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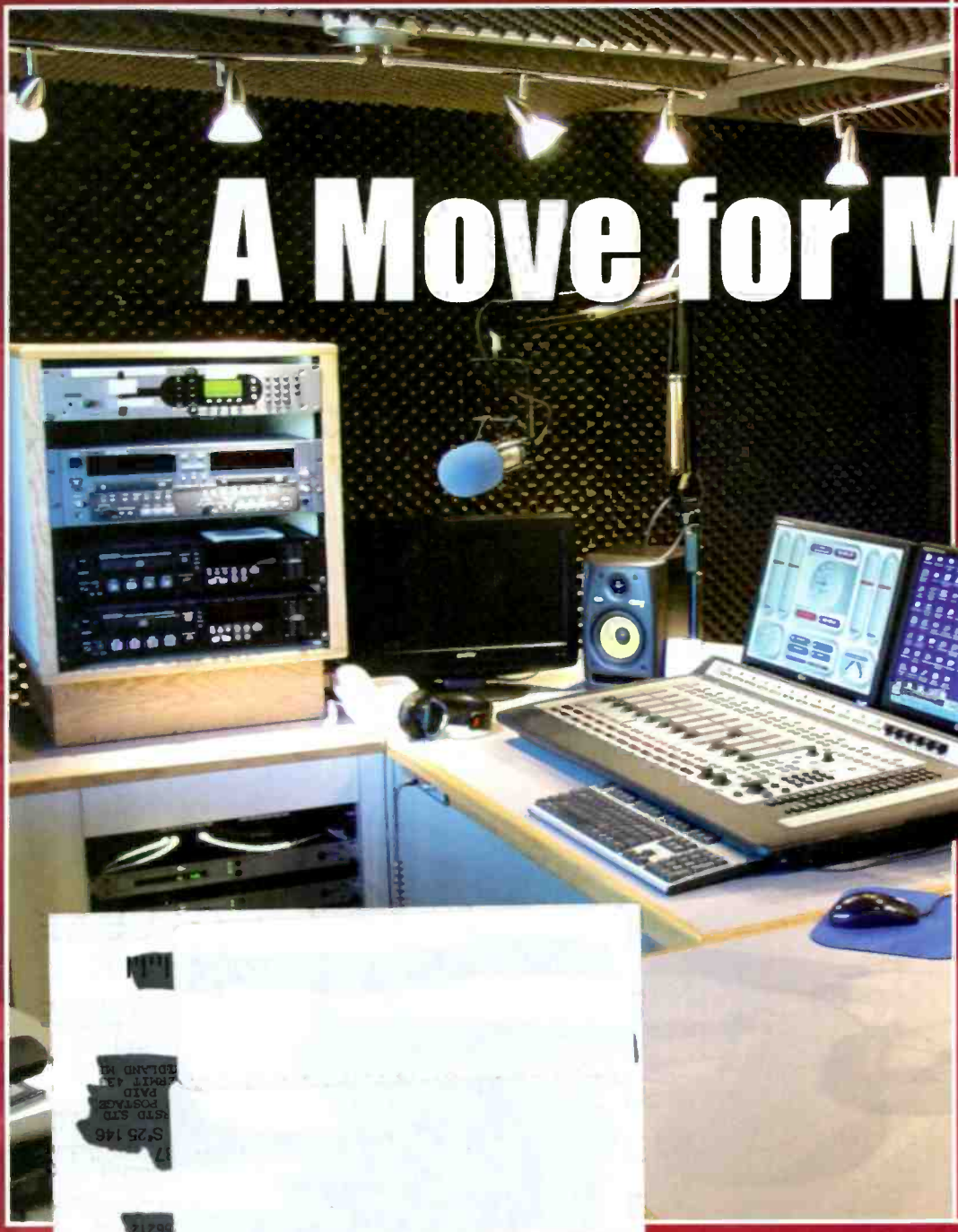

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FIELD REPORTS

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Moody Bible Institute uses pre-built VocalBooth sound booths to future-proof four stations from four cities. Read how on page 20.

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Currents Online

Selected headlines from the past month.

Arbitron Unveils PPM 360

Arbitron calls the new devices a "sleeker, smarter audience measurement solution" that fits "consumers' on-the-go lifestyles."

Tieline Releases Free iPhone Report-IT Application

The free version, called Report-IT Lite, has many of the full version's features.

Comrex Access and Bric-Link Connect with iPhone

Media5 Fone is a SIP client softphone app that runs on the Apple iPhone or iPod iTouch.

Is HD Radio Coming to the iPhone?

An Apple patent application has HD Radio at its core, leading us to believe that the next versions of the iPhone and iPod Touch should have HD Radio tuners installed.

Digital Alert Systems Integrates EAS Into WideOrbit for Automation

The pairing of the two systems is designed to streamline operations, prevent emergency alert step-on insertion over advertiser material and produce a more polished and sophisticated on-air product.

Genachowski Asks for Bigger 2011 FCC Budget

The 2011 budget proposal is an increase of approximately $19.4 million over 2010.

WKSU Adds HD-4 Stream

WKSU is the first public radio station and the second in the country to add a fourth HD Radio multicast stream.

Find the mic and win!

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New Owner for RF Specialties of Texas

Dan Sessler, recently retired from Harris, has purchased the equipment dealership from Don Jones.

Site Features

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The *Radio* magazine Industry Events section lists upcoming conventions and conferences.

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Riding high on optimism

Over the past month, several radio ad revenue reports have been released that show promising news for our industry and the economy in general. The reports all show that radio ad revenues will increase over the next few years. Granted, these predictions come after some of the lowest revenue periods we have seen in recent memory, so it's not hard to expect some improvement. Still, the numbers being touted offer some financial and emotional relief for radio.

Two reports from BIA Kelsey and SNL Kagan both show increases, although their numbers don't agree. BIA expects 2010 revenues to increase 3.7 percent from 2009, while SNL predicts 6.4 percent. Either way, it's an improvement we can all appreciate. The longer term outlook shows these numbers to steadily increase as well.

The Radio Advertising Bureau posted a statistic that agrees with these predictions. The RAB says that first quarter 2010 revenues were 6 percent higher than the previous quarter. This

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In Chile, it was business as usual for the BIO-BIO LA Radio team. They'd been using ACCESS to cover the presidential elections as well as international broadcasts of the Libertadores Cup from Argentina, Brazil and Venezuela. Then tragedy struck in the form of a devastating earthquake. The team was there, with journalist Maria Carrasco reporting live as well as working with the police to help enable communications using a Comrex ACCESS.

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is the highest quarter-to-quarter increase since the third quarter of 2000.

With revenue numbers looking up, some additional good news was released after the 2010 NAB Show from the International Association of Broadcasting Manufacturers. It conducted a survey that shows that broadcast manufacturers have a positive view of their business futures. In the study, 74 percent of the survey respondents anticipate better business in 2011 than in 2009. Of those, 47 percent are already reporting better order volumes than expected. And the sales are healthy: 78 percent of manufacturers said they maintained or increased their prices over the last quarter. In other words, the sales increases are not inflated by lower selling prices.

It's good news for stations and manufacturers alike.

I talk to lots of station engineers on a regular basis. They are aware of the revenue predictions, and many have said they are seeing economic improvements at their own stations. But with the happy news comes a sense of a caution. It was a hard and fast fall when the decline hit, and it's a slow and steady rise to recovery. After working on financial reserves for an extended period, many stations want to rebuild those reserves before returning to business as usual.

