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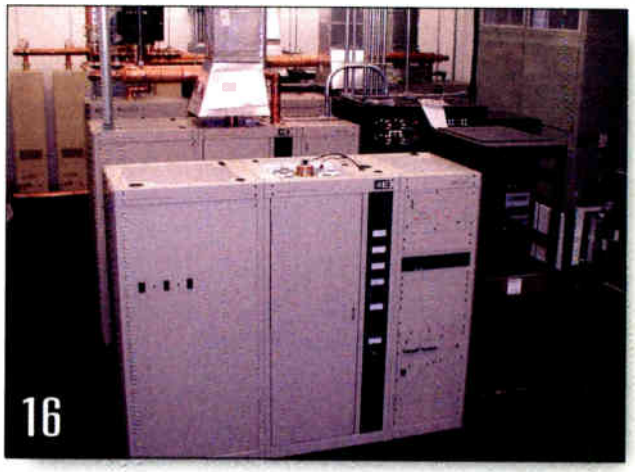

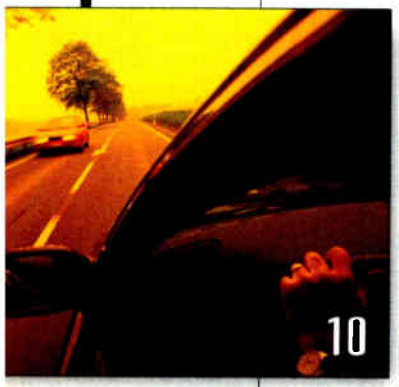

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A successful studio project meets the station's needs today and allows for growth and changes tomorrow.
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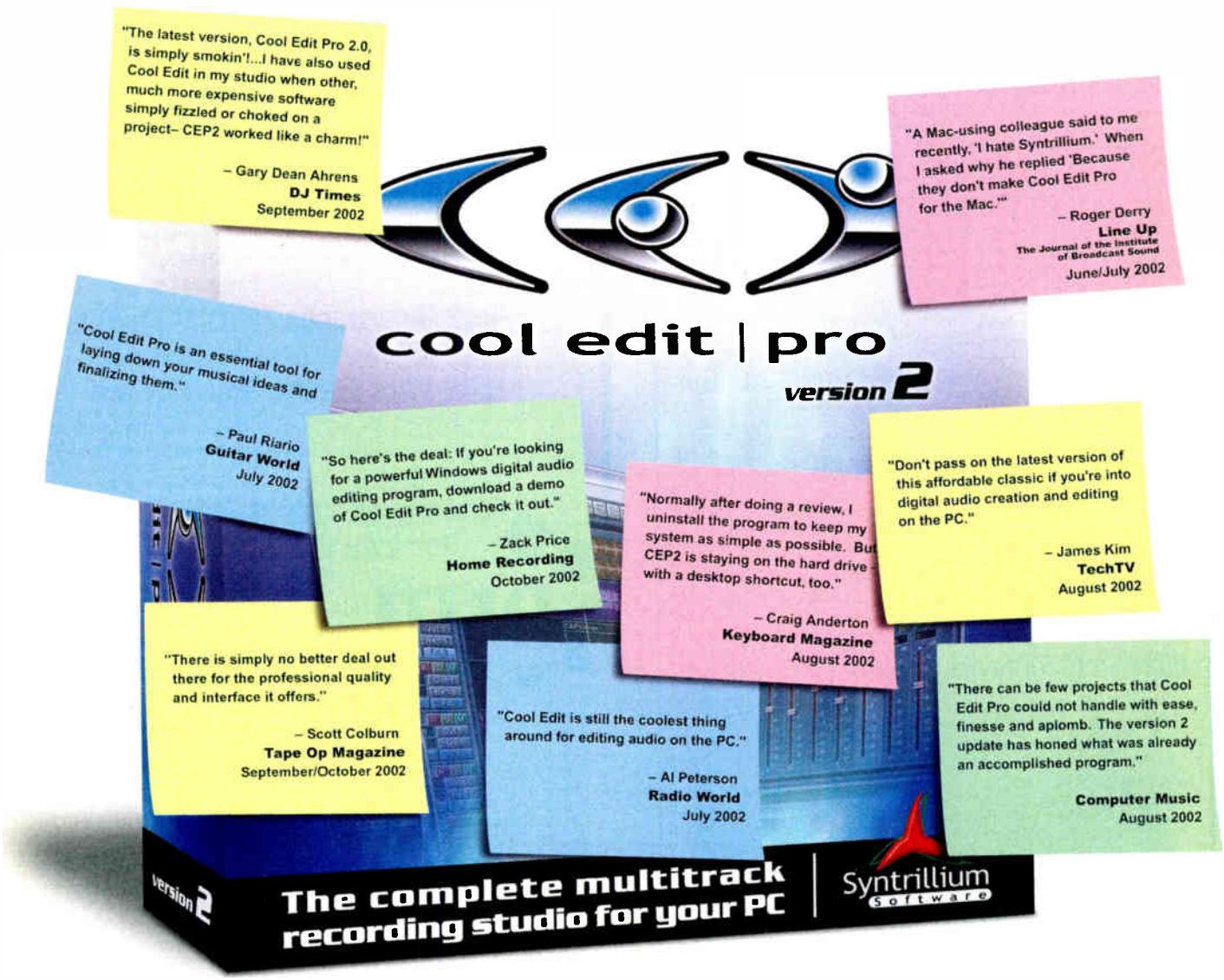

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Currents Online

Highlights of news items from the past month

Stations Urged to Use FCC Coordination Stay to Best Advantage

Suggestion follows the FCC's order to extend the deadline for broadcasters to comply with the prior coordination notification rules.

Silsby Joins Audio-Technica

Greg Silsby joins Audio-Technica as marketing director, installed sound, broadcast and theater. He previously worked for Mackie.

Telos Announces TwoX12 Upgrade

Version 3.0 software adds new features.

BSW Wins Electro-Voice Award

Broadcast Supply Worldwide was honored as Electro-Voice's Broadcast Microphone Dealer of the Year.

DRM Inaugural Broadcasts Slated for June 16

The world's first Digital Radio Mondiale broadcasts will commence on June 16, 2003.

Kahn Proposes Alternate Digital AM Scheme

Its digital AM system, called Cam-D, will restore a 15kHz audio bandwidth and not increase co-channel or adjacent-channel interference.

Klotz Digital Restructures

Klotz Digital AG will oversee three independent subsidiaries: Klotz Digital America, Klotz Digital Asia-Pacific and Klotz Digital Europe.

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Delayed reaction

Name one aspect of radio broadcasting that receives the least attention but holds the greatest potential to cause a problem. Was your answer frequency coordination? If it wasn't, you have further proved my point. Broadcast Auxiliary Services (BAS) coordination is handled mostly through the Society of Broadcast Engineers (SBE) and its local frequency coordinators. In most cases, these individuals watch the spectrum used for studio-to-transmitter links, inter-city links, remote pickup systems and other behind-the-scene services covered under Part 74 of the FCC Rules.

Because the FCC has long removed itself from any meaningful role in policing the spectrum, coordination of the radio waves has been taken care of by other groups. For most broadcast uses, the SBE has filled this role. In other frequency bands, commercial companies and volunteer groups have stepped up to the plate. Regardless of who handles the duty, without coordination, there would be chaos on the airwaves.

When the FCC reviewed the methods used for Part 74 BAS frequencies, it came to the conclusion that we as broadcasters were not following the same procedures as those used by Part 101 users. The FCC's decision to standardize the process has merit because it makes it easier for the agency to ensure that 950MHz and 2.11GHz users follow the same standards of obtaining prior coordination clearance before using the spectrum. However, in requiring the new method, the FCC ignored the fact that its own database is far from up-to-date and accurate.

What does all this mean? Many believe that the days of calling a local SBE frequency coordinator and receiving a free service are over. Some commercial groups are hungrily eyeing the BAS user base as a new-found source of income. In the end, frequency coordination—up to now a free service—may carry a price. Speculation ranges on the actual cost. It's likely that there will be a modest fee involved when the dust settles. If a fee is involved, users will naturally ask what they will get for their money.

What's in it for you?

The FCC will provide nothing directly. A side effect is that the FCC records may improve in accuracy because of the paid efforts. The real benefit lies elsewhere.

In most areas, the BAS spectrum is congested, which justifies the need for accurate and skilled coordinators. While a volunteer effort has worked well in most areas, paying for the service should carry some guarantee of accuracy. Depending on who finally handles the service, there may be some efficiencies that cross into other spectrum areas.

The SBE method of using market and regional coordinators has a proven track record. The organization is also looking into ways of improving its own database methods that will better track data and even help spot potential problems.

The SBE has been a champion of frequency coordination for some time. As the news of the pending ruling was making its rounds, the SBE made several efforts to make its voice heard. The main issue was the requirement for licensees to follow the prior coordination notice (PCN) procedures that are used with Part 101 users. The FCC released its Report and Order with an effective date of April 16, 2003. Many broadcasters were concerned with the deadline.

True to the cause, the SBE filed a request for a temporary stay of the effective date and secured a six-month extension. The grounds for the extension rest in the inaccuracies of the FCC's Universal Licensing System (ULS) database, as noted in the SBE filing. I congratulate the SBE's FCC Liaison Committee for the beneficial outcome of its work.

Just because the deadline to begin using PCN procedures has been delayed until Oct. 16, stations still have an obligation to verify that their license information in the ULS is accurate. If something is missing, add it immediately. If something is listed but is no longer used, have it deleted. Your efforts will be rewarded in the end.

