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December 2008
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WINNING THE RATINGS WAR

VORSIS: THE TECHNICAL STUFF

The loudness wars are over. The winner? Nobody. Why? Because when everyone became as loud as possible, using the same limited tools, the personality of every station got lost. We call it "the sameness syndrome."

We hate the sameness syndrome and believe it's a good part of the reason ears are turning to alternate sources. They are just plain tired. Fatigued.

Imagine, then, scanning a radio dial and finding an aural oasis – sound that's breathtaking in its natural quality, but loud and still retaining a sense of dynamic range. Impossible? If you think so, you haven't heard Vorsis.

Vorsis is the first line of air-chain processors designed for today's 21st century radio listener. It's a complete ground-up rethinking of the tired and traditional approach that is inescapable with those well-known processors. Here we talk about a few of the innovations that make the flagship AP-2000 Spectral Dynamics Processor the incredible tool that it is. Many of these advances are shared among the entire range of Vorsis solutions.

Intuitive Interface and Operation

No processor can meet its full potential if it's not something that's easy to use or if the full palette of controls are not accessible. The Vorsis GUI is designed for intuitive operation, from the front panel or remotely on your PC. No control is more than two clicks of the mouse away. The screens offer a logical layout with a virtual control surface above and monitoring graphs and meters below. You can see and hear the results instantly. Nothing is easier.

Think about having the full engineering control you've always dreamed of – being able to find the whispers as well as the screams in your station's sound, crafting an aural signature that's so good, so transparent, you will have people calling to find out how you do it.

Vorsis Dynamics Control

Vorsis completely rethought dynamics control – AGC and compression – and came up with a design that's intelligent AND amazingly flexible to control and shape your station's "sound."

Five-band AGC (four-band in the VP-8) ensures a consistent spectral balance. Vorsis' exclusive SST™ Sweet Spot Technology manages the behavior of the AGC in real-time so that it always operates in its "sweet spot." The multi-band compressor, operating in concert with the AGC, provides unprecedented dynamics control. All operate in sum and difference – the highest signal controls the amount of processing. This is a completely new way to manage multiband dynamics to maximize the consistency of your station's on-air presentation – no matter what the incoming level or era of the music.

Powerful Bass, Incredibly Clean Voice

Vorsis Bass Management System extracts and reveals the nuances in the program that are simply not heard in any other radio processor. It puts deep pristine bass on the air without the distortions of common bass clipper technologies. VoiceMaster is a special Vorsis clipper management tool that has its own automatic processing chain dedicated to detecting and specially processing live speech signals, giving you the loudest and cleanest on-air voices ever.

Superior Stereo Enhancement

In rethinking Vorsis, it became clear that stereo enhancement HAS to be integral to the processing. It is, after all, a manipulation of the amplitude of the L/R difference signal that creates the perception of a wider sound field. With Vorsis, you'll get smear-free enhancement of the stereo image that can be as wide as you desire. But that's only the beginning – you can also control the stereo image width on a frequency-conscious basis and use L+R to L-R signal ganging to prevent the image from wandering uncontrolled. It's already field-proven to manage wide discrepancies between the recording techniques of various eras (oldies to the over-mastered music of today) and even reduce multipath interference.

Surgical Limiting and Clipping

To some the idea of 31 bands is scary. Not to us. It's simply amazing what can be done with it. Limiting and clipping's primary purpose is peak control to increase loudness; the less audible in its action, the better. 31 bands allow surgical limiting – its dynamic operation is nearly inaudible to the ear so the resulting sound is louder AND cleaner. It also provides unprecedented opportunity to further fine-tune the sound. FM and HD/DAB have entirely different transmission characteristics, so Vorsis processors have completely separate limiting and final peak control sections for analog and digital broadcast.

Welcome to the 21st Century

Vorsis is the first processor designed for the needs of a modern radio station and its listeners. Visit the web to learn more and read our application notes and white papers. Call us to set up a demo today.

It'll make a HUGE difference in your station's sound AND your bottom line.

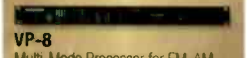
The Vorsis Lineup

AP-2000
Digital Spectral Processor for FM analog and HD/DAB
- 5-band dynamics controller
- 31-band limiter/clipper

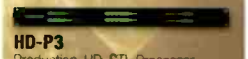
FM-2000
AP-2000 without HD/DAB section

AM-10HD
Digital Audio Processor for AM analog and HD
- 5-band dynamics controller
- 10-band limiter/clipper

FM-10HD
Digital Audio Processor for FM analog and HD/DAB
- 5-band dynamics controller
- 10-band limiter/clipper



VP-8
Multi-Mode Processor for FM, AM, FM-HD/DAB, AM HD, MP3/AAC
- 4-band dynamics controller
- 8-band limiter/clipper



HD-P3
Production, HD, STL Processor
- 3-band AGC

M-1
Digital Mic Processor

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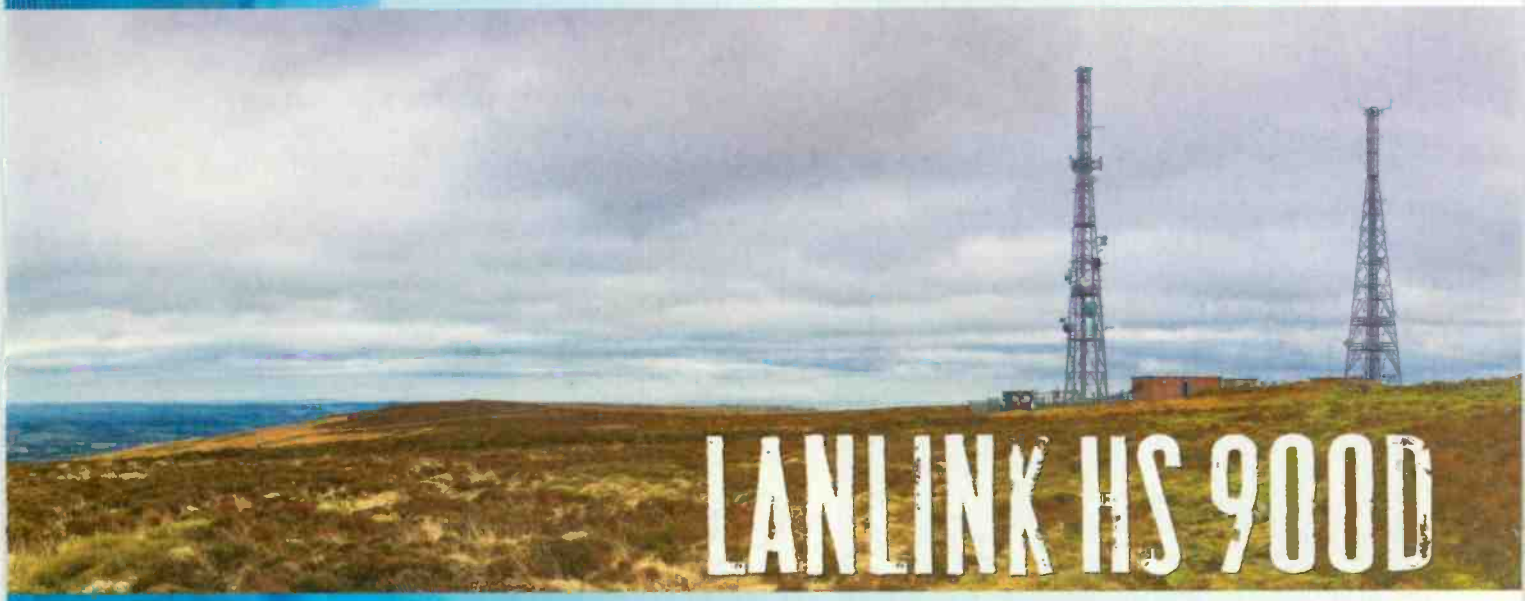

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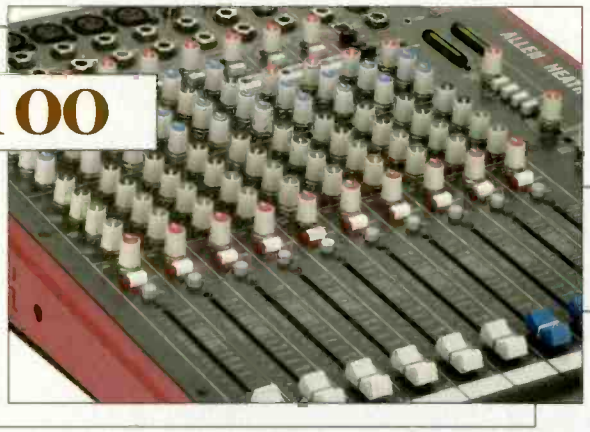

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ON THE COVER

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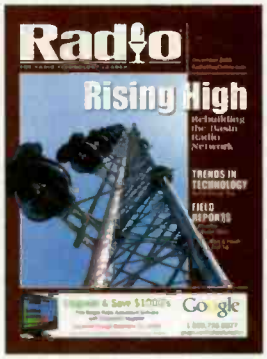

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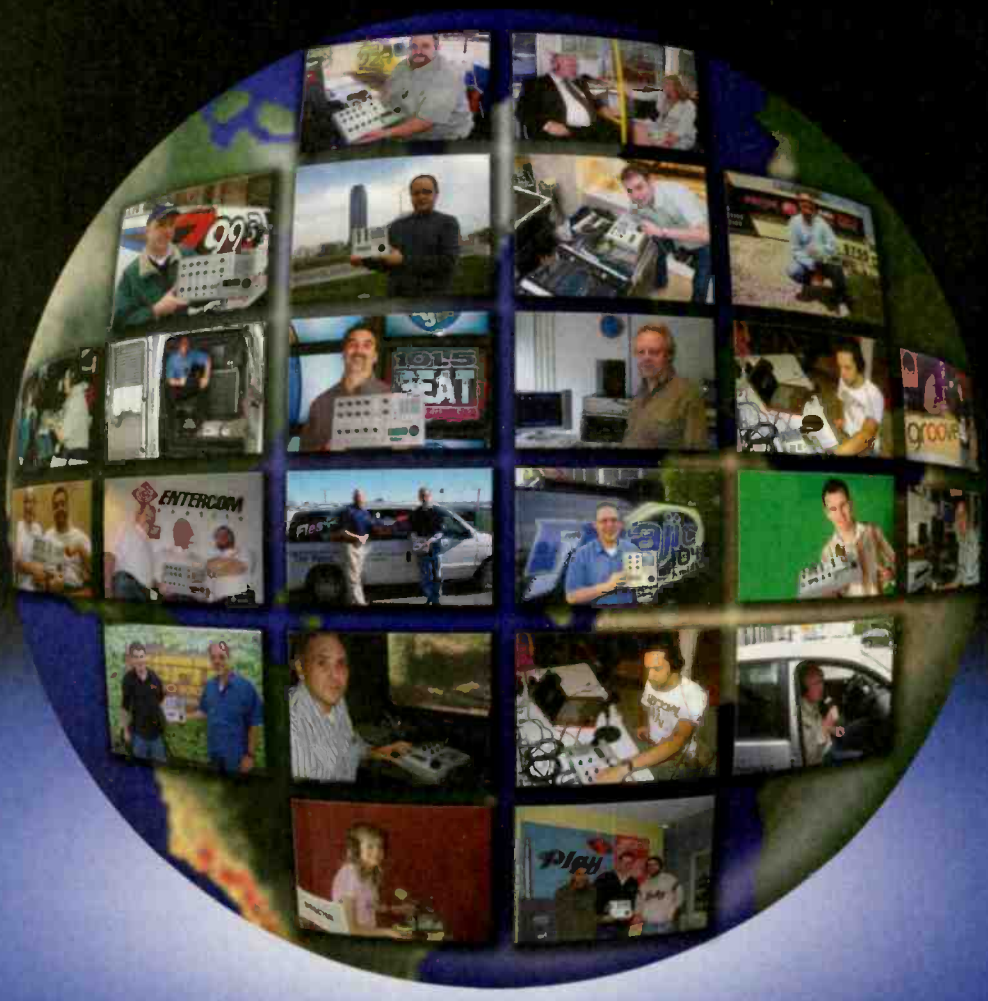

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Currents Online

Selected headlines from the past month.

Nautel Expands Support Services with New Memphis Parts Depot

The parts depot is located minutes from Fedex's Memphis hub and allows expedited North American parts delivery to Nautel customers.

ATI Moves to Larger Offices

ATI moves out of the Day Sequerra offices, which previously owned ATI.

Housing Registration Opens for 2009 NAB Show

The 2009 NAB Show runs from April 18-23.

FCC's Adelstein Calls for PPM Investigation ➲

Adelstein's concern is that the PPM presents a threat to media diversity

Adelstein

Ledtronics Marks 25th Anniversary

The company began as cottage industry in a suburban garage in 1983.

Logitek Posts Sale of First Jetstream IP-Based System

KFCF Radio, Fresno Free College Foundation, ordered a Jetstream Mini router and a Remora control surface.

Axia Seeks Mac Users for IP Audio Test

The beta-software release of the IP audio driver is designed for Intel Macs with OS X v10.5 or higher.

Find the mic and win!

Tell us where you think the mic icon is placed on this issue's cover and you could win a Heil mic courtesy of Heil Sound.

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Site Features

Vote in the Excellence Awards

Four facilities are highlighted in the Buyers Guide Section of this issue in the first annual Excellence Awards. Cast your vote online and help determine the winner.

Talkback is the Radio Blog

Talkback is the name of our blog. Read comments on current events, trends and happenings in radio.

Radio magazine Forums

Everyone needs a little help sometimes. That's what the *Radio* magazine Forums are all about. Post a question, read the responses, and be a part of the community.

The Engineers Notebook

The pull-out card in this issue is also available online, and all that information and more are part of the Engineer's Notebook. It's loaded with tips, ideas, conversions, circuits and other useful references.

Advertiser Links

Web links to the advertisers in the July issue.

Industry Events

The *Radio* magazine Industry Events section lists upcoming conventions and conferences. Plan ahead for 2009.

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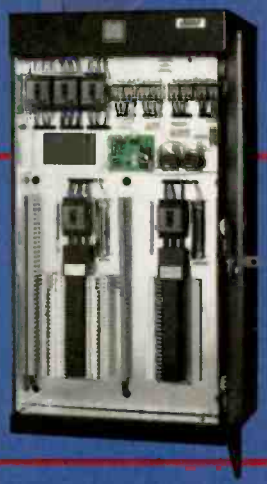

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16? Sweet!

With 2008 drawing to a close, we at *Radio* magazine are looking back on the past year. We're also looking back at the past 15 years. Why the past 15 years? That goes back to 1994, the year *Radio* magazine was first published.

So while *Radio* magazine is celebrating the past 15 years, it actually traces its roots to 1959 when *Broadcast Engineering* magazine was first published. For 35 years, *Broadcast Engineering* covered radio and TV. But in 1993, Brad Dick, who is still the editorial director of *Broadcast Engineering*, and Dennis Triola, who was publisher at that time, realized that while radio and TV share a common history, the two sides of broadcasting were better served by two separate publications. *Broadcast Engineering* continued with TV, and the radio content was directed into the version you're reading now.

I wasn't involved in the foundation plans of *Radio* magazine, but after several years as a contributor to *Broadcast Engineering* and then *Radio* magazine, I was given the opportunity to continue its development when I was hired as the editor in 1997.

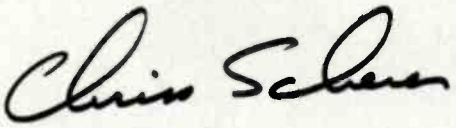
I moved to Kansas City that year, which is somewhat ironic since I turned down a job offer a year earlier to work at a radio station in Kansas City. But one day in 1997 while handling several simultaneous crises at WMMS Cleveland, including having to repair the wired-in-place telephone switchboard, I received a phone call asking me if I was interested in the position as editor of the magazine. I looked around at the must-be-fixed-right-now projects that were in various stages of completion, still wondering how I would get it all done, and I thought to myself, "Give all this up? And get out of show business?"

Obviously I took the job, and like you I'm still in show business. While I may work in publishing, I still consider myself a radio broadcast engineer. We all have to adapt to changes, just like radio itself is adapting.

So what's ahead for the next year (or even the next 15)? The monthly print version is still important, and we'll continue to develop the magazine to enhance the website and vice versa. We're also doing more online than ever before. This past summer we redesigned the site to improve how information is organized. We launched blogs and forums, and presented our first live webinars. We have also produced podcasts since January 2007.

We're building a community for radio media engineers, and I want you to be a part of that. We have more projects and ideas in development, including another online resource that we expect to launch very soon. I hope you'll participate in this community by posting and commenting. Of course you can always contribute by sharing your ideas for Facility Showcase articles, Field Reports, tutorials and other topics with me.

We have 15 years behind us with a 50-year heritage behind that. As the radio industry continues to evolve, so does *Radio* magazine. It's sweet 16 for *Radio* magazine, and I'm glad to be a part of it.



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

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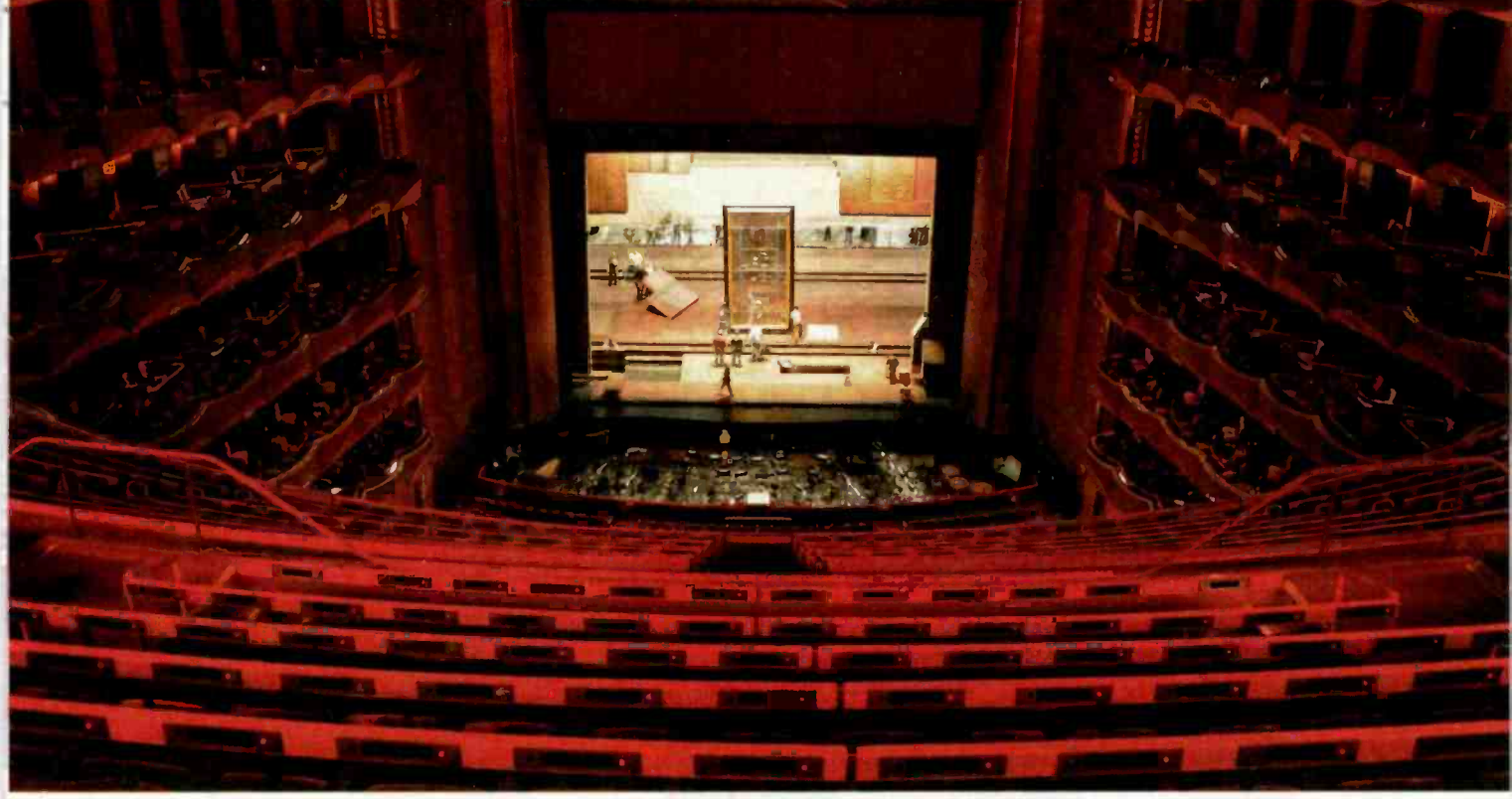

Photo: Jonathan Tichler/Metropolitan Opera

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—Matthew Galek, Broadcast Engineer for The Metropoiltan Opera

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Getting out of the noise floor

By Kevin McNamara

Believe it or not, working in radio used to be fun! Those of us who got into the business in the 1970s and earlier were drawn in because there was some magic about having an association with a radio station. We ended up working alongside the same on-air personalities we listened to as kids. There was a time when people were actually impressed to know someone that worked in radio because radio was bigger than life. Memories were made listening to the radio.

