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THE RADIO TECHNOLOGY LEADER
October 2008
RadioMagOnline.com

Clear Consolidation

Moving five NY stations

SALARY SURVEY
The annual report

FIELD REPORTS
Vorsis AP-2000 & Ultrasone Pro 750

A Penton Media Publication

E² Ethernet Audio Done Right

MEET THE SQUARE

The Wheatstone E² (E SQUARE) gives you the convenience of Ethernet audio without all the IP hassle. It just *knows*. The built-in Setup Wizard lets you configure an entire system with just your browser and a laptop. Unplug it when you're done and there's no PC between you and system reliability.

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88E DIGITAL ENGINE: Just plug an E-SERIES control surface or GLASS E computer interface into this engine and get all the mixes, mic and signal processing you need. Fanfree, so it can stay in the studio where it belongs.

Because the E² system doesn't rely on a third party GUI, tech support is straightforward (and 24/7). Likewise, system operation doesn't require external PCs for continued full functionality. Best of all, 1 Gigabit protocol eliminates the latency and channel capacity restrictions associated with older technology.

E-SQUARE is Ethernet audio done RIGHT!

88D I/O: 8 digital inputs and outputs. You can headphone monitor and meter any of the SQUARE's inputs or outputs in real time. The 32 character display gives you all the information you need about your audio and system configuration. And because you can operate in either 8-channel stereo or 16-channel mono mode, 16 channels of metering are provided.

88A I/O: 8 analog inputs and outputs. You can bring a new SQUARE up in seconds and of course use the front panel encoder for your X-Y control. Front panel status LEDs give you continuous link, status, and bit rate information as well as confirmation of any GPIO activation.

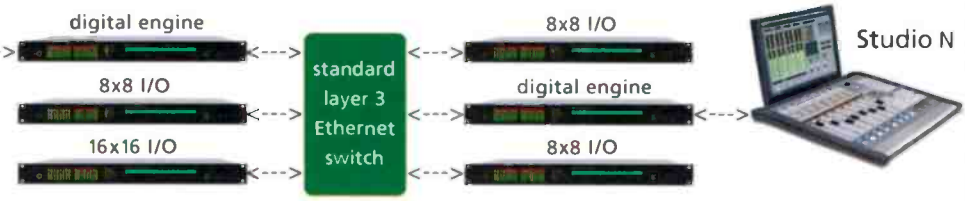
88AD I/O: 4 analog plus 4 digital inputs and outputs—perfect for small studios or standalone routing.

88 I/O CONNECTIONS: E² has both DB-25s for punchblock interface and RJ-45s for point-to-point interface. All SQUAREs have 12 individually configurable opto-isolated logic ports that can be either inputs or outputs.

Studio 1

E-SERIES control surface

STUDIOS DONE EASY!



www.wheatstone.com

Wheatstone

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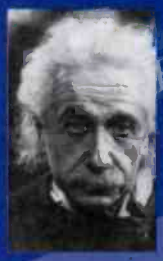

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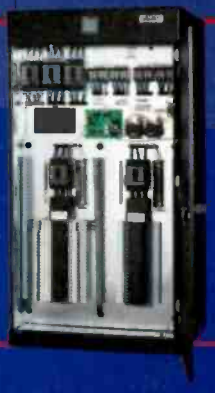

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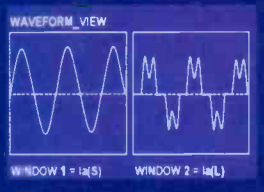
- Available in NEMA 3R and NEMA 12 style enclosures (consult factory)



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Power Quality Solutions Tailored To Protect *Your* Revenue Stream

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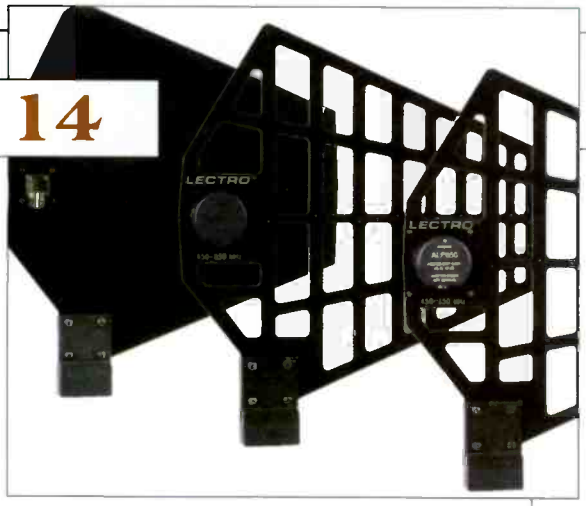

ON THE COVER

Clear Channel Radio-New York takes on the sizeable task of bringing five stations together in trendy Tribeca. Cover design by Michael J. Knust.

Features

Columns

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CONTENTS ONLINE

Currents Online

Selected headlines from the past month.

FCC Moves Forward on AM MoM Modeling

The Federal Communications Commission has issued a second report and order and a second further notice of proposed rulemaking for MM docket 93-177, which allows the use of computer modeling techniques to verify AM directional antenna performance.

EAS Manufacturers Develop CAP Profile ➲

The EAS-CAP Industry Group has released a draft profile to include CAP in the next generation of broadcast EAS units.

Entercom Sacramento Names Rapalee as DOE

Rick Rapalee takes on technical duties for KCTC-AM, KDND-FM, KRXQ-FM, KSEG-FM, KSSJ-FM and KWOD-FM.

NRSC Website Adds Reports Reference

The resource posts studies and test reports as supporting documentation for the group's work.

Sony Intros HD Radio Table Unit

The XDR-S10HDiP incudes Itunes tagging, an auxiliary input and 20 AM and FM radio presets. The XDR-S10HDiP HD will cost about $180.

NAB Names 2008 Marconi Radio Award Winners

Established in 1989 and named after inventor and Nobel Prize winner Guglielmo Marconi, the NAB Marconi Radio Awards are given to radio stations and outstanding on-air personalities to recognize excellence in radio.

Survey: HD Radio Awareness on the Rise

Research from Mark Kassof and Co. shows an increase of people who have heard of HD Radio, but it also shows that misconceptions are rising, too.

Site Features

A New Look at RadioMagOnline.com

We revised our website last month with a new look and improved organization.

Views of the 2008 NAB Radio Show

Look back at the recent convention with pictures from the exhibit hall and sessions.

The Radio Forum

Have a question? Need assistance? Join the *Radio* magazine Forum and network with other *Radio* magazine readers.

Podcasts Keep you Informed

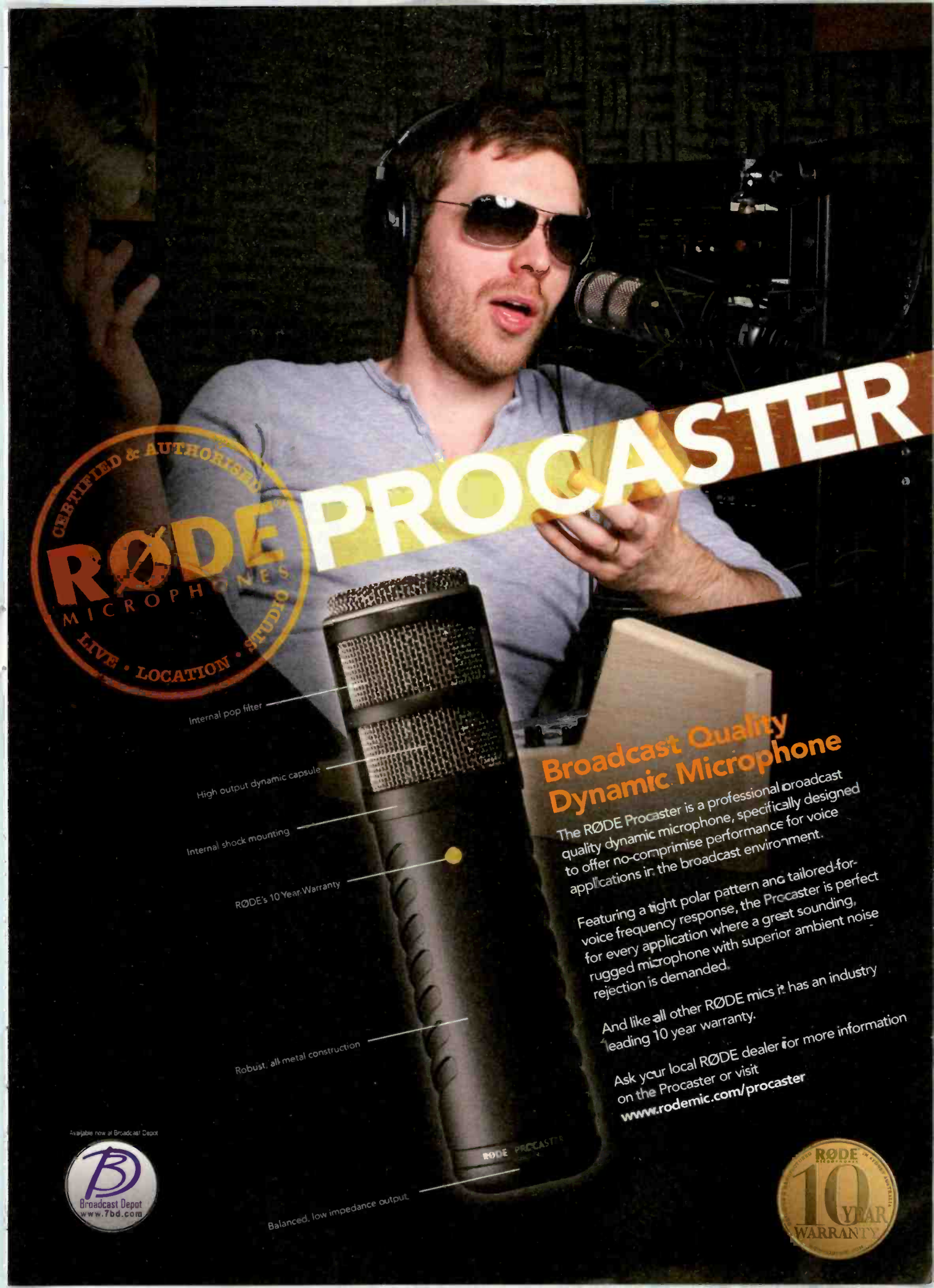
The *Radio* Currents are also available as a podcast. Listen to the latest installment every Monday morning.

Today in Radio History

Do you know what happened in radio history today? Access our list and find out.

Fall Conventions and Conferences

The *Radio* magazine Industry Events section lists all the upcoming conventions and conferences this fall.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WARRANTY

Still moving forward on HD Radio

We just completed another NAB Radio Show, and once again the nearly omnipresent thread was HD Radio. Despite the slow and steady process of the HD Radio evolution, which has included some bumps along the way, there have been some recent innovations pushing the progress forward.

This past spring, one step in making the transition more affordable was announced with the introduction of the imbedded Exporter. While this isn't really an advance in the technology, it makes these devices a more solid part of the signal chain. The first CD players and VCRs were big and bulky before being streamlined. The same is true now of the exporter, and this effort shows a real commitment to advancing this technology.

Another significant change for HD Radio was also unveiled last spring when the idea of increasing the level of the digital sidebands by up to 10dB was announced. This is a significant change in the system, and it has caused many stations to put their adoption plans on hold pending the outcome. This is understandable, since the choice of transmitter and transmission method is not made with 10dB of digital headroom.

The reason for the change in level is cited as a solution to improve building penetration and fringe coverage. Some sources have told me the increased level is a compromise for the HD Radio receiver chipset, which is just not sensitive enough for the -20dB level. Regardless of the reason, the question of digital carrier level has to be resolved soon.

We are finally seeing some real uses of data for HD Radio. Program-specific data is getting more sophisticated, and traffic data is a current hot button. In traffic, two groups, Clear Channel and the Broadcaster Traffic Consortium, have their own ideas of supplying traffic data. This is one area that will make HD Radio new and different instead of just being a replacement technology.

I see many references to programming offerings for multicast streams. I see these tied to HD Radio, but they are not technology advances. As stations plan to commence multicast operation, they obviously need something to feed these streams. Some of these offerings are deep niche programming (such as southern Asian or sports), while others find a specific target format we already know (deep tracks for example). They fill a need for sure, but they could fall into the same trap of just being another jukebox.

Adding conditional access to some of these formats is an innovation that could ensure the multicast formats are active listening choices and not just more background sound.

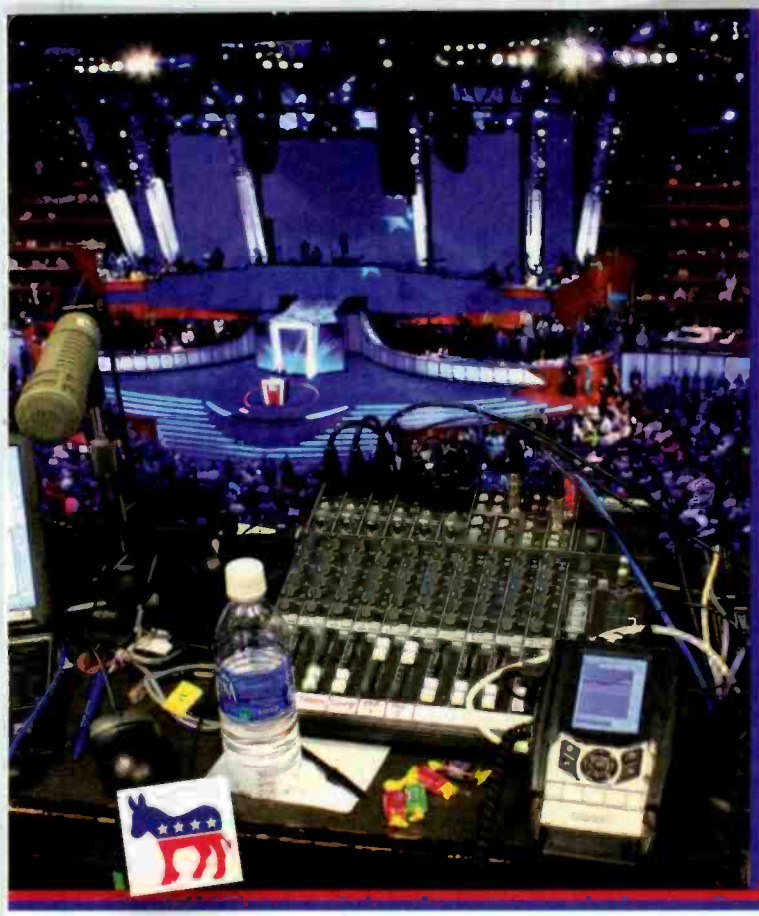
All these new listening choices have stirred interest in an electronic program guide (EPG). This is an innovation that I look forward to seeing implemented. Giving listeners an easy way to browse all available content provides a service, but it also puts all the programming on a level playing field. Listeners can more easily find programming, and stations will also have to put more effort into the programming. A never-ending title of "Hits of the 80s" won't keep the listener engaged when other choices are more savory. I see an EPG putting pressure back on stations to step out of the jukebox mentality.

The recent advance that I like the best is tagging. While the Apple Ipod implements it only for HD Radio, the newer app, the Microsoft Zune, has implemented it for RBDS. This sounds like a step backward, but if we can introduce listeners to a technology today, they will already be using it when it's added to HD Radio.

So while it seems like HD Radio is going nowhere, it's obvious this is not the case.

Chris Scherer

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



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Bullet-proof facilities
An internal due-diligence check

By Kevin McNamara, CNE

While writing this article, Hurricane Ike is blowing into the Gulf of Mexico, just 400 miles south of me and making its way to the Texas coastline. While Ike had no impact on my location, it certainly underlines the importance of being prepared for these types of events.

As part of the group charged with maintaining a broadcast facility, engineers have the added responsibility to ensure the stations continue operating through all types of emergencies. Having the ability to keep a usable signal on the air to disseminate information to the public is the primary reason licenses are issued. Serving in the public interest should be enough of a reason to keep a facility operational during these events; but the station is also a business and it is in the best interest of the owners to ensure continuity in the entire business operation. With so much of a typical station's data residing on the hard drives of a server or PC, you can lose in an instant what may have taken years to create. The key is to have a plan, make sure every employee knows the plan and his role, and create an appropriate due-diligence checklist.

What is an emergency?

The term "emergency" doesn't necessarily need to be a catastrophic situation. The Federal Emergency Management Agency (FEMA) defines an emergency as, "any unplanned event that can cause deaths or significant injuries to employees, customers or the public; or that can shut down your business, disrupt operations, cause physical or environmental damage, or threaten the facility's financial standing or public image."

The agency also lists some of those events to include: chemical, dam failure, earthquake, fire or wildfire, flood, hazardous material, heat, hurricane, landslide, nuclear power plant emergency, terrorism, thunderstorm, tornado, tsunami, volcano and winter storm.

The due-diligence checklist

If your station doesn't already have corporate-wide plans in place, there are several approaches to creating a comprehensive plan.

Your checklist should take into account two general situations: 1) Planning for the emergency – This will serve as the guideline and standard operating procedure for the company's plan to mitigate a potential situation. 2) Creating a disaster recovery plan – This will be the roadmap to getting the business returned to a state of normalcy.

Things to consider

As with most businesses, broadcast facilities are a collection of different systems and functions that work together to create the final end result. You will want to determine and list those functions and the proper personnel to address the issues.

First, creating a proper plan is an entire group effort; the planning should ultimately fall on each core function, i.e. engineering (technical facilities), IT (data), programming and operations (traffic, billing, sales).

Each group should document its respective functions, infrastructure requirements (i.e. networking, applications, data files) personnel and other needs, in as much detail as possible; this will form the basis for establishing a plan.