Chriss Scherer, editor
cscherer@primediabusiness.com

By the way, my praise of the SBE is genuine. While I am closely involved with the SBE on the national level as chairman of the SBE's National Certification Committee, I am not involved with frequency coordination or FCC filing matters.

Send comments to: **E-mail:** *beradio@primediabusiness.com*
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Last-minute remotes?

No stress for John Kennedy of Entercom Boston.

The Patriots win the Superbowl! A major cause for celebration in Boston. And potentially major stress for John Kennedy, Engineering Director for Entercom Boston. With no advance warning, John had less than 24 hours to orchestrate coverage of the festivities on numerous stations — including live remotes along the Patriots' parade route. Fortunately, John knew he could count on Comrex Matrix to deliver — even last-minute. With Comrex in your toolbox, last-minute remotes are successful, not stressful.

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Fixing signal problems

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

There comes a time in every engineer's life when the station manager or program director announces there is a signal problem in a particular area. Questions about the exact location and date of occurrence are usually answered with a vague "I don't know, it's been a longtime." The engineer's response depends on whether it's an AM or an FM station and whether it's an audio problem such as distortion or low signal level, or perhaps unusual interference.

Have your coworker show you the area that suffers from the signal problem.

If it is an AM station, my first reaction, after verifying that the station was operating at full power, would be to grab a field strength meter and the complainer, go to the location in question and listen to the signal on my car radio.

If the level appears to be down, a quick check with the field strength meter should verify the condition. If the field strength is in fact down, roughly define the edges of the diminished coverage, and make a check of the related monitor points if the station is directional.

Some engineers may question the suggestion to check monitor points if only a small section of the general service area is affected. My feeling is that I want to be sure that the transmitter is operating properly and power radiation is normal. If it's a nondirectional operation there will be fewer checks to make because the signal strength is theoretically more or less the same in all directions. A quick check with a field strength meter or even a car radio will give an idea of the extent of the problem—if there is one.

If audio distortion is observed and the poor quality area is in a directional antenna (DA) pattern null, (which should not occur because a null, or low signal azimuth is not normally in a desired listener area) pay attention to the DA adjustment. This is not likely because a major change in antenna tuning would be required to produce what would be a serious antenna problem. However, this is something that should not be dismissed without consideration.

If the antenna operation is found to be correct and poor audio persists, the audio chain should be examined. It doesn't happen often these days, but changed component values in the feedback loop should not be overlooked, and the usual audio distortion correction methods should be followed. Some of the older, high-efficiency tube-type transmitters that use third-harmonic tuning to return third harmonic power to the system can introduce distortion when out of adjustment.

A technique used to pinpoint low signal areas is the diagonal radial. This is more commonly used when a directional antenna system produces unanticipated low signal areas during a proof of performance. The diagonal radial is used to pinpoint unanticipated nulls in a new antenna system. It is not commonly used today because computer programming has greatly refined directional antenna pattern design so that unanticipated nulls show up in the design phase long before construction, and therefore should never occur. This radial is laid out so that it crosses the DA radials more or less at right angles. Any pulling in of the signal along this radial could point to an unexpected null. However, this is not likely to occur in an established antenna system absent undesired major antenna system changes.

Look around

Pay attention to any new structures between the AM transmitter and the area of interest. Any new towers in the vicinity of the AM antenna system should be investigated thoroughly.

AM interference takes several forms ranging from power line transformer problems to commutator buzz, and even fish tank thermostats. A good directional radio or a field-strength meter will usually find the source of interference quickly. Unfortunately, curing this interference is not always as easy, especially if it's a pole transformer. Interference from these beasts often spreads a long way from the source, and is hard to track down.

If the problem occurs with an FM station, spot field strength measurements usually are not helpful, mostly

Reradiation from other towers is a common problem for AM antenna systems.

because of the receiver design. Typically, there is not much noticeable level change as an FM receiver is moved around, provided that the antenna is oriented correctly for each move.

Unlike AM, FM transmission uses line-of-sight conditions. In cases of diminished reception, see if there are any new towers or buildings close to the antenna on this azimuth, or if there is a new metallic construction in the vicinity of the affected area. If this question can be answered yes, the problem may be local shadowing.

Sound off

If the complaint is distortion and poor quality, determine if the distortion changed on leaving the area, in case it was a local phenomenon. If picket fencing occurs in a previously clean area, the problem becomes hard to solve, especially if it is caused by new construction. There is always the possibility that the new construction is reflecting a previously unknown side lobe. It's also possible that this problem could be fixed by changing or redesigning the antenna after the possible side lobe has been identified. Unfortunately, this would probably be expensive and time-consuming.

When designing an FM antenna installation, make sure to obtain the coverage to the radio horizon, and also make sure there is adequate coverage of listener areas between the transmitter and the radio horizon. This point can be overlooked, and will result in desirable listener areas close to the transmitter receiving low signal strength because the main beam passed overhead.

In AM operation, the vertical width of the signal rarely causes a problem because the ground wave originates on the ground and travels horizontally across the earth, normally hugging it. On the other hand, the FM signal originates several hundred feet above ground. It is usually in the form of a concentrated beam that increases in vertical depth as it travels over the immediate and near vicinity of the radiator. Thus it could pass over the desired listening area. This problem is normally taken care of in antenna selection by specifying the necessary null fill or beam tilt that will serve that area.

E-mail Battison at batcom@bright.net.

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IBOC procedures simplified

By Harry Martin

Further demonstrating its desire to jump-start the shift to digital broadcasting, the FCC has simplified its procedures for authorizing AM and FM stations to commence in-band, on-channel (IBOC) digital service. Previously, the Commission required licensees planning to operate IBOC systems to first file a request for Special Temporary Authority (STA). However, the Commission has announced that, as of March 20, 2003, licensees may implement IBOC operation without prior authorization, as long as they notify the FCC within 10 days of the commencement of such operation.

The FCC has issued a sample notification letter that contains all the information required to determine if the proposed facilities correspond with the Ibiquity hybrid IBOC system. Specifically, the following information must be provided:

- The date that interim operation commenced.
- A certification that the IBOC facilities conform to the Ibiquity hybrid transmission specifications.
- The name and telephone number of a technical representative the Commission can call in the event of interference.
- Transmitter power output (note–if separate analog and digital transmitters are used, the power output for each transmitter.)
- A certification that analog effective radiated power remains as authorized.
- A certification that the interim operation would not cause human exposure to levels of radio frequency radiation in excess of Section 0.1310 of the rules and is therefore categorically excluded from environmental processing pursuant to Section 1.1306(b). Any station that cannot certify compliance must submit an environmental assessment (EA) pursuant to Section 1.1311 and may not commence interim operation until such EA is ruled on by the Commission.
- If applicable, any power reduction in an AM station's primary digital carrier.

AM stations can operate their IBOC systems only during daytime hours, and pre-sunset and post-sunset hours if previously authorized to do so.

Electronic renewal forms ready

The Commission has announced that the electronic version of FCC Form 303-S is up and running and must be used for renewal applications due on or after Oct. 1, 2003. Electronic filing of Form 303-S is optional for renewals due June 1 and Aug. 1.

Form 396 (Broadcast EEO Program Report), which must be filed with all renewals, must be filed electronically even by June 1 and August 1 filers.

Recent forfeitures

Tower Fencing Problem. An AM licensee in Alabama argued that he did not need to have a fence around his AM transmitter because part of the property was on swampland and could not be casually accessed. The FCC did not accept this excuse, nor did it believe that the fact that the licensee's brother lived nearby was a deterrent. The FCC noted that on two occasions an FCC agent was able to drive up to the transmitter and touch it. The FCC continues to fine licensees who do not have effective locked enclosures for their antenna structures. The AM licensee was hit with a $7,000 forfeiture.

Former Licensee Escapes. An AM licensee was relieved of his obligation to pay fines after he dismantled his AM towers and sold his station. In deference to claims that its authority over the former licensee had vanished, the FCC cancelled a $12,000 forfeiture.

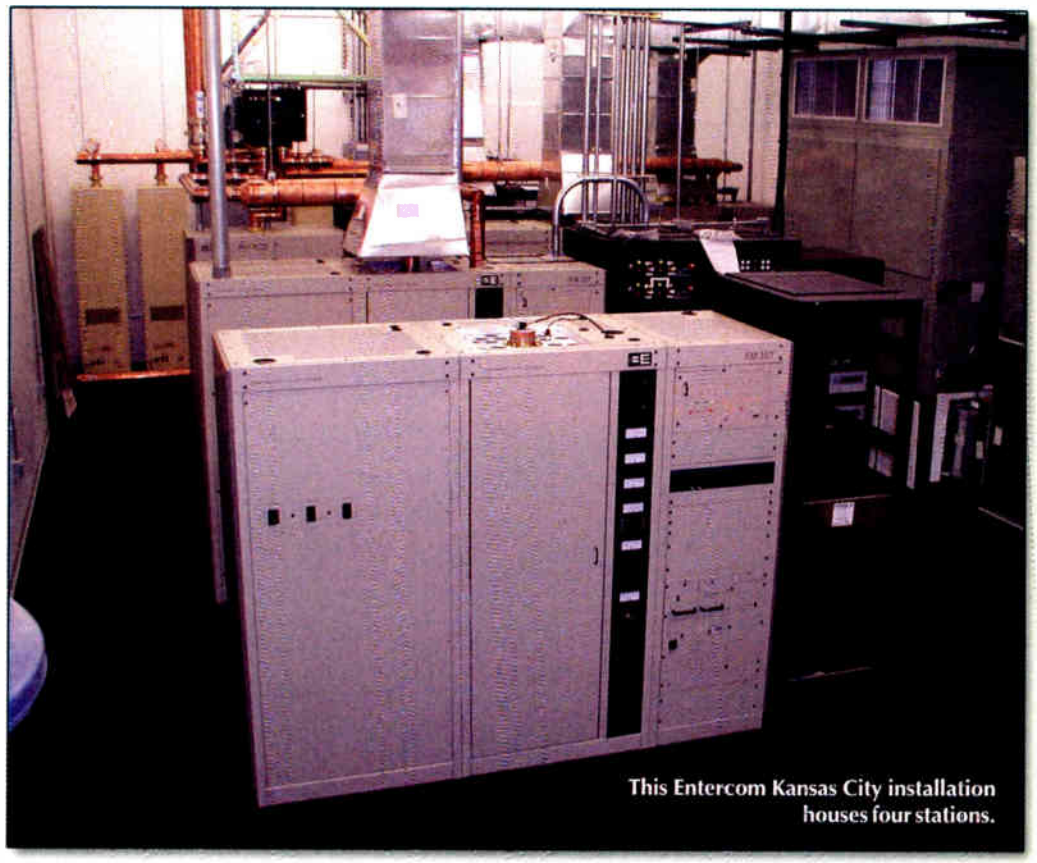
The licensee was fined $12,000 when an FCC inspector found that the station did not have Antenna Registration Numbers or proper painting for its five towers. After the fines were issued, the licensee sold his station and the towers were dismantled. The FCC cancelled the fines in a brief decision, so brief in fact that it's impossible to say exactly why the Commission decided to cancel the fines—other than the fact that the subject of the fines was no longer a licensee subject to Commission jurisdiction, and the towers themselves no longer existed.