A successful radio engineer needed a unique mixture of skills like creativity, problem solving, dealing with egos, dealing with non-technical managers and working long hours, in addition to an aptitude in audio and RF. Radio engineering in its most basic form always represented something new and something challenging. Looking back on all of it, I think many of us now see those situations as fun on some crazy and what we now call geeky level. Most people don't get to mix work with their hobbies.

I'm not sure when the fun left engineering. Perhaps it was deregulation; limiting the amount of stations a person could own seemed to make better owners. Maybe we can blame Wall Street and the point when radio owners figured out they could go public and suddenly needed to keep the stockholders happy. Or possibly it was the ever-improving automation technologies that took the personality out of radio.

But here we are. Many of us are now left with the responsibility of solely running the show, which doesn't really permit us to do what made us enjoy the business in the beginning. Perhaps the fundamental problem is simply the loss of control we once had. Or the lack of time we now have to complete those (once fun) tasks, or maybe responsibilities are taking us in a direction that seems less interesting.

You're not alone

Satisfaction usually equates to fun in the workplace. According to studies of many large organizations, employees are apparently having less fun at work. Statistics from the U.S. Department of Labor concluded that only about 23 percent of employees are satisfied in their work situations. Interestingly, the age group that expresses the least satisfaction is in people under 25. The percentage increased in the older age ranges.

The main reasons for job dissatisfaction include:

- Excessive time and effort required at work takes away from personal time, particularly time with family and friends.
- Excessive stress created by company policies, downsizing, economic conditions, unrealistic goals and expanding responsibilities.
- Little significant income change as a result of increased responsibilities or excessive work hours.

Get the fun back

While changing the way a company operates or its policies may be a little beyond your control, you can change the way you approach a job. Jack Welch, the former CEO of General Electric, considered one of the best places to work, has many writings and statements that have become legendary quotes. I think one of those quotes sums up concisely the underlying source of an individual's satisfaction: Control your own destiny or someone else will.

The vast majority of people seem fine with being told what to do, how to do it, when it needs to be completed, etc. If this were not true, most people would leave their situation for another opportunity. The fact is most people don't work well outside their comfort zone. Combine that with the pressure of financial and family obligations and we have a society of people who will tolerate a job they hate. Interestingly, many research studies also indicate that the current generation of college graduates entering the workforce see themselves in a position for only a short time and feel no pressure to stay at any one position/company if a better opportunity is made available to them. These Millennials believe job-hopping is the key to growth and happiness. In fact, according to the U.S. Bureau of Labor Statistics, more than half of all 20- to 24-year-olds had been with their employer less than 12 months.

While this job-hopping approach may not work as well, particularly in this current economic downturn, with so many qualified and experienced employees seeking work, the take-away is that you always have the control to create a better experience for yourself.

Manage your time

Most companies advocate time management to employees, but their purpose is to make the company more efficient and profitable. But we can't forget personal needs. I am not aware of any company's time management processes that include things like "spend time with your family."

What you need to do is utilize time management in both your work and personal life. Many books about happiness cite the need to have balance in life. Create a time management plan that takes into account all the things that will make you happy and satisfied. The hard part is making the time to follow through on these things.

Don't forget hobbies. Hobbies are like jobs that we get to do on our own terms. We get to set the expectations, how much money and time to spend doing it, etc. Whether playing golf, watching football, building sand castles, whatever, it's *our* time.

Embrace technology

Never has technology become more accessible to the general public. Years ago we were forced to design and build custom devices. This necessity was probably the most satisfying part of the job – seeing something you created, working flawlessly and solving the problem.

Even in a networked environment there is always a need to fix, modify or create something. The choice of hardware and software tools is almost limitless and so is your capacity to home-brew new solutions that will be far more fun and personally rewarding. As an added bonus, you will learn new skill sets that can make a transition into a new career easier. That goes a long way to controlling your own destiny.

The radio industry, like so many others, has gone through huge changes in the way business is done. Take a few steps back and look at how the change has impacted you and how your level of job satisfaction has changed over the years. You may see that proactively balancing your life with work will ultimately help bring some of the fun back into radio.

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

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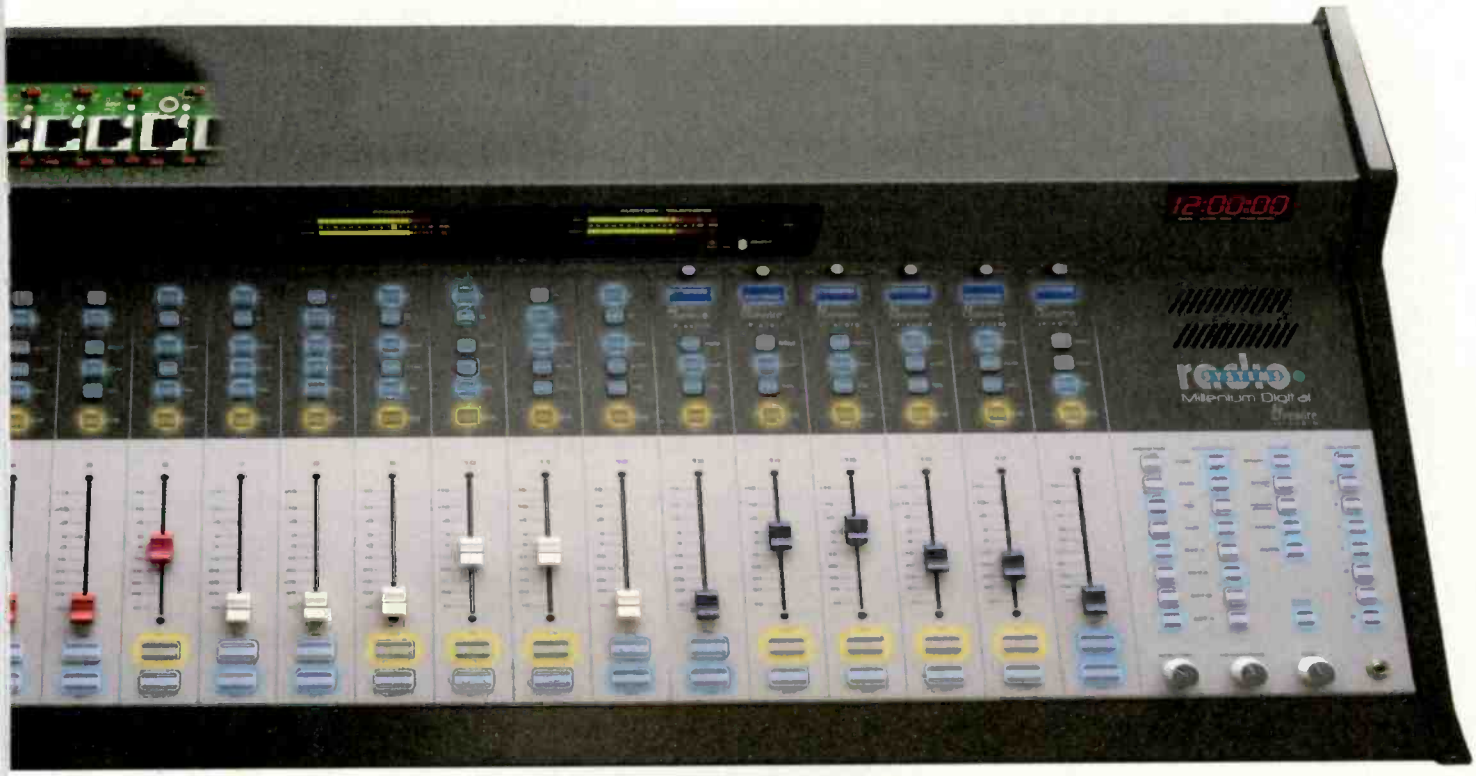

ANALOG is good. There are over 4000 analog Millenium consoles in service today and we continue to manufacture and ship analog consoles every day. That's because these boards are inexpensive, sound great (with specifications that rival and exceed many digital designs) and have enough features for many small and medium market applications. For more demanding applications, our analog consoles optionally can be equipped with additional mix-minus outputs, distributed output busses and redundant supplies making them even more capable and still a great value.

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FCC may mandate HD Radio reception by satellite receivers

By Harry Martin

In August the Commission issued a notice of inquiry (NOI) under the aegis of its XM-Sirius merger order seeking public comment on whether the FCC should (or can) mandate that satellite radio receiver devices include HD Radio receivers. The FCC deferred consideration of this matter when it approved the merger in July.

HD Radio, the digital broadcast technology developed by Ibiquity and endorsed by the FCC in 2002, has struggled to find marketplace acceptance. As part of its opposition to the XM-Sirius merger, the broadcast industry urged the Commission to consider the competitive impact of satellite radio on the fledgling HD Radio service. Congressmen Dingell and Markey urged the FCC to require open access to both satellite and HD Radio digital receive devices. Under the Dingell-Markey proposal satellite receivers would have had to be capable of receiving HD Radio and vice versa.

Dateline

Feb. 1 is the deadline for submission of biennial ownership reports by radio stations in Kansas, Nebraska and Oklahoma.

Feb. 1 is the deadline for radio stations in the following states with more than 10 full-time employees to electronically file their Broadcast EEO Mid-Term Reports (Form 397) with the FCC: Kansas, Nebraska and Oklahoma.

Feb. 1 is the deadline for radio stations licensed in the following states to place their annual EEO Reports in their public files: Arkansas, Kansas, Louisiana, Nebraska, New Jersey, New York and Oklahoma.

In approving the merger, the FCC decided not to adopt mandated receiver compatibility. Instead it accepted Sirius-XM's voluntary commitment to open access, allowing third parties to develop and design equipment and not to bar the inclusion of audio technology, including HD Radio, in those devices. But the FCC also promised to open a proceeding looking toward mandated mutual compatibility of receivers. The August NOI does just that.

The NOI presents for comment a number of specific questions, including:

- What is the state of HD Radio? Is there a need for intervention in light of marketplace developments? Would FCC-imposed requirements help to facilitate deployment?
- Were the voluntary open access commitments that were adopted in the merger order sufficient to address any possible problems?
- Should the FCC require inclusion of HD Radio receivers in satellite-receive devices, and if so, should that requirement apply to all such devices or just those with the ability to receive analog terrestrial radio signals?
- Would mandating inclusion of HD Radio receivers in satellite receive devices promote competition among Sirius XM, HD Radio, and other audio technologies, thus serving the public interest in lowering prices and increasing programming? Or would such mandates unduly burden the SDARS market?
- Should the FCC likewise mandate that all HD Radio devices incorporate satellite-receive capability?
- Does the FCC have statutory authority to require receiver manufacturers to include certain technologies in receivers?

The answer to the last question might render *all* the other questions moot. And this could happen. Unlike the situation where Congress mandated DTV receive capability in TV sets, or required that VHF sets have UHF tuners, there is no law imposing such a compatibility requirement on radio receiver manufacturers. However, the Radio All Digital Channel Receiver Act (H.R. 7157), introduced by Rep. Markey, would provide the necessary authority if it is eventually enacted. Due to this legal uncertainty, it is unlikely the FCC will mandate cross-compatibility unless and until Congress gives the FCC authority to do so.

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.

Friday Night Delivery

By Steven Orr and Tony St. James

KFLP-FM studio workflow supports Internet distribution model

Paramount Broadcasting stations KFLP-AM/FM broadcast country music (25kW FM) and agricultural news (250W AM) from their studios in Floydada, TX. The station's most popular offering on the FM is the weekly syndicated program *West Texas Friday Night Scoreboard Show*, which airs Friday nights from 10 p.m. to midnight throughout the high school football season. The weekly show reports highlights and scores from 50 Friday-night high school football games played in West Texas. Six employees support the live program, including the host/producer, main talent, a scoreboard writer, production engineer and two phone reporters.

Friday Night Delivery

When KFLP started gathering its affiliate audience, the station chose satellite services to distribute the show. Shortages in receiver supply and scheduling conflicts within the provider's distribution network created challenges at the affiliate level. Technical difficulties piled on top of the other challenges, as the station was forced to rely on third party engineers to address problematic feeds and troubleshoot the issues.

Rate increases were the final straw. Last year, KFLP opted to explore other distribution platforms that were less expensive and without the many technical issues of satellite. The goal was to establish a system that used identical technology at each affiliate and allowed KFLP to take complete ownership of the solution, including the engineering aspect.

Pre-recorded interviews for WTFNSS are produced in Studio B.

The station implemented a low-latency audio over IP system within its existing radio broadcast workflow to distribute the program live to 35 affiliated stations. Based on Barix audio over IP encoding and decoding hardware and a backend streaming infrastructure from Stream Guys for Internet distribution, the approach provides a highly robust and reliable multipoint platform for audio distribution that maintains the superior audio quality required for professionally broadcast, syndicated programming.

The workflow

The broadcast workflow for *West Texas Friday Night Scoreboard* begins at KFLP headquarters, a 24'x24' building comprised of three production studios connected to a master control center for on-air operations. KFLP's strategy is to use technically strong, operationally simple equipment that fits into the modest budget of a small-market station. Much of the station's equipment is consumer grade as a result, although there is a strong emphasis on maintaining high quality content and well-engineered broadcasts.

West Texas Friday Night Scoreboard is produced in Studio A, a 9'x9' studio featuring a Yamaha MG124c mixer with eight hard-wired, unbalanced input sources to produce the live broadcast. On-air sources include an Electro-Voice PL-20 microphone (host) and a Sennheiser MD-421U auxiliary mic for guests; a Telos Zephyr Xstream ISDN unit, two Dell computers with BSI Simian automation, an Optimus CD-8400 compact disc player, and a Realistic utility switch for toggling between AM and FM feeds. The Dell computers are labeled as CPU 1, which triggers commercials and recorded interviews during the show; and CPU 2, used to update the KFLP website and maintain contact with stringers who electronically submit scores to the program.

Reporters begin calling in from the field about 10 p.m. Central Time to provide play-by-play highlights and game recaps. An AT&T 944/964 four-line telephone system is the anchor that supports the on-air reports. The audio to the telephone is sent through the Yamaha mixer, utilizing its mix/minus feature to emphasize or reduce caller audio in the mix. An Excalibur Handi-Coupler acts as an interface between the mixer and telephone so the producer can split the send and receive audio from the phone line, and provide exceptionally clean audio at a lower cost than investment in a hybrid unit. The Telos Zephyr Xstream (ISDN) allows KFLP to originate or receive ISDN calls, which the station can also use to produce very clean sounding POTS calls in tandem with a Lucent ISDN 970 phone.

The Yamaha mixer includes a variety of outputs, including two $^1/_4$" aux busses: Aux 1 feeds the Telos Xstream ISDN codec, and Aux 2 feeds the regular telephone. The ISDN line is mostly used to provide consistent, clean audio for daily guests of KFLP's agricultural programming who call in from across the United States. The aux bus outputs are critical to the mix/minus capability employed for *West Texas Friday Night Scoreboard*.

Other Studio A mixer outputs include monitor out to STAV-3870 amplifiers, which power two Realistic Nova-16 speakers for live program monitoring; and a record out that feeds a CPU 2 audio card for recording into the BSI Simian automation system. More importantly, the main XLR and $^1/_4$" outputs are reserved for Behringer Multicom Pro XL processors, which represent the only true audio processing within the end-to-end chain.

These feed the CPU 1 audio card for recording to Simian (XLR) and a Barix Instreamer IP audio encoder ($^1/_4$"). All output feeds are sent through a distribution amplifier to the master control center, the final destination point prior to local broadcast and distribution to the affiliate stations.

The distribution channel

The Barix Instreamer is the first piece of the puzzle in the Internet distribution platform from Floydada to 35 locations.

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Friday Night Delivery

Tony St. James (left) and Steven Orr host the *West Texas Friday Night Scoreboard Show.*

The Instreamer encodes the audio as MPEG-2 stereo with a sample rate of 22.095kHz, which results in a stream rate of 48kb/s, and transports it into a Stream Guys Internet streaming platform for distribution to affiliates.

KFLP purchased a total of 37 Barix Exstreamers, including one spare unit. One Exstreamer sits in master control, pulling the live program off the same streaming architecture as the affiliates and decoding it for local playback over the air. The local Exstreamer interfaces with a Broadcast Tools SS8.2 automation switcher to synchronize the local feed with what is being received at the affiliate stations. The BSI automation breaks into the Exstreamer feed with commercial breaks and promos, provided the show remains on exact time. The Exstreamer also feeds the live signal into a pair of Audiovox monitor speakers for real-time monitoring, allowing staff to act immediately in the event of technical problems with the feed itself or any of the equipment in the chain, such as the ISDN/telephone systems.

The Internet streaming workflow is based on the Stream Guys low-latency Internet distribution service, implemented using Barix's Real-Time Protocol (BRTP) to ensure that program delay at the affiliate side is at an absolute minimum. The aggregated server infrastructure from Stream Guys is comprised of a load-balanced Linux server cluster to receive and transport the feed over a robust streaming network that maintains premium audio quality from point to multipoint. Built-in redundancy at every level ensures the stream is playing out live at all times, with secondary and tertiary streams picking up the live streams in the event the main stream momentarily fails.

KFLP loaded each Exstreamer with Barix's specialist Streaming client firmware and then configured each device with an IP address and port number to capture the stream from the Stream Guys server cluster. Each Exstreamer is configured to check for the stream every five seconds. When KFLP begins pre-roll on Friday, the Exstreamer automatically grabs the audio and is ready for the show at 10 p.m. The Exstreamer continues to check for the stream in the event it is lost during the show, and automatically re-acquires it upon return. The Telos Zephyr ISDN serves as another redundancy layer to the live stream, feeding a toll-free service called Teamline that provides low-latency audio.

At the affiliate site, the preconfigured units are plug-and-play, simply requiring power, network and audio output connections to be fully operational. KFLP affiliates are walked through the initial setup process to ensure proper connections and to confirm the device is enabled to receive the stream without intervention.

Back at the local level, the master control center is the final stop before the signal is transported to the transmission facility via and broadcast over-the-air by way of a Harris HT20 FM tube transmitter and an Energy-Onyx Pulsar 250B AM transmitter. The master control center includes similar equipment for both the FM and AM air feeds, including Behringer UBB 1002 mixers, Starguide satellite receivers for external programming, streaming audio computers, and BSI Simian automation workstations for managing on-air playlists.

Master control also ties to Studio B, a 4x6, single-person, backup production studio featuring a Behringer

Both stations' signals are routed through Master Control.

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MX 802A mixer; Studio C, a 7'x9' studio currently under construction that will become the hub for the All Ag Network, KFLP-AM's hub for agricultural programs; and the technical engineering room, a modest 3'x3' space featuring a 6' rack with an EAS unit, BSI automation hub, telco equipment, Internet and network hubs. Punch blocks and Belden audio cable provide facility audio routing, and multiple-pair cable pulls are used throughout the entire 24'x24' space.

KFLP's minimalist attitude toward its equipment applies to the quality of the audio signal as well. The station prefers to keep the audio as raw as possible at the central studio and deliver a high-quality, minimally processed signal. This way, affiliates that choose to employ several levels of processing will start with a pure studio feed from KFLP. The final on-air product will not be over-compressed, and will sound similar to the affiliate's normal programming.

In addition to *West Texas Friday Night Scoreboard*, the station distributes programs from its All Ag Network, including Agriculture Today and the Agri-Business Report, via FTP to affiliates. The shows can be produced from anywhere and uploaded via high-speed Internet to KFLP's servers, where affiliates can download the shows for immediate or later airings.

The 2008-2009 football season marks the second straight season during which KFLP will broadcast the show using Stream Guys low-latency (BRTP) Internet distribution service with Barix Audio over IP hardware devices. The new Audio over IP workflow and Internet distribution system provides a highly cost-efficient and technically reliable platform that outperforms the previous KFLP satellite distribution system in many ways.

Orr is director of affiliate relations, sales manager and on-air host; and St. James is general manager, producer and on-air host at KFLP.

