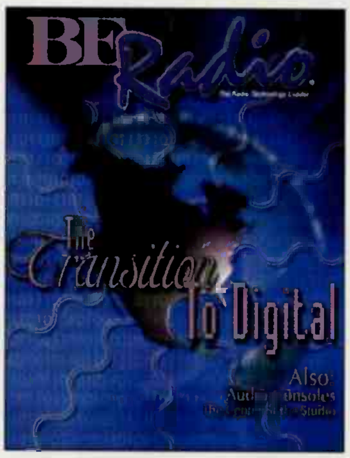

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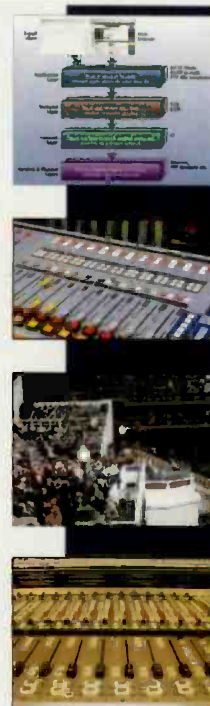

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Caught up in a Web

Is there a future for Internet radio? It depends on whom you ask. The news in mid-April certainly put a damper on all things audio on the Internet.

First, stations were faced with impending fees for simulcasting their on-air program. While stations are already paying fees for on-air play, these additional costs made many stations reconsider the value of the online service. For many stations, these costs easily outweigh any income potential.

The next blow came from AFTRA, who wants stations to pay talent fees that are up to 300 times the standard radio rate for spots played over the Internet. I'm all for fair compensation, but this is extreme. After the AFTRA announcement was made, a new push for ad insertion technology and products began in a classic action/reaction fashion.

In a move that seemed to seal the fate of Internet radio, 3Com pulled the plug on the Kerbango Internet radio appliance. I was surprised by this, considering how much attention and interest the product has already received. I guess that 3Com decided to cut its losses on a project that was likely becoming a significant money pit.

It seems like almost every station has shut down its online stream until the royalty and payment situation is resolved. Since no one knows how it will end or if retroactive fees will be imposed, this is a smart action for stations to simply cover themselves.

Is Internet radio finished? I don't think so. While everyone is pointing at the failure of the dot-bombs, it just goes to show that old methods don't always work for new technologies. In the end, I expect stations will pay additional monies to play music online even if it is simulcast on air. The rates will be negotiated and a satisfactory solution will be reached. The same is true for AFTRA. Contracts will be written that automatically cover the rights for Internet play. A higher talent fee may be the result, but fair compensation is warranted.

What we have seen is a growing phase for Internet radio. A recent Consumer Electronics Association study showed that consumers want free content. We all know that nothing in radio is really free. Whether it's commercials, underwriting or subscription, money is changing hands. I'll modify the statement above and say that consumers want the perception of free content. If they don't know they're paying for it, they will accept it as free. Like the business end on webcasting, the listener side needs to grow as well.

If you're a baseball fan, you have likely seen that this is changing already. Major League Baseball has changed how it provides game broadcasts online. To listen, you must now subscribe to listen. The fee is not excessive—$10 for the season to listen to any game. Some may see this as greedy, but subscription services do succeed. If you wonder who will pay to hear something that has traditionally been free, look at the satellite radio services coming from XM and Sirius.

I doubt that many stations are generating any revenue from webcasts. The cost of business is too high for the current technology to show more than break-even results. Multicast and other streaming advances, ad insertion and targeted ad insertion are all part of the evolution of Internet radio's forthcoming success and advancement.

Chriss Scherer

Chriss Scherer, editor
chriss_scherer@intertec.com

Are you streaming audio online? Tell us about your experiences and how you're dealing with these issues at beradio@Intertec.com.

Professional liability – limiting your exposure

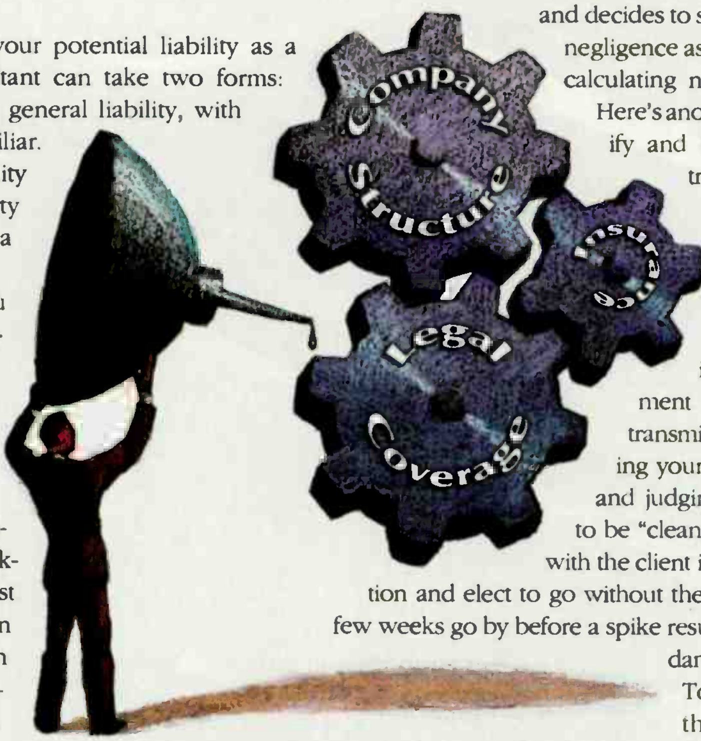
By Mark Krieger, CBT

Broadcast engineers are an eclectic bunch. Put a few of them together at a social function, and you're likely to hear a discussion about almost anything - with the notable exception of professional liability. This isn't surprising, since bringing up the subject of one's professional slip-ups is likely to clear the table faster than the bar tab's arrival. Simply stated, no one likes to dwell on his mistakes in either past or future tense, much less the potentially devastating legal consequences. But professional liability is a serious matter, particularly for the contract engineer. Let's consider the following issues.

General liability

In the most basic terms, your potential liability as a contract engineer or consultant can take two forms: professional negligence and general liability, with which most of us are familiar. Liability is a legal responsibility for personal injury or property damage that may occur as a result of negligence.

For example, let's say you pay a service call to a transmitter installation in the elevator penthouse of a commercial building. While you are moving a toolbox, it falls and damages a piece of equipment belonging to another tenant in the space, making you responsible for the cost of repairs. Or, perhaps you run an extension cord across an aisle, and someone trips, resulting in an injury. Again, you may be held responsible for compensating the victim for related expenses. Though a legal determination of what constitutes negligence is not immutably fixed, the standard is fairly straightforward and is generally consistent from state to state.



Attention to these areas ensures your business will run like a well-oiled machine.

Professional negligence

Less familiar to most of us, however, are potential liabilities arising from professional malpractice, which Black's law dictionary defines as "Professional misconduct or unreasonable lack of skill". Though the term is usually used in reference to cases in the legal or medical field, it is nearly interchangeable with the broader term "professional negligence." Either way, it's a concept every contract engineer needs to understand. What it means is that you, as a practicing professional, may be held liable for damages or losses a client suffers as a result of your (commission of) errors or omissions. Suppose, for example, you lay out a plan for new studios at a medium-market radio station, specifying a network-based audio server system that you believe will be adequate to the task. Upon migration to the new studios, however, your client finds that the system is too slow to get the entire commercial inventory on air as scheduled. The client loses revenue and decides to sue you for professional negligence as a result of your error in calculating needed capacity.

Here's another scenario: You specify and install a solid-state FM transmitter for a client. In the process, you see that the manufacturer calls for a certain type of power surge suppression system to be installed as a requirement of certification of the transmitter's warranty. Knowing your client's limited budget, and judging the available power to be "clean," you discuss the issue with the client in an informal conversation and elect to go without the suppression system. A few weeks go by before a spike results in extensive internal damage to the transmitter. To make matters worse, the manufacturer demands to inspect the installation before honoring warranty claims. Finding no suppression system installed, the manufacturer denies the warranty, and the client demands that you pay for all repairs, claiming that you never explicitly advised him regarding the conditional nature of the warranty. You counter that the client was provided a copy of the warranty when the transmitter was purchased, and decline to pay for the damage. The client sues you for professional negligence stemming from your failure to provide an explicit statement that the warranty would be voided if no suppression system were installed.

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If the case is not settled and goes to trial, a judge or jury will likely rely on expert witnesses to determine the professional standard to which your performance will be held. Referring back to Black's law dictionary, the standard is "that degree of skill and learning applied under all circumstances in the community by the average, prudent, reputable member of the profession..." Thus, the definition is amorphous, particularly if an abundance of applicable case law isn't available. In our hypothetical case, that uncertainty could work for—or against you.

Clearly, this is the stuff that broadcast engineer's bad dreams are made of. Worst of all, it's the plausibility of such scenarios that makes them so scary. How, then, do you best protect yourself and your company?

A proactive approach

To begin with, consider your company's structure. Being incorporated may provide some insulation for personal assets should the worst case occur. However, the degree of protection offered by the "corporate veil" will vary from state to state and in no way indemnifies your company. Thus, it should be considered strictly as an addition to, and not a substitute for, other protections.

Secondly, the old adage, "put it in writing" applies in spades. Retain a reputable attorney skilled in professional liability, and have him review your contracts before signing to see if additions or changes in language can minimize your exposure. While some contractors and consultants feel they can dance around potential professional liability claims by working directly from proposals and avoiding contracts altogether, this only muddies the waters in a legal dispute. Avoid the tendency to rely on "conventional wisdom" when considering any legal issue.

Finally, invest in general liability and professional errors and omissions insurance. These policies are available from a number of reputable carriers and cover the types of issues we've discussed here. Take a look at the program available to members through the SBE. Details are available at www.sbe.org. Typically, these policies offer coverage upward of $1 million, often at modest premiums. Remember that the cost of this insurance is a deductible business expense. Furthermore, some companies will require you to hold such a policy before they'll do business with you, so it can also be seen as a competitive and prudent investment.