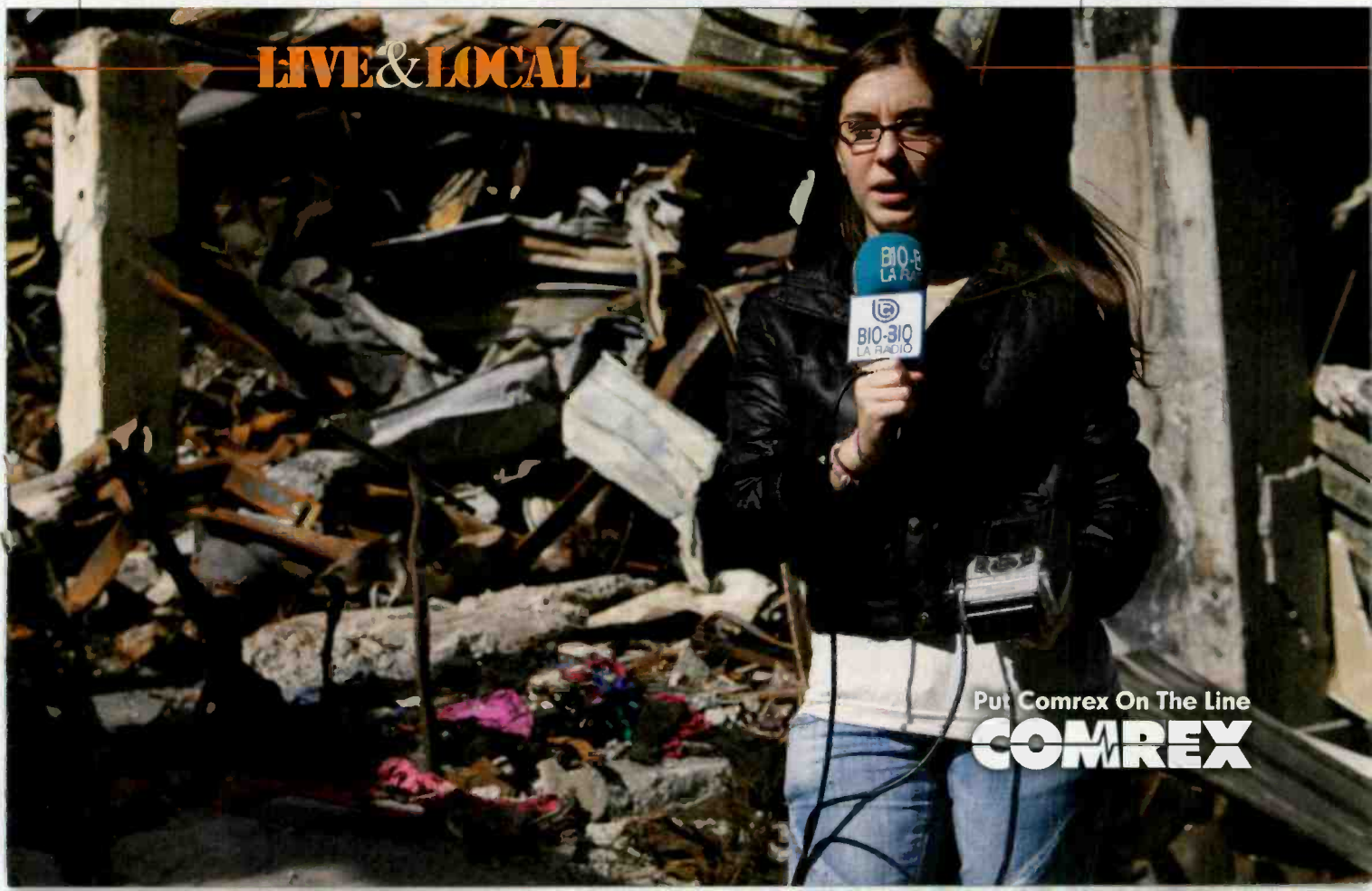
The engineers I talk to are stretched thin. They have been doing more with less for some time, and the expected financial relief shows promise, but it's not fully here yet. For many stations, projects that were put on hold are being restarted, although in many cases it's not because of financial recovery but rather necessity: The improvement was put off as long as possible and it just has to be done. Whatever the reason, it's helping the manufacturers.

And because radio is such a close-knit industry, recovery in one area spurs recovery in another. With the heavy burden falling behind us, we can focus on the future again.

Radio bounces back. It always has.

Chris Schaer

What's your opinion? Send it to radio@RadioMagOnline.com



Transmission line maintenance

By Jeremy Ruck, PE

Transmission line is one of the unsung heroes of any broadcast facility. Without it, the signal goes nowhere. Although line is typically of a robust construction, like anything it requires a certain degree of maintenance. In some cases, a simple visual inspection combined with a little old-fashioned common sense may be sufficient, while in others a more detailed approach may be required. Either way, staying on top of inspections and maintenance tends to allow for better outage planning.

Buried transmission lines such as those utilized in an AM directional array, if properly installed, tend to require a minimal amount of maintenance. As long as they are buried at a sufficient depth to avoid erosion and damage from implements, they will typically function properly for many years. With an intact outer jacket, the tendency for galvanic corrosion and dielectric contamination, in the case of foam designs, is virtually non-existent. Nevertheless there is no downside to an occasional sweep of such lines to be sure.

The lower transmission line is loosely resting on the metal braces, which will likely wear a hole in the outer jacket.

Outside damage

Rigorous maintenance can reduce the impacts of potential damage, but elimination of all risk is likely not possible. Supporting structures for above ground transmission lines should be well maintained and replaced if necessary. Places where lines enter structures or the ground should be such that small movements in the line will not result in damage. Increase visibility and review such areas with all personnel involved at the site. To identify problem areas on the tower, use a competent crew. For significant construction projects, an inspection by a different crew may be worthwhile.

Correct each of the problems identified in a timely fashion. Common sense should tell you that when the transmission line is heard slapping against the tower in wind, an issue may be present. In that true case, the cost in rectifying a year later was considerably more expensive than if the problem had been addressed when initially identified.

Beyond the visual

There is also an electrical component to maintenance. The easiest method of examining the condition of a transmission line run is through the use of a network analyzer. Any such analyzer used for this purpose must be a vector analyzer with time domain options. A scalar analyzer simply will not provide the necessary information to accurately diagnose a run of line. In a pinch, or in cases where a network analyzer is not available, other pieces of equipment such as a time domain reflectometer or return loss bridge may provide sufficient information to identify the presence of a problem or be satisfactorily used for occasional incremental measurements.

Unless subjected to damage or unusual stress, runs of foam or air dielectric semi-flexible transmission line will typically require minimal maintenance over their operational lifetimes. Although not always performed, replacement of hardware, O-rings and bullets every few years is a wise investment. These changes allow for easy visual checks at connection points, which tend to be the weakest points in the system.

Similarly, rigid transmission lines require maintenance, although to a somewhat greater degree depending on the design. Because steel and copper expand and contract at different rates, a mechanism is employed in rigid line sections to address this issue. Although there are some bellows designs where the center conductor itself expands

and contracts, most designs use a watchband spring. In these types, the watchband spring, so colloquially named because of its appearance, is the contact point between the center conductor and bullet, and over time with continued expansion and contraction, suffers a reduction in its surface area. The decrease in the surface area of these springs results in gaps between the spring and the center conductor leading to the potential for arcing. Arcing, of course, is the leading cause of burnouts in transmission line.

Depending on with whom you talk, the replacement cycle on watchband springs and associated hardware varies. I have heard time frames from as long as 15 years to as short as seven years or so. Replacement every 10 to 12 years coupled with biennial or triennial sweeping of the system should catch better than 95 percent of non-malicious events, thus limiting unplanned off-air time and collateral damage.

Open wire

In the case of open wire line, maintenance is really quite simple, although it can be costly as are the installation costs, hence its minimal popularity. Typically, as long as there are no damaged insulators, support structures, breaks in the wires, or large amounts of corrosion or dirt present, this type of line will be in good shape. Due to the style of construction, visual inspections are quite simple to perform.

Finally, in the case of air dielectric lines, pressurization is a must. If pressurization is not used, the normal "breathing" of the transmission line at the joints and connections coupled with ambient temperature and humidity changes will allow for the ingress of water into the line. A minimal amount of water may have a substantial effect on the return loss of transmission line and ultimately can lead to failure via a variety of mechanisms. It cannot be stressed enough that air dielectric line with a substantial leak is a ticking time bomb that must be fixed as soon as possible.