Equipment list

Barix Exstreamer, Instreamer IP
Behringer Multicom Pro XL, MX 802A, UBB 1002
Belden cable
Broadcast Tools SS8.2
BSI Simian
Electro-Voice PL-20
Energy-Onyx Pulsar 250B
Excalibur Handi-Coupler
Harris HT20
Sennheiser MD-421U
Stream Guys Internet streaming
Telos Zephyr Xstream
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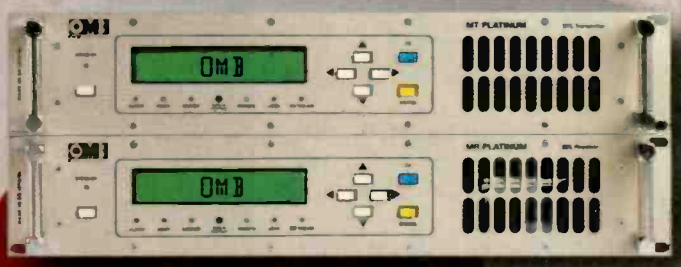
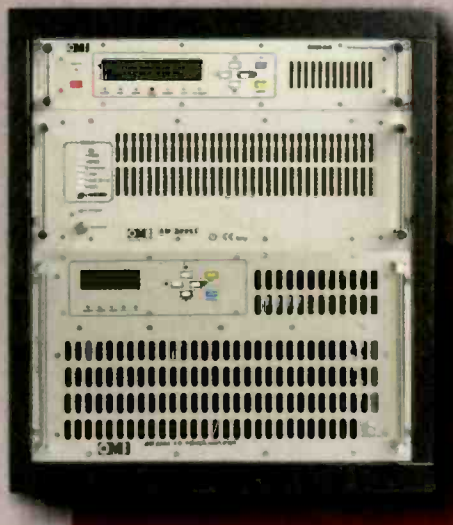


MT/MR PLATINUM

>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 amplifying 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 amplifying modules works independently thanks to a power combining structure that provides high isolation between them.

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Great ideas in studio design

By Doug Irwin, CPBE AMD

During the planning phase for construction of a radio station experience will come in to play, along with desires to do something new. Sometimes when confronting design problems it is helpful to have access to other engineers' approaches to the same or similar problems. This could go on for page after page, but I've picked some good recent examples: an easy way to get access to dozens (or hundreds) of audio sources from your networked PC; a means to mitigate lightning damage in the worst of circumstances; a way to handle the selection and distribution of mix-minus feeds for multiple radio stations all under the same roof; and finally a convenient way to solve the age-old problem of off-air reception at the new place. Take a look. I think you'll find all of them to be interesting.

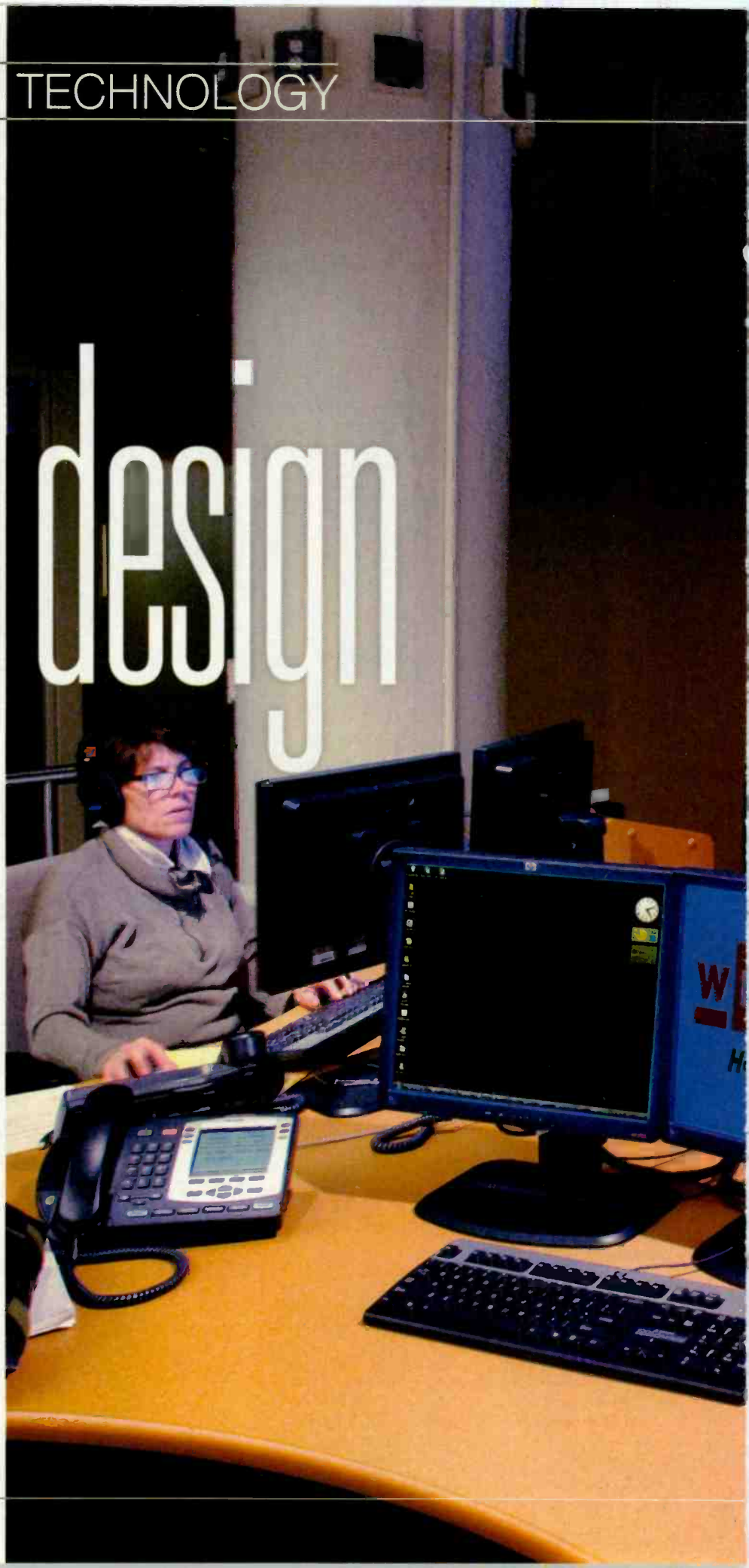

Photo courtesy of The Systems Group

WNYC in New York City's large newsroom.

Multiple monitors

In the "old" days, one feature of a radio station technical facility was a means by which audio from multiple sources could be sampled at multiple locations. There are many examples of how this was done: The most modern and effective means up to this point was having a routing switcher, and having a router head at each of the locations.

Audio TX Multiplex

This is somewhat of an expensive proposition. Some routers could alternatively be accessed via a virtual control panel that would be live on a computer workstation, but even this required the use of a router output; so the proposition was still quite expensive.

Before that, likely the station had an array of pushbutton panels; a good example of that would have been the PR&E LS-10. However, if you were building a newsroom for a well-staffed news radio station, you could have a dozen or more switch arrays such as this. Installation of such a system would have been time-consuming, and therefore very expensive. Dedicated pairs of wires needed to be installed and were used (however frequently or infrequently) for this purpose alone.

Going back even farther than that, you would often see homebrewed switch panels, all made by someone in the engineering department, installed at each location. My favorite version of this was the rotary switch/Op-amp Labs/4-inch speaker built into a bathtub chassis. Of course it worked great until the rotary switch got noisy. Then someone had a big soldering job ahead.

So fast-forward back to the present. If you were building a new studio facility, what would be the best way to handle this requirement? Could there be a streaming audio approach? One that would make use of the computers you already have at each workstation, along with the network wiring already installed? A method that would effectively add nothing to the wiring costs? Of course there is: the Audio TX Multiplex.

Multiplex is a system that consists of the audio server with associated software, along with client software (called Audio TX Multiplex Receiver) for each of the workstations in use by those who need access to multiple audio sources. One server can give access to as many as 96 audio sources for the system; an additional server(s) can be added to handle more audio sources. The server accomplishes IP multicast so that multiple users (over a LAN or WAN) can access the streams simultaneously. The

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system is licensed based on the number of audio sources that make up the system. Each of the source channels can be configured for different levels of quality; for example, 20Hz to 20kHz audio bandwidth, uncompressed, with a 48kHz sample rate would represent the high end of the quality scale. The user can also select lower sample rates, mono as opposed to stereo, and data compression schemes such as MP3 and MP2 with mono data rates down to 64kb/s.

One very slick and impressive installation of Multiplex in the field is at WNYC in New York City. WNYC has just completed a very large facility build in the SOHO neighborhood. As the NPR affiliate in New York, the newsroom is very important, and very large; that department's staff is made of 30 people. (Jim Stagnitto, WNYC director of engineering, was kind enough to show me the installation.) The WNYC system has 32 inputs, which include studio program feeds, network feeds and of course local sources such as other radio stations in the market. The client software is opened on any one of the workstations on the network, and after the source is selected via the very simple GUI, the audio plays through that workstation's speakers. Great functionality is provided to the newsroom personnel. Engineering and production personnel can also use it for quick troubleshooting while sitting at their desks.

Better connections

One of the ironies of new studio construction projects (and often existing locations as well) is that there are off-air reception difficulties. It could be difficult to pick up one of the stations housed in the facility itself; it could be difficult to pick up an important competitor; it could be difficult to pick up a news source; or it could be tough picking up your designated EAS source or sources.

Many years ago I was the chief engineer of Wild 107 (now Wild 94.9) in San Francisco. We competed against two other stations for what was essentially the same audience group across the entire Bay Area. The

Clear Channel NYC recently consolidated five stations.

PD wanted me to make an air monitor signal available to the jocks not only from our San Francisco competitor (KMEL) but also from our San Jose competitor (since this was an embedded market) known then as Hot 97. The challenge lay in that it was impossible to pick up Hot 97 in San Francisco; not only was it about 40 miles away, but it was separated from us by the hills that make up the San Francisco peninsula. Add to that the fact that our studio was near Fisherman's Wharf in the city, adjacent to Telegraph Hill. We had a hard enough time picking up San Francisco stations there, let alone a San Jose facility.

But I wasn't one to simply say it can't be done before giving it some thought. As it turned out, this PD lived on the Peninsula, about 20 miles or so south of our studio location, and at his house, Hot 97 came in fine. So if you're guessing now that I put a receiver in his garage, and dropped an 8kHz phone line in, you'd be correct. Problem solved.

So fast forward 15 years to New York City. Clear Channel recently completed a large consolidation project, putting all five of its NYC FMs (WHTZ, WKTU, WAXQ, WWPR, and WLTW) under one roof in downtown Manhattan. One of a myriad of engineering problems that needed to be solved was making six EAS sources readily available in our master control, so they could be distributed to the various EAS codecs located across the facility. Our five stations required the six sources not only because of the guidelines of the NYC EAS plan, but also because WHTZ Z100 is licensed to Newark, NJ, and follows the New Jersey state plan. Its designated sources (WFME and NJN, the New Jersey Network) come from New Jersey.

Even though our location is way downtown in Manhattan, and our building kind of lords over the neighborhood, it's still, for the most part, impossible to pick up the two AM sources we needed (WINS and WABC) in our 3rd floor MCR because our building is of an old-fashioned design (lots of steel) and AMs don't penetrate well. The FM and NWS sources come in better, but reception of them on the 3rd floor is subject to multipath that frequently changes. We planned on accessing NJN via off-air reception of channel 51 TV transmitted from Montclair, NJ (northwest of Manhattan), so multi-path issues were feared for it as well.

If you have worked on a large radio station facility construction project you know many of the problems are solved empirically after the fact either because they are unknown during the planning phase or because some parameters or circumstances change between the time the planning is done and the time that the facility is finished. We found that reception of our EAS sources was more problematic than imagined during the planning phase of the project. Perhaps this is my favorite type of challenge during a large project such as this: studying the problem at hand; looking at the resources that are available; and then crafting a solution. I remembered the solution I had

come up with 15 years earlier to pick up Hot 97, and I decided it would be a lot easier to receive the sources where they were strong and clean, as opposed to fighting weaknesses in Manhattan. However, 8kHz phone lines for transport were not in the cards.

The Empire State Building is still the tallest structure in Manhattan, and as you can imagine, picking up VHF signals on the 83rd floor there is quite easy. WQXR and NWS were two sources we needed. WQXR transmits from Empire, so it was a slam-dunk. One of our local NWS transmitters came in fine there, too.

The top of our building in Manhattan is at about 500', not really surrounded by other buildings, and a couple of our other sources, namely WFME and WINS, were easy to receive there.

Our disaster recovery site, located in New Jersey west of Manhattan, was a great location from which to pick up WABC, along with NJN on channel 51.

One of the modern aspects of our new build in Manhattan was high-bandwidth, highly accessible network access at all the sites (including the roof of our building). For this reason I decided to use high-quality streaming audio to bring all the various EAS sources to our master control. The equipment I chose for the job was the Barix Instreamer (encoder) and Exstreamer (decoder), although there are other streaming appliances available as well.

The Instreamer is a small network appliance (3" x 4" x 1.5") that has two IHF audio inputs, an RS-232 port (DB9) and an Ethernet port (RJ-45). The unit must be configured by the user; but it's easy to do. Connect to it via serial, or use a crossover cable directly to a computer. Open a browser to access the configuration menus. Tell the Instreamer its network address, subnet mask and gateway. Then set the quality level of the MP3 stream to be generated; and finally tell it the address of the target decoder. Plug in the network connection.

Barix Instreamer 100 (top) and Extreamer 100.

On the opposite end, the setup is similar. Connect to the Exstreamer, provide its network address, subnet and gateway. Connect the network. Pull audio out of the IHF connectors. Within a short time you will hear the audio coming from the far end. Reconnection is automatic, in the event the connection between the two units is lost for whatever reason.

Since the Instreamer/Exstreamer pair will each handle two channels of audio, we have one at each of the three sites I mentioned above. Gone are issues with multipath, fading, and impulse noise. Our EAS sources are consistently available and clean thanks to this modern solution to an old problem.

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Arrested lightning

Being an east coast transplant I can't say I've had that much experience with lightning damage. Back in the Bay Area, we would average two thunderstorms per year (one near the vernal equinox and one near the autumnal equinox usually). I used to have one transmitter site on Mt. Loma Prieta (made famous by the 1989 earthquake) that made use of a T1 STL and twice over my tenure the network interface card got blown up when there were lightning strikes in the immediate area. Even though telco had all the wires buried, there was a big enough EMP induced in them to literally burn up resistors in the front end of the NI cards. I would have to call that a minor inconvenience compared to some of the stories I've heard though.

Cumulus Youngstown has two studio buildings and two tall towers all within 800′ of one another.

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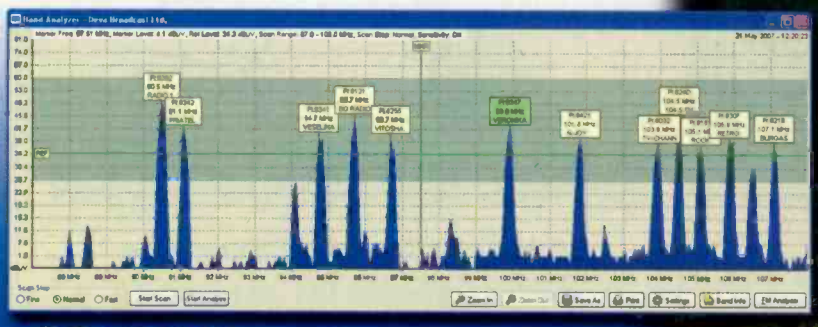

R·D·S RADIO DATA SYSTEM

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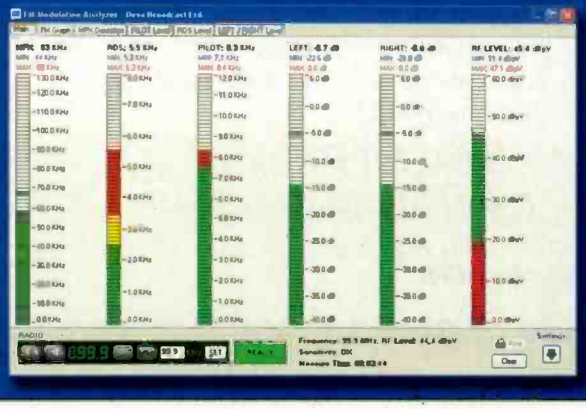
Modulation and RDS Analyzer



Band Scanner Pro

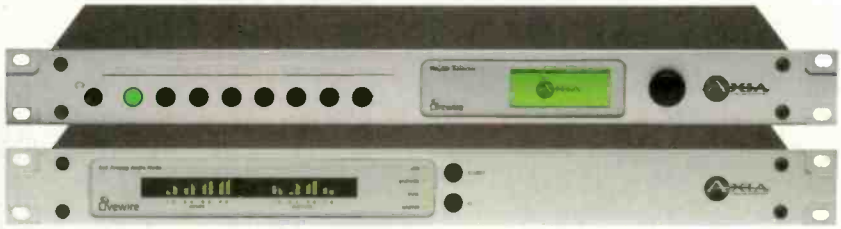
This is a tool to evaluate FM broadcast band congestion and to log station identification parameters. The "Band Scanner Pro" can measure RF level, MPX deviation, Left & Right Audio levels, RDS and Pilot injection levels. The system is powered by the USB port of any Windows PC. Supplied free of charge Windows software sweeps the receiver across the FM band, logging every carrier and generating a spectrum display of carrier level vs. frequency. It then analyzes each carrier and creates a station list. Its interface is like a portable radio: It may be tuned manually through the receiver screen or by double-clicking a point on the spectrum plot or an entry on the station list. Spectrum plots may be saved as jpg or bmp files. The RDS data error level is graphed in a separate window on the receiver screen. The program can be monitored with headphones plugged nto a standard 1/8" jack.

How can you keep large currents from being induced in wires that are in the vicinity of lightning strikes? The common approaches seem to be shielding – which may not be very effective when big currents get induced in the shield itself – and the use of multiple conductors and/or strap to lower the inductance of the path. Both methods, while helping, are a long way from being 100 percent effective.

What if you could avoid using copper wires to connect multiple points together? Wouldn't that be the best way to outsmart even the most vicious lightning strikes?

The Cumulus Broadcasting stations in Youngstown, OH, are WHOT, WQXK, WYFM, WSOM-AM, WBBW-AM, and WWIZ. This cluster includes two studio buildings and two tall towers (one about 750') all located within 800' of one another. As one would expect, all four sites are connected together, previously by copper wires in conduits buried about 4' underground. Interconnections were made via isolation transformers. However, even with those precautionary measures in place, the stations were spending thousands of dollars per year on repairs directly attributable to lighting strikes in the vicinity of the two towers. As computer networking became more and more commonplace, it became clear to the Youngstown engineers that the interconnection of the four sites via fiber, making use of the old conduits, was the way to go to solve the lightning damage issues.

Axia makes 1RU devices refered to as nodes as part of its product line. The node is a device that converts a protocol we are more familiar with, whether it is analog audio, AES3, GPIO, or even microphone level audio, into the IP protocol used over Ethernet and other network types. The pair of Axia AES3 nodes, for example, can be used to send and receive eight separate AES data streams between each other over a 100baseT Ethernet connection.



Axia AES/EBU Node/Axia Selector Node

The Cumulus Youngstown engineers built a network out of HP Procurve Ethernet switches trunked together – one at each site – making use of fiber optic cables in the physical layer. The same old buried conduits were used. Problem solved – lightning damage has been eliminated.

Wish List for 2009

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2) Retain your station's cash, capital and leverage, lower cost, outside capital

3) Wrap all equipment, technology & system costs into a single monthly payment

4) Allocate needed equipment or broadcast systems costs over multiple budget periods

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The exclusive mix

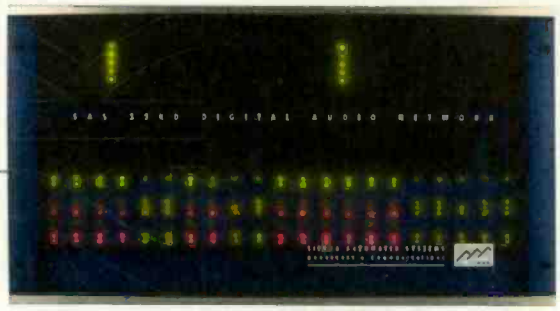
Sometimes I find myself pining for the simplicity of yesteryear in radio – until I remember cart machines. Then I come to my senses. One thing about the old days though is that stations were often stand-alones, and when remote broadcasts were done, the talent typically listened off-air right at the remote site. There simply was no appreciable delay when using phone lines or RPU.

Along with all the great possibilities ISDN codecs brought to remote broadcasts in the early 1990s came the minor issue of the coding/decoding delay. To get around that, stations started using sending a mix-minus feed to the remote site, so the talent would hear everything but themselves delayed. That problem was solved.