We all make mistakes. But by better understanding professional risks, and adopting strategies to compensate for them, you'll be better able to get a good night's sleep after a hard day's work.

Mark Krieger, BE Radio's *consultant on contract engineering, can be reached mkrieger@drfast.net. He is based in Cleveland.*

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TCP/IP primer

By Ken Nosé

The Web pages you visit, the e-mail you read, the music you download and the radio stations you listen to on the Internet are all delivered to you by applications using TCP/IP. TCP/IP makes it possible for different types of computers and devices to talk to each other across multiple networks. TCP/IP is what makes the Internet work, and does so invisibly to the user.

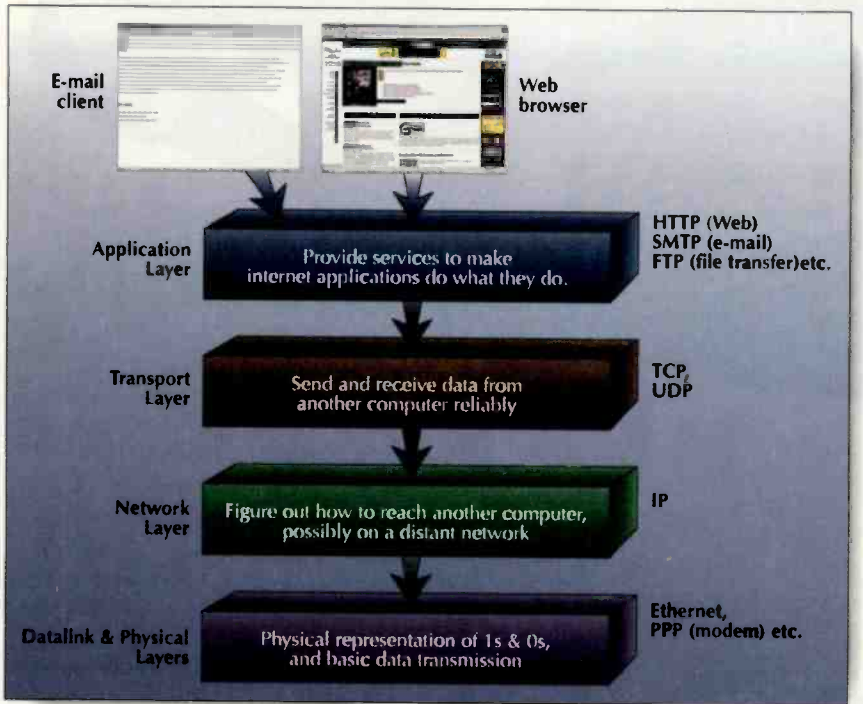

Figure 1. TCP/IP protocols and their responsibilities.

TCP/IP stands for Transmission Control Protocol/Internet Protocol. TCP/IP actually consists of several protocols: TCP, IP and other support protocols. The specifications are in the public domain, so there are no license fees for their use, and any company is free to use TCP/IP in their products. Because it is an open standard, just about every computer system, and an increasing number of devices, can speak TCP/IP and can therefore talk to each other.

TCP/IP works with the *Open Systems Interconnect* (OSI) layered model. Its operation is broken down into layers with specific responsibilities. The concept of a layered model is fundamental to the ease-of-use and widespread adoption of technologies like e-mail and the World Wide Web. Each layer hides the details of the layers below it and provides additional services to the layer above it.

Using this type of approach may seem arbitrary at first, but the advantages are significant. For instance, it is possible to change or improve how things are done at any layer without having to change anything in the other layers. For example, when you visit a Web page, you don't need to know anything about how you are connected to the Internet. You just type in the Web address of the site you want to visit, and your browser works in the same way whether you are using a laptop with a wireless modem or a computer with an Ethernet connection.

Piling on

In the layered model, programs such as the Web browser are at the application layer, the uppermost layer. The bottom layers manage raw data transmission over the physical link, which can be anything from a direct Ethernet connection to a modem over a telephone line or wireless link. In the middle are the TCP and IP protocols, and other support protocols that are part of the TCP/IP protocol suite. The TCP/IP protocol layers are what hide the details of your network connection from the browser. Figure 1 shows the different layers and the services they provide.

The Internet Protocol, or IP, is a network layer protocol, which has the responsibility of routing data from one computer to another across the Internet. Network layer routing is accomplished with IP addresses, which uniquely identify every device on the network. To send data from one device to another, you only need to specify the IP address of the destination device. An IP address is a 32-bit value, often expressed in *dotted decimal* form, for example 208.40.66.168. If the two machines are on the same physical network, the IP layer sends data to the destination directly. If the destination computer is on a distant network, the IP layer uses routers to find a path from the source to the destination.

The Internet consists of thousands of computer networks connected through routers and can be thought of as a network of networks. Routers transfer data from one network to another using complex algorithms and protocols to determine routes and optimal paths across networks. The IP layer handles routing invisibly, so that routers and the details of their operation are hidden to the upper layers. IP also hides the details of the underlying network architecture, so that sending data across dial-up connections, high-speed leased lines, or microwave links all looks the same at the higher level protocols.

Improving transmission

TCP/IP is a packet-switched protocol, which means that when you send a continuous stream or large file across the network, it is broken down into smaller pieces called packets before it is sent. The network layer may choose to route the packets that make up a single transmission along different paths to avoid network congestion or take advantage of optimal routes along the way. While the network layer provides services for routing data from one place to another invisibly, it doesn't offer any guarantees that the data won't get lost along the way, or that the packets will arrive in the same order in which they were sent. These are the responsibilities of the next layer up, called the transport layer.

In the TCP/IP protocol suite, the Transport Control Protocol provides reliable data transmission on top of IP. The TCP layer takes care of retransmission of any lost packets, and puts packets back together in order so that the receiver gets an exact copy of what was sent. Applications that can't tolerate lost data typically make use of TCP. UDP, or *User Datagram Protocol*, is another transport layer protocol that is part of TCP/IP. While UDP is referred to as a transport layer protocol, it is just an interface for sending data over IP directly. UDP doesn't offer any additional services beyond the best effort delivery attempts provided by IP, so it doesn't guarantee that the data will arrive in the order it was transmitted, or that it will arrive at all. Applications such as Web browsers or e-mail clients use the reliable delivery service of TCP so that the Web pages you visit and the e-mail you receive are exact copies of what was sent.

The OSI model defines a standard set of network operating parameters. Each layer is built on the layer below it.

As a user, you don't need to know anything about TCP, UDP or IP addresses to use the Internet. IP addresses are invisible to the user in most cases because of a support protocol called Domain Name Service or DNS. DNS can translate a human readable hostname into IP address. When you access a website by typing a Web address like www.beradio.com into your browser, you're telling your browser to contact a specific computer with the hostname "www.beradio.com." The Web browser gives DNS that hostname and DNS returns the IP address, which allows the browser to connect to the Web server running on that machine.

Ken Nosé is chief software architect of NeoSonic Industries, Cleveland.

Detuning unwanted reradiators

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

Like mushrooms after a heavy rain, unwanted reradiators sometimes appear almost overnight in the near field of AM antennas. Legally and technically speaking, this should not happen. All construction permit applicants are required to identify AM antennas located within a certain distance from the proposed tower, and a condition that requires detuning is made a part of the subsequent construction permit. Unfortunately, this is not always done, and field strength measurements are made only after the construction. Verifying RF field distortion is not possible without preconstruction measurements.

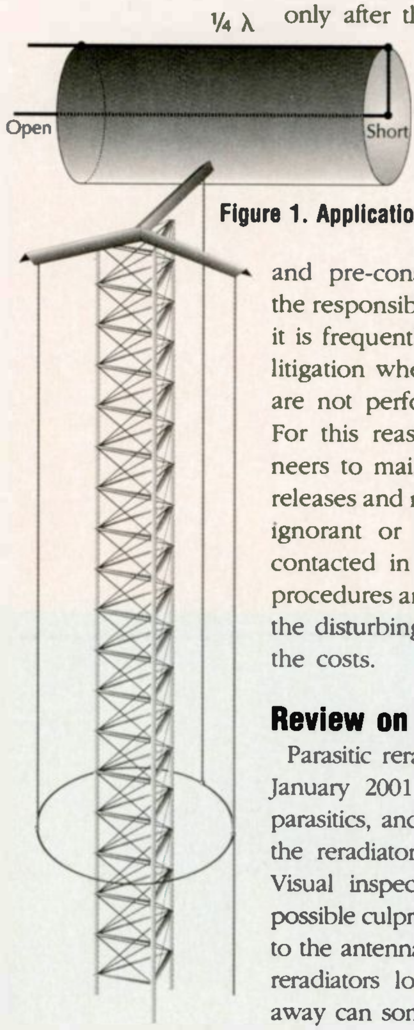

Figure 1. Applications of the quarter-wave section.

Although cooperation and pre-construction measurements are the responsibility of the new tower owner, it is frequently a source of acrimony and litigation when the proper measurements are not performed prior to construction. For this reason, it behooves chief engineers to maintain a close watch on FCC releases and new local construction so that ignorant or uncaring operators can be contacted in time to ensure that proper procedures are followed, and the owner of the disturbing tower pays his due part of the costs.

Review on reradiation

Parasitic reradiation was discussed in the January 2001 *RF Engineering* column on parasitics, and it was noted that the longer the reradiator, the greater the reradiation. Visual inspection will often pinpoint the possible culprit by its location with reference to the antenna system. If in the major lobe, reradiators located farther than one mile away can sometimes cause directional pattern problems such as out-of-tolerance monitor points. When in doubt, the field strength meter is invaluable in identifying such sources. In my opinion, when problems of unexpected RF levels emerge, it is best to suspect any and all protrusions above the ground until the culprit is found.