The bottom line is that without maintenance, transmission line will ultimately fail. The good news is that with regular and periodic inspections, the likelihood of unplanned failures is greatly reduced. These inspections, however, are really a team effort between the transmitter engineer, tower crew and consultant. The seemingly large investment at the time amortized over several years really becomes a pittance when the number of hours in a year is considered, and is certainly far less than the incurred expense with catastrophic failure.

Ruck is a senior engineer with D.L. Markley and Associates, Peoria, IL.

See more examples of transmission line damage at www.RadioMagOnline.com. Send your transmission line damage photos to radio@RadioMagOnline.com.

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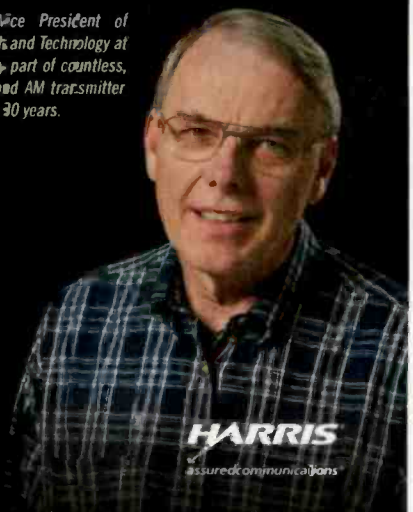

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FCC overhauling antenna structure rules

By Harry Martin

The FCC is seeking comments on changes to its rules governing antenna structure construction, lighting, marking and maintenance. A Notice of Proposed Rulemaking (NPRM) looking to such an overhaul was issued April 20. Comments are due July 20 and replies Aug. 19.

Historically, the FAA has set most of the substantive standards for antenna structures, *e.g.*, for lighting and painting, even though the FCC has the responsibility for enforcing those standards as they apply to its licensees. But the two agencies apparently do not coordinate as well as they might – and, as a result, discrepancies between the FAA's requirements and their FCC equivalents have developed. The NPRM's primary focus is to address these discrepancies.

For example, the FCC rule section on painting/lighting specifications requires conformance with an FAA circular superseded more than six years ago. The FCC proposes to fix the problem now by deleting references to any circulars, and requiring instead that structure owners comply with whatever determination the FAA issues.

Dateline

For *noncommercial* radio stations in Illinois and Wisconsin, the biennial ownership report deadline is Aug. 2.

Aug. 2 is the deadline for radio stations licensed in the following states to place their Annual EEO Reports in their public files: California, Illinois, North Carolina, South Carolina and Wisconsin.

The radio station license renewal cycle begins again in 2011, with the first batch of renewals due on June 1, 2011, for stations in D.C., Maryland, Virginia and West Virginia.

Similarly, Sections 17.14 and 17.17 of the Commission's rules – which specify which structures are subject to notification to the FAA and which are exempt – merely parrot the FAA's rules. The FCC correctly observes that this approach risks creating confusion in the event the FAA changes its rules. So now the FCC proposes to cross-reference, in its own rules, the corresponding FAA rule. But there is more.

Current FCC rules require that each structure's Antenna Structure Registration (ASR) number be displayed "in a conspicuous place so that it is readily visible near the base" of the structure. But elsewhere the Commission requires that the ASR number be displayed along a perimeter fence or at the point of entry of the gate. The FCC proposes to resolve this by requiring the display to be visible from the closest publicly accessible location near the tower base.

The Commission also proposes to streamline requirements regarding inspection and maintenance of marking and lighting by eliminating the separate inspection component entirely while retaining the obligation to assure proper lighting at all times. Timely notification of outages would still have to be made to the FAA. As an alternative, if inspection requirements are retained, the FCC may consider exempting certain network control center-based monitoring systems.

In addition, the FCC proposes definitions addressing exactly what alterations to a structure would require a new FAA study. The Commission's rules currently contain no such definitions, even though the FCC has, since 1995, applied the informal standard that any change in height of one foot or more, or any change in location of one second or more, would trigger a new FAA study. These standards would be incorporated in the FCC's rules.

Another proposed change: Structure owners would have to keep records for two years of observed or known lighting outages or the improper functioning of lights.

To determine the coordinates of a structure, the FCC suggests that it might insist on specific accuracy standards or survey methods, even though the FAA does not impose such a requirement.

The FAA requires structure owners to notify it of construction or dismantlement within five days. The FCC, by contrast, provides only 24 hours for such notice. The Commission proposes to stick by its limit.

One aspect of the FAA/FCC relationship may be out of the FCC's hands. The FAA has on occasion asserted authority over not only the physical nature of antenna structures, but also their RF characteristics. In such cases the FAA has withheld "no hazard" determinations based on the particular frequencies to be transmitted – to protect air navigation frequencies from interference. In fact the FAA has an open rule making on this subject. In its NPRM the FCC inquires whether the FCC's rules or policies should be altered in the event the FAA adopts new standards.

Martin is a member of Fletcher, Heald & Hildreth, PLC, Arlington, Virginia. E-mail: martin@fhhlaw.com

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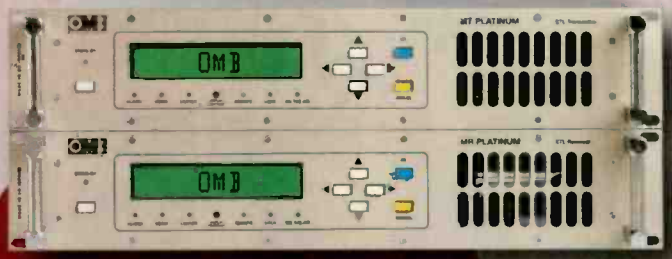

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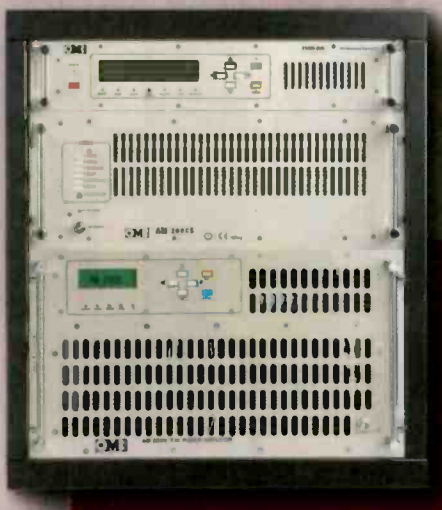

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EXTENDED REACH

How to establish remote connectivity for a bigger network footprint

By Doug Irwin, CPBE AMD

In at least a few of my previous articles I've written about the obvious advantages of having network connectivity at a transmitter site. This time around I'll cover several ways to establish that remote connectivity, how to safely use the public Internet for WAN functionality, and some of the other less obvious considerations you can do once that connectivity is established.

Over the last 10 years the number of ways to establish network connectivity has certainly increased – mainly in terms of wireless connectivity. Before going there, though, let's review the ways of doing it by wire. With respect to the wireless connectivity I mentioned, many telcos have increased their data capacity to remote mountain tops and other tower farms. Generally speaking, it's much easier to get a T1 to these locations than it used to be. There are a number of ways to take advantage of this. The one most familiar to broadcast engineers is the use of a Harris/Intraplex system with the TDM interface. The CM5 (common module) in this frame has a built-in CSU and interfaces directly with a T1. In the configuration of this unit, a certain number of timeslots are assigned for a set of DS-64NCs (LAN bridge) cards. By way of the LAN bridge, packets that need to get to the far end are allowed through, and those that do not are not. This allows you to effectively extend the network that resides at your HQ (or wherever that one end of the system lives) in a very convenient fashion – Ethernet on both sides of the bridge.