Then the consolidation period started, with multiple stations located increasingly under one roof. One of the obvious benefits was the sharing of resources such as ISDN codecs.

And so another problem was generated: if you planned on sharing ISDN codecs among the stations, how would you generate separate mix-minus feeds, and more importantly, how would you switch them into the appropriate ISDN codecs?

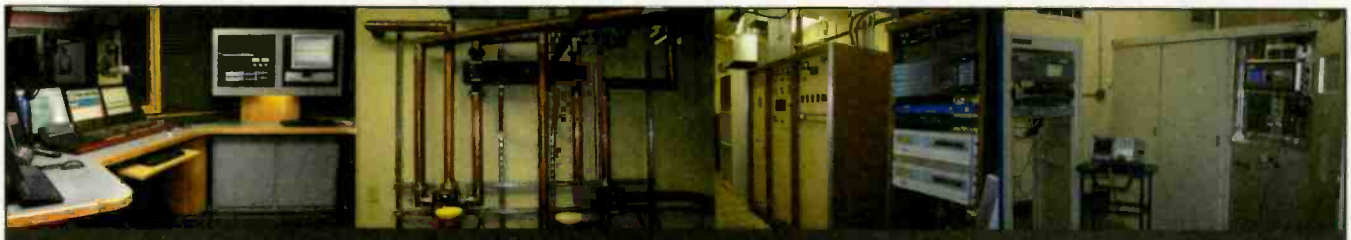
When the station was a stand-alone, it was easy: You generated a mix-minus right on the console, and fed that bus to your codec. When multiple stations came under one roof, typically you made the mix-minus in the same way, and perhaps you used a patch bay or some other type of electro-mechanical switcher to change the mix-minus going outbound.



Sierra Automated Systems' 32KD digital audio routing switcher

Klotz Vadis 880

Once routers became more common in facilities, the patch bay or electro-mechanical means was typically replaced with the router's functionality. Therein lies a problem though; the router can give you too much control. If station WXYZ



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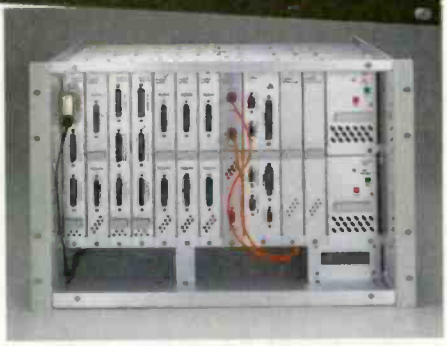
is doing a remote with ISDN codec 1 (for example) it's very easy for someone to accidentally change the mix-minus feed to accommodate another station in the group. WXYZ's mix-minus suddenly disappears or becomes station WUVW's during the middle of a remote! Unfortunately I've seen it happen. More than once.

Fortunately, modern console/router systems have a way to handle this problem. Clear Channel recently installed a Sierra Automated Systems 32KD audio routing system, so I know its method around this very real problem: dynamic mix minus. I know that Wheatstone, Logitek, Klotz and others offer it as well.

At our new Clear Channel facility in New York, we have five stations, 29 studios, and a collection of 16 different codecs (ISDN, POTS and IP types). Friday afternoon holds the biggest potential for errors in the mix-minus assignments, since we are doing remote broadcasts, taking traffic feeds from a remote location as well as remote talent via ISDN for production/imaging purposes. The 32KD is programmed to allow certain studios access to certain codecs; when the control surface in the studio is told to take that codec feed (in other words, the channel on the control surface that corresponds to that feed is turned on) a mix-minus feed is automatically made of a particular bus on that control surface (typically the one we all call off-line mix) and routed to the send input of the codec. Other studios that have been programmed to have access to that same codec can listen to the return audio, but as long as the studio using that codec has the channel turned on, all other potential-use studios are locked out from changing the mix-minus being sent. This prevents errors on the fly. This methodology has prevented the errors ever since.

Wheatstone E-Squared



Logitek Audio Engine

The radio station of today shares much in common with the radio station of yesteryear; it's the way we accomplish what we need to that has changed. Sometimes by looking at the way something used to be accomplished we gain a little more insight in to the way things are done now. I hope the ways in which these "old" problems were solved with new technology inspire you to come up with some clever solutions of your own.

Irwin is chief engineer of WKTU, New York.

More on mix-minus at
www.RadioMagOnline.com
Click on the December issue

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FACILITY SHOWCASE

Towering Over Wyoming

By Charles Dozier

Legend Communications establishes new transmission site for Basin Radio Network

The state of Wyoming is famous for its diverse geography. The mountainous terrain of the western half of the state contrasts sharply with the high-altitude prairie region of the easternmost areas. Near the eastern city of Gillette, the unusual surface features pose distinct challenges for building new transmission facilities. The terrain, climate and other environmental factors all play decisive roles in the planning and execution of the project.

Legend Communications, which operates 14 radio stations in Wyoming, recently added two new stations to its Basin Radio Network in Gillette: KAML-FM, upgraded from a C1 station at 96.9 to a C0 at 97.3, and KDDV-FM. The Basin Radio Network serves the Gillette market and beyond in the eastern part of the state, known for its flat landscape, clay-like ground surface and generally arid climate.

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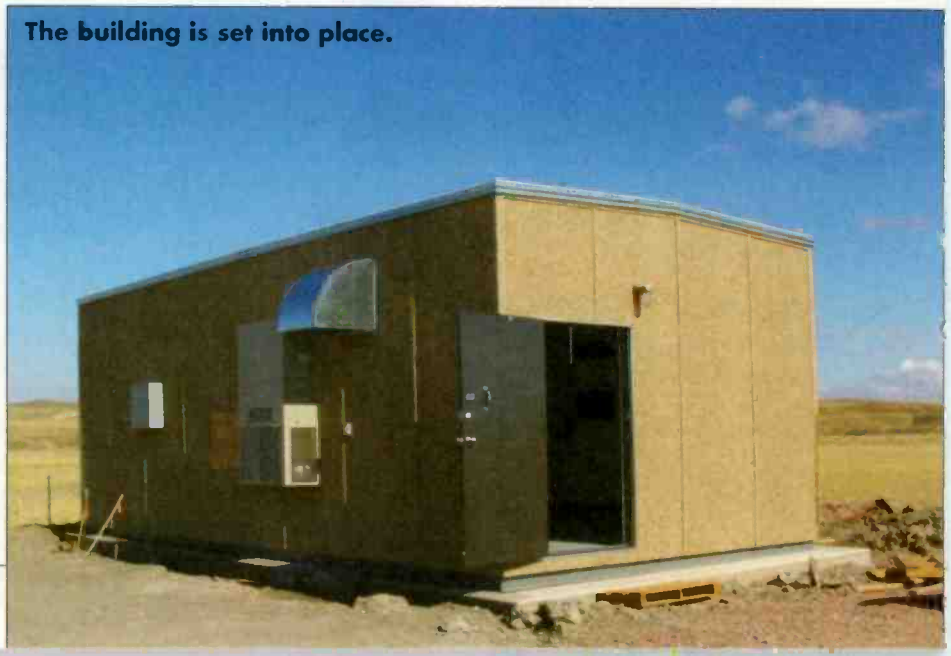
Towering
Over Wyoming

The tower foundation being laid.

With these factors in play, locating the ideal site to erect a tower was an effort. The absence of mountains made it difficult to pinpoint a location with enough height to reach the outer edges of the listening area. The closest sites with suitable heights were too far east or west to cover the market.

After much consideration, a plot on private land with access to three-phase power was secured 15 miles from Gillette. The flat topography required a tower that is the tallest man-made structure in Wyoming. The 1,153' ERI tower features a single combined antenna that emanates separate FM signals from two Harris HT30 transmitters. The transmitters, featuring Harris Digit exciters, went online in October, each broadcasting at 25kW to local audiences. The height study, conducted by consulting engineer Jeff Brock, confirmed each station would reach the entire market. Harris provided the complete transmission package outside of the tower for both stations.

The initial tower specification called for a height between 1,200' to 1,300' to accommodate two dedicated antennas. The weight of the second antenna and associated transmission line would adversely affect structural balances, driving the expense of the project up. The switch to a single combined antenna eliminated the cost of the added support.



The building is set into place.

Building steel

Rocky Mountain Erection, a structural steel firm based in Yukon, OK, installed the foundation for the tower and raised the structure. After initial engineering studies to evaluate the ground structure, the RME team was brought on-site to drill holes, remove rock and anchor the base. The flat terrain collects water easily, so the project was scheduled around the rainier months to ensure a work environment relatively free of mud and poor weather conditions.

Prior to pouring the concrete, our engineering team ran a 4" copper strap under ground to bring up over

the lip of the tower base. This provided a deep grounding system for electrical safety, along with an ERI Mag Rod for extra protection.

The main tower stands at approximately 1,050', with a pair of giant plates with 2" thick solid steel meeting near the apex. The final 100' or so comprise the ERI Lambda mounting section, a free-standing segment with a 3' sway in either direction for wind resistance. Giant bolts connect tower lights and a 10-bay ERI antenna to the Lambda mounting surface.

The ERI SHPX antenna is a 10-bay design, providing plenty of gain to hit a 100kW ERP without requiring larger transmitters. The Lambda section can be rotated, which allowed us to point the antenna in the direction that best matched our desired output pattern. The bottom bay of the antenna sits at approximately 1,040' to maintain a consistent output pattern and distance. Radomes were added to the antenna to prevent ice accumulation.

Local considerations

Eastern Wyoming is in the middle of a construction boom, and finding a contractor to build a new transmitter facility in a remote location proved impossible. We contracted with Thermo Bond of Elk Point, SD, to deliver a pre-built, customized building to house the transmitters.

Following approval of the design, the shelter arrived fully assembled with lights, electrical layouts, grounding systems and HVAC ventilation, among other attributes. Thermo Bond shipped the building by truck from South Dakota, and it was lifted off the truck using a crane and set on the concrete pad. The building was pre-inspected and included all the required electrical drops for the Harris HT30 transmitters, which simplified installation.

"The WorldNet Oslo has provided a single, high quality, integrated solution to our STL needs."

Cris Alexander CPBE, AMD, DRB
Director of Engineering,
Crawford Broadcasting

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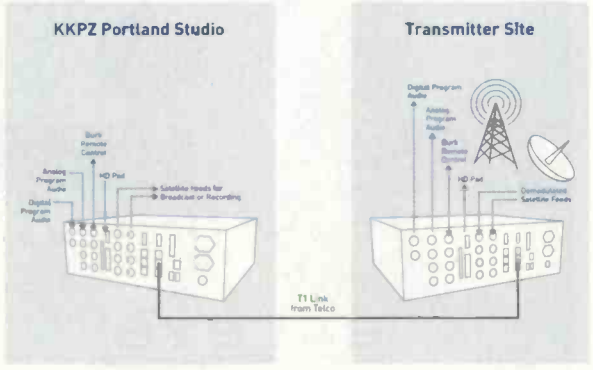
"At Crawford Broadcasting, we are currently running the WorldNet Oslo in two markets, Portland and Detroit.

In both locations, our network consists of the APT units running over T1 and conveying both analog and digital program audio from the studio to the transmitter site. We also use the WorldNet Oslo to carry data, including serial remote control, HD Radio Program Associated Data or PAD, and to bring other studio LAN functions to the transmitter site.



In Portland, the station's satellite receivers are located at the transmitter site and so, in addition to the STL functionality, the WorldNet Oslos are also serving as multi-channel backhaul, bringing demodulated satellite feeds back to the studio for air and recording for later broadcast.

We're running Enhanced apt-X® coding which ensures our multiple channels of audio and data will fit easily in the T1 link without compromising the quality of our output. Additional card capacity in the units also enables us to run back-up feeds to the transmitter should the primary source fail.

I've been particularly pleased with the performance of the WorldNet Oslo and the flexibility, reliability and quality it offers."

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The Thermo Bond building was prewired and ready for equipment.

A quarter-inch steel plate was also added to the roof for ice protection, and electrical was run into the building off the nearby three-phase transformer.

Most of the 16' x 28' interior space is reserved for the Harris HT30 transmitters. The transmitters were part of the greater Harris turnkey package, which also included the ERI high-power FM antenna and combining system, a Moseley PCL 6020 STL package, an Omnia 3-FM audio processor (installed at the studio), Andrew transmission line. Myat RF plumbing and connectors, and Bird RF monitoring equipment.

Harris performed a thorough set up of the HT30 transmitters at its facility in Quincy, IL. According to our computers, the transmitters were sharply tuned to frequency and underwent 24 hours of test runs at the facility. Reassembly at the transmission site was simple, requiring basic interconnections between the high voltage systems and main cabinets before installing the tubes and enabling the remote control

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Transmitters in place and running

system. The engineering team currently uses Burk Auto Pilot remote dial-up units to access readings from the transmitters and alert us of unusual status readings. The point-to-point Burk units communicate over subcarrier cards connected to the legacy phone system.

The Harris Digit exciters were set up at the factory to determine the amount of power needed at each station's frequency to drive the IPA modules. We like the fact that the new HT30 design eliminates a driver module that formerly bridged the exciter and IPA. The removal of that stage means the exciter compensates for the 15W to 20W of drive power that is missing now that the exciter runs straight to the IPA. But the benefits include simplification of the transmitter design and maintenance, and the purging of occasional matching problems that sometimes affected the gain.

The combiner integration was more challenging. The transmission equipment was

Equipment List

- Andrew 4" Heliax, 7/8" Heliax, dehydrator, Super Flex jumpers, transmission line hardware, wall feed-thru panel
- Bird Wattcher
- Burk ARC-16, Auto Pilot
- ERI SHPX diplexed antenna with radomes, FM combiner, Lambda mount, Mag Rod, transmission line hardware, tower
- Harris HT-30, Digit
- Mark 4' STL antenna
- Moseley PCL 6020, STL/RPU power divider
- Myat rigid transmission line
- Omnia 3-FM-Turbo
- Scioto 4" copper strap
- Thermo Bond building

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delivered with a host of 3" hard line and extra elbows from Andrew. This equipment was used to build trombones that would address the signal matching delays at the combiner. The trombones added length to the line through a series of loops, which ERI engineers cut to size on-site to synchronize everything. Our chief engineer, Tony Kyriss, used a band saw to cut cleanly through the hard line, and the swivel points in the elbows made the plumbing assembly less complicated.

The combiner feeds into 4" transmission line to the outside and up the tower. We initially looked at 5" line because of concern that the 60kW capacity of the 4" line was cutting it close. The tradeoff was a much lower weight load on the tower and easier line management. ERI ran the line up the tower to the antenna, and looped it in an orderly manner back to the ground. Bird watt meters at the combiner output monitor signal strength out of the combiner and up the transmission line.

The Moseley STL platform provides fixed 950kHz RF transport over two hops. The STL path from the studio is different from the norm, if not unique. Legend Communications also operates KGWY-FM in Gillette, approximately 1,000' across the street from the KAML-KDDV studios. The KGWY studio site has a 500' tower essentially in its backyard, and it is the STL receive site for the first hop.

The downtown tower location is ideal for providing low-power signals to a portion of the market in the event power is lost at the main KAML-KDDV transmission site, which

Stacking the tower sections.

The new AudioScience ASI8921 tuner adapter packs 8 radio tuners into a single 6.6" PCI card. That's half the space (and half the power) of older analog tuner cards. Keep tabs on up to 8 AM or FM channels simultaneously, including RDS/RDBS info, all from a single antenna input. Monitor or record in PCM and MPEG-1 layer2 and MPEG-1 Layer 3 (MP3). Eight not enough? Install up to 8 cards in one system. Windows XP/Vista and Linux drivers available. To find out more about our small wonder, call +1-302-324-5333 or go to www.audioscience.com.

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currently lacks a generator. A Moseley STL antenna and receiver was installed at the KGWY transmission facility to support the first hop and establish the backup, low-power transmission. From KGWY, the Moseley system transports the KAML-KDDV audio another 15 miles to the main transmission site, where a receiver sits inside the building.

The Moseley STL system is frequency agile, and a backup system sits on a nearby shelf in the event of a failure in the main receiver. Spare HT30 parts share the same limited storage space, with a nearby workbench for maintenance. The Thermo Bond shelter contains and protects this equipment, but the building is nearly at full capacity with little room for new equipment.

Hoisting the transmission line up the tower.

The Thermo Bond shelter offers plenty of other benefits though, notably in terms of HVAC design. Although six tons of AC cooling are available in the building, the eastern Wyoming climate is cool enough to limit AC needs to the thick of summer. Thermo Bond installed ventilation to exhaust hot air out of the transmitters and to the outside at each side of the building. When AC is not required in the cooler months, consumer-grade swamp coolers draw in cool air from the outside. In the winter months, the swamp coolers are on thermostats and shut down when the building is cold, as do the exhaust fans over the transmitters. This allows heat to remain in the building when outside temperatures drop as low as 30 degrees below zero.

Final prep

The final step before firing the transmitters was tuning the antenna. ERI made one final trip out to the site, measuring the feed off the antenna with a spectrum analyzer and inserting slugs around the appropriate conductors to achieve proper tuning. KDDV required more adjustments due to an undesirable level of reflected power, but by trial and error, the levels were adjusted appropriately until we were satisfied.

Legend Communications is looking ahead to potential HD Radio installations. The use of a single combined antenna and 4" transmission line for the two analog transmissions minimized the weight today, allowing plenty of load capacity on the tower for two separate antennas and line feeds for HD Radio transmissions tomorrow.

Dozier is director of engineering for Legend Communications and is based in Cody, WY.

Photos by Rocky Mountain Erection.

More photos online at
www.RadioMagOnline.com

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Tips, tricks, hints and more

By John Landry, CSRE

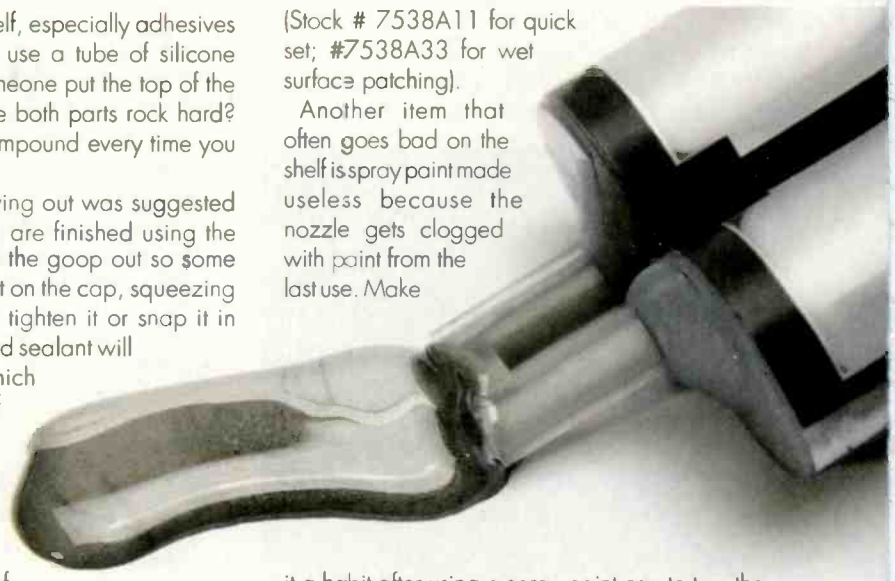
Avoid getting stuck

Many times important supplies go bad on the shelf, especially adhesives and sealants. How often have you gone to use a tube of silicone sealant only to find it dried hard in the tube? Or someone put the top of the two-part epoxy on backward so the hardener made both parts rock hard? It is wasteful to have to buy a new tube of either compound every time you need to make a simple repair.

One method of keeping silicone sealant from drying out was suggested by my colleague Rodney here at CBS. When you are finished using the tube, squeeze a little of the goop out so some runs out the top. Then put on the cap, squeezing a little more out as you tighten it or snap it in place. A ball of hardened sealant will form inside the cap which will prevent the rest of the tube from hardening. And the next time the cap is removed the hardened sealant will stick to the cap and pull out of the tip of the tube neatly so you won't need to find a long nail, wire or 6" greenie to dig the tip clean.

Clear expoy is a versatile repair tool but is never used in a large quantity. For this reason, many companies sell it in little single-use packets that are easier to use and last longer on the shelf. One brand name is Hardman Double Bubble available from McMaster-Carr for about $1 per pack (Stock # 7538A11 for quick set; #7538A33 for wet surface patching).

Another item that often goes bad on the shelf is spray paint made useless because the nozzle gets clogged with paint from the last use. Make it a habit after using a spray paint can to turn the can upside down in a trash can and press the nozzle in. Paint will not flow in this position but the propellant gas will clear any paint left out of the nozzle. If someone has forgotten to do this, often a clogged nozzle can be cleared by pulling it off the can and soaking it in either turpentine or mineral spirits. However, sometimes the clog is below the plastic nozzle, in which case the can is now trash.