Quite often, an out-of-tolerance monitor point is the first intimation that an engineer has of the presence of such an offending reradiator. To identify the offending reradiator, orient the field intensity meter (FIM) at a right angle to the transmitter while facing the suspected reradiator. Look for minimum direct line station pickup and maximum parasitic reradiated signal. Approach the object, and watch the meter reading. Place the vertical edge of the lid adjacent to it. A large increase in signal strength is a good indication of parasitic reradiation.

The method of detuning a reradiator depends on the electrical length of the reradiator and its location. Let's examine coaxial line theory and see how it is applied to tower detuning.

Although the electrical effects of coaxial lines were well known prior to WWII, it took radar's development to illuminate and exhibit the rather unusual properties of quarter-wavelength coaxial cable.

If one end of a quarter-wavelength coaxial transmission line is shorted, the other end will present an open circuit. Consider Figure 1a. Expand this idea into a quarter-wavelength antenna that has a skirt of wires hanging down from the top, as in Figure 1b. This really forms a section of coaxial cable and will resemble a folded unipole AM antenna. But instead of driving this device through the bottom of the skirt, a tuning circuit to ground provides fine adjustment to tune the array for maximum impedance at the bottom of the skirt.

This high impedance at the operating frequency places an RF electrical open circuit at the base of the tower, thus floating it at the operating frequency. Operating as an ungrounded tower, the parasite will not develop any significant voltage and will not reradiate the station's signal to any great extent. However, it must be remembered that at frequencies other than the desired one, the tower will reradiate as before; although, any off-frequency radiation will not affect the fundamental signal.

One theoretical point to consider: assume a badly tuned directional array with a very large 10kHz sideband impedance rise. This sideband frequency may be reradiated by a tower detuned for the fundamental frequency. Audio distortion can result as the off-fundamental frequency impedance increases with a very steep impedance slope.

Detuning installation

It is customary to use three or more dropwires to form the skirt. These are suspended from cross arms placed at the top of the tower. Stand-off insulators are placed as needed down the tower to prevent shorting to it in high winds. At the lower ends, a loop of wire connects them

together and is insulated from the tower and securely anchored to the ground. It is unusual for a tower to be perfectly detuned in this manner, and a parallel tuned circuit is connected to ground from the loop and is adjusted to produce very high capacitive or inductive reactance. The system is thus antiresonated, and reradiation is reduced to a minimum.

Although three dropwires are usually needed, it is sometimes possible to detune a parisitic radiator with a single dropwire. I recall a problem about thirty years ago where a police tower went up, unknown to the station, some distance away in the major lobe of a four-tower array on 1280kHz. Two monitor points were put out of limits, and eventually the new tower was suspected and "convicted."

We dropped a single wire from the top of the tower and insulated it. We then tuned this wire for maximum current with the method described above. The two monitor points came back in. Although it worked that time, it is usually best to plan on using a minimum of three wires to be certain of adequate suppression.

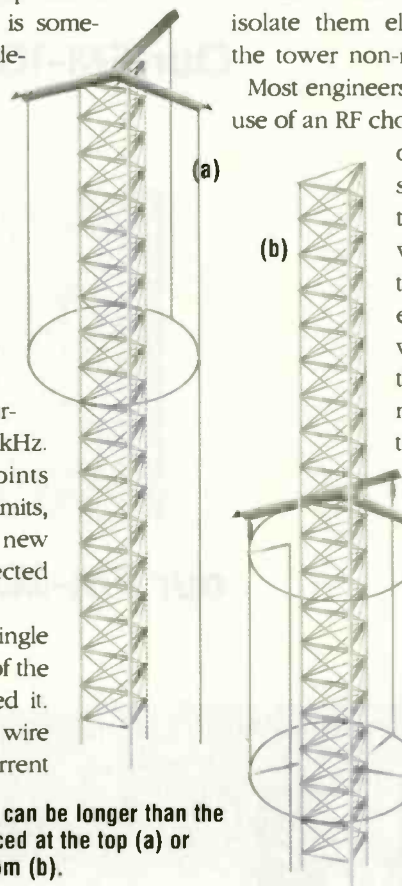

Figure 2. The tower can be longer than the tuning skirt and placed at the top (a) or inverted at the bottom (b).

Guy wires must always be handled with care. Usually, the standard breaking up of guy sections to suitable electrical lengths will be sufficient. However, sometimes it becomes necessary to use Phillystran or similar non-metallic lines for guys. Such circumstances are rare in normal installations, but it is a good idea to be aware of all possibilities when erecting antennas or towers.

Sometimes, on large self-supporting towers, individual wires placed down each side corner leg, insulated and spaced away from the tower leg down to the splayed-base supports, will work well. Although, in the case of tall towers (much more than a half-wavelength), it is usually best to build the tower in sections insulated from each other.

A tall multi-section tower would have tuning networks inserted between several insulated sections to isolate them electrically and make the tower non-reradiating.

Most engineers are familiar with the use of an RF choke in the ground line of a wooden electric supply pole to detune the vertical ground wire. We can compare this to the use and effect of a quarter-wave line. In each case, the detuning component effectively opens the RF circuit to ground and floats the tower. It is important to remember that ground wire continuity on wooden power line poles must never be broken.

The quarter-wavelength choke effect is not limited to the base end of a tower. Many times it is practical to use a quarter-wave section down from the top of a tower to detune a section, as shown in Figure 2.

As a matter of interest, ungrounded half-wave (quarter-wave plus) towers can be detuned by constructing a quarter-wave section that is grounded to the tower at the bottom. The top end of the wire skirt is left open. This effectively produces a high impedance up the tower at the open skirt and suppresses reradiation.

E-mail John at batcom@bright.net.

Remote access: determining needs (part 1 of 2)

By Kevin McNamara, CNE

Fundamentally, data communications networks provide a means to access and deliver information to users over a common infrastructure. The need to access internal company LANs from remote locations is on the rise as more employees work away from the office.

Remote access is a means for a PC located in any remote location to connect to your LAN or Wide Area Network (WAN). Assuming the remote user has the proper rights, he can access files, run applications or print, similar to a PC connected locally; however, the speed of the connection may limit the remote user's ability to use certain resources.

Remote access methods

Remote access to your LAN can be achieved using any of three general methods: a dedicated dial-up connection, an extranet or a virtual private network (VPN). Each method has advantages based on the level of service required as influenced by factors such as speed, security and number of simultaneous users.

Dedicated dial-up. Dedicated dial-up connections are the most popular and easiest to implement. A single dedicated telephone line is connected to a modem, or several lines are connected to a bank of modems. The modems are connected to a *remote access server* (RAS). Some manufacturers integrate modems within the RAS; in fact, larger ISPs use an RAS that accepts a T1, which will provide 24 separate dial-in connections. The RAS manages the data flow between the modem and the local network server. Most dial-in services use the *Internet Protocol* (IP) over the *Point-to-Point Protocol* (PPP).

The PPP is layered, consisting of several protocols including the *Link Control Protocol* (LCP) that is used for the initial establishment of the link. Once connected, one or more *Network Control Protocols* (NCP) are used to transport data for a particular protocol, typically IP. Other protocols permit secure-password authorization, IP-address notification and link monitoring. The *Serial Line IP* (SLIP) protocol also was designed to transport IP over a dial-up connection; however, it has been replaced by the PPP.

Extranets. An extranet is considered a private network; however, it can be thought of as a secure website, generally requiring authorization in the form of a username and password. A properly designed extranet allows you to access information through any standard Web browser or FTP program. Similar to local networks, access can be limited for each user based on the specific rights granted. For example, a company that wants to allow its employees to view certain private information can control who may read it and under what conditions, such as time of day, length of time or ability to download to another PC. Needless to say, extranets require a great deal of security, not only from employees within the organization, but from outside hackers who are always ready to find "holes" in your server. Most extranets are protected behind a *firewall*, a device that performs filtering and routing of incoming data packets. Due to the constantly changing traffic patterns encountered on the Internet, firewalls have limitations and are subject to sophisticated hacking. An unauthorized user that types in the address of an extranet, located behind a firewall, will usually receive a "Site Not Found" message.

Virtual Private Networks. The virtual private network, or VPN, provides a private and secure connection between a remote user and a network over a public network. VPNs can be created through a standard Internet connection or, in some cases, a private WAN. A VPN is designed to work exclusively over the IP protocol; however, it will transport other protocols such as NetBEUI and IPX. In reality, the concept behind the VPN has been around for several years, known as IP Tunneling. The principle behind IP Tunneling is fairly simple: the data is encapsulated within the IP packets and has the ability to be secured using data encryption and authentication methods.

Networks

Originally, the VPN was based on either the *Point-to-Point Tunneling Protocol* (PPTP) developed by Microsoft for PC-to-LAN connections or the *Layer 2 Forwarding* protocol (L2F) developed by Cisco to support LAN-to-LAN communications. Currently, the features of both protocols are combined into a standard known as *Layer 2 Tunneling Protocol* (L2TP). L2TP supports multiple simultaneous tunnel connections. Other VPN protocols include *IP Security* (IPSec), a technology developed for firewalls and designed to support the secure transmission of only IP packets, and SOCKS5, which provides a higher level of control, but requires special software running on an independent server and at the client PC location.

If you have an investment in an Internet infrastructure, such as a Web server and dedicated high-speed connection, a VPN may be the least costly solution to hook-up remote users.

Applications

The broadcast business presents applications for remote access such as programming, sales, marketing, technical and other business function efforts. Personnel at remote broadcasts can have access to your servers, allowing, control over a station's digital audio storage system or the transfer of produced audio tracks. VPNs can connect remotely located kiosks, permitting the station to provide targeted marketing information at high-traffic locations. A sales force can access contact information, presentations, spot availability, etc. while in the field, saving time and potential sales.

The uses of a well-implemented remote access solution are endless. Next month I'll discuss some of the hardware required to achieve remote access at your facility.