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

Dateline:

Radio stations in DC, Maryland, Virginia and West Virginia must file their renewal applications by June 2, 2003.

Stations in the following states must file their biennial ownership reports with the FCC, and place their annual EEO reports in their public files and on their websites, by June 1: Arizona, DC, Idaho, Maryland, Michigan, New Mexico, Nevada, Ohio, Utah, Virginia, West Virginia and Wyoming.



This Entercom Kansas City installation houses four stations.

By Doug Irwin

The power behind THE STATION'S VOICE

A transmitter can be the single most expensive capital purchase for a station. Make sure you have all the bases covered before jumping in.

When buying a new transmitter, you will most likely be replacing an old unit or building a new site. If you are planning on removing your old transmitter and replacing it with a new one, your task is clear and simple. Determine the amount of RF output power needed, the amount of space available in the room and verify the available ac power source.

Other factors to consider include the location of the transmitter's RF output connector, electrical input and remote control connections. While these do not have to be in the same place as the old transmitter, accounting for their location will speed the installation process.

Speaking of the remote control, also check that the old interface will work with the new transmitter. Most modern transmitter remote controls offer the flexibility to accommodate most circumstances, but knowing that the old transmitter used maintained closures or logic-high connections, while the new transmitter uses logic-low connections will save time and frustration during installation. Be sure to answer all these questions before taking the old rig off the air and beginning installation of the new one.

From main to backup

Many transmitter sites already have two transmitters, but of different generations. Most likely, the new transmitter represents the most current generation, and the oldest transmitter (once someone's pride and joy so many years earlier) is slated to go out the door. The middle generation becomes relegated to backup status.

Many of the critical questions are answered; the amount of space available and the capability of the ac source power are known. Because the job won't have to be completed overnight, installation details aren't quite as important. There will be time to replumb the coax or to install new conduits for ac power.

Another possibility is that you are adding a new transmitter and keeping the old one as a backup for a station that has never had a backup transmitter before. If this is the case, more planning and

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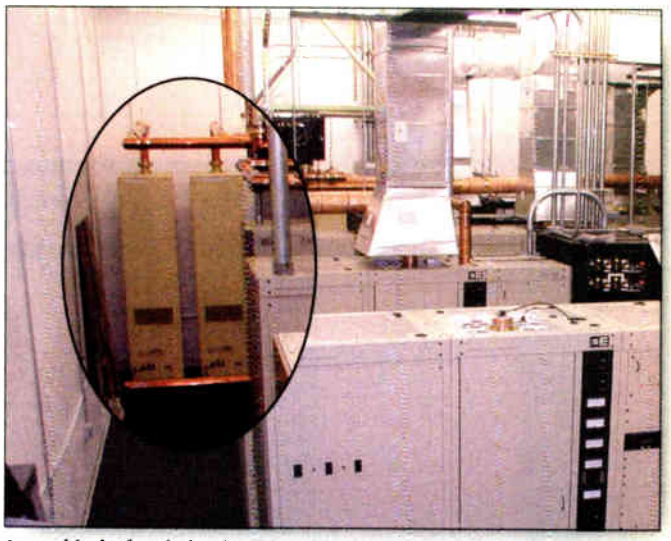
perhaps a bit of research is required.

For starters, the additional transmitter has to fit into the available space. Make a drawing of that space; not only the footprint, but critical details of the surrounding walls and ceiling. There may be some aspects of the transmitter room that can be changed depending on the budget. Don't get caught discovering incompatibilities when the new rig is set into place.

The transmitter facility must have sufficient ac power resources to handle the additional load. There will be times when both transmitters will be operating, so the service input and the main disconnect need to have the current handling capability to run both transmitters simultaneously. Refer to the transmitter literature to find out the amount of ac power the new transmitter will require, then hire an electrician to help determine if the service needs to be upgraded. Double check the air-handling capability in a similar fashion; consult with an HVAC company and make sure to consider the ac power requirements for any upgrades in the HVAC system.

There is little point in having a backup transmitter if it can't be put on the air quickly. The ability to switch transmitters via remote control is critically important. For FM transmitters, there are several different ways to do this.

The most rudimentary way to accomplish this is

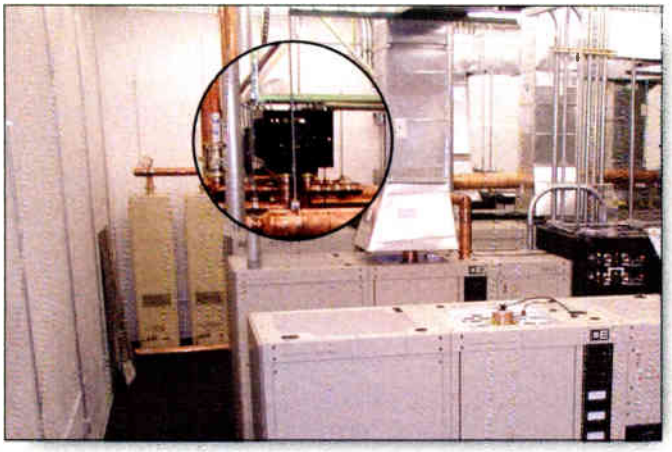


Some kind of resistive load is critical to maintaining a transmitter. With appropriate switching, a single load can be used for multiple transmitters.

to add another antenna, and to connect it directly to the second transmitter. The advantage is simplicity, but with simplicity come two disadvantages. Usually a station's second antenna is inferior in some way to the main antenna, so when one transmitter fails the station be forced to use the inferior antenna. Also, you won't be able to run both transmitters without one interfering with the other.

A better way is to use a single, four-port coaxial relay. This allows you to switch either transmitter to the single antenna. The transmitter not selected for the antenna is connected to a dummy load.

The ideal arrangement is to use two coaxial relays, or one relay and one patch bay, so that either transmitter can be switched to



The ability to remotely switch transmitters between the main and auxiliary antennas and a dummy load will minimize off-air downtime.

either antenna or dummy load.

Every station should have a dummy load, whether it is an AM or FM. There is no better way to test a transmitter offline. While a second antenna can serve this purpose, there are interference issues to consider if two transmitters are running at once. I know of one AM station that actually has a backup antenna ready for use. The second transmitter will be as reliable as regular testing and maintenance will allow. If it can't be tested into a load and it can't can't be put on the air by means of a remote control, that transmitter will simply become a dirty hulk of a museum piece.

Keep in mind that dummy loads are purely resistive, while antennas have some inductive properties. Test a transmitter into a dummy load, but always tune it into the antenna so it is ready for standby use.

Building a new transmitter site

All of the transmitter site characteristics I've discussed so far need to be considered when building a new transmitter facility. However, in most cases the entire site design is driven by the size of the transmitter itself. The standard approach is to first determine the required total power output (TPO) and then work backwards from there.

There are lots of choices in transmitter manufacturers. Regardless of the different brands, the ac power requirements are going to be similar with respect to the RF power level. With this information you will determine the size and type of the ac power service required, such as single- or three-phase, 240Vac or 480Vac. The transmitter specification sheets should list the ac power to RF power efficiency, and from that the amount of waste heat the new transmitter will generate can be determined.

In consideration of that waste heat and other environmental issues, such as the elevation of the site and the typical ambient temperatures, the size of the transmitter room, along with other heat generating equipment, the HVAC requirements can be specified.

Once this has been done, pick the transmitter brand. Once the brand is decided, it may be necessary to reiterate some of the design aspects to be sure that they will work with the specific transmitter.

THE STATION'S VOICE

Considering IBOC

While IBOC is not yet an approved and mandatory standard, it makes sense to consider IBOC operation for an analog transmitter purchased today. There are three proposed methods for transmitting a hybrid (analog and digital) FM IBOC signal: use of separate antennas, high-level combining and low-level combining.

The easiest method to plan is to use separate antennas; one for analog and the other for digital. This requires two transmitters, two transmission lines and two antennas. This requires no change to the existing analog transmission facilities, but requires twice as much equipment and tower space. This method is still under consideration by the FCC. An analog transmitter bought today would still be useful for analog operation later with a separate antenna system.

The natural rotation of transferring a transmitter from main to backup status is common. Staying on the air is the critical element even though the backup may not have all the features or capabilities of the new main, such as stereo or SCA capability.