Clean cut

Cutting and drilling tools dull quickly with heavy use. Saws, drill bits and punches often require more effort and time to use when dull. A common method of preventing this is to put a drop of oil on the surface of a drill bit. The same thing can also be done with saw blades, center punches and other cutting tools. A light spray of WD-40 can often be effective. For tougher materials such as steel or galvanized iron, a tapping oil (such as Moly-Dee, Colco or Tap Magic) is more effective. For coarse sawing, a paraffin-based stick lubricant is best (McMaster part #1009K22; also sold as Do-All Toolsaver).

A recent project of mine required cutting a circular piece for retrofitting a speaker into an opening. The new speaker did not have a round basket, hence the mounting holes in the metal panel would not line up with the old ones and re-drilling was not an option. This piece would resemble a large letter "O" but one challenge immediately became obvious: how to find the center of the piece. After making a mess of the first attempt, I was reminded by another colleague of a simple method of finding the center of a circle: Use a compass, set to the length of the radius of the circle, and pick three points on the edge of the circle and draw an arc through the circle to the far edge. The point where all three arcs intersect will be the exact center of the circle (assuming the outside edge is perfectly round). I was able to cut the two round parts, and the new speaker (as well as a nice, new grille) is in place, working fine. Who says high school geometry is useless?

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

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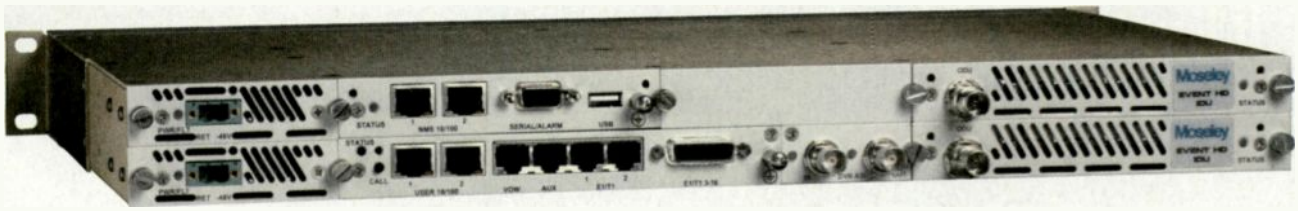

Moseley Event 5800

By Chuck Ince

When I joined Gap West Broadcasting in Missoula, MT, it didn't take long to realize I needed a new STL solution. Because of the terrain, Missoula is dubbed the Garden City for its mild winters relative to the rest of Montana. But its more than 20 area radio stations share transmitter locations on one of two high mountain sites overlooking the valley. That meant I was faced with a lot of 950MHz STL congestion and interference.

I needed a clean audio path from the studios to the 7,000' transmitter site for my three FM stations and an STL repeat point for one of my AM stations. I also used 450MHz transmitters for RPU relay and telemetry back to the studios. I had a great line of site path from the studios to the mountain top, as did other stations in the area, which created the challenge of avoiding or causing interference issues with each other.

I contacted Moseley for suggestions, and I was told about the Moseley Event 5800 high capacity bidirectional STL/TSL. This consists of a wideband E1/T1/IP radio paired with the Moseley Starlink SL9003T1 chassis. It has proven to be an awesome solution to the problem.

Making connections

The Event 5800 is a full-duplex 5.8GHz transceiver consisting of an indoor unit (IDU) connected via IF cable to an outdoor unit (ODU), containing the RF section. The ODU is mounted on the tower and connects with a short jumper to the Radio Waves SPD3 high-gain antenna.

A custom spider cable connects the indoor units to the SL9003T1 chassis and the individual encoder/decoder cards at each location. The Starlink has the unique capability of housing multiple audio cards with T1 interfaces to support each of my four stations. Each card is capable of linear uncompressed AES3 digital and analog XLR audio and RS-232 communication.

Installation was straightforward. Hanging the Radio Waves dish was quick and easy as all hardware was supplied. The Event ODU mounts right on the dish mounting bracket and is connected with a short pigtail cable. At the studio site, 50' of IF cable was plenty to connect the ODU to the indoor rack-mounted unit. At the transmitter site I need 115' of cable, as I wanted to be high enough on the tower to eliminate any possibility of obstruction to the line of sight. This additional length was not an issue as specifications will allow for up to 300' of interconnecting cable.

Moseley
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Once the antennas and cabling were completed, I rack-mounted the Event IDU and SL9003T1 chassis. Rack ears are provided for the 1RU indoor unit, but the predrilled mounting holes force it to be mounted with the cable connections facing the front of the rack unless there are rear rack rails. This is inconvenient and forces you to leave a rack space open for the wiring. At my transmitter site I modified the box slightly so I could turn it around, mounting the rack ears on the edge away from cable connections. Then mounting the unit just above the T1 chassis, all cabling is easily accessible on both units from the back of the rack. The spider cable was preconfigured by Moseley, so installation was a snap.

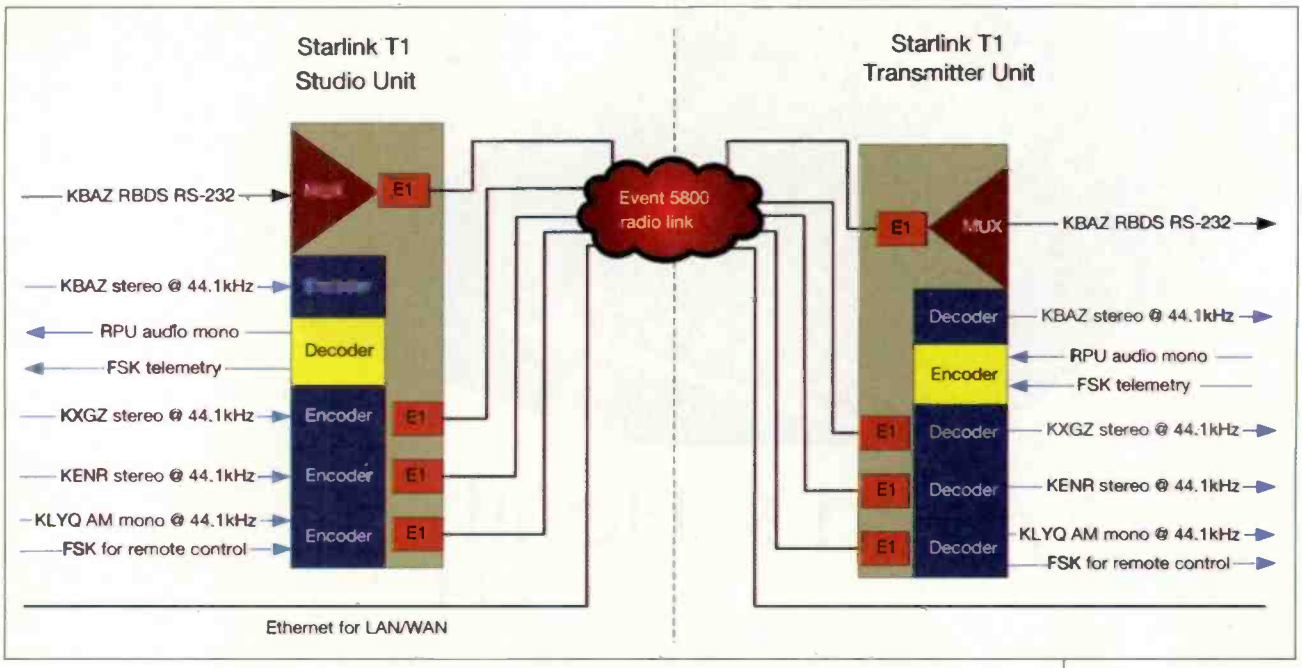
Once everything was hooked up and powered on, it was time to adjust the antennas and peak the signal. The Event HD has a network management port, so I just plugged in the laptop and opened the Web interface. I was easily able to monitor signal at both the studio and transmitter units. After aligning the antenna at both locations I was surprised and thrilled with a -35dB signal. Next step, send some audio.

Performance at a glance

T1/E1/IP Ethernet radio link

High-capacity bidirectional STL/TSL

License-free operation



Custom setup

I had the T1 chassis configured with four encoder cards and one decoder card at the studio. The transmitter site chassis had four decoder cards and one encoder card. With this configuration I am able to send L/R audio for each of my three FM stations as well as using left channel on the fourth encoder card for my AM audio. Right channel on the fourth card is used for remote control telemetry from the studio to the transmitter site. The single encoder card at the transmitter site returns remote control telemetry to the studio, as well as an RPU audio relay back to the studios. One of my FM stations was set up with RBDS, but that simply plugged into the available RS-232 ports.

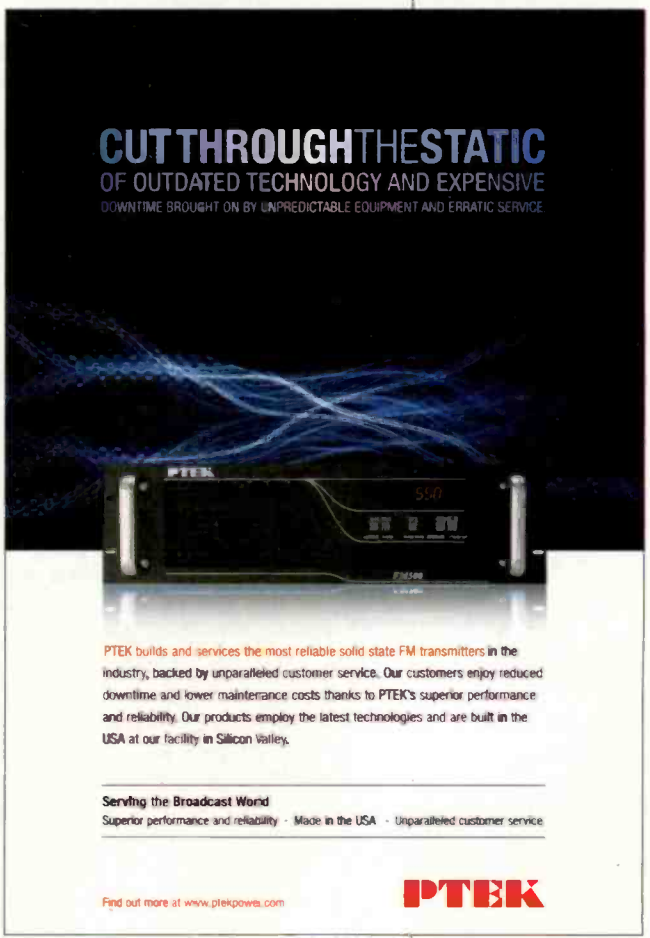
Another bonus with the system is a 2GB Ethernet LAN/WAN extension. Just plugging this into my network switch at the studio, and adding a small eight-port switch at the transmitter site, I have instant network communications for my laptop. I also ended up connecting my audio processors at the transmitter site, to the network, which allows remote configuration from the studios.

I admit I was concerned about the "no license required" 5.8GHz system, as I had spoken with other engineers who used similar products and had issues with brief dropouts and interference. This installation is well engineered and has a tremendous fade margin. My system has been on the air for more than two months now, and we have not had a single dropout or any issues affecting our signals.

Most importantly, the PDs and GM are very pleased with the better audio quality on each of the four stations, and even recently commented on how much better our RPU relay sounds. In total, I shut off six transmitters (STL, RPU, and TRL) when I turned on my Event 5800. I highly recommend the Moseley Event 5800 as an excellent STL solution, with a ton of expandability and bonus features.

Ince is the market engineering manager at Gap West Broadcasting, Missoula, MT.

The system as installed at Gap Missoula.



Allen & Heath Zed-14

By Chris Wygal, CBRE

Since the inception of radio, engineers have found creative ways to record audio and move it from place to place. In addition to the need for live remote location feeds for air, an occasional PA feed is also needed, or better yet, somebody inevitably wants a recording of the event as well! Before you lose your head thinking of all the possible tasks you could get thrown into at your next remote event, consider the small-format Zed-14 mixer from Allen & Heath. The Zed-14 has an intuitive layout for experienced sound techs, but is easy for audio newbies as well. It has a plug-and-play USB interface that makes connecting to a PC or Mac for recording and playback quick and easy. Most radio remote events are fast setups requiring only one or two microphones for DJ announcing. But when a hefty remote event happens where careful mixing of critical audio sources is a must, the Zed-14 will do the trick and then some.

Performance at a glance

- USB 1.1 or 2.0 compatible bi-directional audio connectivity
- 48V phantom power
- High-quality mic preamps
- 100mm channel and master faders
- 3.5mm and ¼" headphone jacks
- Stereo aux groups for extra stereo mixes
- Alternate monitoring outputs
- Rack-mountable

Getting it on tape

The Zed-14 is packaged with Sonar LE from Cakewalk for PC users who need non-linear starter software to get them going. A PC or Mac instantly recognizes the Zed-14 as a USB audio source right out of the box. The console's 16-bit bi-directional audio codec is USB 1.1 and 2.0 compliant, and supports 32, 44.1 and 48kHz sampling rates. It uses standard Windows and Mac core audio drivers, which ensure the mixer will interface with any computer right away. However, a bit of configuration may be necessary in order to assign the Zed-14 as the sound interface. In some cases the computer will switch the in and out sound assignments to the USB device when plugged in, which I found to be the case with the mixer on three PCs during experimentation. If audio latency becomes an issue, different drivers are available on the Allen & Heath website. The mixer is packaged with a thin, 29-page booklet that serves as the user's guide. It's easy to read and puts the user in the driver's seat right away. As with any audio product, hands-on experimentation is vital in learning the detailed features of the device.

The channel lineup

The Zed-14 has six mono channels and four stereo channels, each equipped with 100mm faders. The mono channels have standard three-pin XLR jacks, ¼" TRS line input jacks and insert points. Gain controls on the mono channels will attenuate the mic input -6dB and the line input -10dB, and will boost the mic input +63dB and the line input +26dB. A 100Hz high pass filter is located below the gain control. The mic channels have high and low EQ controls with sweepable mid EQ control and four "aux" sends. The first two aux sends are pre-fader, and each is routed through an auxiliary bus. Auxes three and four are post fader. Each aux control provides up to +6dB of gain for the aux sends. In live situations where stage monitors are required or outboard effects units are used, the aux sends are handy for providing additional mixes. Each mono channel has a pan adjustment and a pre-fade listen switch that allows for cueing of the channel source. The pre-fade listen is routed to the headphones, and the incoming audio level is shown on the LR meters.

The four stereo channels on the mixer provide numerous extra features besides those common to typical mixer input channels. All four have high and

low frequency EQ, balance, mute and pre-fade listen capabilities. Each channel has 1/4" TRS line input jacks paired above the channel strip. When the left jack is used alone, the channel automatically becomes a mono channel. Above channels 7-8 and 9-10 are pairs of RCA jacks labeled ST RTN and 2TRK RTN respectively. The inputs both accommodate stereo return feeds from audio sources for monitoring recordings or for playback of incidental music at a live event.

The return functions can be routed to their respective channels or directly to the LR main bus via an under-panel switch. Similar RCA jacks labeled REC OUT are mounted above channel 11-12. These however are a stereo LR main output. Essentially, whatever is mixed on the master output is sent to the REC OUT jacks. Channel 11-12 also accommodates the USB RTN feature. The USB return from a PC or Mac can be assigned to either channel 11-12 or the LR main bus. Channel 13-14 has RCA jacks above its channel strip as well that carry the ALT OUT output allowing the LR main mix or the monitor assignments to be sent to monitoring speakers without affecting the main output. For example, near-field reference monitors could be used on-site, and sources or recording playback could be referenced without routing the material through the main mix.

Channel 13-14 also contains the USB connector and USB output selector. Using the selector, AUX 1-2, AUX 3-4 or the LR mains can be routed to a PC or Mac for recording. Each AUX 1 and AUX 2 send on the stereo channels can be configured either as two mono sends or as a stereo pair, depending on the position of the under-panel STEREO switch on each stereo channel. This feature is useful for creating a second stereo mix for recording.

The Zed-14 features unique USB send/return controls and two sizes of headphone jacks

The output

The output section contains four 1/4" TRS AUX send outputs, XLR main outputs with insert points, a 1/4"" TRS mono output (a sum of the left and right main output), and headphone jacks. If you forgot your headphone adapter, the Zed-14 has a 3.5mm headphone jack next to the 1/4" headphone jack. Both work in parallel. The output section of the Zed-14 houses the 48V phantom power switch, 12 segment LED meter where 0 reflects 0dBu at the outputs, headphone volume control, and the monitor select switches. By switching the monitor select, the user can route the AUX1 and AUX2 stereo mixes, 2TRK RTN, and USB RTN to the headphones or ALT OUT output. Just above the 100mm master LR faders (+10dB gain above 0 unity) are the AUX 1 and AUX 2 master controls.

Allen & Heath

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E michael.palmer@ah-usa.com

While widely known for its large-format mixing consoles, Allen & Heath puts most of the same components in the Zed-14 as in its larger products. The Zed-14 is robust in its construction, and its amplifier circuitry is ultra-quiet. Each channel is modular, so replacing a fader or entire channel is easy and cost-effective. The Zed-14 weighs 14.3 pounds and is optionally rack-mountable. When critical and pristine sound is paramount, the Zed-14 mic preamps are second to none. I experimented with the Sennheiser e835, Rode NT1, and Shure SM7B, and found the Zed-14 to be essentially transparent. When a critical mix is necessary, especially if auxiliary sends and recordings are needed, the Zed-14 is an invaluable tool at a simple or extensive remote event.

Wygal is the programmer, engineer and Web designer for WRVL in Lynchburg, VA.

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.

NEW PRODUCTS

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by Erin Shipps, associate editor

Broadcast dynamic mic
Rode

Procaster: The Rode Procaster is a professional, broadcast-quality dynamic microphone, specifically designed to offer no-compromise performance for voice applications in broadcast environments. It features a tight polar pattern and tailored-for-voice frequency response. With its retro-inspired design, the Procaster combines a traditional aesthetic with advanced technology to create a broadcast workhorse destined to quickly become an industry standard. The Procaster is fully compatible with the Rode PSA1 studio arm and PSM1 shock mount, for professional microphone mounting.

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Stream Audio

Multi-Format Streaming: Stream Audio has developed a system that allows radio stations to reach a larger audience without any additional hardware or software needed at the studio. Stream Audio's Multi-Format Streaming option gives radio stations the ability to stream in the world-standard format MP3, as well as simultaneously providing streams in Windows Media, AAC, AAC Plus, and OGG. These formats will allow listeners to receive a stream from the station using nearly any player or computer operating system such as Windows, Mac, and Linux, while also reaching many mobile devices.

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1-bit sound recorder
Korg

MR-2000S: Korg has expanded its MR Series of digital recorders with the MR-2000S 1-Bit studio recorder. Input and feedback from leading recording and mastering engineers have lead to the creation of the MR2000S, offering this same unmatched audio quality and enhanced by additional functionality and studio-ready connectivity. With ultra-high quality sound that exceeds DVD audio, a wide frequency response and the ability to capture and reproduce transient responses and spacial imaging as never before, the MR-2000S introduces a new era in recording quality. The MR-2000S is 1RU digital stereo 1-bit recorder, offering 5.6MHz or 2.8MHz 1-bit recording, or up to 24-bit 192kHz PCM recording and playback. 1-bit file formats DSDIFF (used in SACD production), WSD and DSF are all supported, as well as PCM support for standard WAV, BWF (Broadcast WAV) and even MP3 playback. Sampling frequencies for PCM formats range from 44.1kHz through 192kHz.

631-390-6500; www.korg.com

AM HD Radio exciter
Nautel

AM IBOC Exciter: Nautel's AM IBOC Exciter is paired with the Exporter Plus for AM HD Radio transmission. This product implements Nautel's latest AM digital exciter and Exgine technology; it has magnitude/phase outputs suitable for standard AM transmitters. Analog and AES inputs are provided for backup audio sources and a front panel LCD user interface provides full configuration and status information. The AM IBOC Exciter uses a LAN port to receive date from the Exporter Plus as well as for serving Web pages for remote user access.

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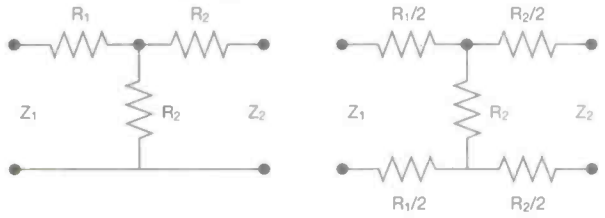
Passive Attenuators

To calculate the values for a pad, you must know the desired input impedance, output impedance and loss in decibels (dB).