Lessons learned from past events, whether good or bad, can be extremely valuable. Many companies will routinely perform root cause analysis (RCA) when something goes wrong, which can be a powerful tool when it comes to predicting possible future problems.

Here are some items to consider:

Data storage – When/how often is data backed-up? Where do the back-ups reside? How is the back-up verified? Who are the personnel responsible for managing back-ups? Is data backed-up at sufficient intervals as to not disrupt the business operation should a failure occur? How will data get restored and who is responsible? Are network servers available offsite? How is the data accessed from the remote location? Since stored data plays such a large role in any business, you should always treat the location where the servers are located as a data center.

Back-up power systems – Have you determined the maximum run time that the studio(s), transmitter(s) will operate on back-up power? Are the back-up systems tested under load routinely? Are they under a current maintenance contract? Are the

generator(s) sized adequately for the application? Is the fuel supply adequate and filled-up? If generators are diesel, has the fuel been tested and polished if needed? Are network servers and other critical equipment powered from back-up battery systems? Are the batteries routinely tested and/or changed? Is the battery back-up properly sized for the application? Have you run a scheduled disaster scenario to see how the system operates?

HVAC systems – Is there an alternate method of cooling/heating critical equipment? Is there a list of and a plan to shut down non-essential equipment?

Microwave radio systems – Is there a back-up method to transport data? If the station operates multiple hop sites, have you evaluated the impact of losing a donor site? Are these systems tied to back-up power? In the case of multiple T1 systems, what other services are affected by a loss of equipment? How do you control equipment at the remote site(s)?

Transmitter sites – Is there an alternate method to deliver programming to the site? Is there an alternate method to control the site? Is there a sufficient level of monitoring to detect smoke, fire, water, etc.? Are back-up transmitter systems in place and operational? Are all antenna switching systems routinely tested? Is there a sufficient level of monitoring of transmission line (VSWR) and other antenna parameters? Are proper fail safes in place and tested?

Studios – Is there a reciprocal plan in place with other stations to support back-up operations in the event of a total studio loss? Can the back-up studio be connected to the transmitter site remotely? If audio servers are out of commission, how will programming occur?

Personnel – Have you identified essential personnel? Does each employee understand his role and responsibility in the event of an emergency? Does the company have a plan to house personnel if travel is restricted?

Other considerations – Be aware of potential hazards such as flood zones, earthquake areas, proximity to chemical/nuclear plants, high lightning areas, fire prone zones, high wind areas, etc. Much of the information you will need to identify hazards specific to a particular location can be found at www.fema.org and other websites. While it is nearly impossible to predict those unforeseen situations with 100 percent accuracy, the implementation and follow-through of a written plan before a disaster strikes is essential.

McNamara is president of Applied Wireless, Cape Coral, FL.

New language for advertising contracts

By Harry Martin

Effective July 15 the FCC amended some of its rules, policies and application forms in an effort to expand the participation of minorities and women in broadcasting, and to bar race and gender discrimination in certain commercial practices.

One of the new policies requires broadcasters to add nondiscrimination clauses to their advertising contracts. At renewal time, a certification will have to be made in Form 303-S that all advertising contracts contain such clauses. Not complying with this new requirement could result in delays, fines or worse at renewal time.

Each broadcaster will be asked to certify in its next license renewal application that: (a) the broadcaster's advertising contracts do not discriminate on the basis of race or gender; and (b) such contracts contain nondiscrimination clauses. Its purpose is to combat long-rumored practices in the advertising business regarding "no urban/no Spanish" provisions which specify that commercials will not be run on stations that feature such formats. While the existence of such practices has not been conclusively established, anecdotal evidence has fueled concern for decades about the adverse effects such practices could be having on minority broadcasters.

Unfortunately, the Commission declined to provide, even for purposes of illustration, the text of an acceptable nondiscrimination clause. So exactly what language the FCC has in mind is not clear. At least one public interest organization has circulated a model clause that, in the organization's view, satisfies the new FCC policy. The suggested contract language provides, in the placement and scheduling of ads, and in compensating advertisers, there will be no discrimination on the basis of race, color, religion, sex, national origin, or on account of the language used on the air. It also includes a separate clause committing the broadcaster to periodic reports, notices to employees and training in nondiscriminatory policy compliance.

This type of clause is unnecessarily broad and could potentially open the door to claims against broadcasters who agree to the standards, and put them in their advertising contracts, but subsequently fail to follow through in implementing them. The following sample notice appears to comply with the new rule, although any specific language stations decide to adopt should be cleared with their own legal counsel:

Nondiscrimination Policy: [Broadcaster company name] and its Station[s] _____ do not discriminate in advertising contracts on the basis of race or gender. Any provision in any order or agreement for advertising that purports to discriminate, or has the effect of discriminating, on the basis of race, gender or any particular language being broadcast, whether handwritten, typed or otherwise made a part of any such advertising contract, is hereby declared null and void.

In addition to adding such a nondiscrimination clause to all new contracts, radio stations should consider sending a mailing to existing advertisers, ad agencies and rep firms, explaining the need to amend current contracts to include the new clause.

Dateline

Dec. 1 is the deadline for submission of biennial ownership reports by radio stations in Colorado, Minnesota, Montana, North Dakota and South Dakota

On Dec. 1, radio stations with more than 10 full-time employees located in Colorado, Minnesota, Montana, North Dakota and South Dakota must electronically file their Broadcast EEO Mid-Term Reports (Form 397) with the FCC.

Also on or before Dec. 1, radio stations licensed in the following states must place their annual EEO Reports in their public files: Alabama, Colorado, Connecticut, Georgia, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, South Dakota, Vermont and Rhode Island.

Martin is a past president of the Federal Communications Bar Association and a member of Fletcher, Heald & Hildreth, Arlington, VA. E-mail martin@fhhlaw.com.

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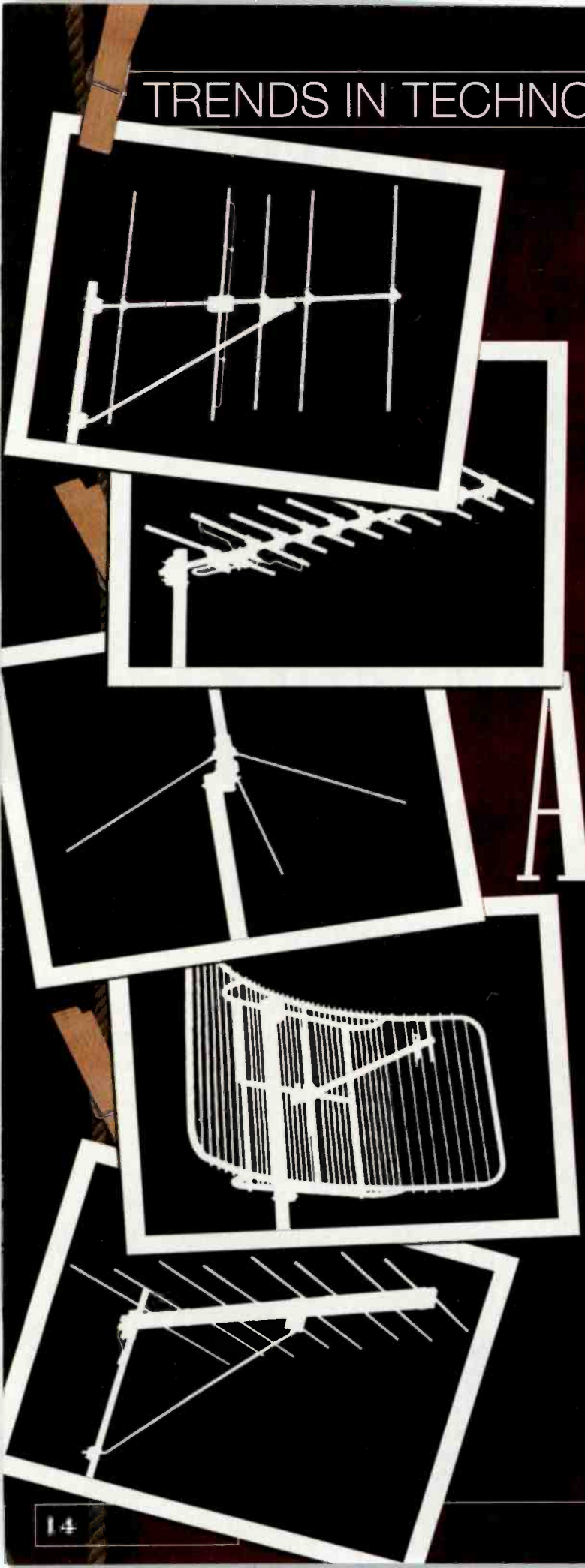


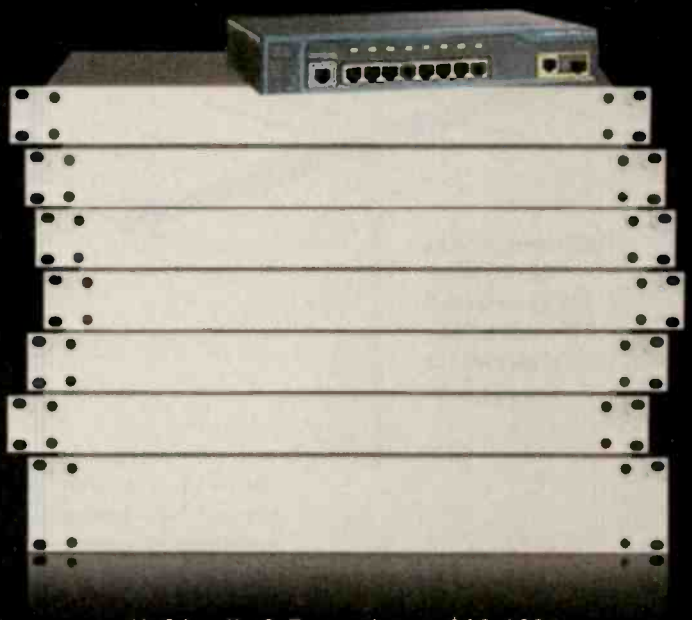
The Other Antenna

Applications beyond the main radiator

By Doug Irwin, CPBE AMD

Trends in Technology usually covers new technologies and how to make use of them in our broadcast facilities. Still, it's worthwhile upon occasion to look at more common technologies to see what the most up-to-date products are and how they relate to common applications. This article is about antennas we don't commonly think of for broadcast transmission.

Antiquated IP Audio



Unfriendly & Expensive at $18,468*

The Choice is Simple.

Next Generation IP Audio

Plug & Play & Auto-Configuring at $6,000

* System Specs: 9 Analog Stereo I/O, 9 AES I/O, 2 Mic Level Inputs, 10 GPI/O, One Console Interface

A new benchmark for IP audio has arrived...

the Logitek JetStream.

Everything about IP implementation has been getting less expensive and more user friendly. It's time for the Radio market to catch up with this trend. The Logitek JetStream represents the next generation of IP routing and networking and, unlike the older stuff on the market, the JetStream is easy to set up and use. Name a source and every JetStream on the network knows the configuration. (Stow your computer after setup – JetStream doesn't need it.) Save space in your already crowded racks – our two rack units accomplish the same functions as the competition's eight units. Even better, JetStream is easy on your budget – a single 10 fader networked studio costs less than $10,000 and a standalone studio is less than $8,000. You can mix analog and digital sources in a 32 x 32 router for under $6,000, and network units for larger routing needs. The JetStream has vLan capability for back-up STL, remote studio applications and long distance snakes.

JETSTREAM MINI

It's time for the next generation.

The JetStream has the features you want in an IP system:

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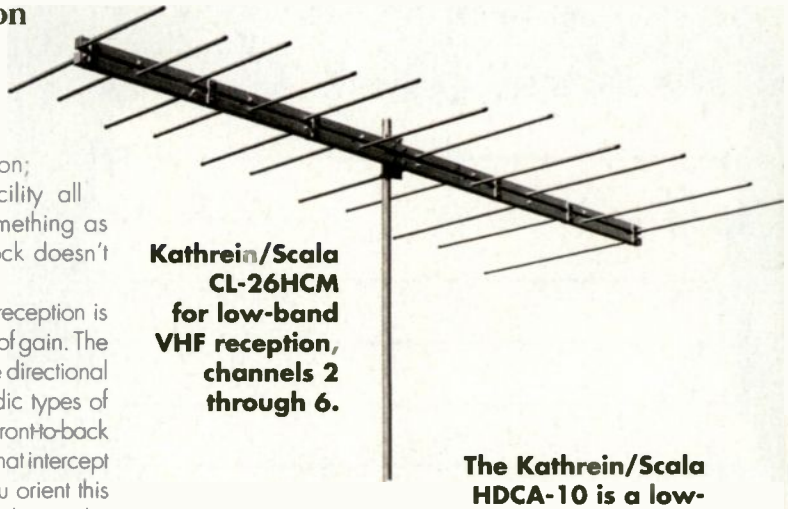
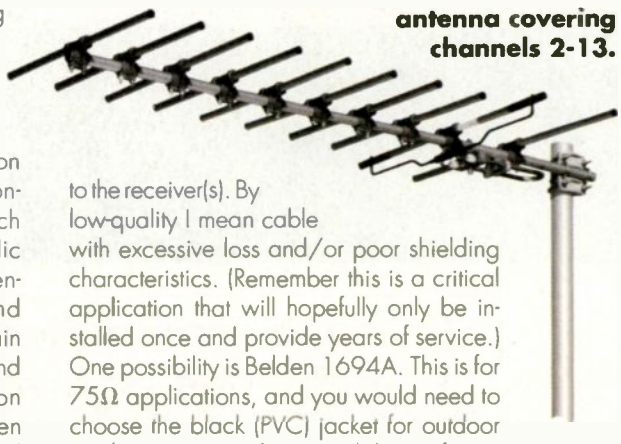
Application 1: off-air reception

There are many reasons you may need to improve or otherwise change off-air reception at your studio facility: Perhaps you've been made into a cluster with another transmitter site in a different direction; perhaps you are assembling a new facility all together; or perhaps you want to add something as simple as TV reception. (After all, what jock doesn't like TV in the studio?)

The best kind of receive antenna for off-air reception is one with good directionality and some amount of gain. The reasons are simple: mitigation of multipath. The directional characteristics of most yagi-type or log-periodic types of antennas have very high front-to-side ratios and front-to-back ratios. This means they effectively reject signals that intercept that antenna from its side or back. When you orient this type of antenna at your transmitter site, you emphasize the signal coming from that direction, while de-emphasizing signals coming from all other directions – and that includes multi-path reflections.



Kathrein/Scala CL-26HCM for low-band VHF reception, channels 2 through 6.



The Kathrein/Scala HDCA-10 is a low-band VHF receive antenna covering channels 2-13.

Probably the most well-known manufacturer of antennas for this application is Kathrein/Scala. If you have the space and a strong enough mount on the top of your building then you may want to consider the CLFM, which is a log-periodic covering the entire FM band with 7dB of gain over a dipole, and a front-to-back ration of 25dB (front to side even higher). It comes in 50Ω and 75Ω versions, and can be mounted in either horizontal or vertical polarity. If space is a consideration you may want to go with the YA7-FM instead. This antenna has the same gain as the CLFM but not nearly as good of a front-to-back or front-to-side ration. The YA-7FM can also be mounted in either polarity.

The Kathrein/Scala CLFM is a log-periodic covering the entire FM band.

Kathrein/Scala's YA7-FM can be mounted in either polarity, but has less front-to-back or front-to-side ration than the CLFM.

For off-air TV reception you may also want to consider Kathrein/Scala. For low-band VHF, consider the CL-26HCM (channels 2 through 6); the HDCA-10 (channels 2 through 13) or the CL-1469 for the entire UHF band.

After you install the antenna and orient it correctly the last thing you want to do is to run low-quality coax to the receiver(s). By low-quality I mean cable with excessive loss and/or poor shielding characteristics. (Remember this is a critical application that will hopefully only be installed once and provide years of service.) One possibility is Belden 1694A. This is for 75Ω applications, and you would need to choose the black (PVC) jacket for outdoor applications. Another possibility is from a company you should know about if you don't already: Times Microwave. Its cable for this application would be LMR-400-75. Both of these cables exhibit low-loss and better than 90dB of shielding.

Once you have delivered those off-air signals to your technical center, you'll likely have to split them in some way. (After all, you probably have multiple stations and you may have an HD Radio station or two or three.) Resist the temptation to use multiple BNC tees to split that signal. Instead, investigate the product line from Mini-circuits. Mini-circuits makes a wide line of passive RF power dividers: You decide on the number of output ports, the impedance of those ports and the connector type.

The cool thing about these passive power dividers is that you can also use them to add RF signals together. Just keep in mind that they exhibit the same loss whether or not you use them to divide or add signals. (For example, a four-way divider has slightly more than 6dB loss per port; if you use them to add RF signals, each signal going from output to input will still be weaker by 6dB).

Likely you will need a receive antenna to capture the National Weather Service or other VHF/public service channels. At least a couple of good options exist. You could consider the Kathrein/Scala K51262 or a Marti Electronics NMO-150K.