High-level combining is fairly straightforward. The output of an analog and digital transmitter are combined through a high-power combiner. For the analog signal, the insertion loss in the combiner (analog input to analog output) is about 10 percent or -0.45dB. If, for example, the station's TPO requirement is 10kW, the analog transmitter will need to produce about 11.1kW into the combiner to provide 10kW of analog going up to the antenna. If this method is in your facility's plan, have at least 10 percent power headroom in the analog transmitter.

Low-level combining creates the hybrid signal at the exciter level and then feeds a single power amplifier for both signals. To pass the digital signal, the transmitter must be linear. Some newer designs plan for hybrid operations, and they are identified as such.

For MW IBOC, there are at least two manufacturers that have IBOC-ready transmitters available for sale and delivery.

Choosing the brand

If you are charged with making the decision about which brand of transmitter to buy, remember that the most important characteristic about a transmitter is its reliability. Every transmitter will eventually break, so the next most important thing to consider is the ease with which it can be repaired when the inevitable happens. When it breaks, you assume the company

When the Rock and Roll Hall of Fame and Museum started planning its new state-of-the-art Alan Freed Radio Studio, help came from Logitek.

Alan Freed Radio Studio Console Configuration

Logitek Audio Engine with 6 IO24A I/O cards, providing up to 72 analog inputs and 72 analog outputs
- 24 mix-minus buses
- Supervisor software for complete control of fader assignments and router functions

Numix-12 Console
- 12 fully assignable faders, easy access to 8 stereo buses

vMix "Virtual" Console software

Logitek is proud to support the Alan Freed Radio Studio

Our digital audio routing and console designs were a perfect fit for a studio that would both showcase their beautiful facility and provide the flexibility that hundreds of visiting DJ's and station personnel would want. The Logitek Numix console can easily be configured for visiting talent, providing access to equipment and guest mics in an arrangement that makes sense for each operator. The Audio Engine provides routing and control functions throughout the studio, making it the heart of this 21st century operation.

Logitek

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THE STATION'S VOICE

is still in business.

Before making the decision on the brand, ask the salesperson some questions. Has the model I'm looking at been available for some time? Is it a proven design or are there many in the field? Is the manufacturer well known and well established? What is the availability of parts and technical service from this manufacturer on a 24-hour, seven-days-a-week basis? Can I interview other users of the same model I'm considering?

While these are questions that can be answered

Even if your station is not ready to install an IBOC system today, consider a transmitter that is IBOC-capable for the future.

objectively, the reality is that your decision will be subjective. You should plan on being able to use the new transmitter for at least 10 years, so choosing wisely now will make your life (or perhaps your successor's life) that much easier in the foreseeable future.

Irwin is director of engineering services, Clear Channel San Francisco.

Resource Guide

Transmitter manufacturers and their websites

Company	URL
AEV SRL	www.aev.net
Armstrong Transmitter	www.armstrongtx.com
Bext	www.bext.com
Broadcast Electronics Inc	www.bdcast.com
Broadcast Technology	www.broadcasttech.com
Continental Electronics	www.contelec.com
Crown Broadcast	www.crownbroadcast.com
DB Elettronica	www.dbbroadcast.com
Ecreso - RFTS Broadcast	www.ecreso.com
Energy-Onix	www.energy-onix.com
Goodrich Enterprises	www.goodrichenterprises.com
Harris	www.harris.com
Itelco USA Inc	www.itelco-usa.com
Kenneke Communications	www.kenneke.com
LPB	www.lpbinc.com
Marti Electronics	www.martielectronics.com
Nautel	www.nautel.com
Nexus Broadcast	www.nexusbroadcast.com
Nicom	www.nicomusa.com
OMB America	members.aol.com/OmbRadioTV
PTEK	www.ptekpower.com
QEI	www.qei-broadcast.com
Ramsey Electronics	www.highpowerfm.com
SBS	www.sbsfm.com
Silicon Valley Power Amplifiers	www.svpa.com
Superior Broadcast	www.superiorbroadcast.com
Technosystem	www.technosystem.it
Transcom	www.trcorp.com

The best selection

FM Educational Circular Polarization antennas.

Model	No. Bays	Max. Input Power	Price
MP-1	1	500 W	$250
MP-2	2	800 W	$650
MP-3	3	800 W	$950
MP-4	4	800 W	$1,250
MP-4R	4	2000 W	$1,750
MP-5	5	3000 W	$2,250
MP-6	6	3000 W	$2,700

FM Low Power Circular Polarization antennas.

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

FM Medium Power Circular Polarization antennas.

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

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

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Avda. San Antonio, 41
Teléfs.: 976.50. 46.96 (6 lines)
Fax 976.46.31.70
50410 CUARTE DE HUERVA
(Zoragoza)

Antenna & Radio Factory:
Camino de los Albares, 14, bajos
Teléfs.: 976.50. 35. 80 (6 lines)
Fax 976.50. 38. 55
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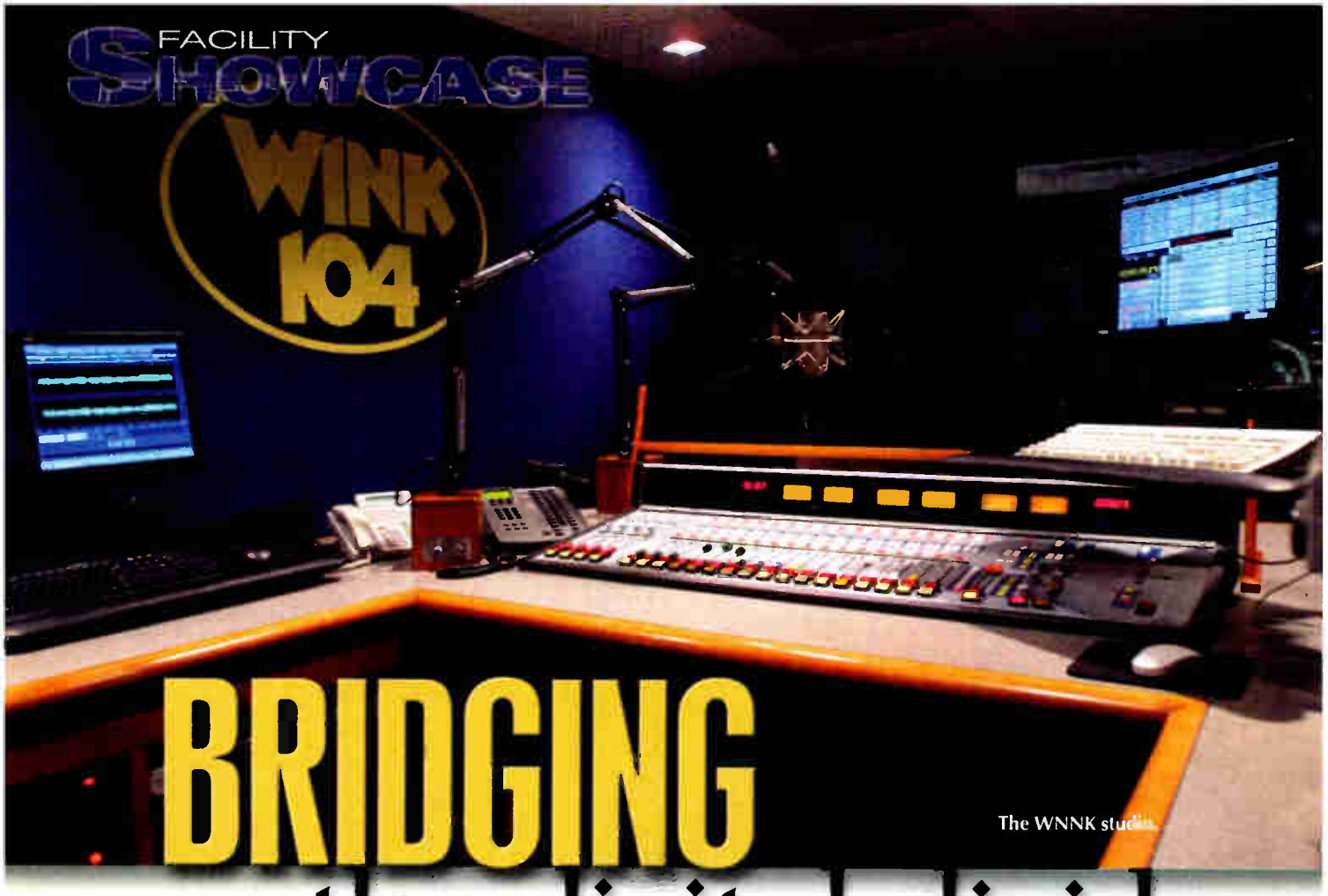
TV & Radio antenna systems



The WNNK studio.

BRIDGING the digital divide

By Dave Supplee

A long-awaited consolidation project comes to fruition.

When Cumulus Broadcasting purchased the Harrisburg, PA, cluster of radio stations in late 2000, the four stations were operating from two facilities. The stations—WTPA, WNCE (now WWKL), WNNK and WTCY-AM—had been under common ownership since 1999, but the planned consolidation of the facilities never took place due to the AMFM-Clear Channel merger, and nearly two years of uncertain status that ranged from being on a divestiture list to being operated by a trust.

Prior to the purchase of WTPA and WWKL, the WNNK/WTCY Harrisburg location was crowded. With 45 full-time employees in a 4,500 square foot building, there was not a lot of room to move. To the amusement of visitors, the continuity director worked out of a converted bathroom, with his filing cabinet in a shower stall. The situation became even more difficult when management decided to move the sales and administrative staff from the WTPA building in Mechanicsburg, at

The WTPA studio is centered around a Wheatstone D-4000 console.