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EXTENDED REACH

If in your case you find that you can afford an entire T1 just for data purposes, then you will find yourself more in the realm of the IT department (which could very well be you anyway, right?). In this case, you would acquire a set of routers that have T1 interfaces along with at least one Ethernet interface. (You may already have a router in-house that has this capability, or at least an empty slot into which a WAN interface can be installed that has a built-in CSU

Harris Intraplex STL Plus

so it connects directly to a T1. You'll still need a router for the far end though.) With the entire T1 in use for your network connectivity, you'll have a 1.536Mb/s connection – not too shabby. The neat thing now is the capability of allocating timeslots to different networks. It's beyond the scope of this article to describe how it's done, but a router that has multi-link capability (and at least two Ethernet ports) will allow you to do this. Here's the advantage: You could configure the router in such a way that one network allows for nothing but traffic for HD Radio. In this configuration you would allocate just enough timeslots for this – and the remaining timeslots would then be used for the remote LAN purposes. Now if you (for example) download a PDF manual, you won't need to worry about causing dropouts in your HD Radio stream.

No T1? No problem

It's certainly possible that your remote site doesn't have T1 accessibility from your local telco, and in that event, you'll need to look at how to make the connection wirelessly. Probably the most well-known equipment for doing this is the Moseley LanLink. Like the Intraplex DS64NC cards, the LanLink functions as a network bridge – and its interface is Ethernet on both ends. The LanLink provides up to a 1Mb/s data rate. Perhaps the most convenient aspect of the LanLink is that it operates in the 900MHz ISM band, so by way of a set of duplexers, you can use the 950MHz antennas already in place.

I should also mention that you could roll your own 900MHz ISM-band system. A few minutes

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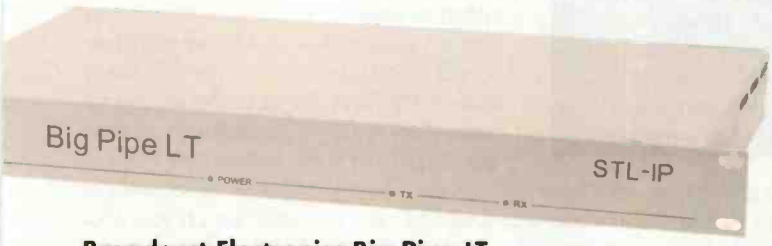
of research on the Internet will reveal a number of companies that make transceivers for that band with Ethernet interfaces. Duplexers can be used with an established 950MHz link, or you could simply find some directional antennas for that band and make a new link.

Another way to establish network connectivity at a remote site is by way of the higher ISM bands – 2.4, 5.3 and 5.8GHz. One of many possibilities in terms of equipment for that would be the Broadcast Electronics Big Pipe LT, which is basically a set of transceivers that work in said ISM bands. Big Pipe establishes a 45Mb/s (T3) data connection in both directions, therefore opening up lots of capability.

The ISM bands are unlicensed, of course, so keep in mind that you may have to contend with other users for spectrum. Take care in the path design.



Broadcast Electronics Big Pipe LT

Moseley Lanlink HS900D

4G connections

As time has moved along, many of us have established Internet connections at home based on cable (or even DSL) connections – and so the connections described thus far may seem kind of slow. In the larger metro areas, there are new companies that are providing connections based on 4G technology that will allow much faster connections to the Internet. Now keep in mind that is not the same as an extension of your LAN. (More about that below.)

One company that has a big presence in New York City is Towerstream, an ISP that provides the actual connection via a point-to-point radio link between one of its sites (such as the Empire State Building) and your office.

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EXTENDED REACH

Terms

LAN: local area network

WAN: wide area network

LAN bridge: A device that makes a physical connection between two networks that are of the same subnet. One end of the bridge is connected (typically by Ethernet) on one network (at the headquarters for example) and the other end at a different location remote from HQ. As the LAN bridge receives Ethernet frames on its network interface, it writes the source and destination MAC addresses into its MAC address table. In this way it learns where hosts are located; and when hosts on one end need to reach the other end of the bridge, it passes those packets through. It does not pass packets that don't need to reach the other end.

VPN: virtual private network. There are two important aspects of network security dealt with by way of VPN. The first is authentication: A router at the HQ will be able to authenticate a remote source of packets as being one that is legitimate. This prevents unauthorized users from accessing a private network. The second is encryption. By encrypting the payload data in the packets sent between two ends of a VPN connection, no one in between will be able to read them. So, in using both authentication and encryption, it's possible to use the public Internet for private network connectivity.

Providence, RI, and appears to be growing in a westerly fashion.

Another company that is getting quite a bit of buzz is Clearwire. Clearwire is more oriented toward personal or "SOHO" (small office/home office) applications. The modem it provides is obviously a transceiver that needs to be located so it can see the best Clearwire network node. The output side of the modem looks just like a modem that we'd be accustomed to seeing from a cable TV feed. Its interface is Ethernet, it has an on-board DHCP server, and by use of a small Ethernet switch, you can connect multiple hosts to it.

Of course, depending upon the situation, you may find some other way to get a connection to an ISP. Perhaps cable TV is an option at your transmitter site (since many sites are practically in residential neighborhoods) or perhaps you can get DSL easily enough. Whatever the case, after making the connection work, you are left with an easy way to get out to the Internet, but nothing else; you can surf the Internet, and you can download manuals and whatnot – but you won't be on your HQ network. No access to the company e-mail server, your

According to the company website, it can provide anything from T1 speed up to 1.5Gb/s (that should be more than enough, right?). Towerstream started in

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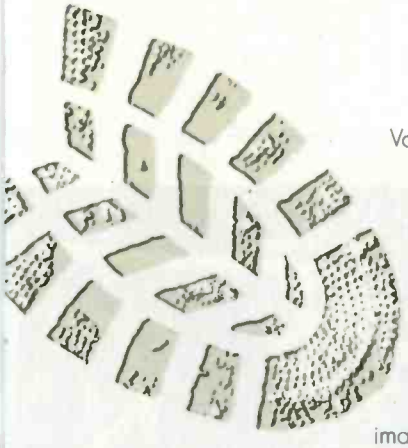

VoIP phone system, or any number of other servers or hosts that you would be able to reach if you were on a private connection to your LAN.

VPN

As you probably imagined, there is a fairly easy solution to this problem as well, known as VPN (virtual private network). Many of us use temporary VPN connections from home to get network access as necessary; but you can set up what amounts to a permanent connection from a remote site, to your HQ network, by way of the public Internet by use of VPN as well. One possible solution (out of many) is to use a Cisco SR-520T1 router at your HQ (in the case that you had a T1 connection from your ISP) and at the remote end, a Cisco RVL200. Just one other possible solution would be the use of two Netgear FVS318s – one would be located at your HQ, and the other at your remote site.

Finally, let your imagination run wild and think about some of the extra functionality you can enjoy after getting a good network connection at your remote site. Probably the most obvious one is e-mail. Not just the text now, mind you: Quickly download all the links people send you. Download a PDF of a piece of equipment at the site. Put an extension of your VoIP phone system at the transmitter site. Install IP/video cameras looking at the front door or gate. Locate any number of backup servers at the transmitter site. Allow yourself remote access to any and all embedded Web servers that live in so many pieces of equipment we use. Start using SNMP (Simple Network Monitoring Protocol) remote controls. Use NTP (Network Time Protocol) to synchronize all the various time references that live at the site, so when you go back and look at error logs, all the times match up. Maybe even an audio stream for a backup STL.

Little stuff like that.

It's about time broadcasters started catching up with the rest of the communications world in the way we use networks and the Internet. The possibilities seem just about endless.

Irwin is transmission systems supervisor for Clear Channel NYC and chief engineer of WKTU, New York. Contact him at doug@dougirwin.net.