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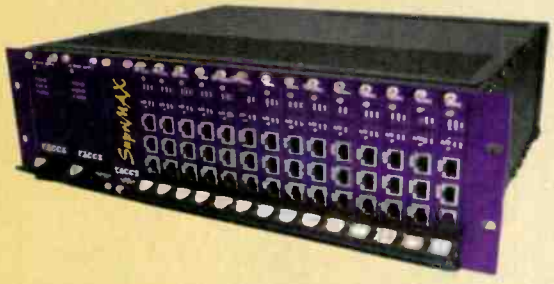

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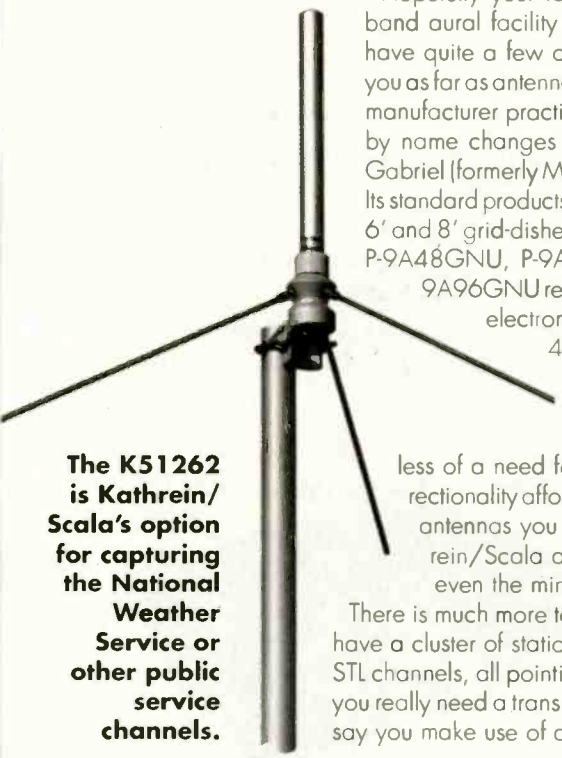
Application 2: Studio-to-transmitter link



The K51262 is Kathrein/Scala's option for capturing the National Weather Service or other public service channels.

Hopefully your facility has 950MHz band aural facility licenses. If so, you have quite a few options available to you as far as antenna suppliers go. One manufacturer practically camouflaged by name changes is now known as Gabriel (formerly Mark or Mark/CSI). Its standard products have been the 4', 6' and 8' grid-dishes (model numbers P-9A48GNU, P-9A72GNU and P-9A96GNU respectively). Marti electronics offers the SC-48, another 4-foot fully parabolic grid-dish. If you have a shorter hop or less of a need for the high amount of directionality afforded by the fully-parabolic antennas you could consider the Kathrein/Scala antennas: the PR-950B or even the mini-flector (MF950B).

The Kathrein/Scala PR-950B is for those who have a shorter hop or less directionality for a studio-to-transmitter link.

There is much more to this topic though. If you have a cluster of stations, with several licensed STL channels, all pointing at the same target, do you really need a transmit antenna for each? Or, say you make use of a two-hop system with an intermediate point. Are you charged for each antenna separately? If so you may want to consider an STL transmitter combiner. Get to know EMR Corporation. One example of its transmit combiners is the 66522, a two-way combiner. Insertion loss is no more than

2.4dB (make sure you include that loss in your path analysis and on your 601) and minimum transmitter separation is 500kHz.

One STL transmitter manufacturer sells a system that makes use of a *duplexer*, which is basically an array of filters that allows you to use one antenna for both receiving and transmitting. You could run with that same idea: Say for example you want to locate your own 900MHz ISM band transceiver at your transmitter site and another at the studio site. Another idea is the locating of an RPU receiver at your transmitter site, and backhauling the audio of same to your studio via a part 101 radio link. EMR makes duplexers that would allow you to assemble systems such as these: for example, the 66542. (Of course you would need one per end).

Maybe you've decided to use the 2.4 or 5.8GHz ISM bands to pass data back and forth to the transmitter site. If so I'm going to assume you're putting together a rugged system, and for that reason you would probably want to at least consider Andrew as your antenna maker. For the 2.4GHz band you could chose the 19T-2440F-1; it's only 15" in diameter and generates 19dBi of gain (make sure you adjust your transmitter TPO accordingly). For the 5.8GHz band one option would be the 23T-5800F-1.

Andrew's 19T-2440F-1 is only 15" in diameter and generates 19dBi of gain.

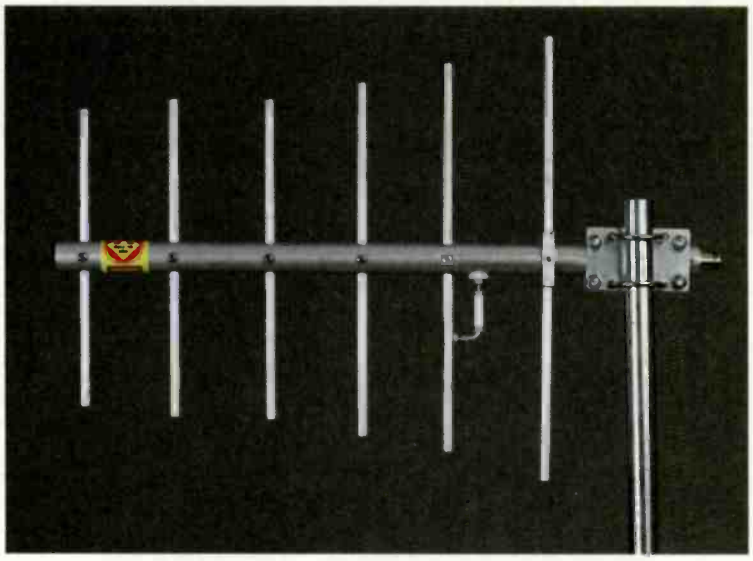
The 23T-5800F-1 is Andrew's option for the 5.8GHz band.

Application 3: Remote broadcasting

Even with the recent proliferation of IP codecs there are still plenty of reasons to talk about the good old-fashioned 450MHz RPU systems.

Most man-made electrical noise is vertically polarized, as it turns out, and most users in the 450MHz RPU band use vertical polarity since it's just easier. However, if you

want to minimize noise pickup and interference from other users, one of the best ways is to use horizontal polarity in your RPU system. Fortunately Marti makes a horizontal, omni-directional antenna that can be used as the base station antenna: the HA450. This antenna comes with 1, 2, 4 or 8 bays. Even at 450MHz the HA450-8 is big: the aperture is 14.5 feet. At the same time, it develops 8.5dB of gain over a dipole. On the transmit end you have lots of choices as well for an antenna, but at least consider the Marti YC series because it develops 10dB of gain, and can be physically oriented in either polarity.

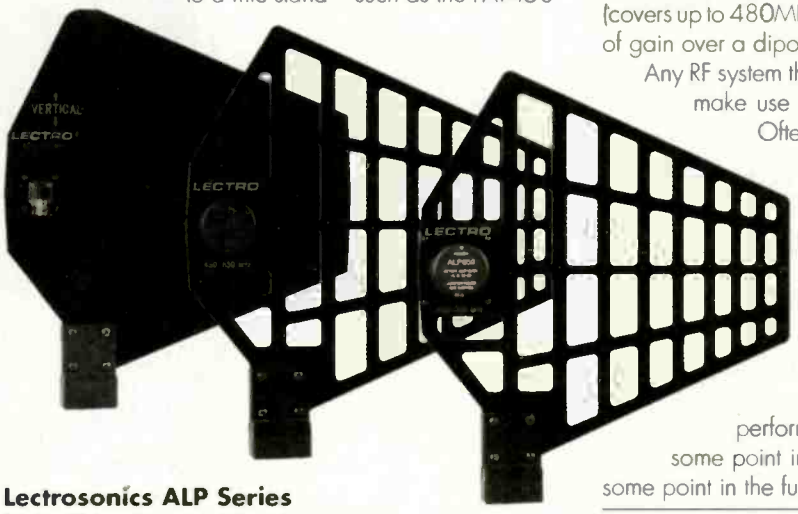


Marti's YC Series develops 10dB of gain and can be physically oriented in either polarity.

Wireless microphones are a big part of many stations' remote broadcasts. What better way to mingle in the crowd? There isn't much you can do about the transmit antenna, since it hangs off the bottom of the handheld mic or is otherwise integrated. All you can really do to optimize performance of a wireless mic system is to increase the antenna gain on the receive antenna. (Avoid using the little antennas that come with the system when you buy it – that is if you want to get out more than about 50'.) Here you have quite a few options. Lectrosonics makes the ALP series. For example, the ALP620 covers the entire 450 to 850MHz band, with a gain over a dipole of 4dB. (Remember that the front-to-side and front-to-back ratios are high on a LPDA such as this; that helps mitigate interference and multi-path effects). Output impedance is 50 ohms. Some stations like to set up wireless systems so their jocks can go way, way out in the crowd, or maybe do spontaneous man-on-the-street segments in front of the station or at some other regular spot. In this event you may

want to permanently install an antenna that points at that spot. Consider then something like the Kathrein/Scala CL1469B. This is a fairly large log-periodic antenna, made to be outdoors all of the time. It develops 8dB of gain over a dipole; 50 or 75 ohm versions are both available.

Perhaps you want to avoid a directional wireless mic antenna – not a bad idea, especially if the venue isn't really that big. Marti makes a series of verticals that mount to a mic stand – such as the PAV450 (covers up to 480MHz). Even this antenna develops 3dB of gain over a dipole.



Lectrosonics ALP Series including the popular ALP620

Kathrein/Scala's CL-1469B is a large log-periodic antenna made to be outdoors permanently.

Any RF system that you design and assemble should make use of an antenna optimal for the job. Often times most of the effort placed in an RF system design considers only the gear that lives in the racks; but with any RF system, it's crucial to pay attention to the mundane details: antenna types, connector types, coax specifications. These items make up a crucial part of any radio station's infrastructure, and if they are neglected, the system's performance is bound to be degraded at some point in time, whether from day one or at some point in the future.

Doug Irwin is the chief engineer of WKTU-FM, New York City.

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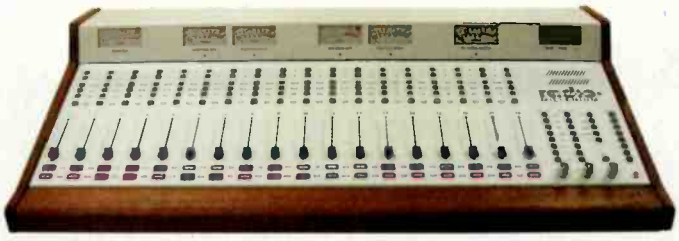

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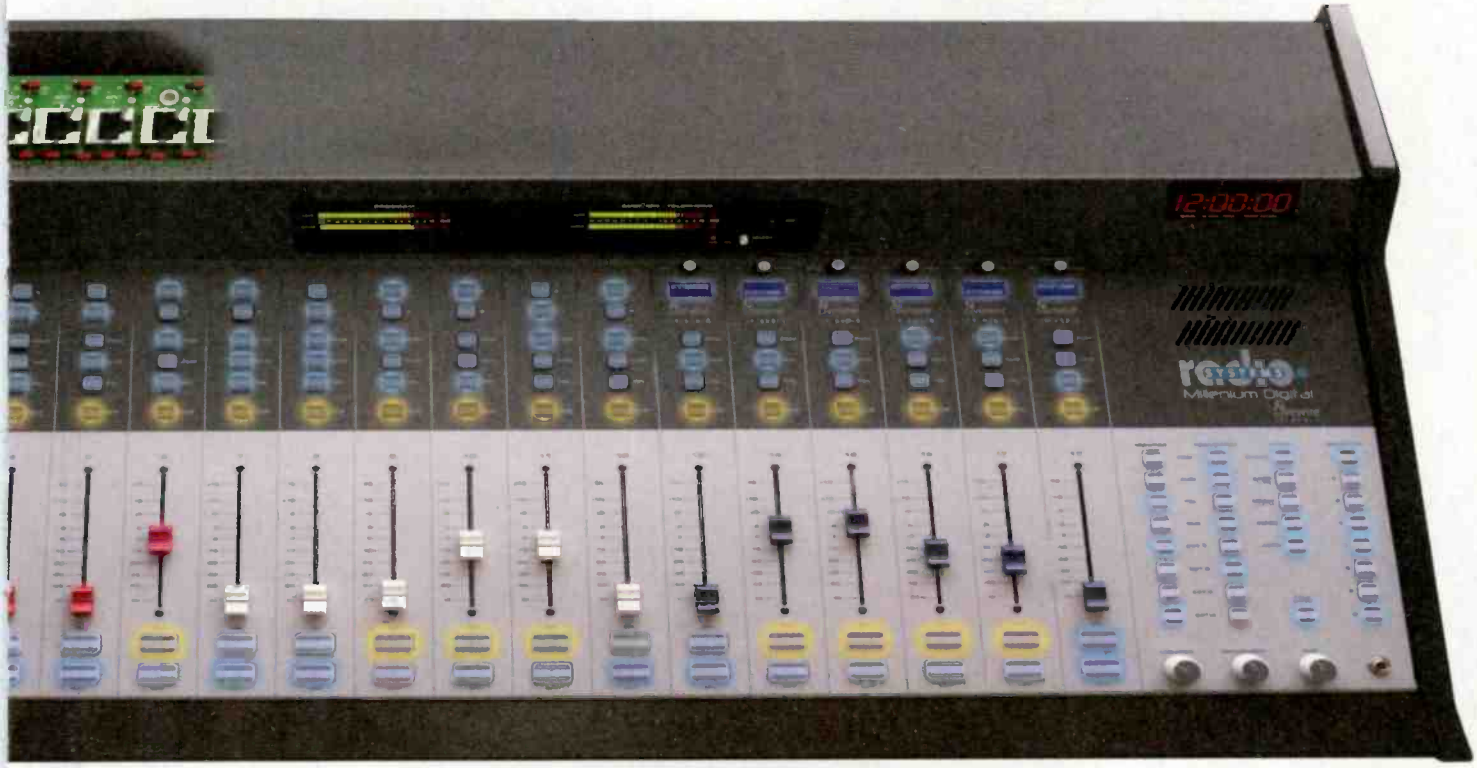

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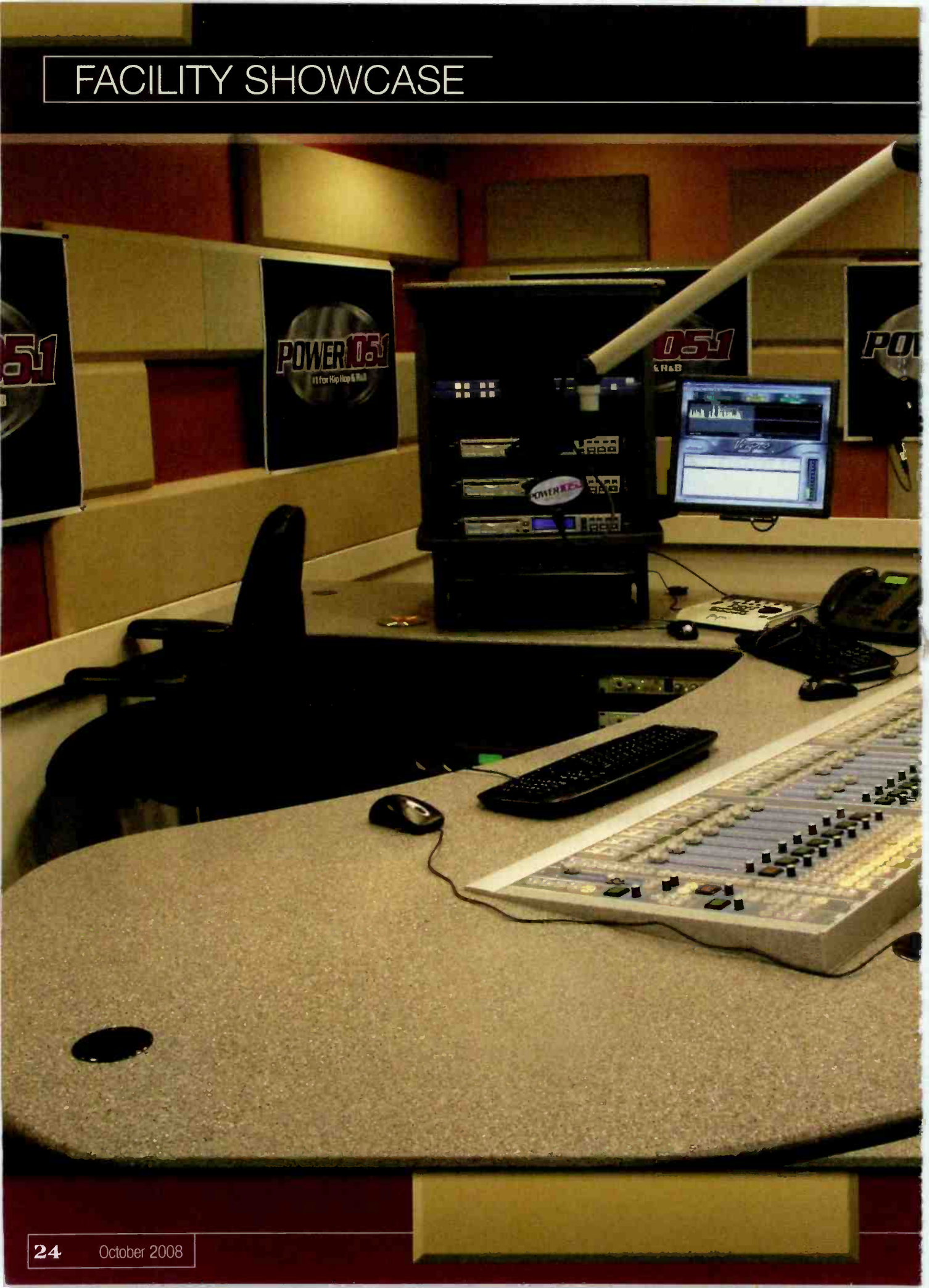
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A Clear Consolidation

Clear Channel New York collects under one roof

By Jeff Smith, CEA CBNT

Bringing together five New York City FM radio stations with long histories of being in their own studio space is no simple task. The planning for Clear Channel New York City's move began in 2005 when the first thoughts of consolidation began to take shape. After searching many buildings in Manhattan, a building in the trendy Manhattan neighborhood of Tribeca was chosen: the NYC stations would occupy 120,000 square feet on the 2nd, 3rd and half of the 4th floors in the AT&T building. Clear Channel Radio-New York also has space on the 1st floor that will be built out as a 200+ seat performance space. This building was built in 1933 and for years served as home to AT&T's long cable division and was the spot where the first transatlantic cables came into NYC. This building offered a great space that could be custom built to meet all the needs of the five stations and also offered all the technical facilities a radio group could need.