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

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

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2001 Regulatory Fees

By Harry Martin

The FCC has proposed a new schedule of annual regulatory fees. While still subject to public comment, the differences in fees between last year and 2001 will likely be as follows:

Population Served	AM Class A		AM Class B		AM Class C		AM Class D		FM Classes A, B1 & C3		FM Classes B, C, C1 & C2	
Year	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000
< 20,000	450	400	350	300	250	200	300	250	350	300	450	400
20,001-50,000	850	800	675	625	350	300	475	425	675	625	850	800
50,001-125,000	1375	1325	900	850	475	425	700	650	900	850	1375	1325
125,001 - 400,000	2050	1950	1450	1350	725	[illegible]	875	775	1450	1350	2050	1950
400,001-1,000,000	2850	2725	2300	2200	1300	1200	1550	1450	2300	2200	2850	2725
> 1,000,000	4550	4375	3750	3575	1900	1725	2400	2225	3750	[illegible]	4550	4375

AM construction permittees would pay $280.00; FM permittees would pay $925.00; and the Part 74 auxiliary stations fee will be $10.00.

FM auction postponed

The FCC has postponed until December 5, 2001, the FM auction that was scheduled to commence on May 9, 2001. Although the FCC did not officially provide a reason for the postponement, the decision is said to be in response to a Motion for Stay filed by National Public Radio (NPR). NPR asked the FCC to postpone the auction until a federal court rules on NPR's appeal of new FCC rules requiring noncommercial educational FM applicants to bid in the auction against commercial applicants.

The new filing window for FM auction applications will run from September 24, 2001 until October 5, 2001. Upfront payments will be due November 5, 2001, and the auction will commence on December 5, 2001.

The six-month hiatus gives participants an opportunity to review further the list of markets and permits involved in the auction and conduct due diligence on them.

Of particular concern for some of the allocations to be auctioned is the availability of a suitable transmitter site. FCC spacing constraints, FAA clearances and local zoning considerations all should be addressed in advance by would-be bidders. The inability to locate a suitable site post-auction could result in a substantial financial loss. Indeed, a successful bidder who cannot follow through for technical reasons would be responsible for 100% of the difference between its bid and the ultimate sale price of the permit, plus a 3% penalty. If no permittee ultimately emerges, the first winning applicant would have to pay 100% of its winning bid and the 3% penalty.

FCC designates license revocation hearing

The FCC has set a license revocation hearing against an AM/FM licensee on the basis of repeated rule violations. FCC agents raided the studios and transmitters of the stations six times in five years and found continuing noncompliance with the FCC's regulations.

The agents discovered both the AM and FM transmitters were located at the same site, even though the FM transmitter should have been located elsewhere. Moreover, the FCC noted the stations were operating at reduced power levels and without locked fences around transmitters, without operating EAS equipment and without a properly maintained public file.

In their initial raid, agents interviewed local business people and determined that the licensee had been evicted from its FM transmitter location. The licensee later filed documents admitting that it had been experiencing difficulty in renegotiating the lease for the FM transmitter site. The FCC claims that the licensee, upon losing its lease, co-located its FM transmitter at its AM site. Four more searches by FCC agents revealed that the FM transmitter remained co-located with the AM station. Following a sixth visit from the agents, the licensee finally applied for special temporary authority

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to operate its FM transmitter from the AM location. In its application for temporary authority, the licensee claimed that both the AM and FM transmitters were operating at variance from their licenses due to a 1999 hurricane. The FCC granted special temporary authority in order to allow the station to continue operating; however, the FCC noted that the station's actions prior to the issuance of the STA were not exempt from future enforcement actions.

The raids also revealed that the stations, at first, did not have proper EAS equipment and that while the equipment was eventually ordered, it was never installed. Further, the licensee had not been maintaining a public file, nor were its licenses properly posted. Finally, the FCC agents observed that the transmitter towers were not properly fenced and that attempts to fence them were inadequate.

The raids also revealed that the stations, at first, did not have proper EAS equipment and that while the equipment was eventually ordered, it was never installed.

Citing the two key elements of FCC character qualifications—truthfulness and reliability—the FCC charged that the licensee may lack both. The licensee's truthfulness is subject to scrutiny because, when the licensee applied for special temporary authority, it falsely claimed that the FM transmitter relocation was a result of a hurricane in 1999. In addition, the FCC found that the licensee's reliability was questionable as a result of its continued failure to maintain a public file, install and operate EAS equipment, and properly secure its transmitters. The FCC also referenced several unanswered letters and notices sent to the licensee.

Every licensee must operate within the parameters that are established by their FCC licenses or promptly seek an STA. In addition, every licensee must honestly and completely answer FCC inquiries regarding their stations. Failure to respond to the FCC was a significant factor that led the FCC to this potential revocation of license.

The licensee's apparent lack of candor with the agency left little room for a graceful escape.

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Dateline

Radio stations in the following locations must file their biennial ownership reports on or before June 1, 2001: Arizona, DC, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, West Virginia and Wyoming.

The Transition To Digital

From the announcer's mic to the antenna

By Chriss Scherer, editor

Incrementally or all at once, the transition is coming.

How digital is your facility? For most stations, the transition began some time ago. A few have resisted the change and are still holding on to as much analog as possible. In time, all facilities will install digital equipment—mainly because most of the analog equipment is disappearing. In most equipment cases, some type of digital replacement already exists. Perhaps the best way to consider the situation is not to think about *if* you will have a completely digital facility, but *when* you will have one.

It's probably safe to say that every station has a piece of digital equipment. With so many high-quality consumer formats available—such as CDs, DATs, MiniDiscs, MP3s—there is bound to be something digital in use. Let's start with a clean slate and move forward from here. Where do you begin?

Start small

I don't think any facility is immune from gradual equipment additions. When minor facility modifications are required, there is usually a need to add the associated audio and control wiring. This is the easiest and best place to begin. A well-planned facility has an established wiring and wire-type standard. If yours relies on non-digital-ready wiring, make the change now. The cost of wire capable of high-speed data and digital audio is not much more expensive than its analog counterpart. What's better is that digital wire and cable is the best analog wire you can get. Digital wire must meet specific criteria for data; criteria which easily cover analog applications.

Professional digital audio equipment uses the AES3 digital audio standard. AES3, the balanced signal standard, also has an unbalanced version, AES3-ID. The data information is the same. The difference is the characteristic impedance (110Ω for AES3 and 75Ω for AES3-ID) and the signal voltage. One or the other should be chosen for the house standard. If necessary, converters are available.

The standard also supports different sampling rates. It is best to select one standard for your facility and stick with it. Avoid converting signals as much as possible, as this creates such problems as overshoot. Once the infrastructure has been upgraded, upgrading the audio equipment is a simpler task.

Digital audio storage and playback systems and digital editing workstations are inherently digital. Connecting these devices to other equipment can be done through analog or digital connections, but digital connection provides greater functionality.

Digital connectivity between all the devices allows you to consider the entire facility as a single entity. When the consoles, audio routers, automation systems, DAWs and other equipment can communicate, audio can pass through the system, but so can *program-associated data* (PAD). While the current analog transmission system does not provide a practical method of including PAD, Internet radio and IBOC do. (Analog FM has RBDS, but there are not enough stations fully utilizing it, nor are there a significant number of RBDS receivers in consumer use.) A digital facility also shifts the design of the studio facility from an audio-based facility to a data-based one.


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The integration of consoles and routers has continued its evolution. In multistation facilities, this approach offers savings in several areas. By locating all the audio engines in one room, the audio wiring needs are dramatically reduced. Cable preparation, a major part of the labor required to construct a facility, is reduced, resulting in a time and labor savings; labor that can be used in other areas.

For some stations, the transition to digital will be time-consuming.

From hear to there

Because the United States does not yet have a digital radio transmission standard, each station's transmission facilities are likely in very different states of technology. The audio processor, really part of the audio chain, is the most sensitive issue in a station. Creating a signature sound is a personal goal for many people. The debate between an analog or a digital processor is one that is best saved for an entire afternoon. As far as the transition to digital is concerned, completely digital, and even digitally controlled analog, processors provide stations with a means to create, modify, store and recall preferred settings. As the facility migrates toward being completely digital, the processor can fit into this "total facility" method.

Digital studio-to-transmitter links (STLs) can be wired or wireless. Most offer greater bandwidth than their analog predecessors. The wired versions typically provide a bi-directional path, which works well with audio sources located at the transmitter site, such as satellite feeds and RPU receivers.

Since an IBOC standard is not ready, there isn't much replacement that stations can do to continue the transition, but stations can take preparatory measures. The *BE Radio* October 2000 cover story discussed some of the costs that a station can expect. These costs can extend to just more than $40,000 or more. What about stations that need to replace facilities today? You can't buy an IBOC transmitter, but you can buy one that will likely be able to handle an IBOC signal. While some of the specific details are resolved and methods refined, the safest approach for a transmission system is to allow greater headroom than you would for analog. This sounds vague, but each application will be different. The best advice is to talk to your transmitter manufacturer. IBiquity Digital also offers an evaluation to stations as part of the iBiquity EASE program.

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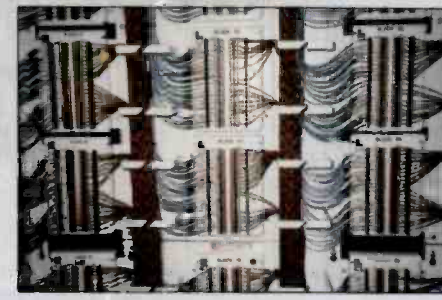
Rebuild or replace?

A long-term facility plan should exist as part of a station's capital plan. This will dictate which approach is best for the station.

Stations planning a new construction should future-proof as much of the facility as possible. There are many unknowns, but current-trend observation can guide you very well. Plan enough physical space for the continu-



Integrated routers can reduce the amount of audio wiring required within a facility.