Resource Guide

Broadcast Electronics
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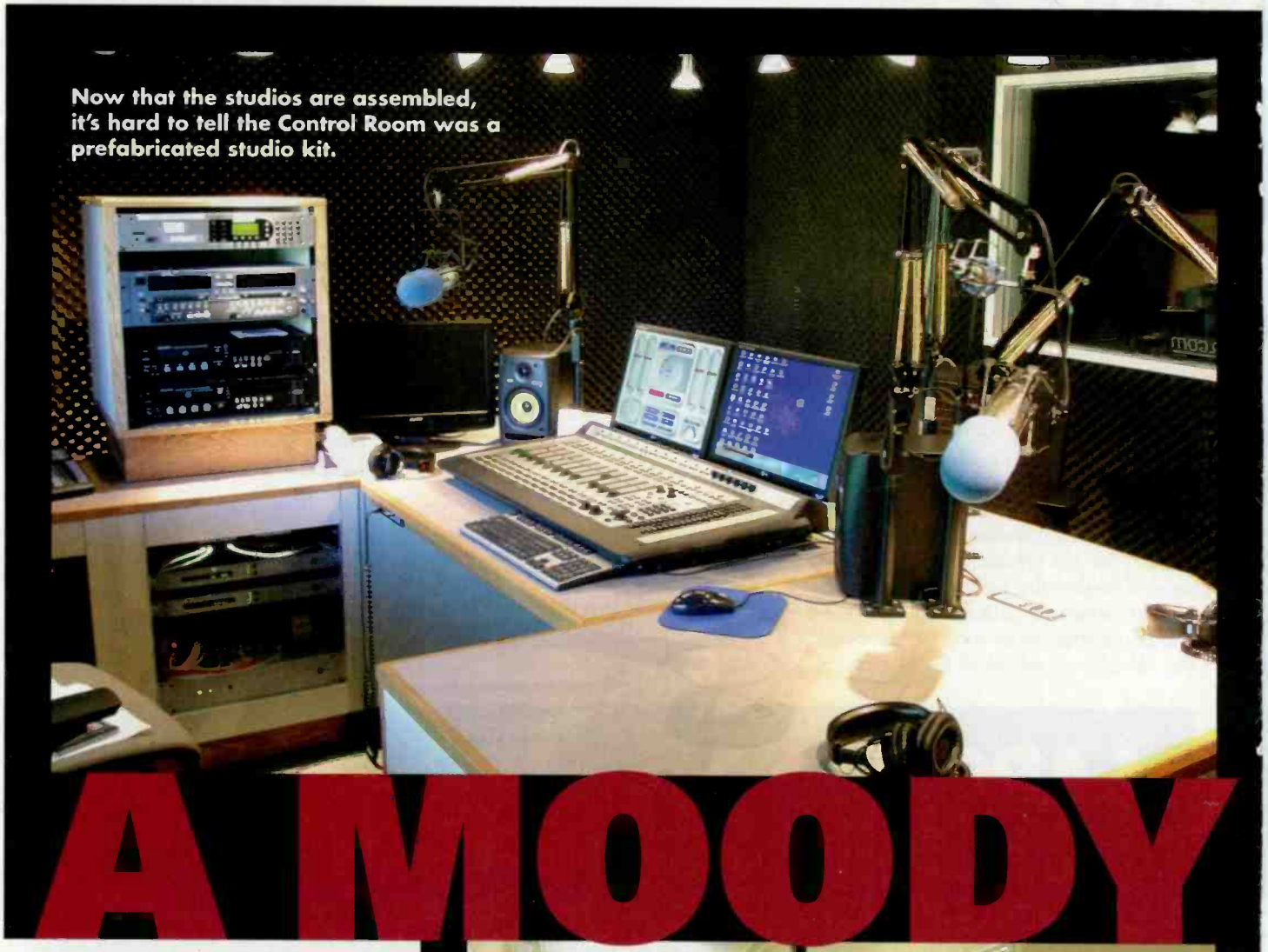

Now that the studios are assembled, it's hard to tell the Control Room was a prefabricated studio kit.

A MOODY

By Chriss Scherer, editor

Moody Bible Institute rebuilds to accommodate four stations in four cities

The assembled studios have a drywall façade built around them.

The Production Studio is a near mirror image of the Control Room.

MOVE

When Moody Bible Institute decided to rebuild its studio complex for the stations in central Alabama, a process began that brought the operations of stations from several cities into consideration. Ultimately, a grand plan was developed to improve the efficiency of handling four stations located in different cities. A key element of the construction design involved a plan that would allow for a more future-proof setup.

Moody started serving the broadcast area with WMWV in Dixons Mills, AL, and WMFT in Tuscaloosa, AL. These cities are about 90 miles apart. In time, WMVU in Forest, MS, and WRNF-AM in Selma, AL, were added to the cluster. The operation remained in Dixons Mills during this time.

As typically happens, the space for the four stations was insufficient. General Manager Rob Moore began looking for a new location. In his research, he considered the rural location of Dixons Mills, but the greater population center was based near Tuscaloosa. In addition, the Tuscaloosa station covers part of Birmingham. The search began for a new site in fall 2007.

By summer 2008, part of the second floor of an office building was leased. This space had six offices and one larger open space. The arrangements were made to occupy this space and begin building studios. The first step: Make one office a temporary studio for the morning show. An ISDN circuit was used to deliver the signal to the station's transmitter in Dixons Mills.

By the end of the summer, Moody had leased the entire second floor, and Chief Engineer Paul Lierman was hired to complete the project.

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A MOODY MOVE

New studio plan

Any studio design project pays special attention to the acoustic properties of the studios themselves. The standard practices of isolated walls, double studs and floating surfaces are applied. In Moody's case, the cost and effort of building traditional studios had a major drawback: If another move or redesign is considered, all the studio construction materials would be lost. With this in mind, the stations looked at using pre-built studios. Products from VocalBooth were selected for the two main studios.

The open area for the two studios is about 20' x 40'. The two VocalBooth studios are placed back to back. The control room measures 12' x 16', while the production room measures 12' x 14'. Once they were set in place, a false wall was created for cosmetic reasons. This false wall hides the HVAC, power and other connections for the rooms.

An existing office was converted into the technical operations center.

With the alternate studio plan came a potential challenge: The VocalBooth studios are heavier than traditional drywall construction. A concern was raised that the cost savings of the pre-fab units would be lost if building upgrades were required, but fortunately, the building was designed for a heavier-than-normal load when it was built. This foresight easily accommodated the weight of the rooms. However, there was another obstacle: The building did not have an elevator.

The original construction plan called for the facility to be built and move-in ready in six months. While the pre-fab studios saved construction time, some time was lost when the decision was made to add an elevator to the building. Some additional time was lost when the HVAC needed to be reworked to accommodate the VocalBooth Studios and technical operations center.

Once they were delivered, the VocalBooths were assembled and in place within two days. Then the work began to assemble the studios. Graham Studios furniture was delivered and assembled in a week. Then the Axia Audio console/router system – which had been delivered earlier and was sitting in storage – was ready to be installed. The original temporary air studio was then converted into the news room.

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Equipment List

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Andrew AVA5-50
Aphex Compellor
Auralex mic windscreens
Axia Element and Livewire
Belden coaxial cable
Broadcast Electronics Vault II
Broadcast Tools silence sensors, switchers
Cisco Systems network switches
Crescend STL equipment
DBX 166XL
Denon DN-C635
Eaton Powerware
Electro Voice RE27 N/D
Graham Studios studio furniture
KaYou Communications, C-band contractor
KRK RP5
Linksys network switches
Marantz PMD570
Mark Antenna P9A72GN-U
McPhilbun on-air lights
Middle Atlantic racks
Moseley Starlink SL9003Q-2STLAN
Neutrix XLR connectors
O.C. White mic booms
Radio Systems StudioHub+ Matchjack CAT-5 adapters
Radyne/Comstream uplink/ downlink equipment
Sony MDR-7506
Tascam TU-690
Telos One
Tiernan satellite receivers
Times Micro Coax LMR400
Trilithic Easy Plus
VocalBooth sound booths

The router-based system allows the four stations to take any source to any destination. Likewise, any studio can be patched to feed any station as needed. This flexibility was a significant change from the four stations' earlier facility.

The control room and production room are essentially mirror images of each other. They have different furniture and production has a slightly smaller console, but otherwise the operation of the rooms is mirrored.