A Clear Consolidation

The concept

Once the contracts were signed, Meridian Design, interior architects, began working on the design of the space. Josh Hadden, director of engineering and IT for Clear Channel Radio New York, had a concept of consolidating five stations under one roof while allowing them to each keep their unique identity and personality. This was accomplished by giving each station its own studio complex on the 3rd floor of the new building. These studio areas would have their own entrance off the main hallways and behind the doors, studios and programming offices for the station would be built.

Construction started in April 2007 and an aggressive time line was set. Luckett & Farley, project managers, and Lehr Construction Corp., general contractors, began with demolition of the 2nd, 3rd and 4th floors.

The Z100 morning show has a small studio for production.

All of the studios have a dedicated call screener area, like Z100's, which looks into the control room.

Connecting studio facilities and transmitters

By Doug Irwin, CPBE AMD

32 Avenue of the Americas is home to one of several large Carrier Hotels in New York City, and as such was an advantageous location for our endeavor. "The Hub" as it is known has more than 50 tenants, including AT&T, Verizon, Qwest, XO, and Global Crossing. Obviously this was an advantage to us in choosing a carrier for our communications needs in and out of the building. The Hub itself is on the 24th floor; and since our master control is on the 3rd, it was obvious that some sort of heavy duty interconnection up to the "roof" was called for. Our needs for the build were: a single T3 connection for our Times Square link (backup transmitter site); a single T3 connection for our ESB link (main transmitter site); a single T3 for our WAN connectivity; an OC3 (155 MBPS) to our ISP; a single T3 for our disaster recovery site in New Jersey; and finally seven PRI circuits that would bring in our toll-free number calls from listeners in the tri-state area, as well as our business lines. Our 950MHz STL transmitters (primary backups) would be located on the roof as well; add to that all of our off-air monitoring for the FMs, the HDs, GPS and several of our EAS sources.

The transmission rack is the hub of feeds from the station to their transmitter sites.

Director of Engineering Josh Hadden decided there would be no wirelines to the 24th floor; everything was to be done via fiber. After that decision was taken, he designed the interconnection facilities around two separate systems: the Adtran Opti-6100 system, and the Evertz 7700 frame (more on that below). The Opt-6100 is basically a shelf, into which specific-function modules are installed. The system is then made up of two of the Opti-6100 shelves; one was to be located in MCR and the complementary unit in our racks on the 24th floor. The two 6100s are configured

Continued on page 28

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A Clear Consolidation

The main lobby outside the commercial production rooms

The master control room is visible through a glass wall.

By September enough construction was done to allow Technet Systems into the space to begin the integration. Technet engineers, Bob Smith, Lindsey Collins and Mark Bizbee began the massive undertaking of pulling miles of audio cables and punching hundreds of thousands of Krone blocks. Soon after they started, the Clear Channel Radio-New York engineering team (led by Hadden) of George Marshall, Henry Behring, Doug Irwin and Jeff Smith began working on studio and master control room (MCR) configurations in the new space.

The MCR is the core of the new facility, containing 65 Mid-Atlantic racks. The racks are laid in five rows, each row with a unique purpose. The front row facing the windows overlooking a main hallway contains monitoring equipment including Belar Wizards, B&B Systems Phase Monitor and Arbitron PPM monitors. The first row also houses the six SAS 32KD router fames that are the audio core of the facility. The router is SAS's largest install to date allowing for OC12 operation and connected together via single-mode fibers (one in each direction) operating at 1310nm. Redundancy is a primary design consideration in the Clear Channel New York operation, so our complete system design includes two sets of the 6100s: one for the west riser, and one for the east riser.

Each of the five stations makes use of a Harris/Intraplex DACS 9560 cross-connect as the primary STL. In this way, one encoder board (in this case a PT353) can have its encoded output (timeslots 1 through 23) "copied" and also sent out via an additional port on the DACS. The first port on the 9560 is used to communicate with our main transmitter site at the ESB; the copied port is sent to our backup site at 4 Times Square. A separate DACS frame is used to handle all the five stations remote controls.

The T1 links from the DACS, meant for the ESB, are connected to an Adtran MX2800 DS3 mux/demux. The DS3 link from this particular MX2800 is connected to the Opti-6100 for the west riser, and thereafter connected to the 24th floor. The T1 links from the DACS meant for Times Square are sent to a separate MX2800, and thereafter connected to the 24th floor via the Opti-6100 assigned to the east-riser.

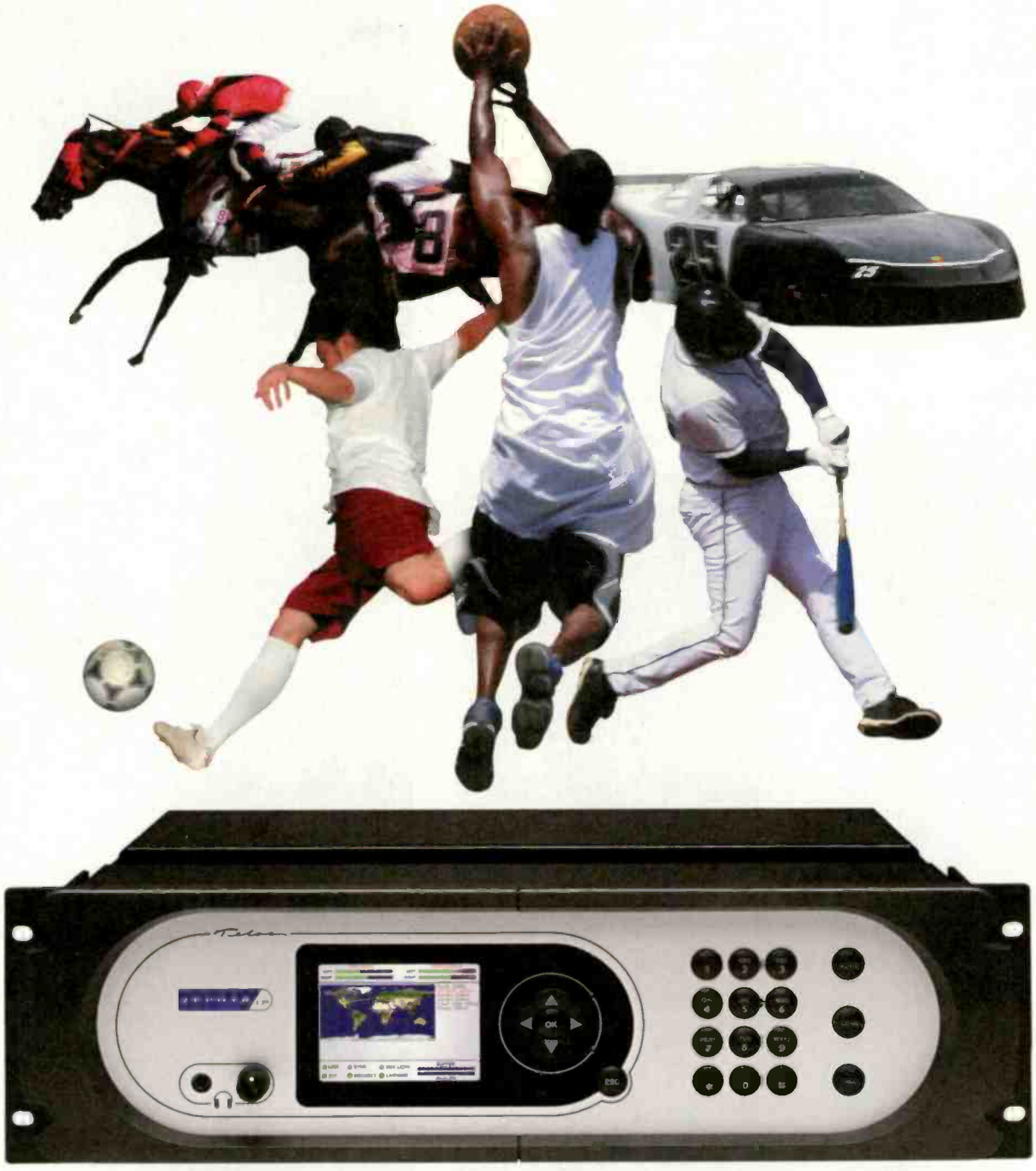
Each MX2800 mulitplexes 28 separate T1s though; and if you were counting, you only got to six. Each transmitter site also has a separate network (each of which is really just a separate subnet of the 10.xxx.xxx.xxx network used inside the Clear Channel WAN). Quite a bit of data makes its way up to the ESB: RDS, MPS PAD, and SPS PAD for WLTW (Lite FM), WHTZ (Z100), WAXQ (Q104-3) and WWPR (Power 105.1). The entire HD Radio data stream for WKTU gets to the ESB over this same network link. As you would expect there are many computer workstations located at the ESB as well – scattered throughout our four different transmitter rooms on three floors of the Empire State Building (ESB). (Data requirements for our 4 Times Square transmitter site are lighter.) The link for each of the two transmitter sites' networks consists of 15 T1s bundled into a single PPP connection by way of two sets of Adtran 5305 Routers (one set for the ESB and one set for 4 Times Square).

The actual physical links between 32 Avenue of the Americas and the two transmitter sites are T3s provided by AT&T on the 32 Avenue of the Americas, and Verizon at each of the transmitter site ends. (Obviously they meet up at one of the various central offices located in Manhattan.)

The Evertz system I mentioned earlier also consists of shelves in to which specific-function modules are added. Like the Adtran system, the Evertz shelf in our MCR is connected to

Continued on page 30

WHEN EVERY SECOND COUNTS



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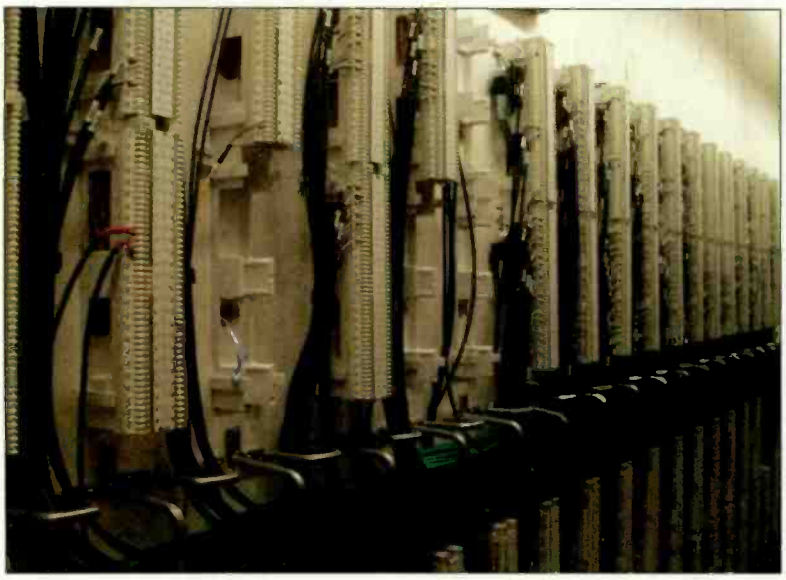
A Clear Consolidation

for 3072 x 3072 audio. Other rows of racks contain the 56 RCS Nexgen computers, as well as, utility computers for the studios, Vox Pro computers, Pro Tools computers, the Telos 2101 Hubs, office network servers, office telco and security systems. The MCR is truly the central core for the facility and all audio and data pass through this room. The MCR is also home to the 150kVA Toshiba G8000MM UPS system that floats all critical systems. The facility is also backed by a 2MW generator. The generator was bought from Qwest Communications with very few hours on it. That worked to the advantage of Clear Channel Radio-New York because it was a solution that was already in place in the building.

Studios

The 29 studios in the new facility were all designed around custom furniture from Omnirax. The furniture was designed

The 14 racks house the audio storage and playback system.



Krone blocks form the heart of the facility infrastructure.

its complement on the 24th floor by way of fiber. (All the modules mentioned below have lightwave inputs and/or outputs, and are further muxed/demuxed together via 7705CWDM modules.) The Evertz system is extremely flexible. For example: We make use of a 7707AT-8 module that carries eight separate AES signals up to the roof. Audio processors fed by AES drive our 950MHz STL transmitters, which in turn feed two separate 950 antennas – one located on each of the two towers on top of the building (did I not say redundancy was a primary component of the design?)

So even though we use two separate risers in the building for our fiber runs to the 24th floor, and even though we have 950MHz radio links as our primary backups, we still considered the possibility that the roof might become disconnected somehow from our MCR. For this reason, we opted to lease the modern-day equivalent of 15kHz stereo lines from Verizon (our local Telco). These circuits are built around the Pulscomm PCAU and each of our five stations has a pair of these lines to each transmitter site – 10 pairs in all. These make up our tertiary STLs, and they are the only egress from the building done at ground level.

32 AofA is only about 2.5 miles south of the ESB (and just slightly farther from 4 Times Square) and since our off-air receive antenna is on top of the building (525' AGL) you would expect that the receive signal level is quite good – and you'd be right. Using a single Scala CLFM we get about -10dBm per carrier from each of the 18 FM signals at the ESB. In order to meet our fiber only system requirement, we used another Evertz module pair – the 7707 IFTA and IFRA. This system accepts RF over a wide bandwidth, converts it to light, runs it over a fiber, and puts RF back out the other end. In this manner we're able to get RF from our analog and HD transmitters from the receive antenna on the roof, and to the MCR. Finally, we make use of a set of 7707GPS modules to get our GPS signals from the roof to MCR, where two Evertz 5600 MSC units feed a 5600ACO, providing redundancy in the generation of all the clock signals we need throughout the facility.

The Clear Channel consolidation project in New York is arguably one of the largest and most complex projects ever taken on by the company. The major design factors for all inbound and outbound communication systems are the number of sites involved and a high level of redundancy for each. A tremendous amount of time and energy went in to the design and implementation of the systems described, and we anticipate the results will benefit the stations for years to come. ■

Irwin is chief engineer of WKTU, New York.

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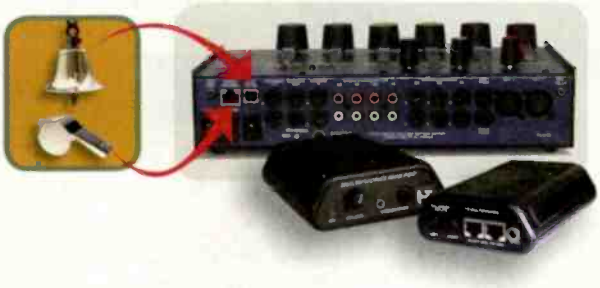

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A Clear Consolidation

Clear Channel NY SVP of Programming, Tom Polman and Z100 DJ JJ press the button to launch Z100 from the new facility.

and built in California and shipped and assembled in NYC. Each studio area for the stations contains two mirror air studios and some also contain two production rooms and a mix studio. The facility also has three commercial production studios, three imaging studios, three voice tracking rooms and a studio for Clear Channel Creative Service Group. The air studios have SAS Rubicon consoles, the production rooms have SAS Rubicon SL consoles and the voice tracking rooms have SAS Rubi-T consoles. The three commercial production studios have Digidesign Command 8 and SL consoles, and the imaging studios have Digidesign D-Command consoles.

The SAS 32KD and Rubicon system allows flexibility at the facility since audio can be available anywhere at anytime. This allows for very easy switching of studios for any reason. It also allows for all the logic to be handled relatively easily. The SAS talks to Nexgen for start/stop logic as well as text displays on the consoles. The Rubicon's also allow for the easy control of TFT 911 EAS, Telos 2101 phones and some custom logic needed for the Elvis Duran morning show on Z100. The flexibility of the Rubicon surface also allows for each station to easily have the console laid out how they want and changes to be made easily without the need to move any wires.

Large signs clearly identify each air studio.

The SAS 32KD gives a lot of redundancy to the stations: One of the biggest is three separate air chains for each station. This is accomplished using the ANI feature of the 32KD to spread the load around to different frames, so a frome could be taken down and it would be possible for the station to stay on the air with no interruptions. The three separate outputs from the router feed the three separate air chains. Each air chain has its own preprocessing, mostly Ariane Sequels, and its own Airtools delay. Each air chain also has its own Arbitron PPM encoder.

The first station to move into the new focility was Q104.3 (WAXQ) on Jan. 29, 2008, less than 10 months from when demolition of the space started. Next were Power 105.1 (WWPR) and then 103.5 WKTU, Z100 (WHTZ) and finally 106.7 Lite FM (WLTW). Only a lot of hard work and long hours by everyone involved could have allowed a project of this scope to be pulled off as well as it was in the time frome availoble.

Smith is supervisor of broadcast systems, Clear Channel Radio-New York and chief engineer of WWPR.