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Often, when asked abo... plans for investment in n... technology, managers w... talk about how much money they are spending. The implication is that the greater the cost, the better the investment. While this approach is great news for broadcast equipment vendors, it can also result in too much money spent for too little return. This is why we need to adopt a strategic planning process for converting to digital.

Strategic planning can be incredibly practical. A strategic plan is all about deliverables—what you should achieve from your investment. There are many ways to design a strategic plan. If you have time for nothing else, follow this simple four-step model, and you will be on the fast track toward investing your capital dollars wisely:

Establish a purpose for your transition. Why are you *really* making this transition? Do you need to improve your on-air sound? Are you trying to reduce operational costs? Do you want facilities that are better than your competition? Unless you have been blessed with unlimited funding, you will face difficult choices between competing deliverables. If everybody on your team agrees on why you are investing your money, you will have an easier time designing achievable goals.

Establish goals that can be measured. It's too easy to write a goal that says "install a cost-effective digital audio routing system." How will you know if your routing system is cost-effective? Instead, consider writing

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a goal to "install a digital audio routing system that every staff producer can operate with one day of training."

Prioritize your goals. Every capital project brings with it the unexpected. Most unexpected issues consume additional funding. Ask your staff, "If we run into problems—and run out of money—what are the most important goals that we must achieve?"

Publicize your plan. Keep your plan out of the file cabinet—and on the wall, where it belongs. Make sure that everyone sees your goals regularly. We tend to achieve goals in direct proportion to the amount of time we spend thinking about them. Therefore, wise managers look for every opportunity to encourage their staff to *think digital*.

Jim Paluzzi, Ph. D., is general manager of Boise State Radio, Boise, ID, Professor of Broadcast Technology at Boise State University, and serves on the National Public Radio Board of Directors.

ing increase of computers. Studio furniture should be able to handle additional monitors and possibly house more computer cases. Don't forget to consider the additional airflow and noise suppression. Rack rooms and server areas will require additional space. "Add another PC" is often the answer given when a new need arises.

New facility installations can be designed for digital from the beginning.

In a new installation, the wiring plan should be digital ready. AES3 and CAT5 cable (or better) should be used. It is also likely that house sync signals will increase usage, so an extra coaxial cable should be added to each room.

The integrated router approach allows you to design the entire facility as a single system. This design can be fulfilled with separate system components or a complete package. Be sure to consider any file-sharing needs. A fully digital studio router does not only route audio. Information from DAWs, automation, music scheduling and traffic systems, and other sources can be shared and used.

For facilities that are not planning a complete change, the transition can be made incrementally. By starting with a few key pieces of equipment, the financial load can be distributed over time while the benefits of the change can be realized.

Photo of WLTW-FM on page 36 by John Farrell and courtesy of Meridian Design Associates.

Trends in Technology

The center of control

By Barry Thomas, CSRE

The station's pilot seat is behind the audio console.

The most critical focal point in a radio studio is the audio console. From day one, the audio console must serve several masters: The engineer wants easy installation and maintenance, high audio quality, flexibility and physical resilience. The announcers want the ease of baby's first radio, and the ability to forget about equipment and think about their shows. Station management generally wants anything inexpensive that will keep the announcers from complaining.

While radio operations have become more streamlined, radio control rooms and production studios have become more complex. More mixes, feeds, sources and controls are needed than ever before. One reason for this is the lack of engineers who have the time or resources to build all the custom devices needed in a radio studio. We have come to expect off-the-shelf solutions to the myriad of technical challenges. Most of those solutions are best integrated with the radio operator's primary control point: the main audio console.

Manufacturers have risen admirably to the task with a wide variety of product options and features that should satisfy almost everyone. It's interesting that when you see an ingenious, home-made device attached to or around the console, you can expect to see a production version of that device in a manufacturer's product line in short order. As a result of all these advances, those in a position to replace the station's audio console or build a new studio have some great choices.

Production

Radio production has changed so remarkably over the past few years that the studios in many stations bear no resemblance to the standard on-air radio studio. The key to production studios is flexibility. Most stations have invested in digital production/editing systems and equipment so that standard broadcast consoles simply aren't flexible enough. As a result, engineers have taken the cue from the pro sound industry and have installed recording consoles with channel equalizers, multiple sends, effects returns and other previously unknown-to-radio-console enhancements. Others have invested in mixing technology that simply augments their digital editing system, leaving the mixing tasks to computer programs and specialized hardware.

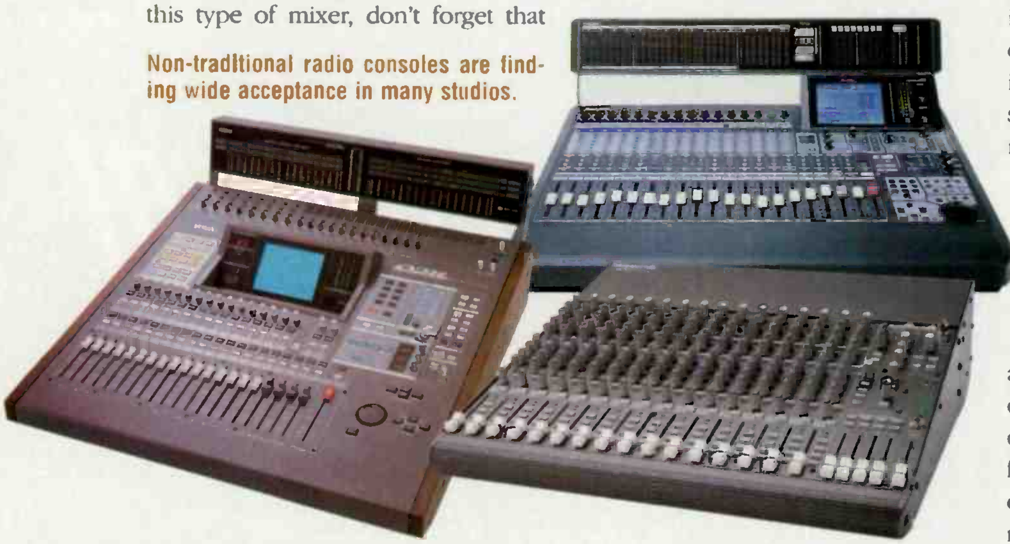
What's available?

Mackie has a broad product line of analog mixers that have become a mainstay of radio production rooms, but it is by no means the only player. A visit to your local music store will give you an idea of the broad range of manufacturers that offer mixers—like Soundcraft, Studiomaster, Yamaha and Behringer. When planning the size of this type of mixer, don't forget that the inputs are typically mono and that input-channel second or B inputs can be problematic. While usually easy to install, these consoles are often extremely difficult to repair. Fortunately, they are frequently priced so that replacement after a few years is not a major expense.

At the other end of the pro sound spectrum are digital production consoles. Mackie and Soundcraft have impressive digital audio consoles, but the Yamaha O2R and Panasonic DA7 have proved effective studio centerpieces. Digital mixers offer all the advantages of their analog counterparts but have the ability to save and recall *scenes* or mix settings, automate mixdowns, and use internal third-party processing *plug-ins* instead of outboard equipment for effects and dynamics processing. Digital consoles present an entirely new set of wiring conventions that most radio engineers aren't accustomed to, but wiring a purely digital studio can be simpler than a full-featured analog room.

There are problems with using this sort of console for your production facility. Pro-sound studios and the recording-grade consoles are complicated to operate. The biggest disadvantage is the lack of control features and ease of use that a broadcast console would have. Speaker muting and warning lights are often

Non-traditional radio consoles are finding wide acceptance in many studios.



a problem as well as equipment remote controls. If the production room serves as a standby on-air studio, it's hard to imagine using a concert-sound audio mixer to run your station. There are add-on products that can solve many of the problems, but they aren't ideal solutions if you want true broadcast functionality.

Fortunately, broadcast console manufacturers have taken some of the best features of the pro sound world and added them to their lines of proven products. Harris/Pacific offers the Production mixer and X-series production consoles, which are extremely flexible for stereo and multitrack production. Wheatstone also offers analog production consoles but also has the D-600/D-700 digital audio consoles, which are excellent production tools. These consoles are essentially a routing switcher with console controls and features. Just like the pro-sound digital consoles, console setups, equalization and internal processing settings can be saved as scenes so that precise settings can be duplicated.

On air

The main studio console is the bottleneck of your entire station. It must have all the features and controls to handle every eventuality, yet be so simple and easy to understand that there are no on-air mistakes. The lion's share of development in broadcast consoles is directed to this function.

Console manufacturers have migrated to the sloped-top, slide-fader form factor. This can sometimes create a problem for operators who can't or won't adapt. Many engineers know of Rick Dees' RCA console. LPB and Autogram still offer the classic audio console style and functionality in addition to the now-standard slide-fader consoles. Proven analog designs are still the basis for consoles from Radio Systems and Ward-Beck. Advances and enhancements to analog consoles continue despite the increased presence of digital equipment.

The greatest recent advances have been made in the digital arena. The industry has long been calling for a means to mix and control all of the digital sources in the studio without subjecting the audio to repeated analog-to-digital-to-analog conversions. Console manufacturers have invested an incredible amount of energy and money into developing digital technology, but the evolution of the console has still been comparatively slow. We are now to the point where the digital audio consolecan more than satisfy a broadcaster's expectations.

Digital on-air consoles can be separated into two general types: those that follow classic broadcast console construction and function, and those that are controls for a routing switcher. The control-surface form factor of both types is similar, but the underlying architecture is vastly different.

The classic construction is a self-contained mixing system that includes analog-to-digital converters for individual analog sources and is built around a wiring architecture that is similar to its analog counterpart. These consoles have most, if not all, of the features of analog radio consoles but suffer from the same limitations of expandability and flexibility. These consoles have offered stations an easy upgrade patch to digital mixing.