The studio facility originally used a Ku-band satellite feed to deliver programming to the four transmitter sites, but there were complications with rain fade. This was converted to a C-band delivery system during the project.

When the project began, the entire building was fed by one electrical service. This plan was modified so the second floor is on its own electrical service feeder separate from the rest of the building. The facility is also set up for a backup generator to be installed at some point in the future.

So while the project had its own challenges along the way, it took about one year to complete. The new studios were used on June 1, 2009. The complete switchover to the new satellite feeds was made July 10, 2009.

More Moody facility photos online at RadioMagOnline.com.

FACILITY FOCUS

The technology behind Moody

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Graham Studios was pleased to provide Paul Lierman and Moody with its Modulux Standard line of furniture. The grey nebula top and natural almond colors suited his studio environment, and the solid oak trim provided great durability. Modulux Standard is Graham Studios' best selling line of furniture. Feature rich with choices in wood trim, colors and materials, Modulux Standard will give the stations many years of service. Quality, hand-crafted furniture has been the hallmark of Graham Studios for 26 years. Modulux Premium and Deluxe lines were introduced in 2008. AC and lighting packages along with a more robust hardwood trim package made these top sellers. With roots in Radius Xp (shown) Graham Studios continues its legacy of quality and choice with its Radius Prime furniture line.

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Tips, tricks, hints and more

By Chriss Scherer

Go to camp

Sometimes the best solution to a problem is one that is far removed. As an engineer, you likely spend some time in the electronic and industrial electrical parts stores or at least looking through a printed or online catalog. But sometimes the right tool or the right part isn't the official tool or part. By looking in some unusual places you might find better and less expensive alternatives. One possible source is a camping or outdoor store.

Several years ago, I needed to replace a fiberglass rod that was part of a transmitter loading control. The rod was about 10" long and connected the loading slider to the front-panel knob. After years of heat and use, the original rod had splintered. I called the manufacturer, who was happy to send a 3' piece (the minimum order) at some bargain price approaching double digits. I had trouble justifying the high price, so I looked elsewhere.

There happened to be an outdoor sporting store down the street, and I had an idea. I looked at the store's selection of fiberglass tent poles. There were two diameters available, and both were slightly larger than what I needed, but with a little sanding, the smaller pole fit just fine. My total cost? Less than $10.

How many times have you been working at the transmitter site and the only place to sit is on a box or overturned bucket? It's rarely comfortable. I recently saw a post with a possible solution for a collapsible chair distributed by an online tool dealer. It's a very nice chair and folds down to a compact 16" long in a 4" canister. It also costs $100.

Collapsible chairs are a great alternative to sitting on a box or bucket. The outdoor store version is on the right.

Once again, the outdoor store has an alternative. Inexpensive camp stools can be bought for less than $20.

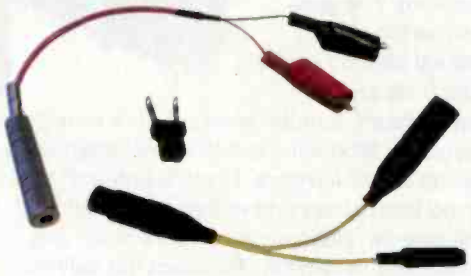
Bring in the hobby

Camping stores aren't the only alternative source for parts. Hobby stores are another great source, especially if you need small tools. With a little creative thinking, parts for an RC car or plane could easily be pressed into an alternative service. Browse the hobby store the next time and see what you find.

Analog testing

Ed Treese is a contract engineer based in Kansas City. While his work includes plenty of digital signals, he still encounters plenty of analog equipment in his work. He shared some notes on his favorite piece of analog test equipment: a pair of headphones.

He keeps a pair of Sennheiser HD414 high-impedance headphones in his toolkit. The original version of these headphones had an impedance around 2k ohms. Most headphones available today are 50 ohms or less. Because of the high impedance, Treese can tap them into an active audio circuit with little or no effect to the audio path.



Treese also keeps a few adapters handy to simplify connections. He has a stereo headphone jack that is monoed to alligator clips. He also keeps a TAC clip on hand to slip on two rows of 66 punch blocks. He also carries an XLR through connector with a stereo headphone jack (again monoed) all in parallel. The XLRs can be used individually or in-line with the audio circuit.

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Matrix Switchers

ACS 8.2 Plus Audio Control Switcher

The ACS 8.2 Plus provides matrix audio switching of 8 stereo inputs to 2 stereo plus 2 mono outputs. Any input assigned to output one has fading capabilities. Matrix switching allows any/or all inputs to be assigned to any/or all outputs. The ACS 8.2 Plus may be controlled via front panel switches, contact closures, 5-volt TTL/CMOS logic and/or the multi-drop RS-232 serial port (control via USB or Ethernet with optional devices). Installation is simplified with plug-in euroblock screw terminals.

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The ADMS 44.22 is an 8x2 stereo matrix switcher with four stereo analog and four stereo AES inputs, and two independent stereo analog and AES outputs in a 1-RU profile. Each input channel is equipped with an automatic level control circuit and a fully configurable 3-band equalizer. The ADMS 44.22 provides both word clock in and word clock out signals for synchronization to external digital equipment.

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The SS 4.4 provides matrix audio switching of four stereo inputs to 4 stereo outputs. Matrix switching allows any/or all inputs to be assigned to any/or all outputs. The SS 4.4 may be controlled via front panel switches, contact closures and/or the multi-drop RS-232 serial port. Additional features include stereo silence sensor with relay, front panel stereo LED VU meters, stereo headphone jack with level control, powered monitor level control all with output selection switching, 16 GPI's, four GPO- open collectors and four SPST relays. Installation is simplified with pluggable euroblock screw terminals. The SS 4.4 is supplied in a 1-RU chassis.

SS 16.4 Stereo Matrix Switcher

The SS 16.4 provides matrix audio switching of 16 stereo inputs to 4 stereo plus 4 monaural outputs. Matrix switching allows any or all inputs to be assigned to any or all outputs. The SS 16.4 may be controlled via front panel switches, contact closures, 5-volt TTL/CMOS logic and/or the multi-drop RS-232 or RS-485 serial port. Installation is simplified with removable screw terminals (Euro).

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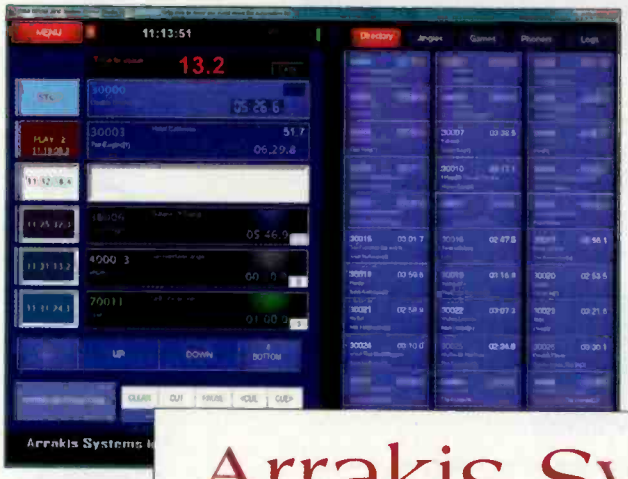

Arrakis Systems
Digilink-Xtreme

by Paul Lundquist

Radio has been a passion of mine since I got hooked in high school. One thing I have learned since then is that quality equipment can make a big difference.

I started looking for colleges where I could get a degree in video editing after taking a class on the subject. I realized that all of the schools had at least a quarter of radio and I wasn't sure if I would enjoy that, so I decided to take an internship at a local radio station, KOLY in Mobridge, SD. That turned into a part-time job and ever since, for the most part, I've been on the radio. I went to Brown College, and then did stints at KGRN-AM in Grinnell, IA, and at KBIZ-AM and KTWA-FM in Ottumwa, IA, before coming to Winona Radio in 2004. Throughout my career I worked with different equipment and different systems, each with their own personalities.