To calculate the values for an H pad, first calculate the values for a T pad, and then divide the values of the input and output resistors (R1 and R2) in half to equally divide the load.

The value of loss in decibels must be converted to a ratio of current, voltage or power. The formula to determine K is

$$K = 10^{(\text{desired attenuation in dB}/20)}$$



T pad H pad

The value of R3 can be used to determine the values of R1 and R2, so it is easier to calculate it first. The equation for R3 can be substituted in the equations for R1 and R2 if you prefer to repeat the calculation.

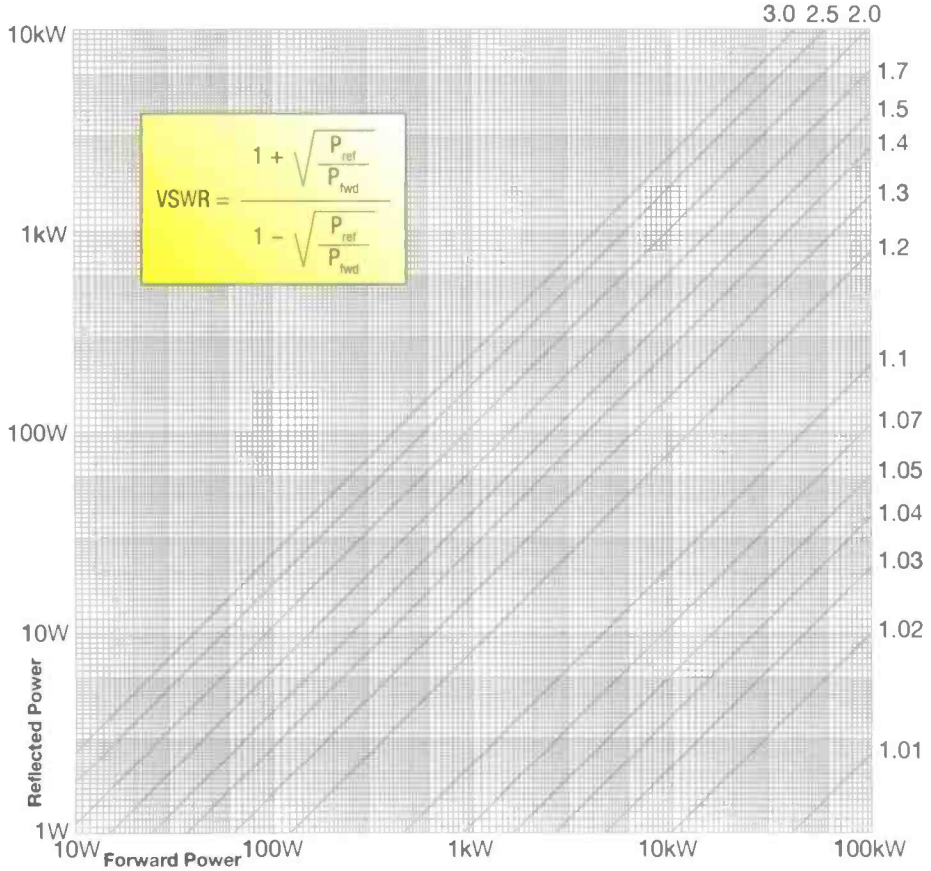
T and H pads are bidirectional, so either side can be used as the input. When calculating the values for a pad with unequal impedances, the value of Z_1 must be greater than the value of Z_2.

$$R_1 = Z_1\left(\frac{K^2+1}{K^2-1}\right) - R_3$$

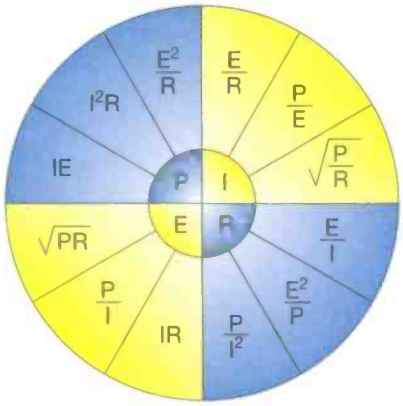
$$R_1 = Z_2\left(\frac{K^2+1}{K^2-1}\right) - R_3$$

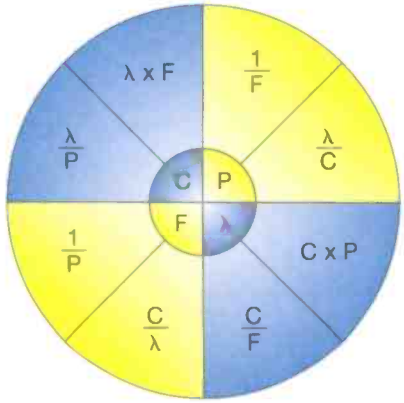
$$R_3 = 2\sqrt{Z_1 Z_2}\left(\frac{K}{K^2-1}\right)$$

VSWR



Common Equations





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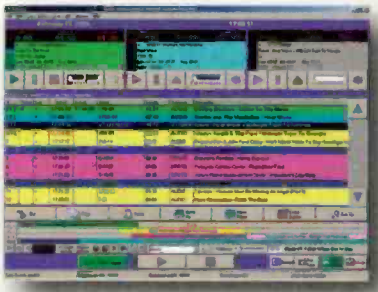

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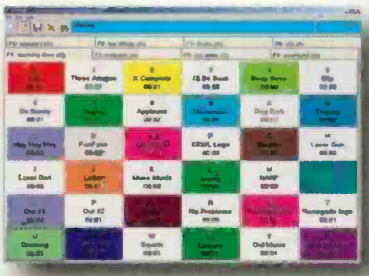

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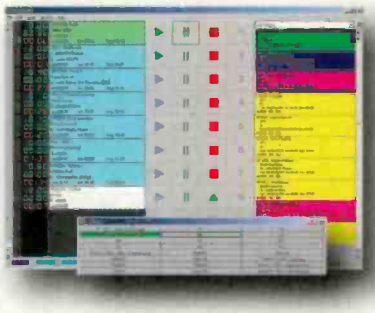

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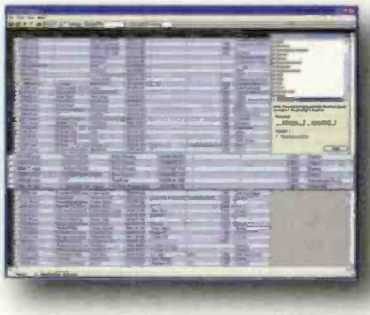

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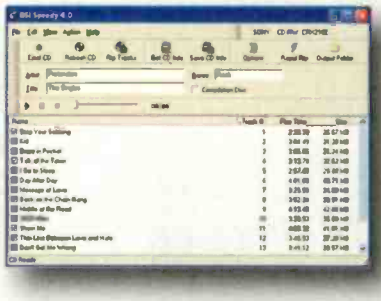
CD Ripping



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IP codec
Telos Systems

Zephyr/IP Mixer: Telos' Zephyr/IP Mixer can go wherever you do. This mixer works well under varying network conditions. Its exclusive ACT Agile Connection Technology works like digital cruise control, continuously correcting and monitoring bandwidth variation, packet loss, and jitter as you sit back and enjoy the ride. A Zephyr-introduced low-delay codec, AAC-ELD, ensures consistent sound quality at low bitrates, advanced error detection, loss concealment that only a dog could hear, and almost imperceptible delay for two-way applications. The Z/IP Mixer makes it easy for both engineers and technophobes to monitor or control the action as much or as little as they wish. The full-color, high-resolution screen displays an easy-to-understand interface, context-sensitive help, and an intuitive display graph of network conditions.

216-241-7225; www.telos-systems.com
telos-info@telos-systems.com

IP codec
Musicam USA

Road Warrior LC: This two-channel, portable IP codec is housed in a compact case measuring 8" × 8" × 3". An Internet connection can enable users to deliver programming on the air within 10 minutes, versus the typical 30-minute setup time. Users do not need to access a third-party server for a connection, but can use Musicam USA's NAT Transversal protocol. Like its big brother the Road Warrior, the LC features SIP compatibility, multiple algorithm support (including AAC-HE), standard protocols (LAN, ISDN U and ST, and X.21), a password-protected keypad and a built-in Web browser for control and monitor from a remote location. It also includes a two-channel input mixer/two-channel IFB talkback and recessed buttons for outdoor environments.

732-739-5600; www.musicamusa.com
sales@musicamusa.com

Non-traditional revenue source
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Mobile Radio Marketing: My Simbook is the leading radio station super network both online and on the Iphone. My Simbook community members are able to broadcast themselves to both individuals and groups through text messaging. Stations can inform listeners so they are never the last one to miss out on specials or events, while staying connected with friends and meeting new ones. In addition to having access to the new super community of information and savings, My Simbook users are able to listen to their favorite streaming radio stations from any computer or Iphone. Listeners can discover new stations, share favorite stations, and gain access to more deals, contests and giveaways.

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Microphone preamp
Lavry Engineering

Black MP10: With features like wide range digitally controlled analog gain circuitry, impedance switch, and balanced or unbalanced outputs, the MP10 offers flexibility and ease of integration into both home and studio recording environments. Precise gain settings from 20 to 75dBs give the MP10 enough range to accommodate low-output ribbon microphones or feed unbalanced -10dBV inputs using high output condenser microphones without loss of signal quality. Accurate matching of the two channels also makes the MP10 ideal for true stereo recording applications. An optional Lavry Black Rack Mount is available to mount two Lavry Black units side-by-side in a 1RU space.

360-598-9757; www.lavryengineering.com
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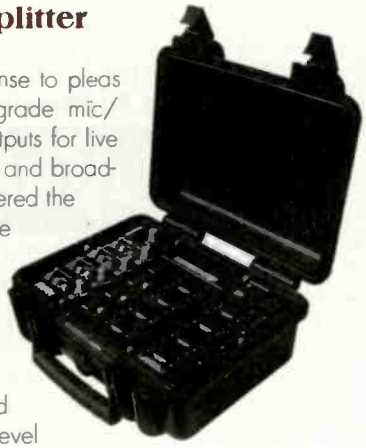
Portable active splitter
Drawmer



Kickbox 4×4: In response to pleas for durable, professional-grade mic/line inputs with multiple outputs for live sound, location recording, and broadcast, Drawmer has engineered the Kickbox 4×4 portable active splitter. Housed inside a rugged, road-ready carrying case, the Kickbox 4×4 accepts up to four XLR mic/line inputs and delivers them with uncompromised fidelity to up to 16 XLR line-level outputs. The Kickbox 4×4 provides multiple outputs where distribution of mic or line inputs to multiple outputs is required. Its four studio-grade mic/line preamps each provide phantom power, independent metering, and up to 66dB of gain. Its 16 balanced output stages each provide a transformer-loaded LED and the option of transformer isolation.

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

Large-diaphragm stereo condenser microphone
Nevaton

MC48: The MC48 is a large, dual-diaphragm stereo condenser microphone with transformerless class A electronics. It is well suited for applications in radio broadcasting as well as for live concerts and studio sound production. The microphone has low self-noise of less than 12dBA, and sound pressure level of 135dB. The two large 25mm diaphragms, placed one above the other, can be simultaneously rotated to provide variable stereo width from 50 degrees up to a maximum of 140 degrees and are capable of advanced, adjustable cardioids functions in mono mode. The ultra-thin and gold-coated diaphragms are made of 3-micron polyethylene-terephtalate film. All capsule components have passed a special artificial aging process to guarantee long-term stability. The internal construction is elastically mounted to attenuate vibrations and reduce handling noise. Additionally, the capsules are fixed on special dampers. A small LED indicates the presence of 48V phantom power and confirms front position. All input transistors pass a special selection process to guarantee minimal self-noise.

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EAS watch on-site monitor
Cascade Technology Corporation

OSM: This on-site station monitor, is a 2RU device designed to monitor on-site received and broadcast EAS alerts. When the unit detects an EAS alert, the full FSK text are captured along with any voice audio and sent to the server for analysis via an Ethernet connection to the Internet. The base unit accepts the digital output from a standard EAS encoder/decoder. The OSM is also intended to monitor the on-air audio in order to confirm the actual broadcast of an EAS alert. The modular design allows for monitoring up to five signal sources per unit. Expansion cards allow monitoring of on-air signals from an external antenna or via direct audio input from existing monitor receivers. Because the OSM continuously monitors preset stations, it can detect spurious alerts and determine on/off air status, relaying this information to the server.

360-988-0459; www.easwatch.com
info@easwatch.com

Coaxial switch
Dielectric

70000 Series: Dielectric's 70000 Series coaxial switch is a compact unit that provides fast and reliable switching of power between runs of transmission line. The unit is motor-driven with a manual override and LED position indicator. The switch may be operated locally or via remote control. It is available in both 115 Vac and 230Vac with 12-24Vdc control inputs. This enhanced version of the 60000 Series coaxial switch features return position accuracy of ±1 degree angular rotor accuracy using more accurate proximity switches versus conventional micro-switches. The 70000 Series switches offer segregated power and control input connectors.

800-341-9678; www.dielectric.com
dcsales@dielectric.com

Studio monitors
Mackie

MR Series: The MR Series features a baffle molded to minimize diffraction and a precision waveguide to ensure broad, even dispersion and a smooth transition between highs and lows for a clear image of your mix and an ultra-wide, even sweet spot. The amplifiers feature a Class A/B architecture that delivers a flat frequency response, plus the addition of acoustic controls to adjust high frequency and low frequency settings to compensate for room placement. The MR5 features a 5.25-inch low distortion LF woofer and a 1-inch high-resolution HF tweeter coupled with a high-headroom 55/30W Class A/B bi-amp. The MR8 has an 8-inch steel frame low distortion LF woofer and a 1-inch high-resolution HF tweeter coupled with a high-headroom 100/50W Class A/B bi-amp

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

Find the mic winner
October issue

Congratulations to

Rudy Briones

of KDLK, Del Rio, TX.
His name was drawn from the correct entries for the November issue. He won a Heil Sound PR-30 from Heil Sound.

The mic icon was inside the "O" on the poster.

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www.heilsound.com

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Spectrum analyzer
Bird Technologies Group

Signal Hawk VNA: The Signal Hawk VNA Spectrum Analyzer handles installation, troubleshooting and maintenance of wireless communications systems. It provides precise measurements of a variety of RF readings in a field-friendly package. To get communication systems up and running quickly or to perform preventative maintenance, the instrument allows even novices to easily carry out spectral monitoring and interference analysis, as well as make one-port cable insertion loss measurements and the highest resolution determination of distance-to-fault. In addition, it's been drop/splash tested to military specifications and has a large color in/outdoor display with an intuitive user interface.

866-695-4569; www.bird-technologies.com; sales@bird-technologies.com

Cable line
Cable Up

Industrial: The Cable Up Industrial line features a high-performance, yet rugged combination of low capacitance AES/EBU quality cable. The connectors are fitted with gold plated contacts for reliable professional use at a competitive price. The Industrial line has a one-year unconditional, no questions asked replacement warranty and a limited lifetime warranty covering defects in material and workmanship.

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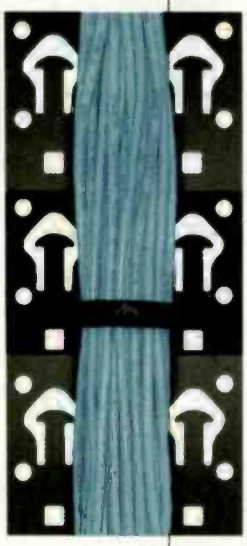

ASP-OWP: The ASP-OWP Series anti-slip cable pads are designed to improve cable management and performance in broadcast applications. When cable is dropped in from the top of racks and enclosures where hook-and-loop or wire-tie-type fasteners are used, the weight of the cable creates a significant and often problematic strain on the tie, connection and horizontal to vertical transition points. The pads have been designed to remove close to 40 percent of the cable weight off the tie point, while reducing pull tension where cables are fastened to meet or exceed cable manufacturers' requirements. These unique pads eliminate the need to over tighten the cable fastener to the point where it deforms or kinks the cables, an issue that can interrupt critical broadcast transmissions.

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

Computer audio interface
Sadie

BB2: Primarily designed to address the needs of radio editors, the BB2 is a simple user interface that provides a standard eight streams of audio playback and editing and concentrates on the crucial task of rapid editing capabilities. Full interchange with more sophisticated Sadie systems is included and the unit can be upgraded to the more fully featured PCM2 software. Full interchange with other more powerful Sadie Series 5 systems, in addition to other manufacturer's equipment, is provided to allow projects to be migrated to larger systems when required. The hardware provides two channels of input which can be switched between microphone, line or digital (S/PDIF), and two channels of output: line, headphones and digital (S/PDIF). The unit is connected to the host PC via USB2.0.

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Dynamic RDS encoder
Axel Technology

Dolphin: The Dolphin is an easy-to-use dynamic RDS encoder that supports all services and features in common use. Dolphin's specifications and operation have been designed to satisfy the most demanding requirements in the RDS generation and broadcasting. Using state-of-art, high-speed DSP technology, Dolphin ensures the purest modulation quality. Its digital architecture also guarantees long-term reliability and easy firmware updates. PC control software comes with the unit. It allows control and setting in an easy and intuitive way of all RDS data and of signal generation parameters (level and phase, synchronism source, etc). The basic software screen always displays, in real time, PS and RT content currently on air, allowing a full and immediate monitor of RBDS broadcasting, even when an FM tuner is not available.

+39 51 736555; www.axeltechnology.com; info@axeltechnology.com

UPGRADES and UPDATES

Axia Audio has released a beta-software release of its IP audio driver for Mac users. Contact Axia to evaluate it. (www.axiaaudio.com)... **Vorsis** has released software version 1.5.0 Four Mode for the VP-8 processer, which expands the VP-8 from two modes to four modes of operation: FM (with stereo encoder), AM, FM-HD and AM-HD. (www.vorsis.com)... **BW Broadcast** has developed an AM version of its entry-level DSPX Mini processor called the DSPX Mini-AM. (www.bwbroadcast.com)... The **Omnia** One family of processors has been expanded to include the Omnia One Studio Pro for production use in the studio settings or as a preprocessor. (www.omniaaudio.com)... **Inovonics** has begun shipping its new flagship RDS encoder, the Model 730, which was built on the success of the Model 713. (www.incvon.com) ■

FMHD-1 and FMAS-1 Modulation Monitors

The FMHD-1 HD Radio monitor uses the latest advances in digital techniques. Some features include continuous time & level alignment displays with audio polarity indication, RF spectrum analysis with FCC mask and power band measurements, simultaneous decoding of multiple audio streams.

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1 KW	2007	Crown FM1000E (demo), solid state
1 KW	2007	Crown FM1000E (new), solid state
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3 KW	1996	Henry 3000D-95, single phase
4 KW	1984	Harris HT3.5
7+HD	2005	Harris Z16HDC IBOC, solid state
14+5 KW	2005	BE Fmi1405 (IBOC) HD, solid state
20 KW	2004	BE FM20S, solid state
20 KW	1985	Harris FM20K
21.5 KW	1989	Continental 816R-2B
35 KW	1986	BE FM35A

USED AM TRANSMITTERS

1 KW	1996	Continental 314D, solid state
5 KW	1982	Harris MW5A
5 KW	1987	Harris MW5B
5 KW	1988	Harris SX5A, single phase
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10 KW	1985	Harris MW10B
12 KW	2000	Nautel XL12, solid state

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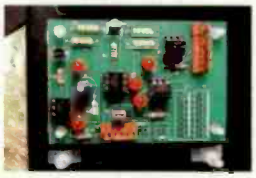

This is a direct replacement for the PR&E CI-2 interface. Use where OPTO ISOLATION is needed between your device and console logic. Each module comes with connectors, pins and instructions. Optional mounting panel for 8 modules and 2 Warning Light relays.

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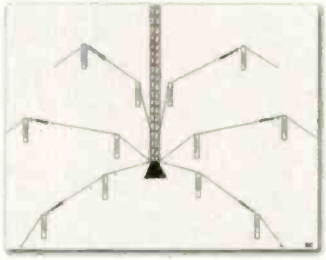

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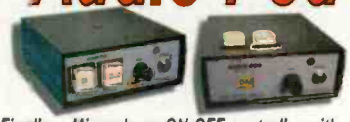
the Audio-Pod



Finally, a Microphone ON-OFF controller with an integrated stereo headphone amplifier featuring user selectable phase reversal and lo-hi output impedance selection. These units are great for remotes or talk studio applications. Various options are available such as a quality mic pre-amp with selectable phantom power, and top or front mounted buttons. The Audio-Pod System consists of from 1 to 4 Audio-Pod Modules and a Power Supply which can power up to 4 Audio-Pod modules. The Audio-Pod modules can be table top mounted using the supplied rubber feet, Hook & Loop material, or permanently mounted using the optional tilting table top bracket or recessed into the work surface using an optional flush mounting bezel. There are too many features to mention in this small ad space, so please visit us on the web for details and pricing on the Audio-Pod System and many other innovative products for the broadcaster.