Studer radio consoles, Fidelipac, and Audioarts and Wheatstone D-series consoles work on this principle. These consoles can be configured for muting and channel assignments by computer on the fly and can even control external routers, switches and automation systems using serial data.

For some time, Harris/Pacific has offered the Integrity, Impulse and Airwave Digital, and has introduced the BMX Digital console, which offers classic console design features with multiple mix and send buses.

The router-type digital console is different. All audio is connected to a completely configurable digital audio engine that is managed through a console-like control surface. This architecture lends itself to expansion and configuration options that blur the line between console and routing system.

The Arrakis digital console looks and feels like an analog console, but there is no audio inside. Instead, there is an audio engine that handles all audio inputs and outputs. The console is simply a control panel.

Auditronics, Logitek and Klotz have developed a systems approach to the audio console. Their consoles also depend on a router engine, but they are designed to be part of a greater system. These engines can be networked with multiple control surfaces attached so that studio inputs can be accessed from multiple locations.

With the router systems concept, a digital audio frame supports all inputs and outputs. These frames are linked like a network, and each studio has an appropriate control surface. These studios have the ability to control and route sources in other rooms. This networking can be extended off-site with computer networking so that studio sources can be controlled remotely over a WAN. Imagine a remote where the announcer runs his own board at the site. All the manufacturers offer a range of control surface options from

The RCA console used by Rick Dees. Photo by Mike Callaghan of KIIS.

small and simple to large and elaborate to manage their routing systems.

Console systems like this are ideal for complete studio build-outs but can be a challenge to integrate into an existing digital/analog facility. If a single engine and console are added, long-range planning is important to insure that the system can be expanded and integrated properly. In any digital console installation, a new set of rules must be learned. Concepts common to video or computer networking, such as clock sync, fiber-optic networking and wiring impedance, become applicable to radio facilities.

While the basic functions of the broadcast audio console are unchanged, the methods and operations have changed remarkably with industry needs and new products. Investigate all the consoles available, but make sure that it satisfies the users and their priorities. If the new console is a replacement, make a note of all of the work-arounds the current users have attached, and make sure your new choice includes these as part of its design.


The integrated-router design offers many advantages.

Barry Thomas is president of Media Systems Design, Los Angeles.

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The Presidential inauguration coverage

By Chriss Scherer, editor

When NPR planned its coverage of the Presidential inauguration in January, the details of the election itself were the top headlines. These issues played no part in the remote broadcast—the focus was on getting clean audio on the air.

National Public Radio had three locations for the inauguration ceremonies. The main location was on the steps leading up to the Capitol building. The other two locations, Lafayette Park and the Canadian Embassy, were along the parade route.

A three-location remote is a major undertaking, but it is not unheard of. What complicates this event is the heightened security for two locations. The third location is unique in that it is technically on foreign soil.

Along the route

NPR typically uses mono with ISDN feeds, but for the inauguration, Layer III joint stereo at 64kb/s, 32kHz was planned. The stereo feed would provide better ambience from the surrounding activity. Like any live situation, not everything went as planned.

Both Lafayette Park and the Canadian Embassy used two POTS lines and one ISDN line. The ISDN carried the main program feed back to NPR's master control. The POTS lines were used for data feeds and communication.

Security clearances were required for anyone and anything inside the secured area—both people and equipment. As the final event approached, security measures increased. Five days before the inauguration, it took about three minutes to pass through the security check. On the day of the ceremony, it took 30 minutes.

For the Lafayette Park location, the ISDN circuit was tested and checked out on Monday. Unfortunately, the equipment could not be set up on Friday, as was originally planned. On Saturday, the day of the event, the ISDN line only had one bearer channel available for use, so LIII joint stereo was not possible. Despite all efforts, it could not be corrected, so a 64kb/s mono Layer II (LII) feed was used. Stereo was preferred to capture the parade ambience, but it was not to be. For the stereo feed, Earthworks omnidirectional mics were set up in a spaced-omni pair.

A similar non-stereo fate was suffered at the Canadian Embassy. A casualty of the rain, the Neumann RSM 160 stereo mic got wet and was unusable. A substitute mic was placed, and the codec was set to 128kb/s LII mono (the NPR standard). Without the stereo audio, there was no need to provide a stereo feed.

Security at the Canadian Embassy was no problem. All the equipment was set up on Saturday. In fact, the security clearances required for the people and equipment on the Capitol steps and in Lafayette Park did not apply to the Embassy because it is foreign soil. Security efforts were taken, but the scope was much smaller.

The Presidential inauguration

In addition to the fixed locations, there were reporters with cell phones stationed along the parade route. While cell phones don't provide the same quality, mobility was an important requirement. Washington, DC, is rich with RF usage, and a major event like this only increases the demand for frequencies. Cell phones do not require frequency coordination and are by nature compact and portable. Qualcom and StarTec phones were used.

The Capitol Building setup overlooking the podium where the President was sworn in and delivered his speech

Stepping up

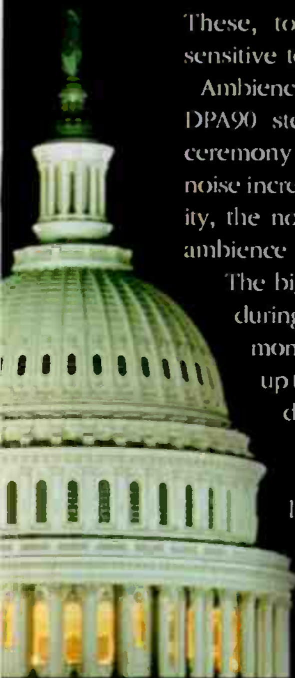
The broadcast location on the Capitol Building steps was the main point of activity. A two-tier platform was built to house all the media covering the event. NPR was at one end of the platform, to the extreme right of the speaker's podium.

The telephone setup on the steps had two ISDN lines and one POTS line. A Prima 220 was used for the main audio feed. The other ISDN line was for data transmission using the ENPS software. The POTS line was for communication.

A Mackie 1202-VLZ mixer was the center of activity. Headset mics were slated for use, but proved too sensitive to the noise in the area. They also got wet and could not be used. Instead, Neumann KMR81 shotgun mics were used to try to eliminate some of the unwanted ambient sounds.

Placement of the DPA90 stereo mic used to capture ambience during the ceremony

The Presidential inauguration



These, too, proved to be overly sensitive to the surrounding sound.

Ambience was picked up with a DPA90 stereo microphone. As the ceremony proceeded, the ambient noise increased. At the height of activity, the noise level was so high, the ambience mic was turned off.

The biggest obstacle was the rain during the morning of the ceremony. Equipment that was set up the night before was soaked, despite the efforts to seal everything. Since security is so important at an event like this, replacement equipment brought in that morning was subject to an intense round of checks and rechecks to pass through the gate. The main casualties of the rainwater were some of the microphones, the timers for time posts and some of the data hubs. However, each site worked, although not entirely as planned.

Scheduling equipment setup to meet the security schedule was a challenge. Like Lafayette Park, the Capitol Building broadcast platform is a secured area. As the event approached, security concerns increased, as did the time required to pass through the checkpoints. On Monday, it took five minutes to clear security to get to the broadcast stand. On Saturday morning, it took nearly two hours.

Despite the less-than-ideal weather, the entire event was considered a success. Sufficient back-up plans were in place for almost any circumstance.

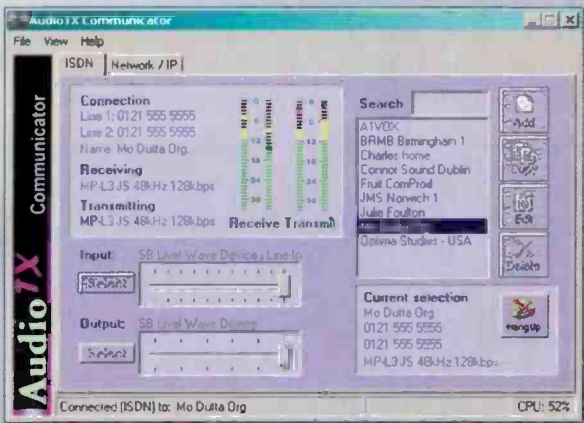
In case of rain during the ceremony, there was a backup plan for the Capitol steps. The ceremony would have been in the Capitol Rotunda. NPR has an ISDN line in the Senate hall, and a four-wire cable would have been run between the two locations, with a Shure FP11 mic-to-line amplifier and FP22 headphone driver feeding the codec.

The broadcast covered six hours of programming. While this is a major event, it is not the largest location broadcast during the election season. Planning for this event began three months before the ceremony. Planning for the 2004 election will begin in November 2003.

Thanks to Shawn Fox, election technical director of NPR, for information in preparing this article. All event photos by Shawn Fox.

New Products

Software codec
Audio TX



◀ **Audio TX Communicator:** Runs on Win98 or WinNT and uses any standard sound card. Runs well on a laptop. AudioTX Communicator connects directly to all major ISDN audio codecs and automatically detects the type of codec to which you are connecting and configures itself. The system provides live audio links over IP networks using a standard IP network port by default, but this can be changed to suit the local network configuration. AudioTX will run over private leased lines and allows a live audio connection over the Internet using your choice of high-speed connection. The unit uses the existing networking setup of the PC on which it runs for audio transport. Or you can use specialized ATM hardware—as long as it presents an IP network connection capable of carrying TCP packets on the PC. Audio TX is distributed by MusicamUSA in North America.

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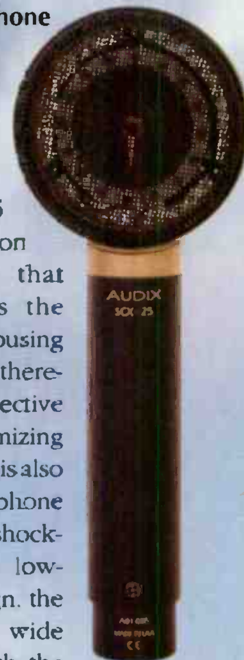
Condenser microphone
Audix USA



▶ **SCX25:** A brass condenser microphone with a 25mm gold sputtered diaphragm, the SCX25 features a suspension mounting system that effectively isolates the capsule from the housing and the electronics, thereby minimizing reflective surfaces and maximizing phase coherence. This also means that the microphone does not require a shock-mount clip. With a low-noise pre-amp design, the SCX25 provides a wide cardioid pattern with the open-air sound quality found in classic microphones.