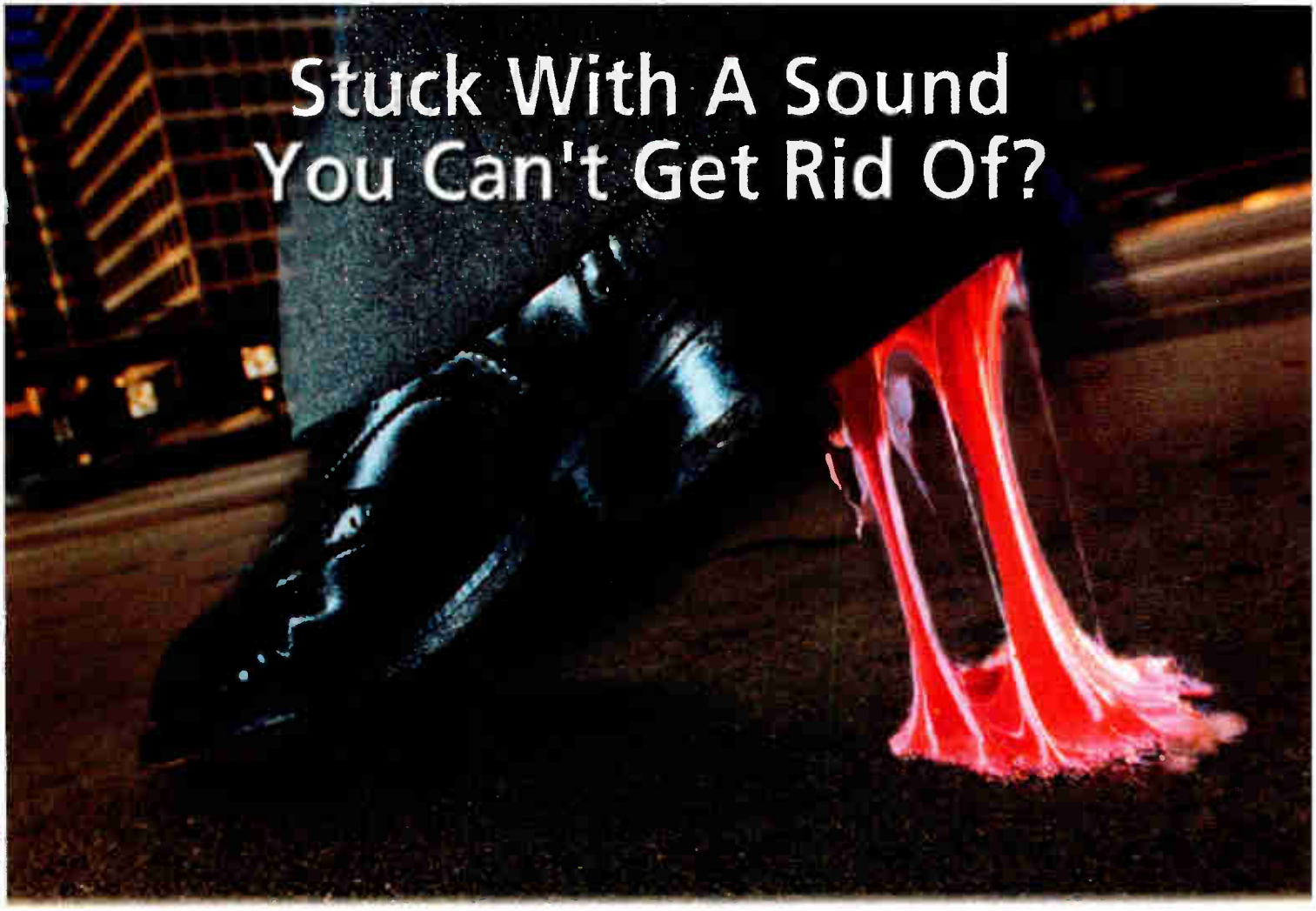
BRIDGING the digital divide

which time we lost our conference room to sales cubicles and began having our meetings in vacant office buildings nearby. We also had aging equipment at both facilities. While we had no reliability issues, the numerous ownership changes had limited our ability to replace much of the equipment that was near the end of its expected life.

The light ahead

By 2002, the pieces were finally in place to start the integration process. We had identified a new location with sufficient room to house all stations and provide some room to grow, and our new owners, Cumulus Broadcasting, were committed to building a showcase facility. There were several meetings with our director of engineering, Gary Kline, to discuss each of our visions for new the facility. We agreed that we wanted digital technology where possible,

Like the WWKL studio shown here, all the studios have low equipment profiles to maintain easy sight lines.



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BRIDGING the digital divide

simplicity of design and maximum flexibility. We also wanted to avoid any single point of failure items that could potentially take the entire cluster off the air.

I became the integrator, calling on contractors and other Cumulus engineers as needed to complete the build. The new consoles were furnished by Wheatstone. We purchased one D-5000 console for WNNK and four D-4000 consoles for WTPA, WWKL and two production rooms. We recycled several analog consoles and a refurbished A-500. The old WNNK console was installed in the WTCY-AM studio. WTCY programs an urban A/C satellite format so the primary use of the studio is WTCY production. We also had two Audioarts R-60 consoles that were in nearly new condition that we installed in our two newsrooms.

Another view of the WWKL studio.

The audio system

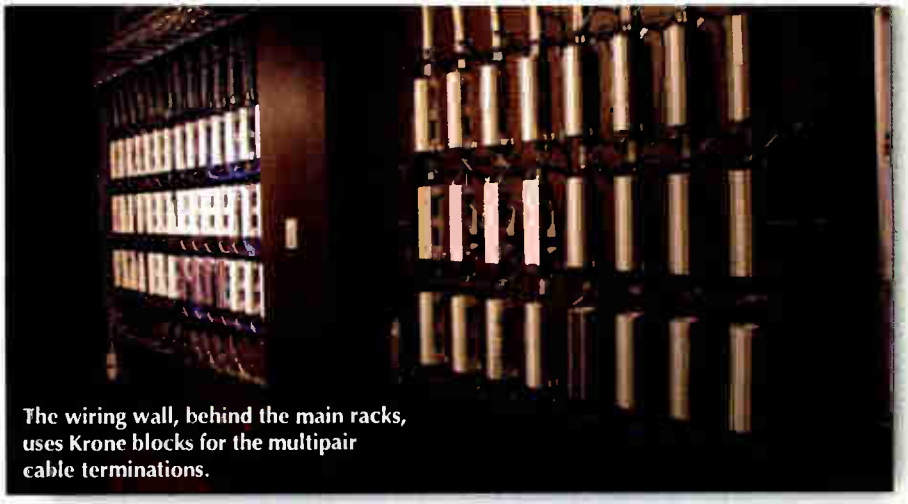
In our production rooms, we replaced our aging Roland DM80 and DM800 editors with Cool Edit Pro using Lynx2-LS-AES cards.

As former Capstar/AMFM stations, the stations were equipped with Prophet CFS16 systems, which had performed reliably, and in the case of WTPA the hardware was only three years old. Rather than

The central rack room is a showcase of its own.

Equipment List

360 Systems Shortcut
360 Systems Instant Replay
Ariane audio processing
Omnia audio processing
ATI Dual 1×6 digital DA
ATI Dual 1×6 digital DA
Audioarts R-60 audio console
Audiometrics CD10 CD players
Belden 8451 audio cable
Belden 89758 18-pair digital audio plenum cable
Benchmark DA104 D/A converter with mainframe
Betabrite messaging signs
Broadcast Tools 1×2 Switcher
Broadcast Tools Connect-o-adapter
Broadcast Tools Connect-o-pad
Broadcast Tools Silence Sense
Comscope 5624 24-pair CAT5 plenum cable
Cumulus Custom Furniture
Cybex KVM extenders
Dell Optiplex PCs
Denon C630 CD players
Denon C680 CD player
EV RE-20 microphones
Event 20/20 BAS powered monitors
Gepco 552624GFC 24 pair digital audio trunk cables
Gepco 5596 EZ digital cable
Gepco D5526 dual digital audio cable
Gepco D61801 dual analog digital cable
Harris monitor mounts
Henry Engineering Super Relay
HHB 800 CD recorder
HHB CDR-850 CD recorder
JBL studio monitors
Krone termination blocks
Liebert 1500kVA UPS
Lynx One and Two sound cards
Mackie HR824 powered monitors
Marantz PMD520 cassette recorder
Middle Atlanic racks
Moseley 6010 and 606 composite STL
Moseley SL9003 uncompressed digital STL
NEC LCD 1550 V 15" LCD monitors
O.C. White microphone arms
Presonus VXP mic processors
Prophet Systems Audio Wizard CFS 16 automation system
Radio Systems 4×4 analog DA
RAM SR64 6×4 switcher
Rolls headphone amplifier
Sage EAS
Samson S-Phone headphone amplifier
SAS 16000 32×32 Stereo Analog Router
SAS dual router controller
Shure KSM-44 microphones
Sine Sytems MBC-1 Message Board Controller
Sony MDS E12 MD recorder
Sony PCM R500 DAT recorder
Starguide II and III satellite receivers
Symetrix mic processors
Tannoy Reveal powered monitors
Tascam 112 cassette recorder
Telos 2×12 ISDN studio telephone system
Telos Xtream
Telos Zephyr
Wheatstone A-500 console
Wheatstone D-4000 digital console
Wheatstone D-5000 digital console



The wiring wall, behind the main racks, uses Krone blocks for the multipair cable terminations.