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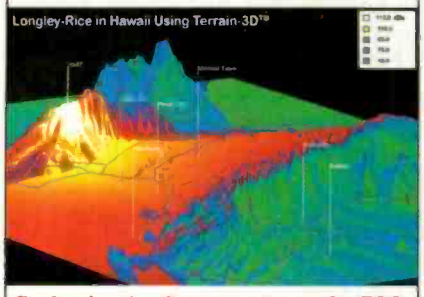

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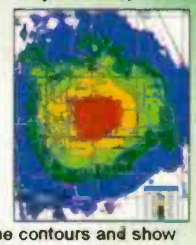

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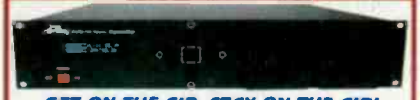

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Contributor Pro-file

Meet the professionals who write for *Radio* magazine.
This month:
Field Report, page 106.

Chuck Ince
Market Engineering Manager
Gap West Broadcasting
Missoula, MT

With experience in computer consulting, ham radio and electronics, Ince's radio career began in 2000 at Clear Channel in Pasco, WA. In 2007 he became chief engineer and IT manager at FM Idaho in Boise, ID, but in January 2008 joined former Clear Channel coworkers at Gap.

His constant companion is Ginger, a deaf Red Heeler that was rescued from a shelter.

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THE RADIO TECHNOLOGY LEADER

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Written for radio professionals

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by Erin Shipps, associate editor

That Was Then

Hank Landsberg of Henry Engineering sent us these photos from his past.

To the left is Landsberg when he worked for Drake-Chenault in 1974. The photo shows an early 1970s-era radio automation system, with Scully 270 playback decks that hold 14" reels of tape. The same system could be replicated on a laptop today – and the tapes wouldn't break, stretch or run out.

At the right is a Shaffer model 903 Automation System, which was the demo system Landsberg used in the lobby at Drake-Chenault. He worked there as chief engineer from 1974 to 1988. Drake-Chenault was a programming syndicator, supplying music programming tapes to about 300 radio stations nationwide. What required about $50,000 worth of equipment in 1975 (in these photos) can now be done on a laptop computer and $2,000 of software.

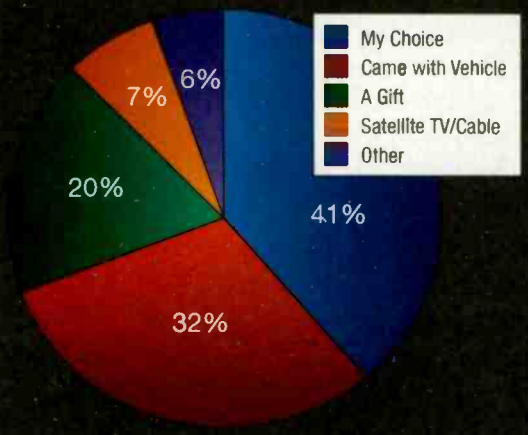
Sample and Hold

Satellite Radio Response

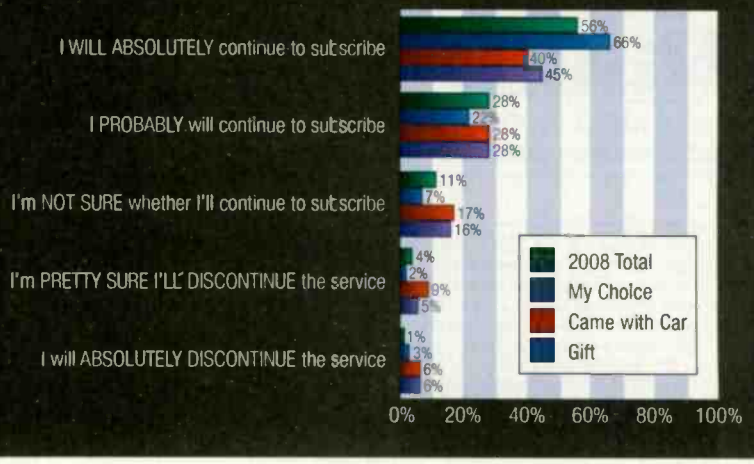
Only four in 10 current XM and Sirius subscribers made the decision to subscribe to satellite radio on their own. For one-third, it was pre-installed in their vehicles, while one-fifth received satellite radio as a gift. And for 7 percent, XM or Sirius was part of a satellite TV package.

Two-thirds of subscribers who chose XM and/or Sirius on their own say they will absolutely continue with the service through 2008. But only four in 10 of those whose vehicle came installed with satellite radio say they'll absolutely stay with the service. And nearly a third indicate they'll likely discontinue or aren't sure about the status of their subscription. Similarly, those who received XM or Sirius as a gift aren't especially committed either. Less than half say they will absolutely continue with satellite radio through this year.

Source of Satellite Subscription



Likelihood of Continuing Subscription Through 2008 - Based on how they came to possess satellite radio



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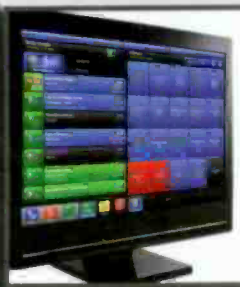

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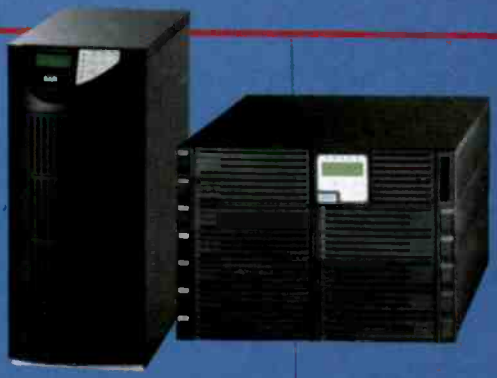

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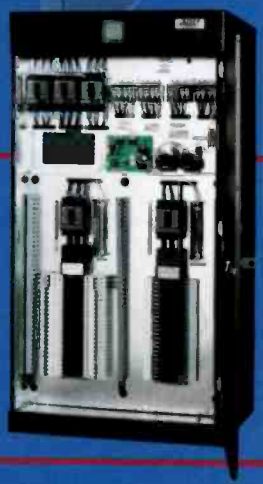

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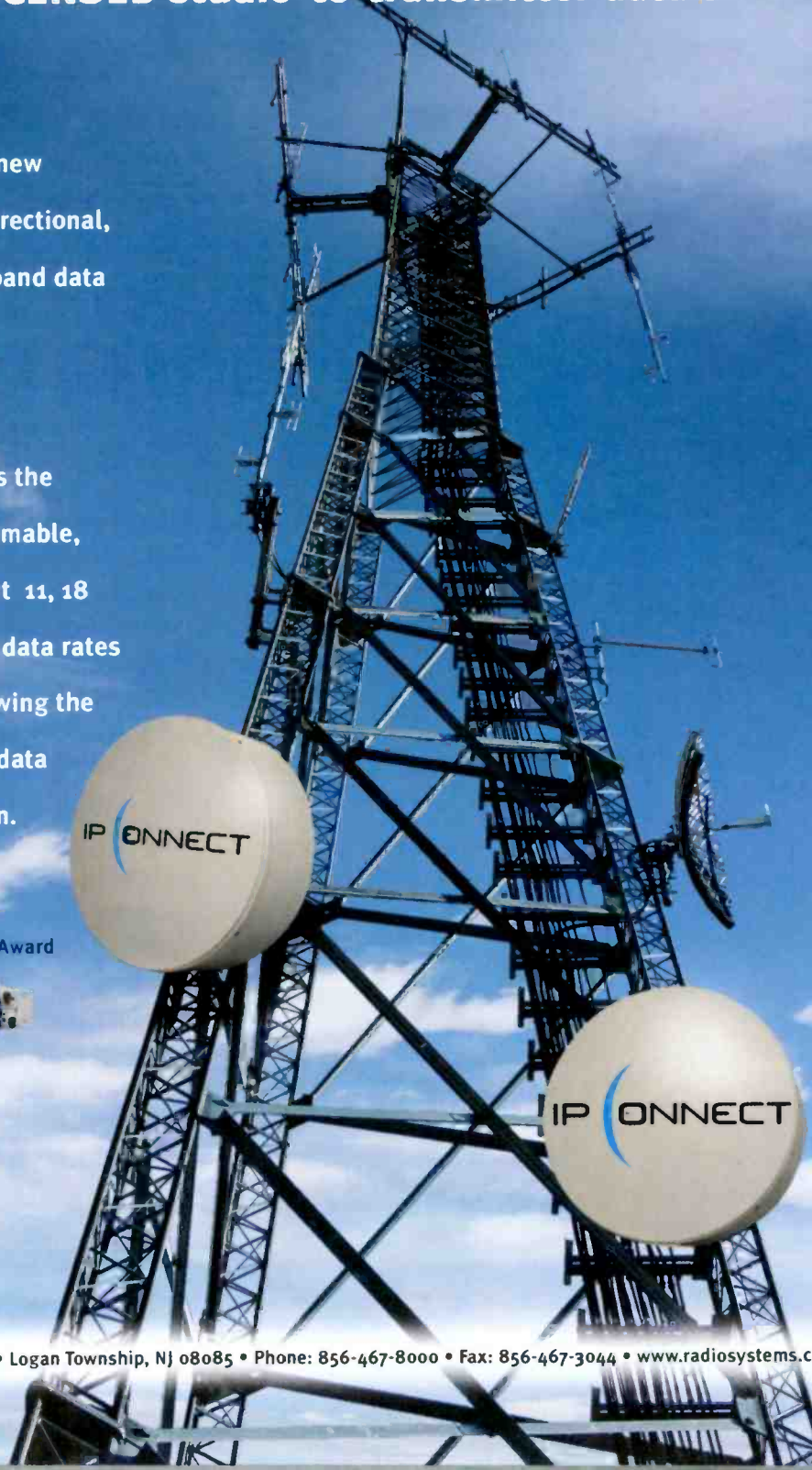

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Welcome

To the 2009 Radio magazine Buyers Guide

What's on your equipment wish list for the coming year? Microphones? A console/router system? A transmitter? No matter what it is, you'll want to consider all the options and make the best selection to fit your need. Sure, it's easy to just buy another Turbo 2000 because you have always bought a Turbo 2000, but if you have a chance to move forward, why move sideways?

What's the first step in finding new sources of equipment? Discovering who makes the equipment you seek. That's where the *Radio* magazine Buyers Guide can help. We have listed manufactures by category. Look into a category and I'll bet you find some new options for your equipment needs. Once you know, turn to the company contacts section and get more info.

We know that you save your issues of *Radio* magazine, and to make it easier to access the information in this Buyers Guide, we made it easy to pull out of the December issue for quick access. (By the way, be sure to look at the card holding the Buyers Guide in place for some handy reference information.)

But there's more than the printed information here. We're preparing all this information to be accessible online at RadioMagOnline.com, but we're going to make it even more useful with enhanced tools to search and sort the information. Look for this enhanced information to be posted in the coming weeks.

Chriss Scherer, editor

The information in the *Radio* magazine Buyers Guide is provided by the listed companies. Every effort is made to ensure accuracy.

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Antennas

Includes all antenna categories except wireless mics

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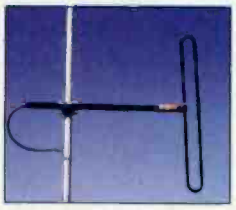

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Includes converters, adapters and utility items

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Audio delay systems

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Eventide
Logitek Electronic Systems
Sonifex Ltd
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25-Seven Systems

Audio distribution

APT

Winner of the 2008 ART Award for audio and data transmission, WorldNet Oslo delivers multiple stereo pairs over IP and T1 networks. Fast becoming the IP multiplexer of choice amongst US broadcasters, the WorldNet Oslo offers a solid, modular and highly reliable platform, multiple layers of redundancy and a choice of audio options including Linear, Enhanced apt-X and MPEG coding.

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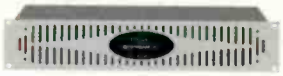

The Logitek JetStream Mini is an IP-based audio router that is easy to set up, administer and use. A single 2 RU enclosure provides enough capacity for a 24 channel console and includes GPI/Os, profanity delay, silence alarms, input metering, mic processing, automation protocols and an internal codec.

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Codecs, hardware and software

Includes POTS, ISDN, IP and others

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Z/IP Mixer: Available in two versatile models, the Zephyr/IP now makes it possible to use public IP networks and mobile phone data services for high quality, trouble free audio transmission. The Z/IP does this automatically with minimal setup and very little delay. The connection is nearly bulletproof and traverses firewalls and NATs. The new Z/IP Mixer combines the versatility of the Zephyr/IP with the utility of a digital four-channel stereo mixer, all in a rugged, road-ready portable chassis.

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Includes computer hardware

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AEQ Phoenix Mobil: Phoenix Mabile. Powerful IP audio codec, with aditional connectivity: GSM and 3G by USB and PSTN (POTS) and ISDN telca using optional communication modules. It's a small, light weight and portable unit. Includes digital mixer, multiple analog inputs, 12Vdc power supply/charger and optional long-life LI-ION battery.

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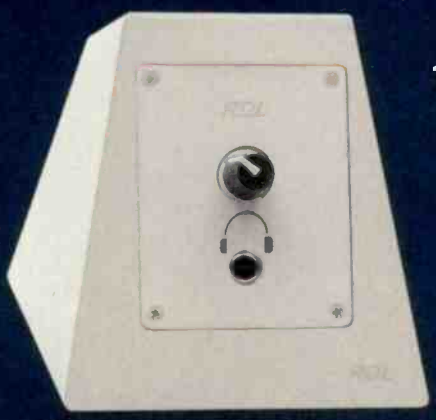
STEREO HEADPHONE AMPLIFIER



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RoadWarrior LC

- **IP/ISDN**
- **2-channel input mixer with line/mic levels and phantom power**
- **Lightweight & rugged design**
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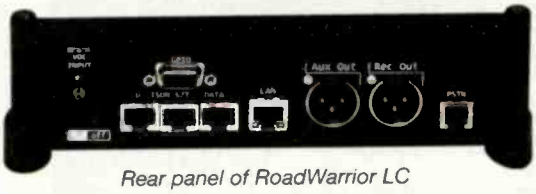

Rear panel of RoadWarrior LC

Suprima

- **Includes LAN, ISDN, U & ST, and X.21 interfaces Standard**
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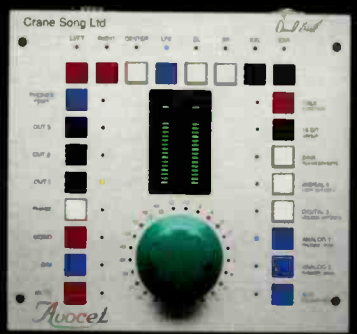

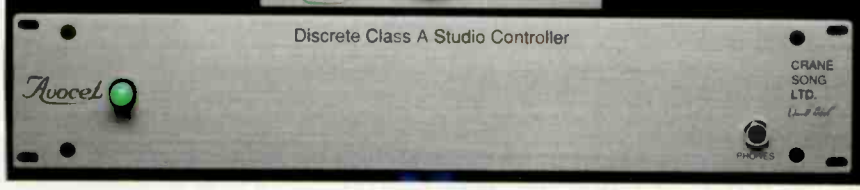

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Bond Scanner GPS is a Google Earth-compatible tool for visualization of collected FM radio measurements. The Bond Scanner GPS can measure RF level, MPX deviation, left and right audio levels, RDS and pilot injection levels. The tool is powered by the USB port of a PC.

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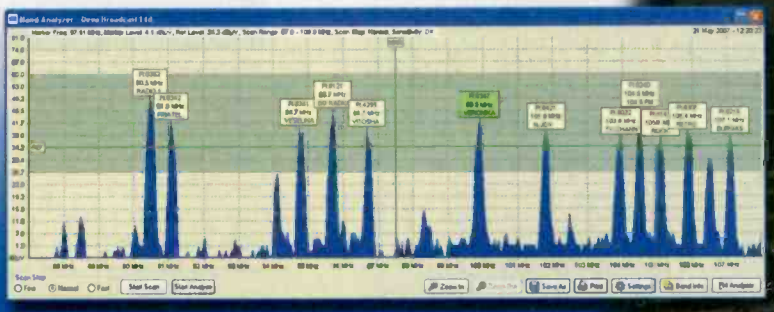

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USB FM-Scanning Receiver
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Band Scanner Pro

This is a tool to evaluate FM broadcast band congestion and to log station identification parameters. The "Band Scanner Pro" can measure RF level, MPX deviation, Left & Right Audio levels, RDS and Pilot injection levels. The system is powered by the USB port of any Windows PC. Supplied free of charge Windows software sweeps the receiver across the FM band, logging every carrier and generating a spectrum display of carrier level vs. frequency. It then analyzes each carrier and creates a station list. Its interface is like a portable radio: It may be tuned manually through the receiver screen or by double-clicking a point on the spectrum plot or an entry on the station list. Spectrum plots may be saved as jpg or bmp files. The RDS data error level is graphed in a separate window on the receiver screen. The program can be monitored with headphones plugged into a standard 1/8" jack.

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Welcome to Radio magazine's Excellence Awards!

You decide the winner!

Radio is a technical industry, and technical excellence should be recognized. That's the purpose of the *Radio* magazine Excellence Awards. For our first annual contest we received four entries that represent the highest state-of-the-art in new studio technology.

The four entries are detailed in the following pages. Read each one and decide which one met its design criteria and goals, overcame unique challenges, improved workflow or otherwise showed excellence in its approach.

Visit RadioMagOnline.com and click on the Excellence Awards link to cast your vote. The winner will be announced in the April 2009 issue, and a plaque will be presented to the winner at the 2009 NAB Show.

All votes must be entered by *Feb. 1, 2009*.

Are you building, rebuilding or renovating a facility in the next yaer? We'll accept entries for the second annual Excellence Awards in the summer of 2009.

Chriss Scherer, editor

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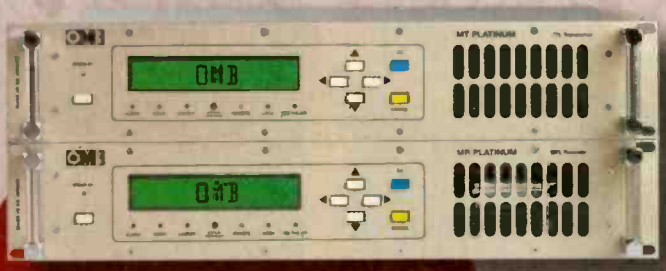
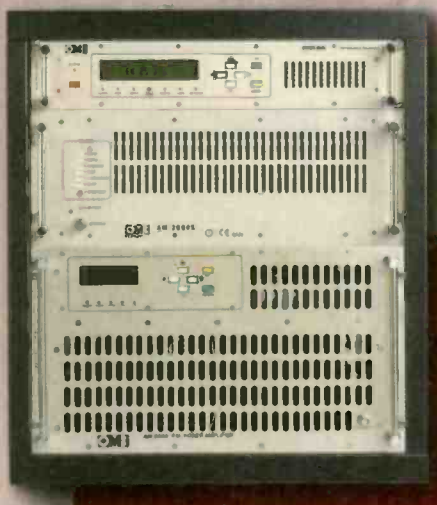


MT/MR PLATINUM >1GHz

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 MF 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 amplifying 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 amplifying modules works independently thanks to a power combining structure that provides high isolation between them.

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Radio 2009 Excellence Awards

CATEGORY

New studio technology – station

SUBMITTED BY

Balsys Technology Group

DESIGN TEAM

Balsys Technologies Group: Larry Lamoray

Saga Communications: Greg Urbiel, director of engineering; Gary Robinson, chief engineer

TECHNOLOGY AT WORK

Adobe Audition
Alesis RA300
APC UPS
Audio Science ASI5042
Audion Labs Voxpro
Avocent LV830-AM
Axia Element and audio network
Balsys Technology Group project management, system design, systems integration
Balsys Wood Arts Furniture, maple wood ends for Axia surfaces
CBT CBT-2
Cisco WS Series
ESE ES185U, LX5112
Fostex 6301B, RM-2
Harris World Feed Panel
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Sony MDR7506
Tannoy Reveal 6
Tascam CD01UPRO, CDRW2000, 112MKII
Telos 2101

Saga Communications Asheville, NC

Saga owns four stations in Asheville: WISE-AM (sports), WYSE-AM (sports), WTMT-FM (rock) and WOXL-FM (classic hits). The station group was built over the course of several years, and with each station acquisition, the existing studio site was expanded to accommodate.