When I came to Winona the station had old DL-3s and DL-4s from Arrakis. They worked well for what they did, but as with all technology there comes a point when we needed something new. The stations were pleased with the Arrakis automation systems, so in 2005 we began looking at the Digilink-Xtreme. From what we could tell, the Xtreme was very affordable and still provided the features we needed.

With 10 stations, a big part of the decision process was based on the fact that we needed something easy to network and with all the features required for our several different formats. It had to do satellite, hard disk music and ball games reliably without a headache. Winona has five stations, two music on hard drive, one of them AC and the other HAC. Another station is a satellite FM country station, the fourth a live daytime AM country station and the last a news talk AM that is a mix of satellite and live programming. KWNO-AM our news talk is a Twins, T-Wolves, Wild, ESPN and Gophers affiliate. We also have local games from the two high schools in town. Our satellite FM is a Vikings affiliate and we have live local games on that as well. As you can see, we needed an automation system that does it all, short of making coffee and doing our laundry.

Having spoken to the staff at Arrakis, and from our experience with the DL-3s and -4s, we felt we had a pretty good idea of what we were getting into with the Digilink-Xtreme. The nice part is that we only spend $100 a month per station, and there is no contract. That meant we didn't have to drop thousands of dollars up front and wonder if it would work out. We went ahead and purchased five systems in January 2006 for the stations at Winona.

Making it work

It was obvious from the start that Arrakis was very interested in making it work for us. Customer support and phone training is included. What really impressed us was how easy and effective different features worked. Voice tracking can be time consuming and sometimes painful, but with the Xtreme it is as simple as a couple clicks. Being an on-air personality, it makes a difference to voice track an entire week in a matter of hours. You can also schedule recordings for the entire week. Once it is set up, it automatically records and re-records over news feeds (any satellite source) so that we can play it back at a later time. When I am live, I love to use the jingle (hot key) wall. Anyone who has used a hot-key feature knows how important it is for live shows.

The phoner recorder is also very easy to use and great for when you're live. With a couple clicks you can record, trim and save a recording. Instantly it goes to the library, which makes it easy to throw into the on-air playlist at the last second. The Digilink-Xtreme had evolved quite a bit from the DL-3 and -4 and has perfected a lot of what I like about automation.

Performance at a glance

300-cut cart wall

Includes music scheduler and production editor

Imports logs from other schedulers

Free telephone training

No file server required

Another thing that impressed me from the start was its stability. Automation systems can certainly struggle at times, but we found the Digilink-Xtreme to be a step ahead. When you have 10 stations, stability of an automation system can either be a nightmare or a relief, and we found the Digilink-Xtreme to make our lives easier.

After a year and a half of seeing the benefits of the Digilink-Xtreme for Winona, we decided to purchase the Xtreme for the five other stations at Lakes Radio. Again, this decision was a lot easier since it was only $100 per station. We also liked having uniformity between stations.

Both Winona and Lakes Radio have five stations and each are linked by a simple network. Networking with the Digilink-Xtreme is easy and 100 percent necessary with this many stations. Instead of creating multiple cuts for multiple stations, we are able to drop a spot into multiple stations quickly. The on-air personality can start a track on the on-air machine while traffic can be reconciled on a computer next door; all the while scheduling/programming is done in a room on the other side of the building. The software for the production and traffic computers all came included at no additional charge.

In a time when the economy can shift in a day, the Xtreme has been a real asset; one less expenditure to stress about. It has given us flexibility when we needed it and it makes a difference. It is refreshing when your automation works for you, instead of you working for the automation.

We also get updates for our stations every year included with the Xtreme at no charge. The 2010 update has a great new look and it seems like the look and feel of the system has really come together. We've looked at other systems over the years and never found anything that would work this well for the price. As I said before, quality equipment can really make a difference, and the Digilink-Xtreme has been a pleasure.

Lundquist is program director and morning host on KHME-FM, Winona, MN.

Editor's note: Field Reports are an exclusive *Radio* magazine feature for radio broadcasters. Each report is prepared by well-qualified staff at a radio station, production facility or consulting company.

These reports are performed by the industry, for the industry. Manufacturer support is limited to providing loan equipment and to aiding the author if requested.

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NewTek TriCaster Studio

By Robert Chickering

At the risk of dropping an over-used phrase, NewTek TriCaster is truly a plug-and-play device. It allows the non-technical user to begin webcasting with the production effects of ESPN. It's a PC built in a case that includes audio/video I/O on the front and the standard PC connections on the back. Its combination video effects/switcher and powerful PC will stream, play and record video all at the same time.

The unit boots to a standard Windows active desktop with choices to launch TriCaster or configure it. The launch screen includes video preview monitors, a vectorscope, program and preview monitor as well as two video playback decks. There are multiple other tabs for video setup, audio mixing, titles, video input configuration and record/streaming settings.

Simply simple

We have had the unit for more than a year, and I am extremely happy with its reliability and features. It also is very intuitive, and users have the ability to train themselves on its functions.

I have a long history of building my own audio/video encoders and finding some sort of video I/O card as well as an external switcher and monitors. TriCaster eliminated all of that into one neatly assembled box. It's also road ready. My favorite use was placing it under an end table in a Naples condo living room for a one-week broadcast there. I have shipped the unit to locations, and with a simple high-speed wired Internet connection I'm on the air. Once on the road I can easily run the radio show as well as the webcam.

The keyboard hot keys allow transitions as well as direct camera or source cuts. I can automate the transitions to play video roll and at the conclusion of a video playlist it will auto transition to the camera setup in the preview window. Each input features video input status closures; we use these at live events to provide a source tally on each live camera.

Various models of TriCaster are available, and each is scalable depending on the video source requirements, number of inputs and video playback needs. Our unit is the Studio model, which has six video inputs and four audio inputs. The audio sources can be linked in stereo or run mono and configured for mic or line level through the user interface page. The software mixer has pan and EQ on each channel as well as variable level if needed. Each video playback deck (DDR) has all the normal playback controls like pause and fast forward. It also allows the user to vari-speed play and scroll search to a desired point in a video.

The system comes with a complete array of titles and dissolve effects, which gives a video production a clean, professional look. Included with our unit was the LiveSet feature that allows users with a green screen to place talent on various news/entertainment sets. We have started to use this feature for our Show Biz top 5 daily video, and the look is much more professional. Our YouTube views have doubled. If you are looking for a way to edit video and capture from a video camera you can place the unit in capture or production mode.

Streaming setup is found on the record/stream page's on-screen interface. There are many Flash encoding presets, and one can easily set up a stream to existing services.

Using TriCaster, we are able to stream the radio show live and provide commercial or entertainment

Performance at a glance

Video capture, editing and streaming

Accepts up to six cameras

Balanced mic/line audio I/O

Records 20 hours of MPEG-2 video

Weighs 19lbs

videos during breaks. Frequently we are able to B roll in video while a topic is being covered on the air. For example, we have a weekly feature called Music That Makes You Cooler. We roll videos of the artists while Kidd is playing the audio on the air. The multiple video playback decks make this very easy as we stack content to cover our commercial breaks and come back live to one of our five studio cameras.

The recording capabilities of the unit have streamlined our operation. We record every live segment while they air and save each segment to an external hard drive. This allows us to pull moments from the show and post them for playback on our website, archive interviews and replay the show segments in a loop through the playback stack on the video player (DDR) so viewers can watch the show all day. This has increased our viewer numbers and makes the stream something we can sell to advertisers. We will also rerun segments of the show from weeks past during commercial breaks.

I know it's odd to think that a radio station needs to have a tool like a TV station, but with mobile viewing and listening you can take advantage of the entertaining things going on in the radio station and bring that visual to the listener. We started out with a few hundred watching our live camera feed and now easily have 3,000 to 4,000 viewers. In one year we have had more than 7 million hits to our Ustream page. Much of that is due to using TriCaster and providing a view into the show that is more than a static camera in the corner of the room. Supplementing conversation with B roll or pictures of an event or bit, and during the break providing the full view of what happened, adds up to taking radio to the next level – converting your listeners to viewers.