BRIDGING the digital divide

The outer racks face into a common hallway.

replace these systems with an entirely new automation, we chose to purchase a new server capable of handling all four stations and several additional audio cards to complete the system. All inputs and outputs from the Prophet system are running AES Digital in both production studios and on our three FM stations. I discovered that only a few stations had attempted to run digital in and out of the Antex cards in the CFS system. Part of the difficulty originated from the DIN connector on the Antex cards. To correct this problem, we used an adapter cable that takes the four DIN connections and provides a single DB15 connector, wired like the Audio Science card used in the newer systems. This allows me to mix-and-match newer cards as needed.

We maintain the digital path as far as possible on our FM stations, converting to analog just prior to the preprocessors, which are analog-only. For the D/A converter, Kline specified a high quality unit, the Benchmark DAC 104. It handles two streams per card, so we are able to handle the three stations with two D/A converters. Each of the AES streams is fed from a single RAM 6x4 switcher, which allows fast switching of any digital studio into any of the on-air stations processing. This offers a patch-panel-free way of bypassing a failed console, or vacating a control room for maintenance. Two of the three FMs are then processed and sent to the transmitter via composite analog.

In the case of WNNK, we returned to digital for the STL using a Moseley SL9003. The uncompressed AES audio enters an automatic switcher made by Titus Industries at the transmitter site, and then into the main processor. In the event of STL failure, the Titus will sense the loss of AES and automatically switch to a backup STL, a Moseley 6000 series with 6000 DSP.

We did not install a facility-wide central router. Instead, we installed a smaller system to handle only satellite, RPU and other remote

The reception area presents a professional business image to visitors.

Active Participants

The facility integration was handled by Dave Supplee, with the help of Gary Zocolo, Cumulus - Youngstown who handled much of the detail wiring in the studios. Lightner Electronics of Claysburg, PA, punched down the studio trunk cables and provided several harnesses for the recycled consoles. Alf Long and Mike Mackenzie of Cumulus - Harrisburg assisted in the construction and the move of the stations. IT wiring and satellite work was done by Skyline Communications, Indianapolis, IN. Photos by Scott Giambalvo, HarrisburgPA.com.

feeds, as well as air monitor routing. These sources are analog, so the SAS 16000 with expansion chassis worked well. The ability to route air monitoring is useful when the air talent is handling production at the same time. Dual remote units for this router were installed in each on-air studio. Production rooms access the router through PC controls

Full integration

The programming department demands high quality telephone calls. All three of the FMs rely heavily on callers, so we incorporated the Telos 2x12 ISDN dual hybrid into each of our studios. These, like most of the other equipment that does not need to be accessed regularly, resides in the central rack room, offering convenient access for maintenance and troubleshooting. As anyone who has dealt with the local telephone company can understand, it is much faster troubleshooting a suspect ISDN line when you have more than one unit available at a single location.

We did not begin the integration process until September 2002. I was able to take advantage of the delays by planning virtually every aspect of how the facility was to be wired and plan the station moves down to the last detail.

The first station, WTCY-AM moved on Nov. 15. WNNK followed several days later. The last station to arrive was WTPA, which moved in on Feb. 14, two days before a big blizzard hit the northeast.

During the project we relied on many time-saving devices, such as the Broadcast Tools COP and COA devices for wiring satellite receivers. We also used Wheatstone Phase 2 prewire, with the in-studio equipment prewired and preconnectorized to the harness, resulting in savings of many days of time.

Supplee is regional engineering coordinator of Cumulus Media, Harrisburg, PA.

Tieline Technology Patriot

By Kirk Chestnut, CSRE

The Patriot from Tieline Technology delivers bi-directional 15kHz mono audio over a standard phone line using its special codec and a custom-made modem to provide solid performance. The Patriot will communicate with other models within the Tieline family, including the Commander with ISDN and the I-Mix ISDN and POTS codec.

I can describe the Patriot in two words: stable and dependable. This product left an indelible first impression in our shop. Here is a device that addresses many of those woes and headaches we've all experienced in field production and broadcasting.

Tieline's proprietary coding algorithm provides the most stable performance I've ever witnessed in a POTS codec. It achieves compression factors on the order of 20 times or more. This allows remarkable communication at a rate of 28kb/s, comparable to Layer II and Layer III that need rates of at least 64kb/s to 128kb/s to be effective. It even delivers fairly good audio quality down to rates as low as 9.6kb/s.

Performance at a glance

- Stable performance
- Superior audio quality
- Remote control of audio from either end
- Loop back and tone generator aid setup
- Toolbox software support package
- 9,600 baud data stream concurrent with audio
- Low delay
- Negotiates data rates up and down

The unit is the lowest-priced Tieline codec product, but certainly not at the bottom on quality and features. The retail price per unit makes it affordable even for a penny-conscience operation. Some stations are using these units as cost-effective backups for their studio-to-transmitter links.

Out of the box

In the middle of the Patriot is a large rotary-encoder knob for navigating through the menu-driven setup. A 10-button soft-touch keypad, including user-assignable function keys, allows quick access to various features and dialing functions.

A useful feature on the Patriot is the ability to remotely control volume levels from either end. Even if the remote engineer gets distracted and levels get out of hand, the studio engineer can control input levels to the remote unit via front panel controls or with the Toolbox software package. In the event that field and studio engineers become distracted, the intelligent gain control (IGC) sets levels based on program material over a five-second duration.

A built-in 400Hz tone generator and loop-back feature assist in testing and troubleshooting connections between the studio and the remote site. Once a link is established, the Patriot negotiates for optimum performance, changing data rates up and down until a stable link is established. Line quality (LQ) can be monitored on the LCD display. Line quality of 35 percent or better is acceptable while levels below 20 percent prompt the unit to renegotiate the rate for a more dependable connection. A new rate can be renegotiated in about 1.5 seconds.

Dialing up the studio has never been easier. The Patriot has a 50-number memory and can redial the last number used. In the event that the connection is interrupted, the codec can be programmed to auto reconnect.

The codec sports a number of convenient interfaces, including solid XLR audio connectors for switchable mic and line levels as well as RCA jacks. A 3.5mm cell phone jack provides an interface for standard cell phone audio. Four audio controls are located on top of the case, two for input audio and two for monitoring outbound send and return audio from the studio.

A 200b/s serial port provides data communication to a laptop computer for remote control, chat or setup using the Toolbox software. The software is included with the purchase of the Patriot. One CMOS relay contact is available on the nine-pin female connector for a user-defined remote control function. Soon to be released will be a secondary nine-pin male connector for 9,600 baud data communications.

It uses Windows

The Toolbox software application aids configuration, remote control and monitoring of the Patriot. If Toolbox is running on computers at both ends, a chat window facilitates communications between the studio and remote operator. Even faster communication rates are possible over the secondary data channel using terminal emulation

software. Data is transferred using a standard computer or laptop and a serial RS-232 connection. Toolbox helps keep the phone book up to date as well as upload the most current system software.

An additional tool within Toolbox is the Line Quality Monitor. Samples of LQ are taken every 30 seconds and displayed on a graph in one-hour blocks. Scroll through the history to observe LQ over a period of time for advanced phone line troubleshooting.

The ultimate test

Our test package had no more arrived when it was on the road to a remote. One of our regular engineers called in sick at the last minute and everyone else was booked. I had just a few hours to pack, drive through rush hour traffic and set up for an afternoon sports talk show in a neighboring town. It was the worst combination of circumstances possible.

"Where are your phone lines?" I queried while dropping 50 pounds of equipment on the floor. With 30 minutes to air were patching cords at a fevered pace. I thought to myself, "This was not the best time to try something new." Finally, the proprietor of the restaurant showed me the phone line. It was a POTS line but routed through a PBX. Could things get any worse? Earlier in the day I had set up the studio unit temporarily on one of our PBX POTS lines just for sake of testing with no intention of actually going on the air.

Five minutes to air and I'm dialing up the Patriot. The unit negotiated and locked at 24kb/s even through two PBXs. Sound checks came through loud and clear. Even at 24kb/s the sound was amazing with just a hint of digital artifact that was noticeable to a well-trained ear, but imperceptible over the air. I thought that digital delay was inevitable at such a connection rate. As published, the delay was insignificant (about 100ms) and the remote talent interacted smoothly with callers live over the air. My line quality remained around 34 percent with no dropouts.

Later, I took the time to examine the Patriot under less hostile conditions on the bench at the station. The audio was superb down to even the lowest of connection rates, considering that this was carried over POTS. Playing my favorite classical CD, I was impressed with how smooth the response was in music mode. As data rates dropped, high end disappeared and digital artifacts became more pronounced, yet the audio was still acceptable and air-worthy.

For improved low data-rate/narrow-band response, Tieline developed a special voice mode algorithm to minimize digital effects. While the Patriot was intelligible down to a rate of 9.6kb/s the sound was a bit grating. This lowest rate is probably practical for short news clips over worst-case phone lines. Total harmonic distortion was around 0.4 percent from 800Hz to 12kHz at a 33.6kb/s connection rate. Voice mode figures varied from 2

percent at 800Hz to 7 percent at 5kHz at a 28.8kb/s rate. Despite what the numbers reflect, to the instrument that counts the most (my ears), the sound was pleasing.

The Tieline Patriot fits the bill for bare-bones, dependable and cost-effective POTS codec transmission. Sales, promotion and accounting alike are singing the praises of this little box. Oh, and let's not forget, engineering is rather partial to it as well.

Chestnut is assistant chief engineer at Entercom, Kansas City.

Tieline

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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.

It is the responsibility of Radio *magazine to publish the results of any device tested, positive or negative. No report should be considered an endorsement or disapproval by* Radio *magazine.*

Broadcast Electronics FXi 60

By Ed O'Donnell

For several years we have been preparing our Class C, country music station for digital operation. Broadcast Electronics' new digital exciter was on the list of equipment needed to complete WIBW-FM's digital audio chain—someday. Our reliable, ever-ready Broadcast Electronics FX-50 analog exciter had many years left of service and we were in no rush to replace it. Then, we received notice that a new station in Lee's Summit, MO, was willing to pay us to relocate WIBW-FM to a new frequency.