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Stereo rackmount mixer
Studiomaster

DEMO ROOM

◀ **162BP:** Boasting a full 16 XLR microphone input complement, the 162BP features all-steel construction and is internally modular. Mono channels 1 through 14 provide three-band EQ with mid sweep, channel direct outputs, inserts, two discreet auxiliary sends, LED overload indicator, PFL listen and 60mm faders. Channels 15 and 16 provide the same features with the exception of a two-band channel EQ, but with the ability to use the XLR microphone and the stereo line inputs simultaneously. Other features include: 48V global phantom power, balanced XLR outputs, output inserts, 12-segment LED metering, stereo playback bus with independent level control, stereo record bus with independent level control, and headphone bus with level and 60mm master faders. The 162BP also features back patching, which keeps the cables tucked away from the front panel controls.

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www.studiomaster.com; us-info@studiomaster.com

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New Products

POTS codec
Musicam USA

Voyager: This POTS codec/mixer achieves 15kHz mono audio over a standard analog telephone line. Low (100ms) delay even at bit rates as low as 24kb/s, means Voyager covers the full frequency range of FM. A custom-designed modem enables broadcasters to keep the sound flowing, regardless of changing conditions on the POTS line connection. Voyager allows users to renegotiate their connection or re-equalize the line for complete stability within 1.5 seconds. Audio frequency response degrades smoothly as line connections fall below 24kb/s, with Voyager improving on regular analog line quality down to 9.6kb/s. Voyager's built-in telephone coupler can be used to connect in standard telephone mode. The bi-directional Voyager extends the expertise of studio personnel to the remote location.

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TASCAM/Teac Professional

CD-RW2000: Features include comprehensive audio I/O, word sync input, call function for checking play cues, incremental play function, auto ready (single play) mode, input monitoring, digital gain adjustment and digital fade in and fade out. The CD-RW2000 is made for professional use. A RAM buffer is included

to ensure tight ID markers without danger of clipping the start of the track, and the SCMS code can be set via the user menu. Digital gain adjustment allows you to boost level adjustments without going back to the analog source, and the adjustable auto cue function lets you locate right to the start of actual audio, rather than the track ID.

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New Products

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Ramsey Electronics

▶ **PX1:** This transmitter is designed for worldwide service and operates on 110 or 240VAC power. The PX1 can also run on 12VDC for remote or emergency operation and is appropriate for use as an exciter for higher power broadcast stations. Features include an 8× oversampled stereo generator with true analog filters. The power amplifier is over-temperature and VSWR protected. A five-button user interface gives the user access to all operating parameters and adjustments. The two-line vacuum florescent display provides verification of all parameters. The PX1's microprocessor continuously monitors, and makes subtle adjustments to various circuit parameters based upon frequency, temperature, power, audio level, and deviation. The PX 1 is housed in a 2RU case.

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Software module and user interface
ENCO Systems

AirPlay: A new virtual machine within DADPRO32 intended for live assist use. With easy to read cut information and many customizable features, AirPlay is a fourth-generation user interface designed for the most intensive live on-air usage, with features based on dozens of user interviews. Nearly everything on the AirPlay machine can be customized by the end user, from number of playback slots to the background and foreground colors of slots while playing and while in ready mode. AirPlay takes advantage of higher screen resolutions available on larger monitors and can be used on its own or together with other DAD machines such as Mini-Array or Script.

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www.enco.com; support@enco.com
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Straight-arm turntable
Stanton Magnetics

STR8-80: Features of this turntable include reverse and motor-off functions; 3.5mm line input built-in cable; key adjustment (master tempo); quartz lock (zero pitch); three speeds: 33, 45, 78 rpm ; selectable pitch adjustment (±8%, 12%); skip-proof straight tone arm; blue LEDs; remote start; adjustable feet; and dust cover and slipmat. The STR8-80 comes with a Stanton 520 SK cartridge pre-mounted on a silver headshell, S/PDIF digital output, a direct drive motor, an aluminum platter, a target light and a blue strobe indicator.

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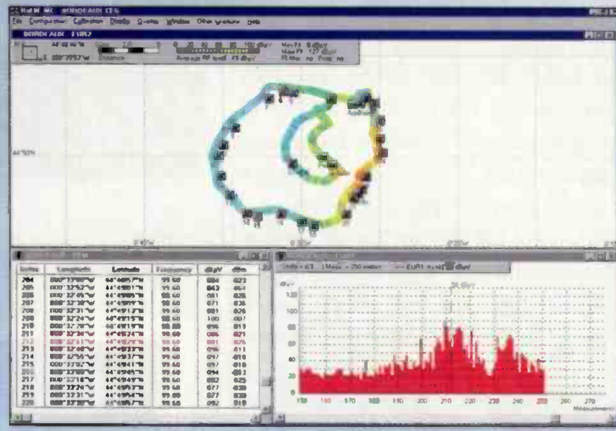
RF field-strength measurement
Audemat



Fieldstar: This mobile RF field-strength measuring unit can automatically measure up to 99 stations simultaneously. Fieldstar measures, and immediately displays on geographical maps, the effective coverage area of all stations received in a target market. Fieldstar includes a GPS receiver and RDS decoder, easy operation and user-friendly ergonomics, high performance professional FM receiver and an optional cartographic (map) display. Fieldstar is an evolution of the Audemat FM-MC-3.2.

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Internet broadcasting service
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New Products

Stereo effects processor
Eventide

▲ **DSP7000:** A new design, evolving from Eventide's DSP4000 series processors, the 7000 has four times the processing power of the previous-generation DSP4000, plus a host of new features and capabilities. More than 500 factory presets are included for lush reverbs and accurate, high-quality pitch change programs. Features 24-bit conversion at 96kHz. The DSP7000 provides analog and digital I/O with separate gain controls and metering for each domain. Offers the user extensive programmability and remote control capability. More than 150 user presets can be stored internally, and hundreds more can be stored on removable PCMCIA cards. Accommodates presets and preset library cards developed for the DSP4000 series Ultra-Harmonizer units.

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Voice editing system
Audion Laboratories

▶ **VoxPro PC:** This PC version has the same look, feel and functionality of the Mac VoxPro but includes many new features. Some of these include: a large re-sizable sound window that displays seven to 15 seconds of a recording, the ability to import and export .WAV, AIFF, MP3 and other file formats, unlimited undo, unlimited hot keys, and the ability to run on any Pentium II or higher, Windows 98, ME and 2000. Mac versions released in Q3 2000 run on the G3 and G4 platforms.

DEMO ROOM

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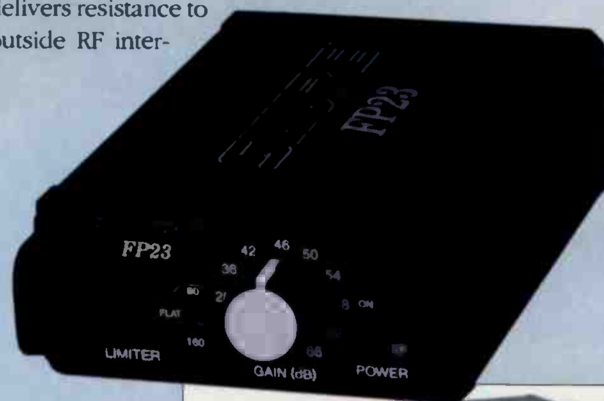
Mic pre-amp and mixer

Shure

▶ **FP23 and FP24:** A battery-powered mic pre-amp suited for on-location recording or broadcast environments, the FP23 offers 24 hours of operating life with two AA batteries. Features include all-metal construction, special filtering and transformer isolation. The FP23 offers a maximum of 66dB of gain, adjustable in 11 discrete steps, delivers resistance to outside RF interference, features a selectable low-frequency roll-off, and input and output transformers. The FP24 is outfitted has up to 66 dB of gain, transformer-balanced inputs (assignable to the L-C-R outputs), a built-in slate microphone, 1 kHz tone oscillator, and a headphone monitoring amplifier. Input transformers provide quiet operation and freedom from RF interference, while high-current, balanced output drivers maintain signal integrity. The FP24 features: a dynamic range exceeding 110 dB; a bandwidth extending from 10 Hz to 50 kHz; and low distortion characteristics.



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New Products

Reference monitor

Alesis/GT Electronics

▼ **Monitor One Mk2:** The monitor's updated voice coil provides improved performance and longer throw. Additionally, an industrial cabinet design offers longer and more rigid porting tubes for a punchier sound, while rounded corners reduce edge diffraction and improve the quality of sound. Monitor One Mk2's crossover point has been adjusted to 2kHz, which provides a truer, flatter frequency response than the original unit. The renovated 6.5 inch low-frequency driver provides a more detailed and controlled low-end. Mk2 also features the next generation of the Alesis exclusive SuperPort venting technology, which eliminates the choking effects of smaller, shorter ports.