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Chickering is VP operations/engineering, Yea Network, Kidd Kraddick in the Morning.

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by Erin Shipps, associate editor

Instant remote reboot
Broadcast Tools

WebSwitch: The WebSwitch is a solution for instant remote reboot or remote control over the Internet. It offers two power outlets, which can be independently controlled using a Web browser or Web-enabled mobile device. It is completely self-contained and includes a built-in Web server and internal power supply. It is simple to set up and can be configured in minutes using its built-in configuration Web pages. Each outlet can be configured for standard mode or automatic reboot mode. In standard mode, users can remotely control each outlet. In automatic reboot mode, WebSwitch will ping a specified IP address and power-cycle that outlet if a number of pings fail.

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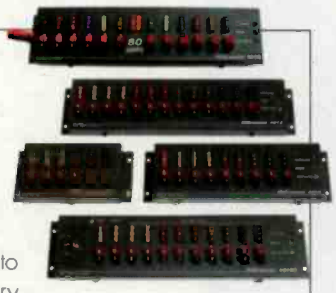

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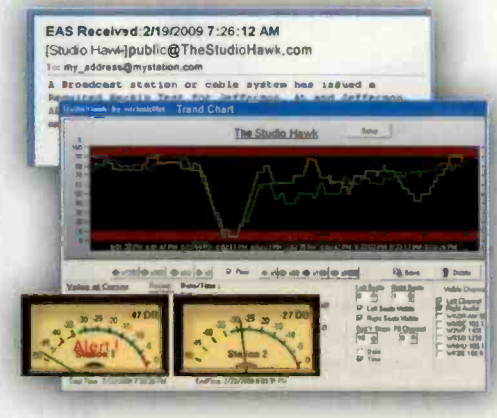

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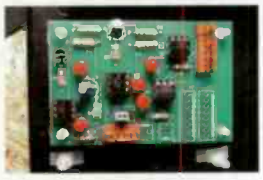

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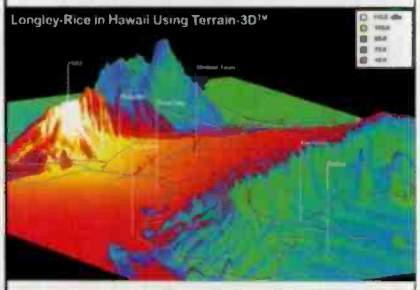

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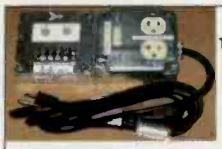

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Penton Media

Penton Media, Inc.
249 West 17th Street
New York, NY 10011

Chief Executive Officer – Sharon Rowlands, *sharon.rowlands@penton.com*

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

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month:
Field Report, page 30

Robert Chickering
VP Operations/ Engineering
Yea Network, Kidd Kraddick in the Morning

Chickering has been a broadcast engineer since 1984. His past work experience includes being a producer for Morton Downey Jr., the engineering manager for Susquehanna/Cumulus Dallas, a videographer for Xgames skydiving and amateur photography. In August 2007 he joined the Kidd Kraddick in the Morning Yea Network as the VP operations/engineering.

Radio
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Written by radio professionals
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Radio, Volume 16, Number 7, ISSN 1542-0620 is published monthly and mailed free to qualified recipients by Penton Media, Inc 9800 Metcalf, Overland Park, KS 66212-2216 (www.penton.com). Canadian Post Publications Mail Agreement No 40612608 Canada return address: Bleuchip International, P.O Box 25542, London, ON N6C 6B2 Additional resources, including subscription request forms and an editorial calendar are available online at www.RadioMagOnline.com. To order single copies call 866-505-7173 or 402-505-7173.

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by Erin Shipps, associate editor

Do you remember?

Marcus Brooke, managing director of Sonifex; Mark Goodwin, chairman of Hospital Radio Bedford (HRB); and Chris Stills, technical director of Sonifex with the Sonifex mixing console used by HRB since 1978.

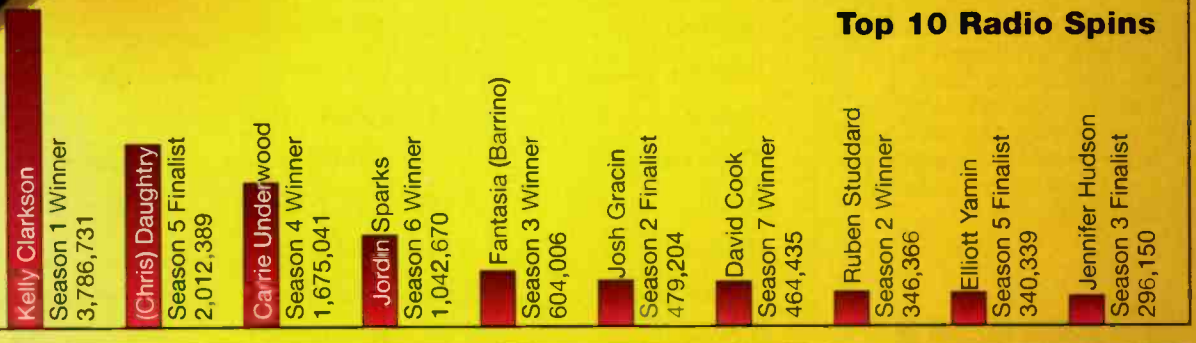
Hospital Radio Bedford (HRB) is a registered charity that started broadcasting from a 12'x10' room in Bedford Hospital, Bedfordshire, UK, on June 28, 1975. It now has three large studios, a record library and a reception area in the main hospital building. In 1978, HRB commissioned Sonifex to hand-build a mixer for its studio. The mixer has been used almost every day, has undergone three studio relocations, and after 30 years of service (with dedicated care and maintenance from the HRB studio engineers) was still going strong. Last year, as replacement parts were no longer available for the console, HRB decided to replace the aging mixer with a new Sonifex S2- digital I/O analog radio broadcasting split mixer. As the original console was still in such good condition, it was decided that it should be returned to Sonifex for posterity.

Sample and Hold

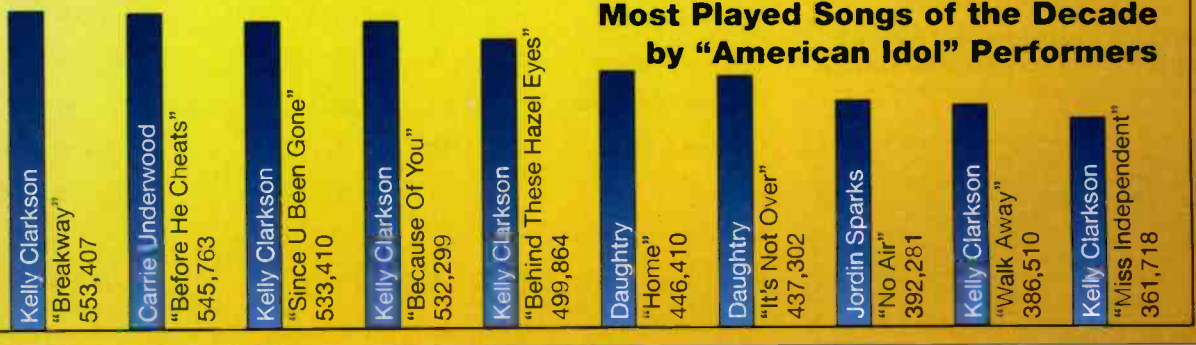
American Idol on the radio

Mediabase, a music monitoring service, released a report analyzing the effect of the artists who have appeared on Fox Television's "American Idol" from the last eight seasons. Since its debut, "American Idol" has had a large impact on radio airplay. Four performers have achieved more than 1 million U.S. radio spins from 2002-2009. Acts from the show have received airplay at every major radio format from Top 40 to Urban, Country, AC and Rock.

Top 10 Radio Spins



Most Played Songs of the Decade by "American Idol" Performers



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