With a frequency change on the horizon, we were suddenly anxious to find out how fast we could get the new Broadcast Electronics FXi 60W exciter and how it would benefit the station.

Would it give us the same reliability as our trusty analog Broadcast Electronics exciter, only with the benefits of digital? In an effort to get WIBW to stand out and to get listeners to stop at its new position on the dial, the station's priority became audio improvement. Just about any digital exciter we chose would give us marginal improvement in the quality of the audio by eliminating the analog-to-digital conversion between our existing analog exciter and a digital STL receiver. The FXi, however, promised to give us something extra. Available in 60W and 250W, the FXi is a direct-to-channel digital FM exciter that converts the digital signal to the carrier frequency directly. Analog up-conversion (stepping through a series of oscillators and mixing to generate a desired frequency) doesn't exist in this exciter, which can only mean less noise, fewer spurious emissions and virtually no filtering artifacts.

My immediate concern was getting the unit by Sept. 17, when WIBW would move down the dial from 97.3MHz to 94.5MHz. We not only received the unit in time for the switchover, but we also received a visit from a Broadcast Electronics technician who came out to retune our existing Broadcast Electronics FM-35T transmitter and FX-50 exciter for backup.

Installation of the FXi 60 at our transmitter site went well, which was a pleasant surprise given that the unit we received was one of the first off the factory floor. The unit offered a smorgasbord of input options, which was extremely helpful in the short term because we were still operating off of our analog STL system but anticipating installing a new digital STL system in the coming months. The FXi 60 accepts AES/EBU, wired or optical, left and right analog, balanced and unbalanced composite or mono inputs. And, it can switch from a primary input to a backup input automatically. For the time being, we fed it a composite analog signal from our existing analog STL receiver. When the time comes to install a digital STL, we'll set up the exciter to take digital audio from the main STL and analog audio from the backup STL unit. That way, if the main digital STL receiver fails, the FXi 60 will automatically switch to analog audio input for the analog backup STL with no loss of service.

A Swiss Army knife

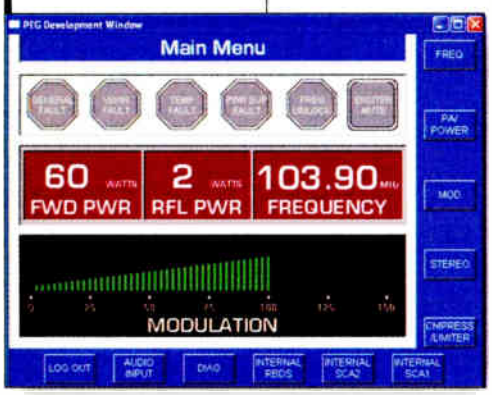
Once we got the unit installed and running, we checked the spectrum with a spectrum analyzer and everything checked out legal. Next, we decided to push a few buttons. This exciter has a lot more features than I'd come to expect of an exciter. The 4RU box includes an exciter, stereo generator, RBDS encoder, two SCA generators and audio processing—a broadcaster's Swiss Army knife. We plan to put all those functions to good use, with the possible exception of the stereo generator because we already have a stereo generator at the studio. We set up the two SCA channels for queuing purposes, and will set up the RBDS port at a later date.

I was curious how Broadcast Electronics solved the inevitable user-control overload for all the functions of the unit. The company earned major points from us in

Performance at a glance:

- Direct-to-channel modulation
- Multiple input options
- Smart buttons
- Large screen display
- On-screen troubleshooting
- IBOC upgradeable
- RBDS and SCA generators
- Internal audio processing

this regard. A good-sized screen display on the front of the unit offers several menu options selectable according to "smart buttons." The smart buttons, along the bottom and side of the 640×480 display, change function from screen-to-screen so although there was ample user control, there was little confusion. This unit also has an on-screen troubleshooting guide that comes about as close as anything to automating the chief engineer. Once, when I was conducting modulation measurements of the main carrier, a pop-up box appeared on the unit's menu display reminding me that I needed to turn off an SCA channel first.



Overall, I found this unit to be user friendly and, more important, spectrally clean. (S/N ratio: 90dB below rated power reference carrier with 100 percent FM modulation at 400Hz, 75µsec de-emphasis with no FM modulation present.) If the station's stereo generator goes out, I can simply pull the FXi 60 offline as an exciter, plug in the backup FX50 exciter and use the FXi 60 as a stereo generator. Because the FXi 60 can be upgraded to transmit IBOC with the addition of a card, we'll already have the exciter we need when the day comes to add IBOC to our facility.

O'Donnell is chief engineer of WIBW-FM/AM, Topeka, KS.

Broadcast Electronics

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E	bdcast@bdcast.com

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New Products

By Kari Taylor, associate editor

Digital console
Harris

Expresso: This full-featured 10- or 14-channel digital console is available at a lower purchase price than its analog counterparts. Developed for small or medium market radio stations or smaller production studios, this console offers a secure upgrade path with analog and digital inputs and outputs. Broadcasters can start with analog and easily upgrade to digital when they are ready. Features include a traditional look with familiar analog meters for instant usability, ergonomic implementation and a phone setup with features from other consoles.

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

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Handheld II: This audio recorder offers advanced software, downward compatibility with version HH I , as much as 30 percent lower power consumption (also a high efficiency battery pack) and advanced, user-friendly USB connectivity. It also provides improved S/N ratio, a lower noise floor, improved jitter performance, higher headphone power output level, integrated line drivers on output and improved RFI suppression on internal microphone signal.

+31 481 453466; fax +31 481 375988
www.maycom.nl; sales@maycom.nl

Self-contained remote kiosk
Spacewise Broadcast Furniture

Broadcastmate: This self-contained traveling broadcast kiosk offers a large, electric color backlit sign that is visible to about 150'. It also features a built-in dual 100W RMS pre-wired stereo speaker system. Also available is a 19" equipment rack with rear access for mounting permanent remote broadcast gear, such as codecs, RPUs, receivers, mixers and DVDs. The kiosk includes locking access to the rack, stowage of promotional items and a locking utility drawer. It's useful for flat-screen display and additional promotional signs. When open, the kiosk stands about 70" high and its speaker swings open to 60" wide. When closed for travel, it folds down to a 52" high, 30" wide and 24" deep. A junior system, the JR-42, folds down to 42" high. The kiosk is constructed with road-case plywood with an aluminum frame and heavy-duty latches.

800-775-3660; fax 480-704-6149; www.spacewise.com; info@spacewise.com

Multi-algorithm codec
Audio Processing Technology

Worldnet Tokyo: This codec features standard and enhanced Apt-x, along with a range of other algorithms including G.711, G.722, MPEG AAC and MPEG Layer I, II and III, making it compatible with a wide range of other codecs. It also features ISDN, X.21 and TCP/IP interfaces, which means that it is useful for broadcast applications. The codec offers a variety of data interfaces i.e. ISDN (supports 1 or 4 BRIs), X.21/RS422/V.35, TCP/IP, UDP/IP and AES/EBU. It is compatible with the APT range of codecs, including the Worldnet Milano, DSM100/Pro-Link, BCF256/384 and DRT128. This product also offers compatibility with Telos Zephyr, CCS CDQ Prima, Dialog 4, AEQ and Prodys. With its auto sense feature, the codec will automatically detect and configure to an incoming signal.

323-463-2963; fax 323-463-8878; www.aptx.com; aptmarketing@aptx.com

Audio router system
Z-Systems

Z-256.256R Digital Detangler: This product enables recording studios and post facilities to seamlessly integrate and reconfigure their digital audio workplace. The unit accommodates as many as 256 stereo/two-channel inputs routing in any combination to a total of 256 outputs. Asynchronous sources and destinations can be 24-bit AES/EBU or S/PDIF format, at sampling rates to 192kHz and beyond. I/O crosspoint assignments can be selected via a dedicated serial port, using the firm's dedicated hardware remote or networked MacOS and Windows control software. The system is modular in increments of 16x16.

352-371-0990; fax 352-371-0093
www.z-sys.com; z-sys@z-sys.com

Search system
Enco Systems

Phonetica: A phonetic-based search system for digital audio, this product is available as an integrated module in the DADpro32 Digital Audio Delivery system. The module allows users to search a library of audio files containing spoken material and find specific words or phrases simply by typing them. This product contains underlying technology licensed from FastTalk, an Atlanta-based software company.

800-362-6797; fax 248-827-4441
www.enco.com; support@enco.com

Multistream audio adapter
AudioScience

ASI6244: This adapter is aimed at high-performance broadcast and streaming applications requiring multi-stream MP3 and MPEG Layer 2 record and playback with analog and AES/EBU digital interfaces. This sound card uses dual 150MHz Texas Instruments TMS320C6711 DSPs and provides four stereo outputs, two stereo inputs, four record streams, four play streams and a powerful multirate digital mixer. Audio format choices include MP3, MPEG Layer 2 and linear PCM. Multi-rate-mixing technology supports digital mixing of multiple stream formats and sample rates. The AES/EBU sync input allows adapter clock and AES/EBU outputs to be synchronized to an external AES/EBU reference. Soundguard transient voltage suppression protects against lightning and other high voltage surges.

302-324-5333; fax 302-738-9434; www.audioscience.com; sales@audioscience.com

Phone recorder/editor
Scott Studios

Lazer Blade: The Lazer Blade edits fast and auto-records every call. Place markers can be set while recording and the user can zoom in and out of visible waveforms. Hear edit points by scrubbing or rocking reels with a jog wheel. Announcers and callers are on different tracks that can be locked or separated for easy edits. Tracks can slide separately to improve timing. It can add hot keys, effects, bleeps, pauses and re-record parts at any time.