Equipment List

Adtran Opti-6100, DS3M3T, OMM12VIRE, DS1VM2, ETHM8 4, Netvanta 5305 router
Aphex mic processors
Ariane Sequel
Audic-Technica 4033
Electro-Voice RE-27
Evertz 7700 frame, 7707 BPX, 7707 IFRA/IFTA, 7707 GPS, AT47-8, 7705 CWDM 3, 5600MSC, 5600ACO
Harris/Intraplex Digital Cross-Connect 9560, PT353 2
Neogroupe Neoscreener
Omni-ax furniture
RCS Nexgen
Sierra Automated Systems consoles and system routing
Snapstream Enterprise
Symetrix/AirTools profanity delays
Telos 2101, Zephyr Xstream
Yellowtec Mika support arms

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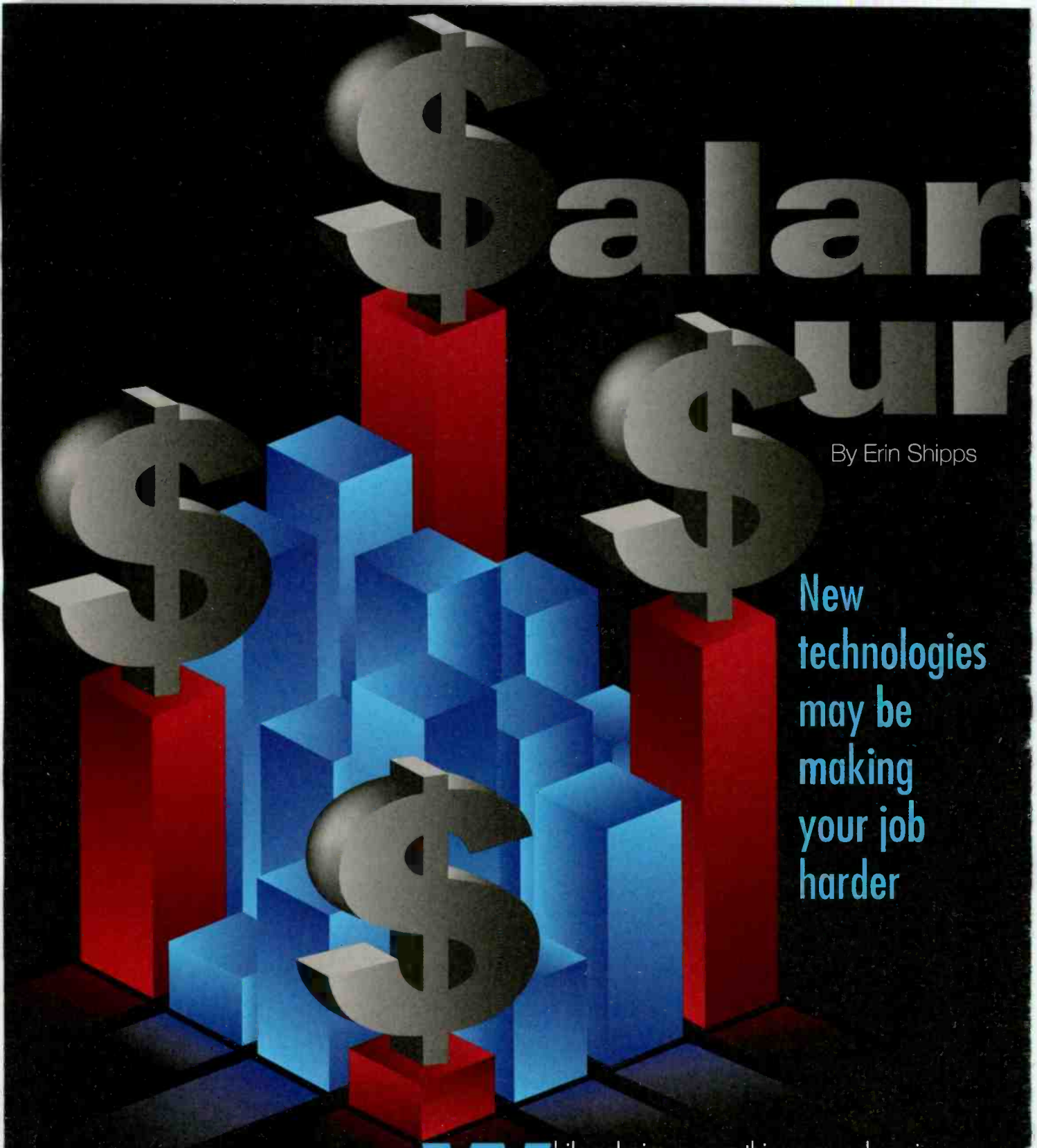


Salar ur

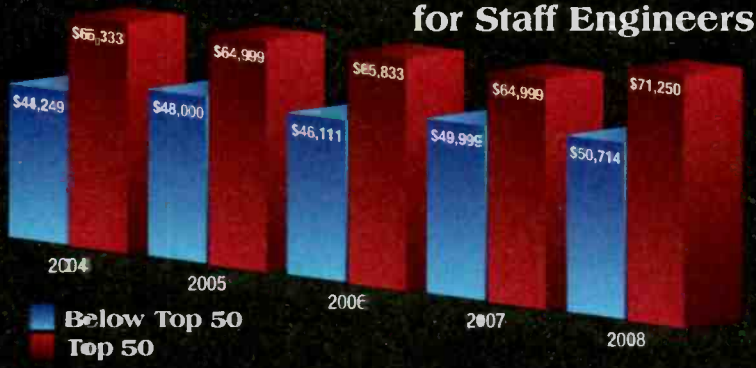
By Erin Shipps

New technologies may be making your job harder

While salaries are up this year and seminar attendance is stable, engineers may find themselves fighting to keep up with the demands of engineer *and* IT manager. Many also state certification is needless and they would like to learn more about these new technologies. Welcome to the 2008 Salary Survey, where engineers learn they're not alone in their struggles and aspirations.

y vey

Estimated Median Salaries for Staff Engineers



Estimated Median Salary by Job Function

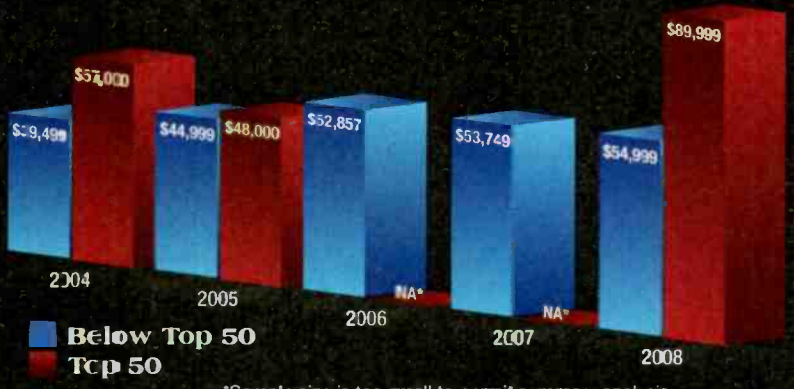
Salaries

Overall salaries are up compared to last year despite a rough economy. From Regional Directors of Engineering (up $3,333) to Station Chief Engineers (up $4,510) to Staff Engineers (up $3,000) and Operations Staff/Managers (up $1,945), most people are seeing more money this year.

Below Top 50 management salaries have risen consistently over the years, but Top 50 has seen a big leap, raking in $35,000 more this year than Below Top 50. On the engineering side, while both Top 50 and Below Top 50 are rising, the gap between the two markets has increased from $15,000 to $20,000. Contract engineers are mostly earning $50-$59/hour, but 19 percent are also split, making either less than $20 or $70 (or more, as contractors typically charge more for emergencies).

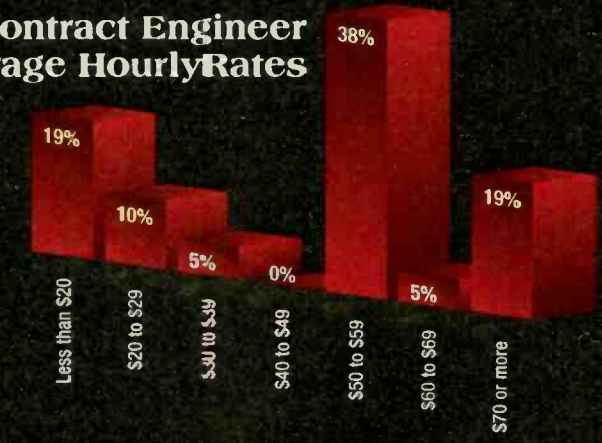
Around 62 percent received raises in 2008, while 38 percent did not. Of those who did, 33.3 percent received 3 percent raises; 12 percent, 2 percent; 15.7 percent, 4 percent; 12.4 percent, 5 percent; 13.3 percent, 6-10 percent; and 7.2 percent, greater than 10 percent.

More data on contract engineering at: RadioMagOnline.com



*Sample size is too small to permit summary analysis.

Contract Engineer Average HourlyRates



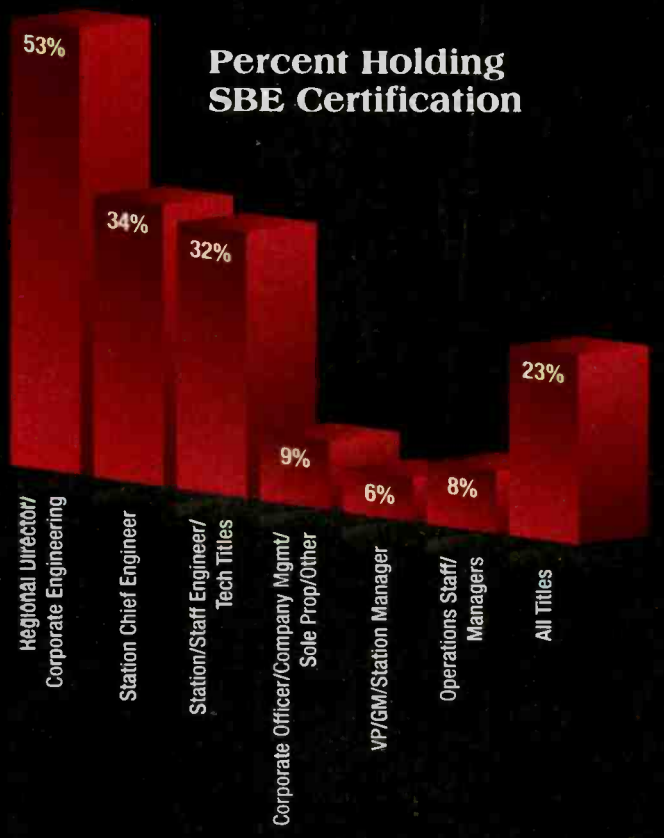
Salary Survey

Estimated Median Salaries by SBE Certification

Certification

Certification is perhaps one of the great debates among radio engineers. Our data shows that engineers with SBE Certification bring home $18,000 (Top 50) and $19,000 (Below Top 50) more in salary than non-certified engineers. Yet only one-third to half of respondants hold certification. It is understandable that times are tough and certification costs money (and time); it is also reasonable to say it won't help your career if your boss doesn't respect certification and you don't plan on moving to another job. But simply not seeing the need or saying it's not necessary for your job is ignoring the fact that certification offers more money and shows an avid interest in your career. Regardless of what your employer thinks, certification is something to better yourself – you're never too old or experienced to go through the process and maybe learn something.

More about respondents' benefits received at RadioMagOnline.com



Methodology

On May 6, 2008, Penton Media e-mailed invitations to participate in an online survey to a total of 5,099 subscribers of *Radio* selected on an nth name basis from the category *Radio Station/Network*. To encourage prompt response and increase the response rate overall, the following marketing research techniques were used: A drawing was held for one of four $50 Amazon.com gift certificates. A link was included on the invitation to route respondents directly to the questionnaire. The magazine name was used on the invitation to tie the study effort to the magazine. Follow-up e-mails to non-respondents were sent on May 13 and May 20, 2008 to this same group. ■

Want to know even more?
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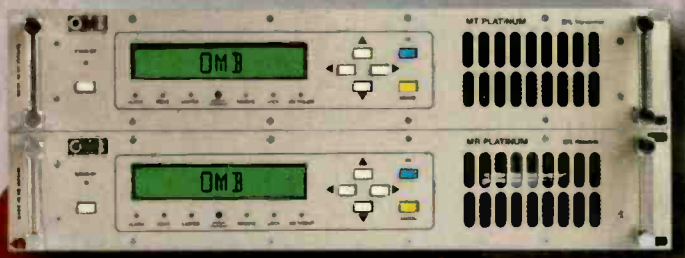
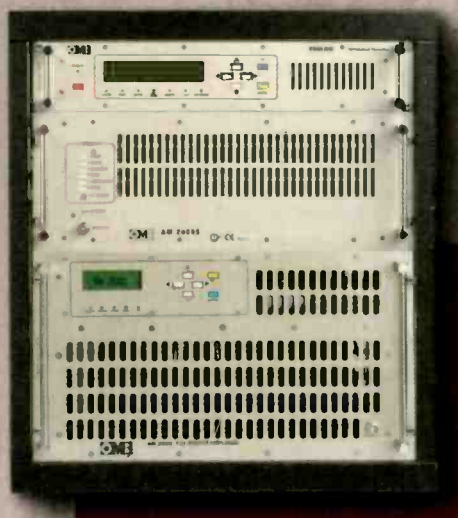


MT/MR PLATINUM

>1GHz is a high-performance Studio-to-Transmitter link. It is made up of the 5W MT transmitter externally synthesized in 10MHz sub-bands with a step of 100KHz, and the MR double conversion receiver, that is externally synthesized, too. The MT is microprocessor controlled, and includes LCD display for the visualization of the most relevant transmission parameters (frequency (6-digit), forward and reflected power, modulation level), balanced Mono, Stereo (MPX). The MR receiver has the same visualization system as the transmitter. It includes balanced Mono and Stereo (MPX) outputs. Furthermore, the MT/MR Platinum STL includes a jumper in order to get a proper operation with digital signals.



EM 2000

is a 2000W FM transmitter made up of the EM 25 DIG exciter (or EM 20/30 exciter) and the AM 2000 FM amplifier. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifiying modules work independently thanks to a power combining structure that provides high isolation between them.

EM 10000

is a 10000W FM transmitter made up of the EM 250 COMPACT DIG exciter and three control units which combine the power of six AM 2000 FM amplifiers. AM 2000 includes eight 300W high-efficiency MOSFET technology amplifying modules, fed by 2 independent switching power supplies, which are made to withstand the working conditions. The amplifiying modules works independently thanks to a power combining structure that provides high isolation between them.

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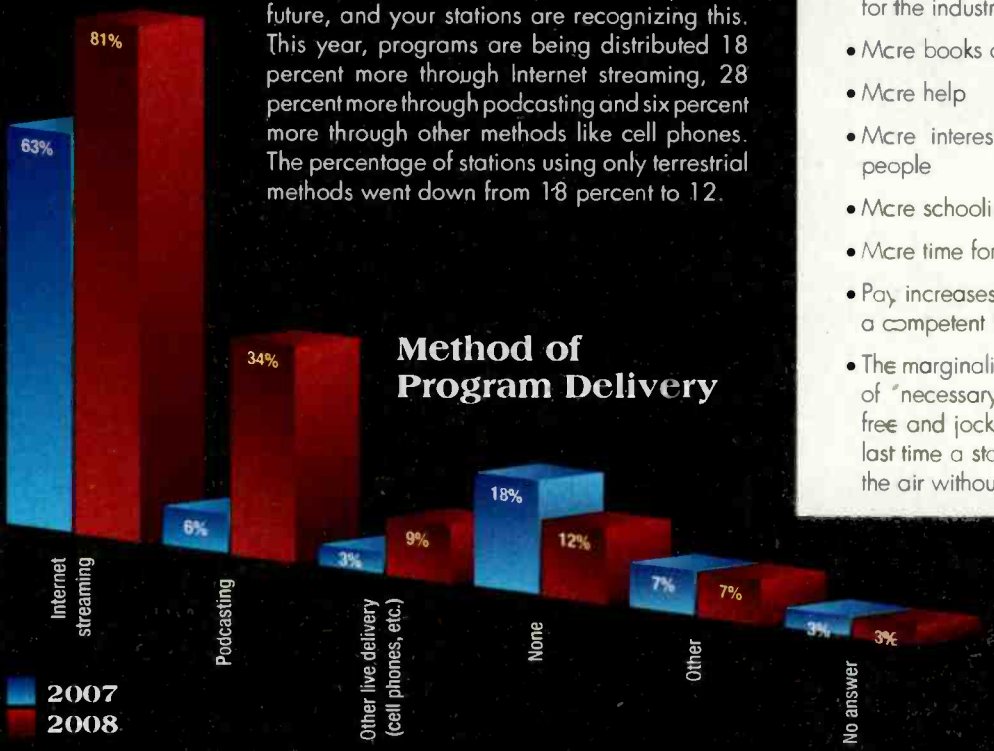
Salary Survey

Education/Non-terrestrial broadcasting

Half of respondants have attended seminars in the past year and the majority still prefers online courses and seminars. There is no doubt that online methods of delivery are the way of the future, and your stations are recognizing this. This year, programs are being distributed 18 percent more through Internet streaming, 28 percent more through podcasting and six percent more through other methods like cell phones. The percentage of stations using only terrestrial methods went down from 18 percent to 12.