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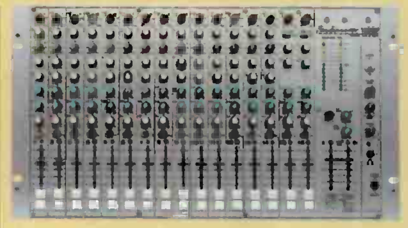

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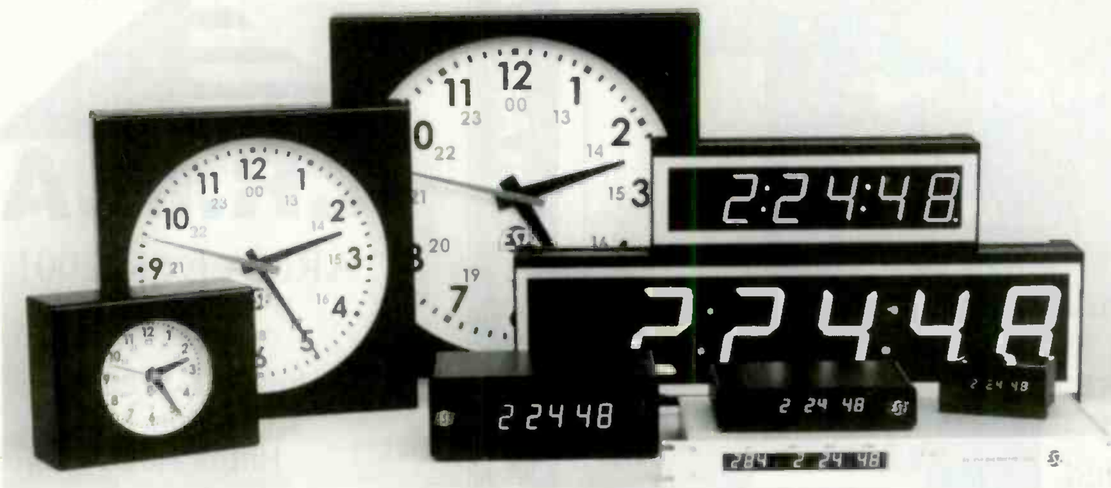

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2.5 KW	FM	1984	Harris FM 2.5K Single Phase
2.5 KW	FM	1980	Harris FM 2.5K Single Phase
2.5 KW	FM	1976	Collins 831D Single Phase
3.8 KW	FM	1994	Continental 814J-Solid State, Sgl. Phase
5 KW	FM	1985	BE FM 5A
5 KW	FM	1967	Collins 830E
6 KW	FM	1994	Henry 6000D Single Phase
10 KW	FM	1974	Harris FM10H/K
25 KW	FM	1982	Harris FM25K

AM TRANSMITTERS

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5 KW	AM	1980	Harris MW5A
10 KW	AM	1983	Continental 316F
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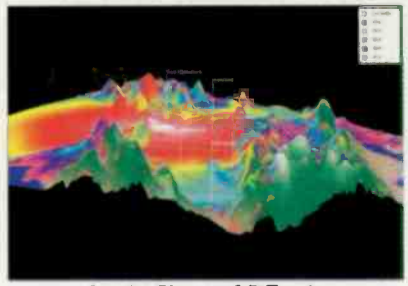

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Ups and downs

By Skip Pizzi, contributing editor

As with any business, the radio industry must weather cyclical variations in economic conditions. The volatility of this environment can often mask more fundamental long-term indicators, however. Consider the following big-picture analysis of radio's current situation:

The short-term fortunes of commercial radio are ruled by the overall advertising industry's climate. Advertising is, in turn, strongly indexed to the overall economy. When Wall Street is booming, radio does as well or better than other advertising sectors, but the opposite is also true.

In the long term, radio is experiencing a slow, downward trend, based essentially on changing user behavior. Like all traditional broadcast services, there are simply more services competing for audiences than ever before. When compared to the number of new services, radio is holding its own fairly well, but the overall negative trend remains inexorable. If nothing is done to counteract this trend, it will eventually drive the medium into serious difficulty.

On the other side of the ledger sheet are the liabilities, which have also changed in important ways. The consolidation process that radio owners have undertaken in recent years was executed at a time in which station values were inflated to double-digit multiples of cash flow. The belief that radio could only compete by eating its competition as soon as it was allowed to do so caused most broadcasters to violate the cardinal rule of buying low and selling high. Now these groups are saddled with debt and the corporate inertia that accompanies monolithic structure and massive size.

Worst-case scenario

The picture just painted provides a uniquely bleak outlook: Radio is in desperate need of something new, yet its current economic environment is hampered by high risk, making it unwilling to invest in speculative ventures.

To some broadcasters, the mirage of IBOC DAB seems to be the answer. In fact, IBOC may prove to be a continuing distraction, and ironically dangerous to radio's health. To wit, during the 1980s, IBOC lured broadcasters to believe they needed no spectrum for new services. In the 2000s, it may tempt them to spend precious resources toward developing an ultimately unsuccessful delivery format, which may serve only to accelerate the medium's downward spiral. It's been noted here before: purely *qualitative* improvement to existing services is not what radio needs to stem the tide of departing audiences and advertisers. Instead, new and expanded services with increased personalization and added value are required. The mainstream radio industry's current approach toward DAB (IBOC or otherwise) is not yet providing such a solution, as the lackluster results in other DAB-deploying countries are proving.

Radio has been resilient enough to recover from every downturn it has experienced with an even higher subsequent peak. This time around, the bounce will have to be particularly strong.

Piling on

If this weren't enough, new environmental changes are making life ever more difficult for radio broadcasters. The additional assessment of music performance royalty fees for streaming services could have a serious chilling effect on development of new media at radio stations. Recent actions by AFTRA regarding online services also indicate that even this kind of streaming media programming may be prohibitively expensive to produce for broadcasters.

Meanwhile, the movement towards marketing direct, online listener subscriptions and corresponding broadcast-affiliate streaming blackouts by some network and syndicated content providers also does not bode well for local radio stations' online future. Popular national programs such as Rush Limbaugh and Major League Baseball have started down this path, blocking stations from repeating their on-air signals in the stations' streaming online services when airing that content. These program originators have established alliances instead with non-broadcast streaming aggregators to offer this content directly to online listeners.

The handwriting is on the wall: radio will need to make a play for enhanced content and new media services soon, or it will be too late to stop the bleeding that will eventually become a red-ink hemorrhage. Simple survival is not enough. Aggressive growth and staking new territory is required. Increased local programming and revised deals with providers of externally acquired content are key components of this strategy. *Quantitative* growth and exclusivity of content on new media services will be required to drive audiences to radio's next frontier.


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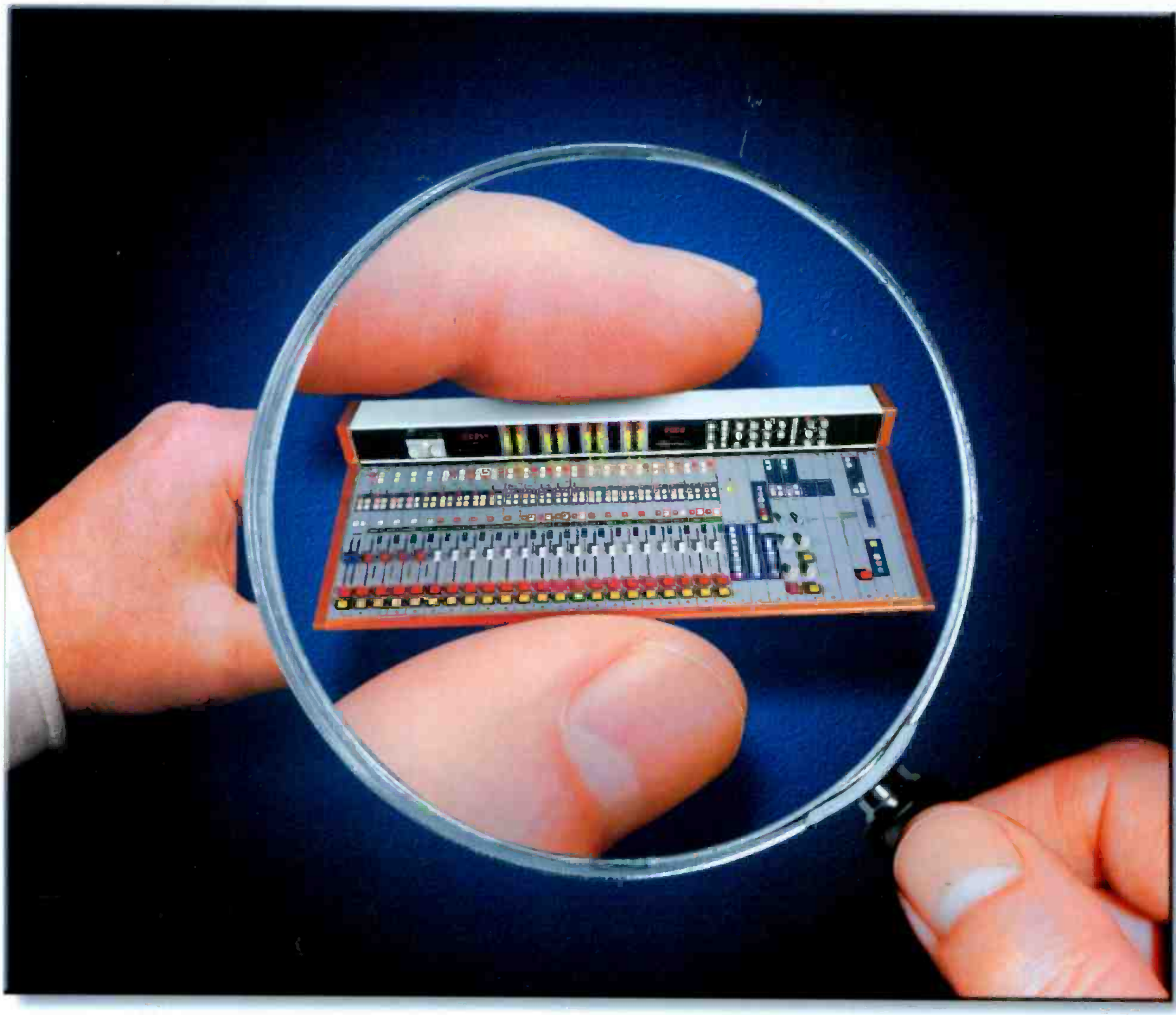

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