800-SCOTT-77; fax 972-620-8811
www.scottstudios.com; info@scottstudios.com

Remote antenna system monitoring
RFS

Antenna system monitor: Broadcasters can remotely monitor network performance via a modem or the Internet with this system. The monitor comprises a user-friendly touch screen connected to a programmable logic controller (PLC) interfaced with a transducer and analog/digital converter. This local setup provides an active mimic panel, as well as interactive graphical displays depicting parameters such as forward and reflected power, voltage standing wave ratio (VSWR), temperature or whatever is required. It also allows local control of motorized coaxial switches.

877-737 9675; fax 203-821-3852
www.rfsamericas.com; literature.americas@rfsworld.com

Stereo headphone amplifier
Sonifex

RB-HD1: A 1RU stereo headphone amplifier, this product is useful for driving as many as two pairs of professional stereo headphones from a single stereo or mono input. One headphone jack is on the front panel with one on the rear. The main stereo input connections are electronically balanced XLR connectors on the rear panel, which can be wired unbalanced. The output volume for the headphones can be controlled through the front panel or by a VCA signal supplied externally via the remote connector. This option is controlled by the local/remote control on the rear panel. Its main purpose is for installations where the unit needs to be remotely controlled. A mono input can be mixed into the main headphone feed, for example, for mixing in talkback to the headphones. This has an input level control via a recessed adjustable potentiometer. The mono mix input can also be remotely controlled. An LED power indicator on the front panel displays the power supply connection.

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

Directional antenna
Kathrein, Scala Division

k72314 SERIES: These directional broadband panel antennas are intended for use in professional fixed-station applications in the 470MHz–860MHz bands. They feature heavy-duty stainless steel and aluminum construction, and silver-plated copper radiators. A heavy fiberglass radome ensures performance in heavy icing conditions. All metal parts offer dc ground potential. Multiple antennas may be used to meet a variety of radiation patterns.

541-779-6500; fax 541-779-3991
www.kathrein-scala.com; broadcast@kathrein.com

Digital voice processor
DBX Professional Products

Pro Vocal: This processor is an all-inclusive toolbox that is useful for applications including live, studio and karaoke. The processor features a microphone preamp coupled with microphone and mic-preamp modeling for a variety of sonic characteristics. This unit offers DBX dynamic processing such as gating, compression, de-esser, and limiter, then on to chorus, flanger, delay and reverb. Other features include a 24-bit S/PDIF output with selectable 44.1 or 48kHz sample rate and MIDI control. This processor helps vocalists create warm and rich vocal tones in the digital domain with clear digital effects, while providing dynamics processing powers that can all be controlled via the front panel. The unit's connections are XLR and 1/4" analog inputs and outputs and S/PDIF digital outputs.

801-568-7660; fax 801-568-7662
www.dbxpro.com; customer@dbxpro.com

Mixer with mic preamplifiers

Behringer

Eurorack UB 1002: This 10-input, two-bus mic and line mixer features two invisible mic preamps (IMPs) and a musical three-band EQ, plus a switchable low-cut filter on all mono channels. There is one post fader FX send per channel for external FX devices, main mix outputs plus separate control room, headphones and stereo tape outputs. Tape inputs are assignable to main mix or control room and phones outputs. This mixer can connect a DAT recorder or monitor speakers to running permanent video audio installations.

877-672-0816; fax 425-673-7647
www.behringer.com; support@behringer.de

FCC license data tracker

RadioSoft

License Agent: This service permits the tracking of FCC license data for AM, FM, television, low band VHF, high band VHF, UHF and 800MHz and above. The system will track items of competitive interest or those that could cause potential interference or allocation problems with the subscriber's facility or location. It covers all activity in FCC Parts 22, 73, 74 and 90 in one easy-to-use format. It can be used not only to identify potential interferers, but also to see the details of what is being proposed and the possible effects on the flagged site. Users enter a latitude, longitude and radius distance for each site they wish to flag or simply the call sign. Moreover, users can request daily, weekly or monthly e-mails of any activity without any difference in cost. Any flag will generate an online list of information that pertains to a facility or market the user wishes to monitor. Flags are available for one site or hundreds of sites so the service is useful for small as well as large users.

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Contributor Pro-file

Meet the professionals who write for *Radio*. This month: Facility Showcase, page 24.

Dave Supplee
Regional Engineering Coordinator
Cumulus Broadcasting
Harrisburg, PA

Supplee is the market engineer for the Cumulus stations in Harrisburg, PA, and oversees the technical and IT facilities. In addition, as regional engineer he works with the local engineers at the company's stations in New York, Connecticut, Ohio and Kentucky. In this role he provides assistance on major projects such as transmitter moves and upgrades, studio projects and consolidations, capital-request preparation and operating budgets.

He has more than 27 years of experience in broadcasting.

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Written for radio professionals

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Advertiser Index

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Shaping radio today and tomorrow

By Kari Taylor, associate editor

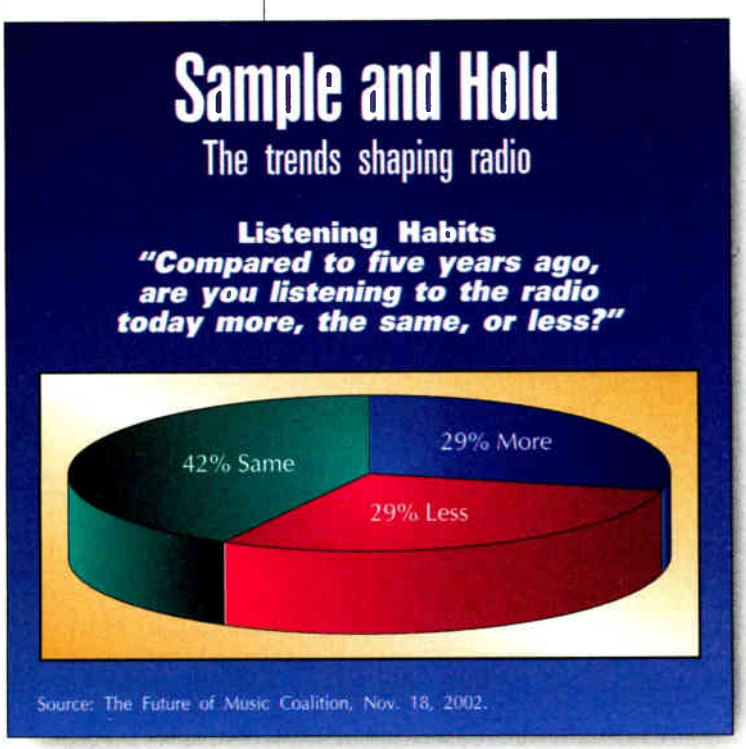
That was then

In 1994, Fostex's D-10 DAT recorder boasted auto record, hands-free edit and accurate repeated punch-in recordings. A RAM Scrubbing function allowed about 1MB of RAM to be used for cueing to an edit point with the jog/shuttle wheel. The jog/shuttle feature allowed the user to clearly hear the audio material during forward and backward play. A 10-key pad allowed the user to store and recall as many as 100 cue points.

The D-10's control layout was functional. Transport controls were located under the cassette tray, including those for auto cuing and search operations. A blank search function sought the next unrecorded section of a tape.

The recorder could record or play as many as 799 program cuts with auto or manual numbering, renumbering and skip programming. The company even suggested using a pair of recorders for precise assembly editing procedures using the universal GPI ports to provide the control between the two machines.

Although DAT recorder's overall design was successful, there were a few minor quirks. A Field Report in the May 1994 issue of *Radio* magazine pointed out that a delayed power muting function needed to be added to avoid the audible pop in the speakers or headphones. In addition, to use the RAM scrub feature, the tape needed to be striped with A-Time or R-Time. This wasn't a problem if the user had a deck with that capability when to original recording was made, but such a machine wouldn't always be available. The reviewer also noted that a switch to attenuate the analog outputs from +4dBu down to 0dBu, -3dBu or -6dBu would have been helpful for different monitoring situations. The D-10 retailed for less than $3,000.



Do you remember

In May 1994, the Electronic Industries Alliance (EIA) and the National Radio Systems Committee (NRSC) were recruiting listeners for subjective testing of proposed DAB formats at the Communications Research Centre in Ottawa, Ontario. Tests were conducted in sessions of two or three consecutive days beginning in June 1994 and continuing throughout the year.

Volunteers who were capable of, or accustomed to, judging the quality of audio signals evaluated recordings of audio material that had been passed through DAB systems under varied impairment conditions.

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Once configured, the system operates entirely independently of external computers. Configuration itself is intuitive and carried out onsite by means of user-friendly graphic interfaces provided by Wheatstone desktop software. We have gone to great lengths to make these setups easy for your field engineers, allowing expansions and changes to be achieved painlessly. Naturally, the Generation 9 system also takes full advantage of Wheatstone's exclusive VDIP® configuration software as well, so that studio functions (like mutes, fader and timer starts, tallies, etc.) are easily accomplished right at your desktop. Once set-up is completed the desktop is disconnected; all settings are retained in nonvolatile storage and the entire system runs standalone. Ethernet protocol is built in, providing interface with automation, scheduling, and hardware controllers as you require.

Whether you're planning a small, centrally located studio network or a large, multiple format build-out, the Generation 9 Digital Control Surface can form the basis for a fully integrated, reliable and user-friendly broadcast system that will handle your most demanding requirements *and* be able to change with your varying needs as they arise.

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