Write-in answers

One always interesting point in our survey is found in what you would change about your current job. Here are some of the top answers to show you you're not alone in your thoughts:

- Don't mind hard work and lengthy to-do lists, bu too many tasks are emergencies in the eyes of the requestor
- Expression of appreciation from time to time fro n management for extra hours and weekends worked without additional compensation
- Find more people truly qualified for radio
- Hire and retain good broadcast IT staff.
- I love my job, and the only thing that comes to mind is a fantasy – that is to reduce the time it takes for cross-country airline flights.
- I would like to have more help, but we are a public radio station, and it's necessary for each of us to wear several hats.
- Improve relations with management and get more assistance from station management for handling of non-engineering related problems
- Improved Industry wide vision, leadership and direction
- Larger department, bigger budget, up-to-date equipment
- Less FCC involvement in broadcasting
- Less industry concern for (and limiting its perspective to) the next quarter rather than the longer term which is what will ultimately be required for the industry to do well going forward.
- More books on radio broadcast
- More help
- More interest in broadcasting from young people
- More schooling made available
- More time for strategic planning. This is vital.
- Pay increases and ability to take time off with a competent backup engineer in place
- The marginalization of engineering to the level of "necessary evil". Stations run commercial free and jockless all the time. When was the last time a station got on the air or stayed on the air without an engineer? ■

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Tips, tricks, hints and more

By John Landry, CSRE

More Cool Tools

Last month I highlighted some cool tools – and here's another one. The Dremel hand held rotary drill kit is a mainstay in many shops. As shipped, the tool comes with small drill bits and some small grinding wheels. Many attachments and special tools have come out for use with it.

The 409 series cut-off wheel is especially useful for cutting into hard metals. It can cut small screws (such as 4-40 or smaller) cleanly without damaging the threads. It can also cut notches into Atlas microphone booms to make cable outlets into the pipe. It makes cutting and preparing Heliax cable easier. The 409 wheel requires a 402 mandrel (screw type). The EZ476 cut off wheel is similar, but makes use of a quick change mandrel that doesn't require a screwdriver to change the wheel (the EZ402).

Dremel also offers a right angle adapter (#575) that makes cutting or drilling in tight spaces easier. The 670 Mini-Saw also makes sawing in tight spaces easier. And the MS400 saw turns the Dremel into a miniature Hilti saw. All of these attachments will fit most older model Dremel tools.

While not an attachment for the rotary tool, the Dremel 671 Flex light with magnifier can make emergency repairs at the transmitter site easier. Equipped with a bright LED lamp and a magnifying lens, it brings the repair bench anywhere. Even out to the antenna site!

Conversion

No matter how precise we are, at one time or another we need to be able to convert measurements. Inches to feet (in fractions or decimals), millimeters and areas all require a trip to the resource book now and then. We have a page of conversion tools in the Engineer's Notebook at RadioMagOnline.com, but there are several specialized converter tools available as well.

Engineer's Notebook
RadioMagOnline.com/tutorials_tips/engineers_notebook

Time Calculations
RadioMagOnline.com/tutorials_tips/radio_time_calc
www.onlineconversion.com/advanced_time_calculator.htm

Calculated Industries
www.calculated.com

Calculated Industries manufactures handheld converters for area, time and even the scale of a drawing. The Time Master II is a versatile calculator with a built in stopwatch. It can add the different minutes and seconds of the timed segments to make production tasks easier. The Construction Master Pro can add linear lengths and calculate drywall or wallpaper areas, locations of studs-on-center and many other construction figures. They also make a variety of "take-off" tools, like the Scale Master II. This pen-shaped device can be dragged across a surface and it will calculate area and length measurements to scale for drawings.

Adding time values is not a simple task. There is a trick to adding and subtracting time values with a calculator, called the 940 rule. Check out the *Radio* magazine time calculations link at left for more.

More for the toolbox

How many times have you had a stuck key on a keyboard or something else cause trouble? A quick spritz with a cleaner may help, but usually there is something under the key cap and you need to remove the cap to clean underneath. Needle nose pliers and greenies sort of work, but sometimes the cap or the switch is broken. The Techni-Tool Keycap Puller #7581E0100, which resembles a kitchen utensil, turns out to be just the thing for removing the cap easily without any damage.

More and more connectors use contact pins that are crimped on and pushed in. These can be timesavers, but every now and then the wrong wire is in the wrong place. Extractors are available, but each manufacturer makes a slightly different connector, which means you ultimately have a drawer full of extractor tools (if you remembered to order one). Techni-Tool 7-in-1 extractor #104PR010 has seven interchangeable extractor blades that fit most of the common D-sub, Military, circular and other connectors.

Hanler Corporation's Wrap-Lock (www.wraplock-clamps.com) is a build-to-fit steel strap system used by two-way radio installers for years. It can make clamps, brackets and holders in any shape or size on-site in minutes. The steel strap is strong and rust resistant. It can be used to hang pipe, patch leaky pipes, put up signs and lights and lots of other uses. A simple ratchet key tool and a patented D-shaped locking buckle are unique to the Wrap-Lock system.

Landry is an audio maintenance engineer at CBS Radio/ Westwood One, New York.

Do you have a tech tip? Send it to us at radio@RadioMagOnline.com

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Vorsis AP-2000

By Kirk Chestnut, CPBE

The Vorsis AP-2000 is a five-band AGC/compressor and 31-band limiter with specialized algorithms for bass and voice band processing. Its output feeds will accommodate just about any flavor of FM/HD Radio operation. Transients are gracefully controlled without compromising the long-term texture, levels, frequency response and harmonic integrity of a station's signature sound. The AP-2000 includes the latest development from Vorsis, a division of Wheatstone.

This one does it by the numbers, packing the math power of 19 digital signal processor (DSP) engines. The processing workload is split into a multitude of parallel processes. Independent analog and digital transmitter paths contain their own respective 31-band limiter, VBMS and Voice Master algorithm. Despite its complexities, the AP-2000 amazingly reconstitutes all this information – time aligned analog to digital, phase aligned analog L+R vs L-R and phase coherent across the audio spectrum.

Performance at a glance

- 31-band fine grain processor
- Five- or three-band AGC preprocessor
- Oversampled lookahead limiter or specialized clipper
- Voice Master voice distortion management
- Ethernet-based remote control
- Eight input GPI preset triggers
- 32kHz - 96kHz digital input
- FM/HD Radio delay of up to ten seconds

The big bottom

Spy on your program director's car or office radio and it probably has the EQ extremes cranked up. Everyone wants more bass, but that can mean more intermodulation distortion. To that end, the Vorsis Bass Management System (VBMS) was developed to separate and process the bass range independently. The VBMS boosts base while mitigating the effects of IM through mathematical control of harmonics.

Membership into a secret society is not required for full access to the AP-2000. Every feature and control is present on the front-panel LCD display or through a Windows-based software application.

Analog and AES3 audio inputs provide source diversity for fail-over protection in the event of prolonged silence to either path. There are analog outputs with or without de-emphasis, AES3 digital outputs with selectable pre/post diversity delay and with/without de-emphasis. Balanced composite stereo is present on the XLR jacks for a clean, noise-free signal into an FM exciter equipped with balanced inputs. There are also two unbalanced composite stereo outputs on BNC connectors. Jacks are provided for SCA injection and control.

The general purpose interface (GPI/GPO) has up to eight opto-isolated inputs and four outputs that have tested well in high RF environments. A typical application might include remotely bypassing the AP-2000 during EAS tests with a logic return on the transmitter remote control confirming the system status. Convenient front-panel connections include a headphone jack and a USB port for a mouse. A five-port Ethernet hub inside is brought out to RJ-45 jacks on both the front and rear panels.

Getting started is easy. The manual has an 11-step guide to getting on the air. Suggested default settings for most parameters are listed for a good starting point. There is a list of about 70 ready-made presets for various programming formats. Finding that perfect setting comes down to choosing a compromise between clean and loud.

The GUI was designed so navigation is done with no more than two mouse clicks – no more auguring through multi-branched menu trees. It can control any number of AP-2000s over a LAN through VPN tunnels and behind firewalls. Any laptop or desktop computer running Windows 2000 or XP with a CPU speed of 1GHz should perform just fine. The Web interface does not

support open ports to the Internet or act as a Web server making it immune to network hacking.

The GUI display is divided into four basic sections: Title Bar, Control Area, Side Bar and Dynamic Displays. Dynamic Displays region includes a frequency-domain graph showing the parameters of the five-band AGC, both FM and HD 31-band limiters and the adjusters for manipulating settings.

On the left hand side of the Dynamic display are a series of four bar graph meters for monitoring input/output levels and processing levels. The Gain Reduction Meter can be selected to monitor a variety of internal processes.

Fast-Fourier Transform (FFT), real-time spectral analysis is available at the click of a button to display the input audio or the processed audio. Various other display parameters such as an oscilloscope representation of the signal, gain reduction graph and control position markers can be selectively added or removed from the display.

Control Area

A large area above the Dynamic Display is the Control Area. Under the Input panel you will find adjustments for selecting analog vs. digital audio sources, engaging the input failsafe feature, independent gain control for the analog and digital sources, balance trim as well as controls for auto mono, phase rotator, Voice Master and the high pass filter.

The auto mono feature, as the name implies, was developed to clean mono content where unintentional artifacts cloud the spatial image. The phase rotator prevents clipping by rearranging the phase of asymmetrical waveforms before they hit the rail. The high-pass filter eliminates low frequency content that cannot be heard on FM and is a source of intermodulation distortion.

A Vorsis exclusive is the Voice Master algorithm. It engages a special voice-specific set of equalization and limiting parameters when it detects mono, narrow bandwidth and asymmetric waveforms. If all three of these parameters are met the Voice Master engages.

The four-band parametric equalizer could be described as a four *control node* EQ. These fully independent but complementary control nodes can be frequency centered anywhere in the audio spectrum, even stacked. Each node can be adjusted for bandwidth and Boost/Cut. The EQ can be electronically inserted before or after the five-band AGC section.

Core audio processing is divided into three sections: the SST, AGC and compressor. While the AGC and compressor work in a traditional fashion, it is the Sweet Spot Technology (SST) that smoothes processing performance over the long haul, making sure that program content has a consistent sound regardless of the program material. Where AGC and compressor address instantaneous events, the SST acts as the intelligent gain riding control from program element to program element.

The Vorsis/Wheatstone website contains a wealth of information including support documents and software downloads. Jeff Keith, head of the Vorsis design team, has authored a number of white papers explaining the theory behind each algorithm.

Out of the box

Our facility had the opportunity to examine the AP-2000 first hand as well as its predecessor, the AP-1000. It was bench-tested and placed in the broadcast chain of our hot country station for about a week.

Whether you're the intuitive type to simply plug things in and make them work or wait till you've scoured the manual, the GUI was intuitive and easy to navigate. Most controls are mouse-based with some parameters that can be entered via the keyboard. Having every control within two mouse clicks does make it a bit easier to change parameters.

Wheatstone

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W www.vorsis.com

E sales@vorsis.com

My director of engineering was impressed with the limiter and AGC controls but especially the parametric EQ. The click-and-drag method for changing frequency, gain/loss and bandwidth is pretty cool.

The sheer number of variables that go into shaping the final product can be a bit daunting. Finding the best balance among the various limiters and clippers along the way can take time. In the week the AP-2000 was in chain, many different preset styles were tried with relatively good results.

It's probably impossible to find the perfect sound overnight. Processing is a subjective art and one can become lost after listening intensely for a while. Every audio processor has its signature sound, as does this one. It has some pretty powerful features and evaluating it was like going back to school.

Chestnut is assistant chief engineer at Entercom Kansas City.

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.

Ultrasone Pro 750

By Ned Luberecki

Wearing headphones every day as a radio disc jockey and recording musician, there are a few things I require in a good pair: great sound, comfort, durability and serviceability. The Ultrasone Pro 750 headphones measure up to all my requirements.

The feature that makes Ultrasone headphones different is the use of its patented S-Logic Technology to create three dimensional, natural surround sound. The concept is that the outer ear is responsible for three dimensional hearing, so instead of the headphone driver being centrally located and aimed directly at the inner ear, the drivers are directed at the outer ear. Allowing the sound to be reflected off the outer ear not only creates a natural three dimensional sound, but also helps to cut down fatigue by reducing the sound pressure level at the eardrum by up to 40 percent or 3 - 4dB, according to Ultrasone. The drivers are titanium and the frequency response is listed as 8Hz - 35kHz. I am very pleased with the sound of these headphones. The bass response is very natural, not overbearing, and the highs are crystal clear without being shrill or tinny sounding. To my ears the S-Logic natural surround sound does what it's supposed to do. They sound as if I am not wearing headphones at all, but instead listening to music live or through good sounding loudspeakers. It's as though I can hear the air around the music. I have also noticed they are much less tiring to wear than other headphones, which brings me to the next point.

Performance at a glance

Closed earpiece

Velour earpads

40mm Titanium-plated mylar driver

Frequency response 8Hz - 35kHz

40Ω impedance

Up to 94dB SPL

The headphones are very comfortable to wear. The ear pads are soft velvet and there is also a velvet pad that rests the headphones on top of your head. The fit is tight enough to hold the ear pads closed, but not so tight as to squeeze one's head. The manufacturer suggests these headphones should always be worn with the left and right ear capsules over the correct ears and with the frame fully on top of the head to achieve the natural surround sound effect. There is a noticeable change in sound quality if this is not done. And if they are not worn properly, the headphones don't fit very well, so it's not much of a problem. They are relatively light weight at 295g without the detachable cord.

Long-term comfort

After wearing these headphones for several hours at a time in both the radio and recording studio, my ears were much less tired than with other headphones. In the recording studio, I have to be able to hear the sound of the track mixed with the sound of my own instrument or voice louder than the actual sound of the instrument in the room. With some headphones this means turning the volume up so loud that not only do my ears become exhausted, but I lose the ability to hear the pitch correctly. In the recording studio, I could hear everything perfectly clearly, along with my own track and at a very comfortable volume level. Singing was also easier with these phones as the volume wasn't so loud as to affect the pitch. It is worth noting that the Pro 750 headphones are of a closed back design as opposed to the Pro 2500, which are open back. I prefer the closed back to prevent any sound leakage from the phones to the microphone, a must in the radio or recording business.

As to durability, the Pro 750 headphones come in a hard case for storage and transportation. The ear cups fold flat to fit into the case or fold up into the frame for storage in a carry bag (not included). Included with the headphones are two detachable cables, one coiled and one straight. Both are a little over 10'. The coiled cord helps keep from getting tangled up in tight surroundings and it's nice to be able to switch to the straight one if I'm a little farther from the source without the coiled cable tugging me toward it. The cables attach to

the headphones with a screw in 1/8" gold plated connector and end in a gold plated 1/4" stereo jack. A 1/4" to mini plug gold plated adapter is included. Also included in the hard case is a spare pair of "speed switch" ear pads. The ear pads are easily replaced by locking tabs on the ear pads into a track on the headphones and giving a slight twist. One of the few faults I found with these phones is that the ear pads can come loose during normal use such as removing them from the case. They are very easy to re-attach, but the locking connection could be made stronger in my opinion. I have also noticed diminished sound quality if the ear pads are not connected properly.

Fortunately, I have not yet had any issues with serviceability. However, the manufacturer's website shows a variety of accessories and replacement parts, but they are not available for purchase from the site and instead instruct you to "Contact the distributor in your country for purchase." I have not contacted the distributor in my region to find out about service or replacement parts, but the contact information was readily available on the website along with a map showing the locations, addresses and contact information for dealers around the world.

Ultrasone

P 951-678-9091

W www.ultrasone.com

E p.taylor@ultrasone.com

Overall, I am pleased with the sound, comfort and so far, the reliability of these headphones and would recommend them to anyone who uses headphones on a daily basis.

Luberecki is the morning host of the Sirius Satellite Radio Bluegrass channel, Nashville.

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Advancement in Radio Technology

ART AWARDS

The best current products chosen by you.

The *Radio* magazine Advancement in Radio Technology Awards were created to recognize the best available products introduced over the last year with a practical use in radio broadcasting facilities (including terrestrial, Internet and satellite).

Nominations were accepted from readers like you, *Radio* magazine contributors and manufacturers, and then placed into one of 13 categories. During August, we asked you to vote for your top pick in each category. The results were tallied in early September, and the winners were announced at a reception held at the NAB Radio Show in Austin, TX.

The winners of the 2008 Advancement in Radio Technology Awards are:

Ancillary Equipment

Broadcast Tools SRC-16
Serial-controlled relay interface

Audio Storage and Playback

Enco Systems DAD v5.1e
Audio recording, management and playout

Audio and Data Transmission

APT Worldnet Oslo
Multichannel IP audio transport

Digital Audio Workstations

Adobe Systems Audition 3
Multitrack audio recorder and editor

Audio Routing and Control

Axia Audio Element
IP audio routing and mixing

Facility Support

Burk Technology ARC Plus v2.0
Remote monitoring and control platform

HD Radio Technology

Enco Systems RAMA
Metadata delivery appliance

Microphone Technology

Neumann TLM 103 D
Digital microphone

Online Technology

Jetcast Streaming service
Audio streaming

Remote Broadcast Technology

JK Audio Bluepack
Bluetooth cell phone audio interface

RF Transmission

Deva Broadcast Smart Gen 4.0
RBDS generator

Signal Processing

Orban Optimod-FM 8500FM v2
FM/HD Radio audio processor

Test and Measurement

Kaltman Creations Spectran HF4040
Handheld spectrum analyzer

Reaching

There is a new generation that needs to be spoken to. Millennials (also called Generation Y or Generation M), will possibly be one of the most influential generations in terms of how communication works. Called Millennials because of the importance of the millennium in terms of their lives, this is the generation that will eventually take the place of Generation X, who set the stage for the information revolution. Though sources vary on a specific age range for this generation, The Kaiser Family Foundation says Millennials can be as young as 12 years old, or as old as 25. They come from all different economic, educational and racial backgrounds; they don't even necessarily share the same social and political values. But what this generation does have in common is the ubiquitousness of the use of technology in their lives.

Portable media devices have allowed Millennials (and other audiences) to store and access vast amounts of audio. The radio in the car is slowly being replaced by the Ipod. Listening to NPR on a Walkman on the subway has evolved to listening to podcasts on a Zune. We are no longer constrained to listen to whatever is on at the moment; we have audio at our fingertips – it is searchable, fast-forwardable, and subject to our whims. We are not forced to sit through content we don't like in order to hear a commentary by our favorite author. We can now skip to what we want and delete the rest.

Radio has to face such juggernauts as podcasting, Itunes, Ipods, Youtube, and Facebook when they are trying to sway an audience, and there are several organizations already doing this.

Next-generation radio

Probably one of the most interesting and effective initiatives for engaging Millennials in radio is the Next Generation Radio Project at National Public Radio. This project identifies rising stars in college radio news and invites them to radio training projects across the country. These young reporters are paired with an NPR producer in the project city, who then helps them create an NPR-ready news piece. From the initial brainstorming, to interviewing, writing, editing and distributing, these producers follow their young protégés along the way.

What really makes this project effective is the use of new media technology. The project locations feature blogs, online radio training, and they even use the Public Radio Exchange distribution program (PRX).

Next Generation uses the social networks Facebook and PRX to connect with new producers, project alumni and new listeners. They

Millennials

Fast-tracking technology to nab a new generation

By Matthew Terrell

believe Millennials will be the ones signing the donation checks to support public radio in the coming years, so they try hard to keep open contacts with as many young people as possible. Their philosophy is that in order to keep the attention of this generation it is key to speak in the same context that they do. That means staying up-to-date with the latest technologies, and figuring out how that applies to public radio.

SCADRadio.org

Every year, more and more people listen to radio on the Web. What makes Web radio such a good idea for engaging Millennials is the ease of production. Terrestrial radio is still susceptible to major amounts of bureaucracy and regulations through the government and the FCC. Millennials who work in Web radio are freer to explore, make mistakes, learn and (most importantly) stay involved in radio. Because the structure is much more flexible and open, Millennials are allowed a stronger voice in Web radio.

SCADRadio.org is a completely student-run radio station at Savannah College of Art and Design. No administrator controls the content they broadcast, and there is no approval before content airs.

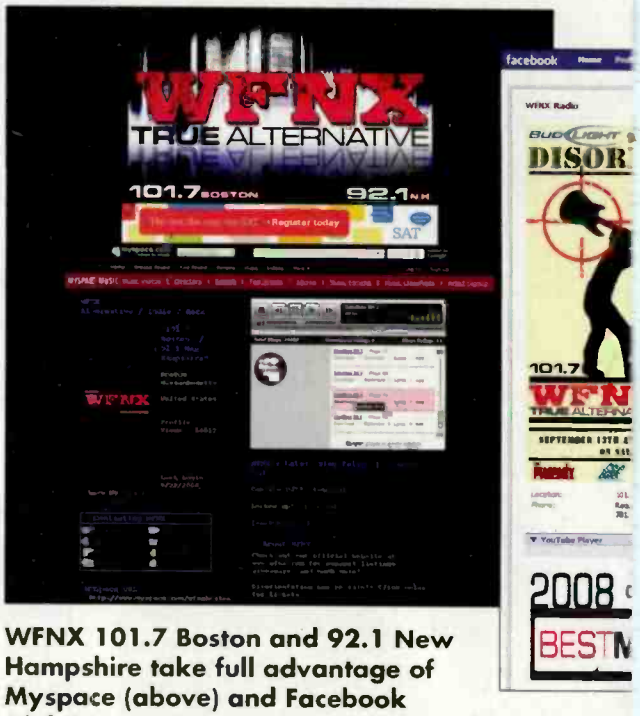
Reaching Millennials

Though it is completely student-controlled, it is financed by the college (the station has no advertising revenue or pledge drives). The full-time adviser to the station serves as a bridge to the administration, rather than a manager/controller. While the station does follow the FCC standards for a licensed, terrestrial radio station, everything is in the hands of the Millennial-aged students who run it. This produces a snowball effect: Millennials run the station, their friends listen, then the friends join, and those friends' friends join...and so on. By letting Millennials control the content, a credibility is created that older individuals can't achieve when interacting with Millennials.

The Public Radio Exchange

The Public Radio Exchange is an online platform meant to connect producers of radio work (news commentary, and drama mostly) with radio stations across the country. Member producers can upload their content, define and describe it, and then license it to radio stations across the country. Producers who upload work can also choose to charge for their work, and can even make a small return on their time producing. The income that producers receive is small ($0.50-$2 per minute of content licensed); it is mostly considered to be a bonus on top of getting one's voice heard across the country.

The Generation Project at PRX (generation.prx.org) is meant to actively engage students and Millennials in radio. This project tries to make sure that Millennial producers have the tools, training and outlets they need to get their voice heard. While it does not send equipment to individuals, it offers training and advice to students trying to learn the ins and outs of radio production. Furthermore, it recruits individuals for the Youth Editorial Board that listen to and review pieces



WFNX 101.7 Boston and 92.1 New Hampshire take full advantage of Myspace (above) and Facebook (right) to reach a younger demographic.

produced by the younger generation. Those on the Youth Editorial Board also receive a small monthly stipend which is also meant to help producers who are new to the game.

A new policy

While some of the advice I've offered may seem like common sense to some, these aren't widely enacted policies. The key here is that a lot of these three organizations' policies seem like common sense to a Millennial audience. If you want your content to appeal to the younger generation, you need to do the things that seem commonplace to them.

If you are not online already, get online as soon as possible. Millennials are the most connected generation ever. They eat, sleep and breathe technology. Computers, Ipods and cell phones are intrinsic parts of the daily lives of the younger generation. A presence available in these devices is key to reaching this audience.

There are certain websites and software programs you absolutely most know and use:

Facebook: This is the social networking site geared toward upwardly mobile, educated Millennials. This is where you will find a lot of students who may one day become part of your organization.

Myspace: This is one of most visited websites in the world (clocking in regularly in the top five in amount of hits). While this may not necessarily get young people who will produce radio, this is a great site to increase presence and find new listeners.

The Public Radio Exchange: This is the most important site to learn for distributing content. Not only will you be able to sell your content to member stations (a great way to license work produced by younger reporters), but this is a great place to find and recruit new talent. Member stations can cut down costs of production for local producers, and they get to feature more voices on the airwaves. While this may not be good news for the local, full-time producer, it is great news for young reporters all over the country.

Itunes: This software available free from Apple is the most prolific publishing source for music, news and podcasts. While there is a lot of content to compete with through Itunes, this is an important tool because so many internet users get their music from Itunes. This is the best and easiest way to get your content downloaded onto Ipods and heard across the country.

Reaching Millennials

Use these tools like Millennials use them. It's not enough to you know how to surf Myspace and have a Facebook profile. You cannot have a boring, professional profile on Facebook and expect to attract a younger audience. Millennials respect these new tools, and they are investing their time and energy in using them with the belief that it will pay off with a deeper, more nuanced social network. If you want to use new media tools and social networks, you have to respect them as the tools for social change and interaction like their Millennial creators view them. It's a very common theme in new media research that users (especially Millennials) can sense a fakeness and distrust people who don't use these tools in the right ways. The right way involves using the tools primarily for social uses rather than professional, and keeping a personal tone to created profiles and sites.

The Public Radio Exchange connects independent producers with radio stations.

Go niche. Satellite radio, podcasting and new media technology have allowed us to systematically categorize and sort through the information we find appealing. Have a niche understanding of what you do. (Are you youth-produced radio from Vermont? Are you African American news by high school students?). People want the potential to hear new things, and it is easier to find it when the niche is defined. The markets currently losing listeners (especially the younger ones) are the stations that think everyone wants to hear the same thing. When Millennials discover the power of niche media, it will be hard to return to corporate controlled media.

Podcasts can be listed for download through Itunes, as seen here with NPR.

Don't be afraid to innovate too soon: Part of the charm and the challenge of appealing to Millennials through new media technology is the constant search for what is going to be the next big thing on the Internet. Five years ago, Internet radio was scoffed at, but today stations like SCADRadio.org have become something to emulate. Don't let your organization or any other factors hold you back from participating in the new tools that come along. The Millennial generation has shown no sign of slowing their acceptance of new technology, so organizations that want to appeal to them have to keep up their technological presence.

Empower Millennials: Probably one of the most common themes in Millennial research is the generation's need to find purpose. Part of this is feeling important or being needed in an organization. A combination of teamwork and individual accountability gives them a sense that the work they are doing matters, and they should continue doing it. This is a generation that does not respond well to micromanagement and wants to be able to learn from its own mistakes. Over-supervision of Millennials will lead to disdain and distrust, and will create a bad name for yourself or your organization among the generation. The most successful Millennial-based organizations (such as SCADRadio.org and Generation PRX) are almost completely controlled by this generation, and they are doing well in this system.

The overwhelming nature of keeping up with Millennials may seem like a drawback – the endless amount of websites, software programs and technologies may never all be kept up with. What is important is to stay up to date with the specific technologies that Millennials value. If you can keep up with Facebook, Youtube, and PRX, then you will be able to gain a higher respect among Millennial audiences. And gaining a respect among this audience is key to your organization thriving, because they are the people who will be signing the checks in the future.

Avoiding bureaucracy, SCADRadio.org is a completely student-run radio station at Savannah College of Art and Design.

Terrell is a freelance writer currently based in Prague.

by Erin Shipps, associate editor

Dynamic headphones
AKG

K 702: These headphones combine the superior sonic performance of AKG's K 701 with features demanded by recording and broadcast engineers in a professional package. The K 702's new features include a detachable input cable with a locking 3-pin mini-XLR connector. The high-performance, low-loss detachable cable makes transportation, service and storage easier. The new K 702s also feature a stage blue finish that is more rugged and professional looking than the K 701's gloss white color. The headphones feature flat-wire voice coils and their patented Laminate Varimotion diaphragms eliminate spurious resonances and deliver an engaging listening experience with out-of-head imaging so that engineers can hear all the nuances of their sound.

818-920-3212; www.akg.com
akgusa@harman.com

Vistamax enhancement
Harris

Vistatouch: Vistatouch is a Windows PC client application that expands access to common tasks within Vistamax for studio personnel with a simple and visually oriented presentation that provides secure system-wide control functionality to operators. Vistatouch software features user-activated Image Panels to initiate frequent, show-specific and day-part requirements. Each Image Panel is associated with specific session or macro tasks and controllable via mouse or touch-screen for optimum control. The Vistatouch software offers visual enhancements to the studio operator by associating predefined picture or live webcam images with each Image Panel. As many as 20 Image Panels can be assigned to each application to address multiple-user or requirement-specific presentations at every Vistamax-connected studio within the facility. The Live Webcam streams are ideal for visual cueing of live sources, especially useful for news and talk stations, and live multi-talent morning shows.

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

Analog-to-digital converter
Drawmer

A2D2: The Drawmer A2D2 is an AES Grade 1 dual stereo output analog-to-digital converter. It offers dual simultaneous stereo outputs, each with separately selectable sample rates, and additionally provides three word clock outputs, allowing the A2D2 to also act as a master clock generator. It also provides simultaneous dual stereo outputs that may each be selected to different sample rates, including 44.1, 48, 88.2, 96, 176 and 192kHz. This permits, for example, the output of a high-resolution 192kHz version with a simultaneous lower resolution 44.1kHz version. Each digital output has a selectable word length of 16 or 24 bits, with automatic dither generation.

702-365-5155; www.drawmerusa.com; sales@transaudiogroup.com

Audio processor
Vorsis

AM10-HD: The AM10-HD offers a five-band AGC followed by a specialized 10-band limiter and high performance asymmetrical modulation peak controller algorithm that has been specially designed for the requirements of competitive AM broadcasting. This new peak controller maximizes AM coverage by providing the highest possible average modulation accompanied by consistent positive peak capability of up to 200 percent. Selectable low-pass filters are available to tailor the output for the requirements of various regulatory needs. The HD signal path includes its own specialized multiband peak controller which has been tailored for the codec that is utilized in AM HD Radio broadcasting.

252-638-7000; www.vorsis.com; sales@vorsis.com

NEW PRODUCTS

Locking lever
NKK Switches

S Series: The S Series locking lever toggle switches are offered in single- and double-pole models, both with two or three maintained positions. They are available as single throw or double circuits and the electrical capacity ranges from 15A to 20A at 125Vac. The S Series toggle switches were designed with robust actuation applications in mind and provide an excellent choice for designs requiring a safeguard against accidental actuation. In addition, they provide equipment designers with high levels of environmental protection – the switches are panel sealed with a rating of IP67. Each S Series switch is panel mounted with 12mm D-flat threaded bushings, constructed of brass with chrome plating and conforms to standard panel cut outs. The D-flat shape prevents rotation of these devices when mounted in the panel. Standard hardware is provided with each switch and includes a hex nut, a lock washer and an O ring.

480-991-0942; www.nkkswitches.com; sales@nkkswitches.com

Ribbon microphone
Soundwave Research Laboratories/Cro

Naked Eye Roswellite: Naked Eye Roswellite now joins el Diablo as the toughest and most powerful ribbon microphones ever created for music recording and live sound reinforcement. The Naked Eye Roswellite features the same True Dual Voicing design and carefully crafted tone of the Naked Eye Classic, plus it adds the power of the Crowley and Tripp nano-composite ribbon material – Roswellite – that was first introduced in the el Diablo Mercenary Edition.

508-231-4515; www.soundwaveresearch.com; Chris@soundwaveresearch.com

Transmitter control
Nautel

Advanced User Interface: The Advanced User Interface is a 17" color LCD screen with a wide range of configurable displays. The AUI includes real time locus measurement, an instrument grade spectrum analyzer, an IBOC modulation analyzer, module-level monitoring and control and logging of all functions. The AUI can be controlled by touch screen or via a mouse and keyboard. In addition, users have 100 percent remote access to transmitters via a Web browser.

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

Music library
Loopmasters

Jazz Sessions: Loopmasters' new collection of jazz samples contains 3GB of original samples, all played by seasoned professionals. With Jazz Sessions the focus is on maximum realism, to add a perfectly authentic smoky vibe to music. More than just traditional jazz, there's also plenty for devotees of nu-jazz, broken beat and a other jazz-tinged genres. The DVD features 3,000 separate WAV files, including instruments such as drums, double bass, fretless bass, brass sections, flute solos, trumpets, trombones, acoustic and electric guitar, piano, Hammond and Rhodes samples.

+44 845 094 1460
www.loopmasters.com
info@loopmasters.com

Flexible gooseneck lamp
Hosa Technology

Hosa-Lite LED: Available in both BNC and XLR connector-type models, the Hosa-Lite LED is a console lamp with a 15-inch gooseneck. Ideal for both live sound and studio environments, the Hosa-Lite LED console lamp delivers warm, diffused light that is bright enough to work by, without causing eyestrain. It features four white LEDs and two red LEDs for accurate color illumination, and operates at cool temperatures, facilitating adjustment without the risk of burning one's fingers. The Hosa-Lite's flexible gooseneck design offers functionality wherever a 12V BNC or XLR light socket is available. The Hosa-Lite is durable and features long-lasting LEDs that make replacing light bulbs a distant memory.

714-736-9270; www.hosatech.com
lee@hosatech.com

Live performance condenser mic
Rode

M2: The M2 benefits from Rode's experience in crafting premium condenser microphones for studio, live and location use. This new microphone builds on the foundation set by the award winning Rode S1. Combining sound quality equal to that of the finest studio microphones, the M2 features a tailored response to reduce feedback, as well as an integrated shock mounting system to minimize handling noise. A locking on/off switch located on the microphone's body provides the switching feature required by singers with self-operated sound systems, and yet can be locked off when used in larger, dedicated operator environments.

877-328-7465; www.rodemic.com
usasupport@rodemic.com

T1 and IP codec
APT

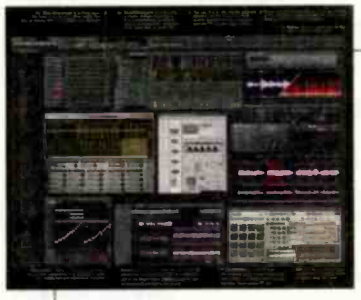
Worldnet Oslo Updates: This audio multiplexer offers a modular platform for the delivery of multiple channels of audio, voice and data over both IP and T1 networks. New for 2008: plug-in voice modules can combine both telephone and intercom traffic along with program audio and data for networking over high-speed digital links. The range includes a wideband voice module with four independent, fully duplex 7.5kHz channels as well as four-wire E and M and two-wire FXO and FXS modules for the creation of off-premise extensions and PBX links. Available audio modules include analog, AES/EBU, simplex, duplex and phase-matched options with support for both linear and compressed audio. One key challenge in the migration to IP-based audio delivery is the lack of a stable reference clock throughout an IP network. Worldnet Oslo now offers the option of adding an AES/EBU external synchronization input to the IP transport module. This enables the use of a common audio reference clock throughout all units on the IP network and ensures the audio clock of all units is stable to achieve the highest audio quality possible over the entire network. Single frequency networking is enabled throughout an IP audio network.

800-955-APTX; www.aptx.com; info@aptx.com

Studio monitor
Event Electronics

Opal: A two-way studio monitor, the Opal was designed to overcome what Event Electronics saw as common deficiencies in other monitors. The result is a speaker with improved mid-range and transient response, lowered distortion and controlled noise floor, consistent tonal character as output level increases, and improved low frequency response and phase response. Each cabinet features an EX8 woofer with XBL Split Gap Technology, which linearizes the speaker's impedance while increasing the sensitivity across the mid to high frequencies. The speaker cone is a combination of paper and long-strand carbon fiber to provide extreme stiffness and low mass. A metal dome tweeter mounted on an elliptical completes the monitor.

805-566-7777; www.event1.com; info@event1.com



Digital audio workstation
Image Line Software

FL Studio 8: FL Studio 8 opens a new chapter in DAW flexibility with the addition of FL Synth Maker, a FL Studio native version of the plug-in development application Synth Maker. Users can now create their own virtual instruments, effects and MIDI dashboards, use them in FL Studio and share them with other Synth Maker users, all without the need to write basic code. FL Synth Maker is included in Producer and XXL editions. The Producer and XXL Editions also include Slicex – a powerhouse drum loop slicer and re-arranging tool. Slicex uses advanced beat detection algorithms to slice song/percussion samples into pieces and make them independently playable from the piano roll or controller. Slicex offers playback, reordering of slices and time-stretching capabilities optimized for drum loops with all the editing power of Edison built right into the plug-in.

+32 9 281 15 33; www.image-line.com; info@image-line.com

Studio furniture
Arrakis

Accent: Arrakis has artfully integrated the metal structure into the visible design decor of the cabinetry, creating an even more durable and attractive studio. Accent is a contemporary blend of brushed metals, pleasing colors and interesting textures. Cabinetry and electronic equipment complement each other in such a way as to create a bold visual environment for talent, guests, and clients alike. Accent is available in standard models as well as custom configurations.

970-461-0730
www.arrakis-systems.com
sales@arrakis-systems.com

USB stereo condenser mic
MXL Microphones

USB.007: Designed with ease-of-use as a high priority, the new USB.007 features two gold diaphragm capsules with an X/Y pick-up pattern. Unlike most condenser microphones, however, the USB.007 is a USB instrument that connects directly to a computer without the need for external mic preamps. Now, anyone requiring high quality, professional sound on their computer can record music or dialog by simply connecting to a standard USB port. Featuring support for USB 1.1 and 2.0, this exceptionally easy-to-use microphone even includes gain adjustment settings via the built-in three position attenuation switch. The microphone is optimized for capturing a wide range of musical performances—both vocal and instrumental.

800-800-6608; www.mxlmics.com
sales@mxlmics.com

UPGRADES and UPDATES

Digigram has licensed the Fraunhofer AAC audio codec and all its variations. Digigram was already meeting the mandatory requirements of the N/ACIP standard for IP audio, but with the additional AAC codecs the company can further enhance its products. **(www.digigram.com)**...**Izotope** is now shipping its ANR-B Adaptive Real-time Noise Reduction Unit. The ANR-B uses Izotope's noise reduction technology to intelligently identify and suppress environmental broadband noise, hum, phone line artifacts and other noise sources from audio feeds. **(www.izotope.com)**...**Steinberg** has released an update to its Nuendo 4 system. Nuendo 4.2.2 includes a range of improvements to enhance stability, and several workflow enhancements. **(www.steinberg.net)**...The **Zaxcom** Deva Mix-8 mixing control panel will ship in October 2008. The Deva Mix-8 integrates directly with the company's Deva and Fusion audio recording systems. **(www.zaxcom.com)** ■

Digital live mixing system
Mackie

TT System 32: The TT System 32 Digital Live Mixing System includes the TT24 digital live console, DS3232 digital snake and the U100 networking card. The system combines Mackie's TT24 digital live sound console with the DS3232 digital snake and everything needed to connect the two for a complete, plug-and-play digital live mixing system. TT System 32 provides stage-to-console connectivity via the DS3232 digital snake with 32x32 analog I/O, 32 ultra high-quality Mackie mic preamps, and complete remote recall and control of all preamp settings (gain, pad, phantom power) all through a single CAT-5 cable (up to 300'). A total DSP package (gate, compressor and EQ) is available for all 32 input channels. The TT System32 includes a U-100 Network Card and 100' shielded CAT-5 cable for out-of-the-box mixing capability in mere moments.

800-898-3211; www.mackie.com
productinfo@mackie.com

NEW PRODUCTS

Midfield monitor
Klein + Hummel

O 410: The O 410 midfield monitor is designed specifically for use in music, broadcast and post-production studios for tracking, mixing and mastering. The O 410 is a tri-amplified three-way loudspeaker, featuring magnetically shielded drivers: 10-inch bass, three-inch soft dome midrange and one-inch tweeter. The drivers are powered respectively by 340, 160, and 180W hybrid class A-B amplifiers. The cabinet accommodates an optional grille and an extensive set of accessories for a multitude of installation and mounting possibilities. Various input options allow the O 410 to be used with any source equipment.

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

Twin microphone
Sennheiser Electronic

MKH 800: Based on Sennheiser's MKH 800, the MKH 800 Twin offers polar pattern switching after the recording session. The MKH 800 Twin can be thought of as a multi-pattern microphone without the pattern switches. It is equipped with both front and back capsule outputs. In a standard multi-pattern mic, the pattern of the mic is derived by adding and subtracting the back capsule. Because of the MKH 800 Twin's dual outputs, recordists can simply plug both of these capsules into a DAW or recorder and create the pattern desired during mix-down. The Twin is ideal for broadcasting and field recording.

860-434-9190
www.sennheiserusa.com
lit@sennheiserusa.com

Broadcast Software

1-888-274-8721
www.bsiusa.com

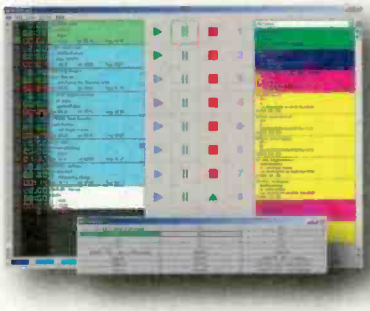
Radio Automation

Simian - radio automation and digital play out system

Instant Audio

Stinger- instant acess to 288 'rapid fire' audio files

Digital Cart Player



WaveCart - the original on-screen cart machine

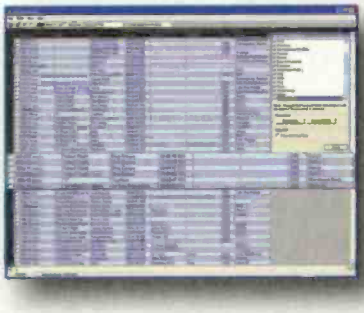
Audio Logging

SkimmerPlus - professional audio logging and skimming

Full PC Systems

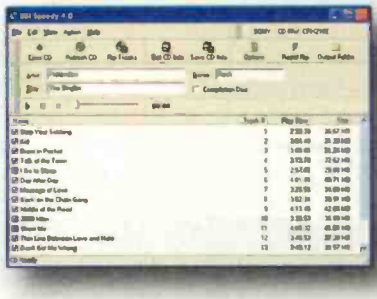
Complete PC systems - with hardware and music

Music Library



MusicStore - thousands of ready to play (tagged) songs

CD Ripping



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AudioScience - built for broadcast, pro sound cards

Remote Control

Trigger & Relay Devices - for GPI/O & remote control

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Eugene, OR 97401 USA
Direct: 541-338-8588
Fax: 541-338-8656
www.bsiusa.com sales@bsiusa.com

BSI

Digital audio distribution amplifiers
ATI Group

Series 2: There are four new DDA models, all featuring up to 192kHz sample rates and 24-bit resolution. All units have switchable re-clocking, giving users the option to correct for high jitter input signals, or to pass coded Surround signals without interference. All units have front panel selectable dual inputs and input loop-through with switchable termination. All units display input sample rate, word length, digital errors and pro/consumer mode to enable rapid confidence checks and troubleshooting. All units provide automatic equalization for long input lines and have a front panel control lock to protect user configuration settings. Models include: DDA-106XLR, DDA-106BNC, DDA-212XLR and DDA-212BNC. Dubbed Series 2, these new high-performance units bear the ATI Digital Audio logo and draw on Day Sequerra engineering expertise.

800-922-8001; www.atiaudio.com; sales@atiaudio.com

Numbered rack rail
Middle Atlantic Products

RLA Series: This numbered rack rail allows easy equipment alignment, which saves time by simplifying product installation. The RLA Series aluminum 2-post open frame racks are EIA/TIA-compliant and available in heights of 45 and 51 rack units. The RLA Series racks feature 15-inch deep bases constructed of sturdy quarter-inch thick aluminum, which include precut holes and screws for secure floor mounting. This makes it suitable for applications that require tough racks with hefty weight capacity.

973-839-1011; www.middleatlantic.com
sales@middleatlantic.com

Digital audio delivery service
Yangaroo

DMDS: DMDS is a digital file transfer system that was expressly developed to streamline radio promotion activities for the music industry. DMDS delivers broadcast-quality music tracks, together with related promo materials, directly to media outlets anywhere in a quick, secure and inexpensive way. An added benefit is that the service eliminates a great deal of the waste of packaging and shipping from the traditional method of distributing physical copies of media.

905-763-3553; www.musicrypt.com

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Greater Media's North Jersey stations, WMTR, WDHA and WWTR are seeking a full time chief engineer. This is an opportunity to join one of the best privately held companies in the business with a strong commitment to excellence in engineering. Experience with AM DA's and Audiovault automation a plus. Full benefit package including pension plan and 401k. This is an ideal opportunity for an engineer with several years of experience to join an outstanding organization with realistic expectations as to workload. Greater Media is an equal opportunity employer. Please contact Keith Smeal, DTO, Greater Media, NJ **ksmeal@greatermedianj.com**.

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THE RADIO TECHNOLOGY LEADER

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month:
Field Report, page 44

Ned Luberecki
Host, Sirius Satellite Radio

Ned Luberecki is a radio personality on Sirius Satellite Radio's Bluegrass channel. He has been teaching and playing bluegrass banjo for more than 25 years, having been part of Paul Adkins' Borderline Band, Radio Flyer, the Gary Ferguson Band, and the Rarely Herd. Now residing in Nashville, TN, he is the banjoist for Chris Jones and the Night Drivers and Larry Cordle and Lonesome Standard Time, and teaches private lessons at The East Nashville School of Music.

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THE RADIO TECHNOLOGY LEADER

Written by radio professionals
Written for radio professionals

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ADVERTISER INDEX

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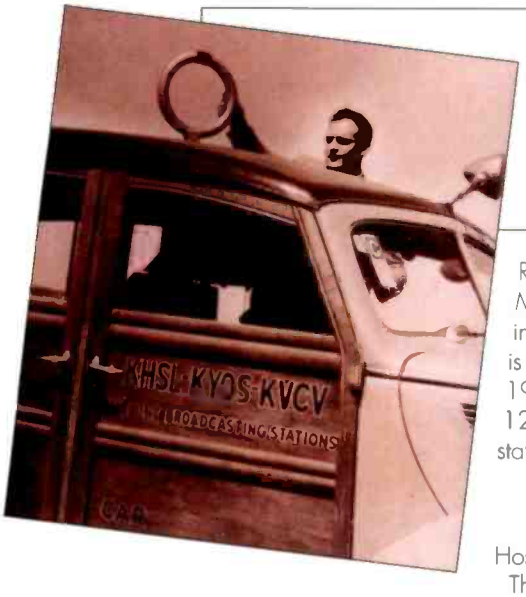
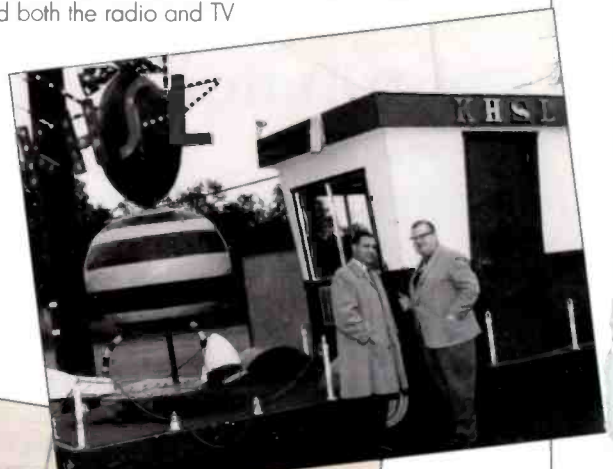
by Erin Shipps, associate editor



That was then

These photos come from Dino Corbin who has been in radio and television for 35 years. The photos are of some broadcast pioneers from the West Coast. Dino writes, "KHSL 1290 and KHSL TV 12 were the first commercial stations in Northern California, owned by Golden Empire Broadcasting."

Russ Pope was the VP/chief engineer for Golden Empire Broadcasting, owned by Mickey McClung one of the industry's very first female owners. She owned KYOS in Merced, CA, KHSL in Chico, CA, and KVCV in Redding, CA. In this picture Russ is adjusting the antenna on the news car in preparation for a live report circa late 1940s. In 1953 they put the first TV station on the air in Northern California: KHSL 12, a CBS affiliate. McClung owned both the radio and TV stations until the mid 1990s.



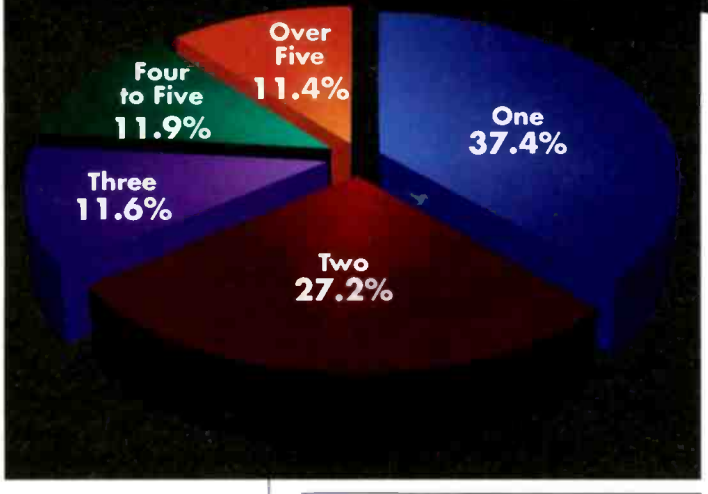
Frank McDonald (right) was the Host of Paris Startime during WWII. The show was heard on stations all over America and Europe. He was also on CBS Playhouse 90 in the early days of television. Frank was the morning show DJ at KHSL 1290. Here he is interviewing a client during a remote broadcast in Chico at the remote Kahisle Bug studio from the 1960s.

Bob Gheller was the KHSL Radio 1290 station manager in the Sixties and Seventies. He hired Dino. Here he is with the "Kahisle Bug" (KHSL) promotion vehicle at the Silver Dollar Fair Grounds in Chico.

Sample and Hold

How many people are in your engineering department?

Every year our Salary Survey rolls around and we are always sure we'll hear about one thing: A lot of you feel overworked. Data doesn't lie, so here are our statistics from 2008 on how many staff members respondants are working with. Feel this data is misrepresenting your field? Get involved and respond to our survey next year! And in case you missed it, check out more coverage of this year's report on page 34.



Source: Radio magazine 2008 Salary Survey

Tommy Nelson was one of the original announcers at KHSL Radio and later for KHSL-TV. He served for more than 30 years at KHSL. In retirement, through a program at California State University, Chico, he converted books to audio for the blind. In the foreground of this 1930s photo is the

E² Ethernet Audio Done Right

2008 PICK HIT Radio

MEET THE SQUARE

The Wheatstone E² (E SQUARE) gives you the convenience of Ethernet audio without all the IP hassle. It just *knows*. The built-in Setup Wizard lets you configure an entire system with just your browser and a laptop. Unplug it when you're done and there's no PC between you and system reliability.

SQUAREs are totally scalable: use one as a standalone 8x8 studio or transmitter site router, with browser access from anywhere. Plug two together and have a standalone digital snake. Add a fanfree mix engine and build yourself a studio using analog and digital I/O SQUAREs.

All the power is *in* the SQUARE. Distributed intelligence replicates all configuration data to every unit. Profanity delay and silence detection are done *in* the SQUARE. Even virtual mixing (w/automation protocol) —it's *in* there; all with real front panel meters, 32 character status indicators and SNMP capability.

88E DIGITAL ENGINE: Just plug an E-SERIES control surface or GLASS E computer interface into this engine and get all the mixes, mic and signal processing you need. Fanfree, so it can stay in the studio where it belongs.

Because the E² system doesn't rely on a third party GUI, tech support is straightforward (and 24/7). Likewise, system operation doesn't require external PCs for continued full functionality. Best of all, 1 Gigabit protocol eliminates the latency and channel capacity restrictions associated with older technology.

E-SQUARE is Ethernet audio done RIGHT!

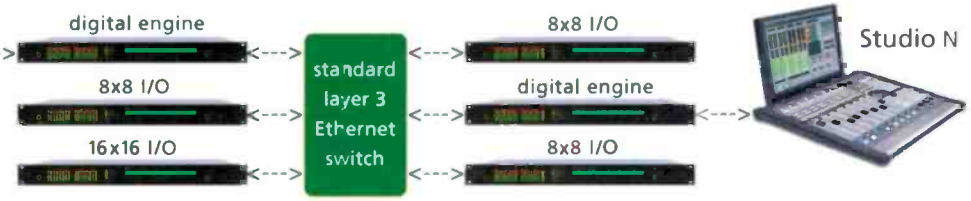
88D I/O: 8 digital inputs and outputs. You can headphone monitor and meter any of the SQUARE's inputs or outputs in real time. The 32 character display gives you all the information you need about your audio and system configuration. And because you can operate in either 8-channel stereo or 16-channel mono mode, 16 channels of metering are provided.

88A I/O: 8 analog inputs and outputs. You can bring a new SQUARE up in seconds and of course use the front panel encoder for your X-Y control. Front panel status LEDs give you continuous link, status, and bit rate information as well as confirmation of any GPIO activation.

88AD I/O: 4 analog plus 4 digital inputs and outputs—perfect for small studios or standalone routing.

88 I/O CONNECTIONS: E² has both DB-25s for punchblock interface and RJ-45s for point-to-point interface. All SQUAREs have 12 individually configurable opto-isolated logic ports that can be either inputs or outputs.

STUDIOS DONE EASY!



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