The new studio/office site was selected mainly because of its advantageous business location. On the west side of the metro, the facility is in a business area that is easy for listeners to find, which is important for prize pickup and helps strengthen the stations' ties with the community. The chosen building was previously a restaurant. Saga added to three sides of the building to increase the overall floor space from 4,280 square feet to 7,210 square feet. Once expanded, the interior build-out began. This is when one of the first challenges was met: The station lost its full-time engineer.

To keep the project on schedule, Saga looked to outside help. Greg Urbiel, director of engineering for Saga, contacted Larry Lamoray at Balsys Technology Group to take over the project. This was the first time Saga used an integrator for an installation.

When Balsys came in, the first project modification was made after the studs were in place but just before the drywall was ready to be installed. Lamoray first realized that the conduit entries for each studio's cables were not in an optimal location and some last-minute relocations avoided what could have been a significant problem.

While the studio space construction was underway, Balsys began building the custom furniture and assembling the studio wiring in its facility near Orlando. The wiring for the technical operations center (TOC) could not be integrated off-site because there were too many factors that would be determined on-site. One of those factors was the final layout of the TOC. With slightly less floor space than originally planned, providing sufficient rack space for the operation could have been a problem. The solution was to go vertical. Middle Atlantic GRK racks were used. Each rack provides 52 rack spaces and stands 8' tall.

This was going to be a digital facility, and with that in mind, Saga selected Axia for the audio network and Imediatouch for the automation system. With an IP audio system planned for the operation, Ethernet-ready cable was installed for each studio. Again, Saga used an outside service to handle the cabling. The phone system installers wired the office phones and office network, and also ran all the CAT6 cabling for the on-air operation. All the house wiring is CAT6. Each studio has 16 CAT6 drops, two coaxial cable drops, and a stranded #2 ground wire attached to copper bus bars at each end to create the star ground system.

In each studio, Krone blocks and IT-style Ethernet patch bays are used for interconnects. A studio's audio sources are punched down to one side of a Krone block. The Krone block has RJ-45 connectors on the other side, and an Ethernet jumper runs from the Krone block to an Ethernet patch bay. The CAT6 drop into the studio is connected to the Ethernet patch bay.

While the Axia system can use distributed nodes to provide I/O as needed, the only nodes in the studios are for the microphones. Any other studio audio sources run analog or digital audio back to the TOC via the CAT6 cable. This was done to reduce some costs of installing additional Axia nodes. The Imediatouch computers and Axia engines all live in the TOC, where the signals remain as direct IP runs. The Imediatouch computers use the Axia IP audio driver to attach to the audio network.

Clear Channel New York City, NY

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. 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 Middle 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 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 also home to the 150kVA Toshiba G8000MM UPS system that floats all critical systems. The facility is also backed by a 2MW generator.

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

Radio 2009 Excellence Awards

CATEGORY

New studio technology — station

SUBMITTED BY

Clear Channel, NYC

DESIGN TEAM

CCNYC: Josh Hadden, director of engineering; Jeff Smith, Doug Irwin, George Marshall, Henry Behring

Meridian Designs

Luckett & Farley

Lehr Construction

Technet Systems: Bob Smith, Lindsey Collins, Mark Bizbee

TECHNOLOGY AT WORK

Adtran Opti-6100, DS3M3T, OMM12VIRE, DS1VM2, ETHM8 4, Netvanta 5305 router

Aphex mic processors

Ariane Sequel

Audio-Technica 4033

Electro-Voice RE-27

Evertz 7700 frame, 7707 BPX, 7707 IFRA/IFTA, 7707 GPS, AT47-8, 7705 CWDM 3, 5600MSC, 5600ACO

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RCS Nexgen

Sierra Automated Systems consoles and system routing

Snapstream Enterprise

Symetrix/AirTools profanity delays

Telos 2101, Zephyr Xstream

Yellowtec Mika support arms

Radio 2009 Excellence Awards

Cox Radio Birmingham, AL

CATEGORY

New studio technology — station

SUBMITTED BY

Harris Corporation

DESIGN TEAM

Cox Birmingham: Tom Scott, director of engineering

Harris Corporation: Nick van Haaster, architectural and interior design, and installation; Todd Peterson, audio infrastructure design

TECHNOLOGY AT WORK

- Acoustical Solutions
- Adam A7 Powered Monitors
- Avocent KVM Extenders
- CBT Classic On Air Light
- Harris VistaMax (Audio Management System), RMXdigtal console, NetWave console, VistaMax Intercom System, 3x6 Headphone Distribution Amp, HRK Integrator Racks
- Sony Professional Headphones
- Symentrix 6200 Dual Channel Processor
- Telos Broadcast Telephone System

The Rick and Bubba Show, heard nationally on more than 50 stations, recently joined the lineup at Cox Radio Birmingham's flagship station WZZK-FM. The show was moved to a new broadcast facility in Vestavia Hills, AL, to develop a complete morning show experience with a live band performance area, audience seating in the studio, and an exterior broadcast plaza area for public viewing.

The 5,000 square foot facility features a complete Harris digital studio solution including VistaMax audio networking, studio consoles, furniture, and various tools for the on-air and production operations. Featuring spacious studios for on-air, production, video control and call screening, the facility provides a fully functional digital studio solution for today with an eye toward future growth through the VistaMax platform.

The VistaMax mainframe and associated processing gear reside in the technical operations center. A T1 link transports programming to New York for national satellite distribution, and an IP connection to the Birmingham headquarters addresses local distribution. The system considerably reduces facility wiring, with clean, centralized routing to and from VistaMax and studio destinations.

All studios feature custom-designed Harris Smoothline furniture to match the size of the operation while also providing a visually appealing presence for TV station cut-ins. The on-air studio is the life of the operation, with plenty of space for the four show players and several guests. A venue-like atmosphere in the studio incorporates a separate space to host live bands and accommodates seating for in-studio audiences.

The Harris RMXdigital was the choice of console for the on-air studio. The RMXdigital features six mix/minus busses that prove very convenient for remote broadcasts. The busses are programmed into the system, so the operator can avoid punching in a matrix of channels. Four assignable program busses allow the operator to feed audio around the facility, including a set of speakers outside the studios.

The on-air operation includes a Telos Twox12 interface drop-in within the furniture surface for bringing phone calls live to air. Harris also provided several of its World Feed Panels to accommodate laptops and other non-traditional source equipment. The World Feed Panel is also ideal for external camera crews. Pre-delay audio feeds to synchronize audio with video from the camera crew are easily assigned over a program bus for camera.

The RMXdigital provides redundancy as a standalone console and can immediately go online in this configuration should VistaMax be taken offline. Most sources are wired directly to the console, including the automation system, an Allen & Heath mixer for live band performances, microphones, ISDN equipment, and traditional source equipment including CD players.

The RMXdigital has an intercom feature allowing players outside the on-air studio to contribute to the on-air program. The show's webmaster, Ryan Greenwood, often contributes to the show over the intercom, which is picked up by the microphones to create a "drive-through" audio effect. Intercom stations are also present in the screener room, production studio, TOC and TV control area.

The production studio features a Harris NetWave eight-channel mixer (NetWave-8). The NetWave-8 serves as an edge device for VistaMax, with three channels used for external audio source selection, and several more to route sources to and from the automation system.

Radio 2009 Excellence Awards

WNYC-FM New York City, NY

WNYC Radio recently moved from the New York City Municipal Building (the station's home since 1922) to a new 72,000 square foot facility in the trendy SoHo area of Manhattan. The Systems Group (TSG) of Hoboken, NJ, was chosen to partner with the station throughout the consulting and integration phases of this innovative project.

The design goals were to leverage current technology trends toward a highly efficient workflow, an expanded capacity for production, and to provide for improved on-demand distribution. The new facility also supports exponded programming in response to an increase in community initiatives.

Spread over the 7th, 8th, and 9th floors of the new facility are five on-air control rooms with studios, two music mix rooms with performance spaces, 11 production control rooms, four news edit booths, four shared studios, and five voice-over booths. For desktop work, there are more than 180 workstations outfitted with the latest audio editing software suites.

The audio portion of the system is built around a Sierra Audio Systems routing platform configured with 1,536 inputs and 1,536 outputs. The decentralized, redundant core of the system is spread through two equipment rooms on different floors and reaches out to 34 remote IO hubs throughout the facility. The SAS system provides facility-wide intercom functionality. A variety of IP and Web-based control systems were incorporated to facilitate the "anything, anywhere" approach, which required significant innovation to allow operators in each control room to control the pool of shared equipment located in centralized equipment rooms.

Automation and asset management is accomplished by using Silex Media's DigaSystem suite of products. Two-hundred client PCs throughout the station have the suite installed, allowing anyone in the building access to the full-range of content stored on the network. Silex and TSG worked extensively with stakeholders throughout the WNYC organization to develop powerful workflows leveraging new file-based technologies. All audio content is stored on a 24TB Isilon storage array managed by the DigaSystem. The clustered nature of this system allows for strong fault tolerance with a virtually limitless potential for growth. An additional 24TB of storage is available on SAN accessible from 70 Pro Tools workstations throughout the facility.

The new facility includes a music studio as well as a cornerstone performance space anchoring the first floor of the building. The rooms are each based on API Vision analog surround mixing consoles configured with 40 channels of automated faders. A Pro Tools HD2 rig with 48 inputs and 48 outputs gives flexibility for in-room recording and mix-down.

A state-of-the-art datacenter provides support for next-generation IT systems. Core server systems were built with blade servers to drastically reduce network switch and KVM port counts. These servers have the added benefit of reducing the datacenter's power and air-conditioning requirements, helping make the facility more environmentally friendly.

To ensure that disparate systems would work together effortlessly once the equipment was delivered, The Systems Group built a test lab in its offices to allow the entire system to be fully configured and tested well before the first cable was installed onsite.

The technology in WNYC's new home gives the station a powerful platform to support its current nationally-distributed program line-up as well as provides a foundation for exciting future growth.

CATEGORY

New studio technology — station

SUBMITTED BY

The Systems Group

DESIGN TEAM

The Systems Group: Jared Miller, Senior Systems Engineer; John Meusel, Senior Project Manager; Anton Mittag, Integration Supervisor; Paul Rea, Associate Systems Engineer; John Kourkoutis, Test Engineer

WNYZ: Steve Shultis, Chief Technology Officer; Jim Stagnitto, Director of Engineering; James Williamson, Associate Director of Engineering

TECHNOLOGY AT WORK

- Sierra Automated Systems Audio mixing, routing, intercom
- Silex Media DAVID DigaSystem Asset management
- DigiDesign ProTools LE/ HD2 (Editing)
- Studio Network Solutions SANmp (ProTools SAN)
- Hewlett-Packard Servers and desktop PCs
- BroadcastBionics PhoneBox Call screening system
- Harris Modular distribution/ conversion
- API Vision Recording console
- Digital Alert Systems DASDEC EAS system
- Avocent KVM switching

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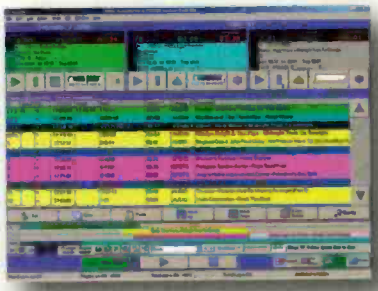

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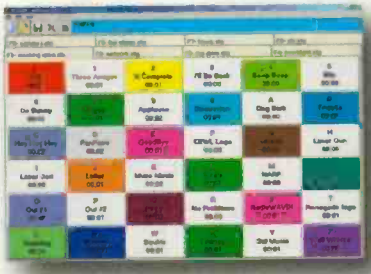

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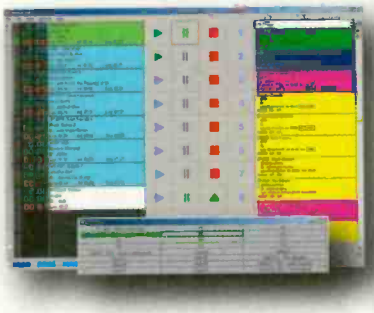

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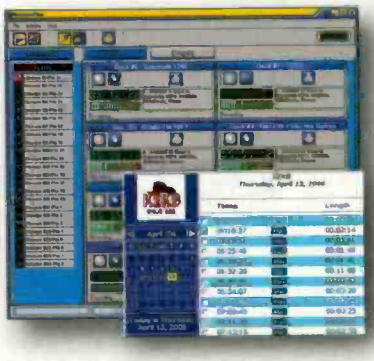

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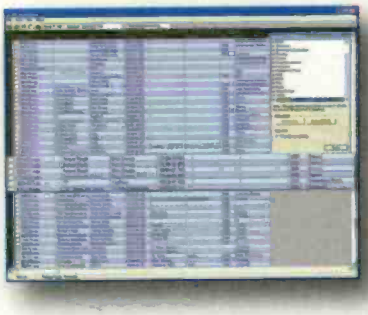

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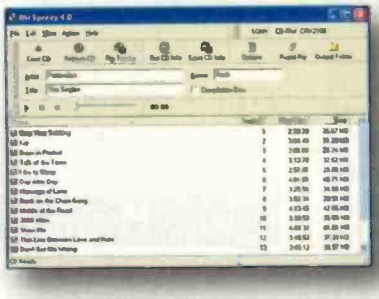

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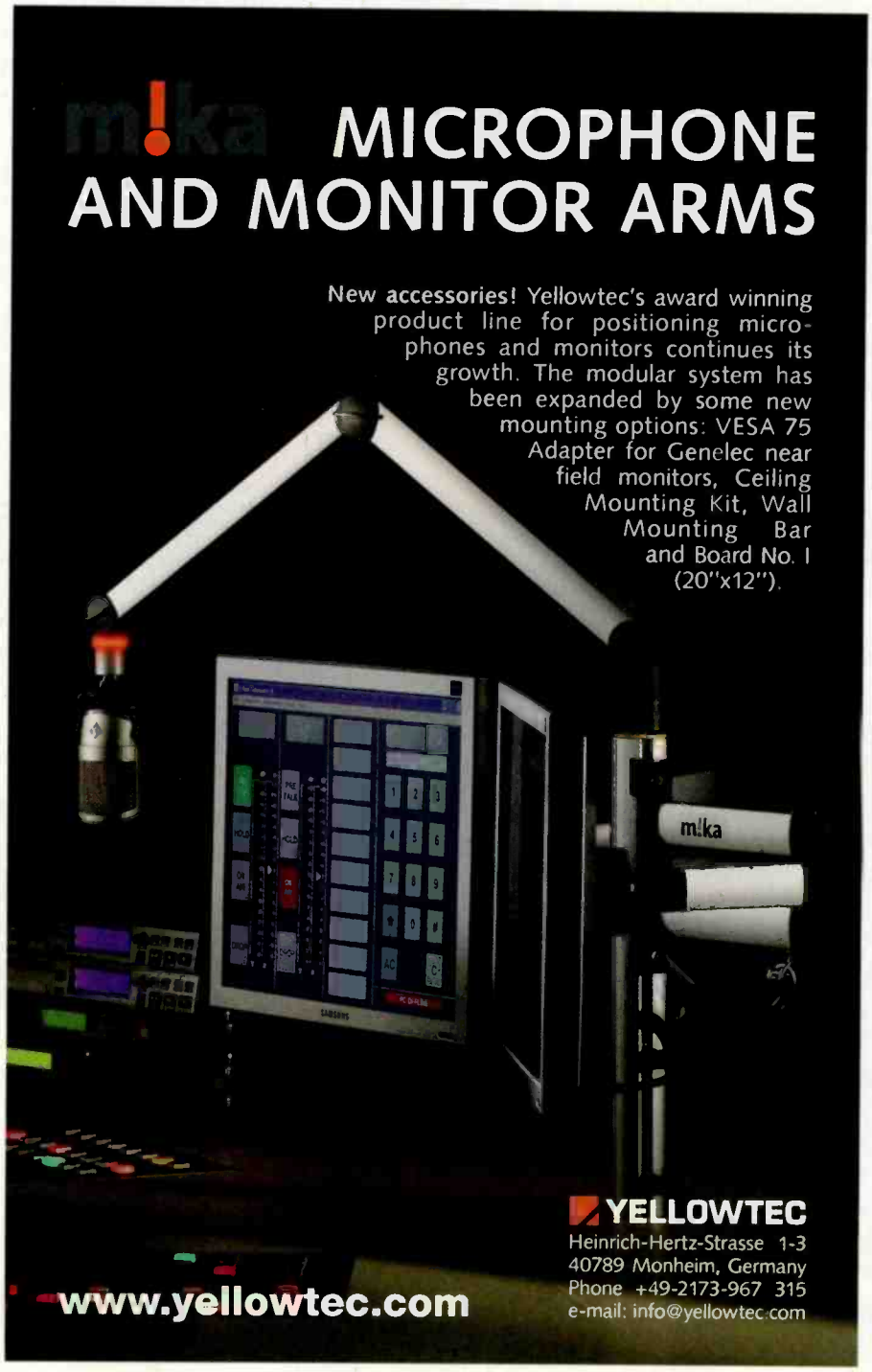

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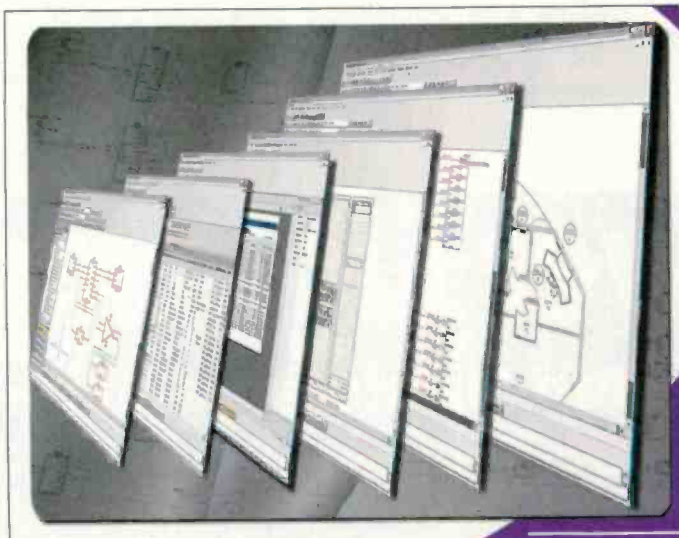

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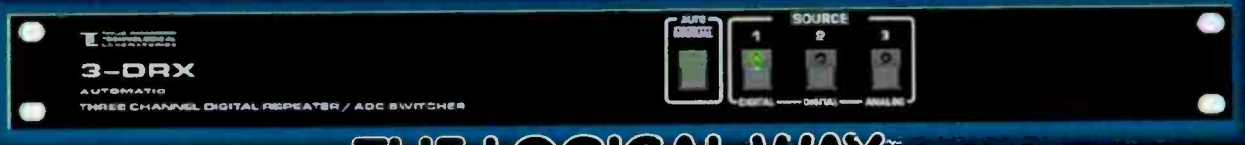

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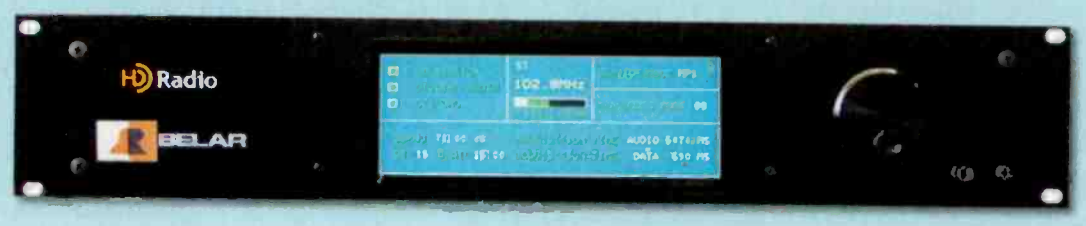

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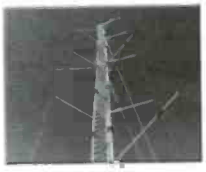

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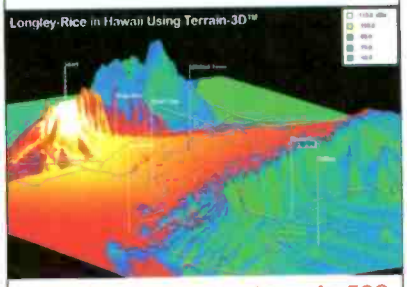

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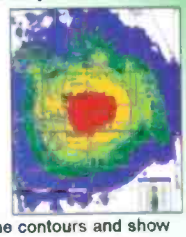

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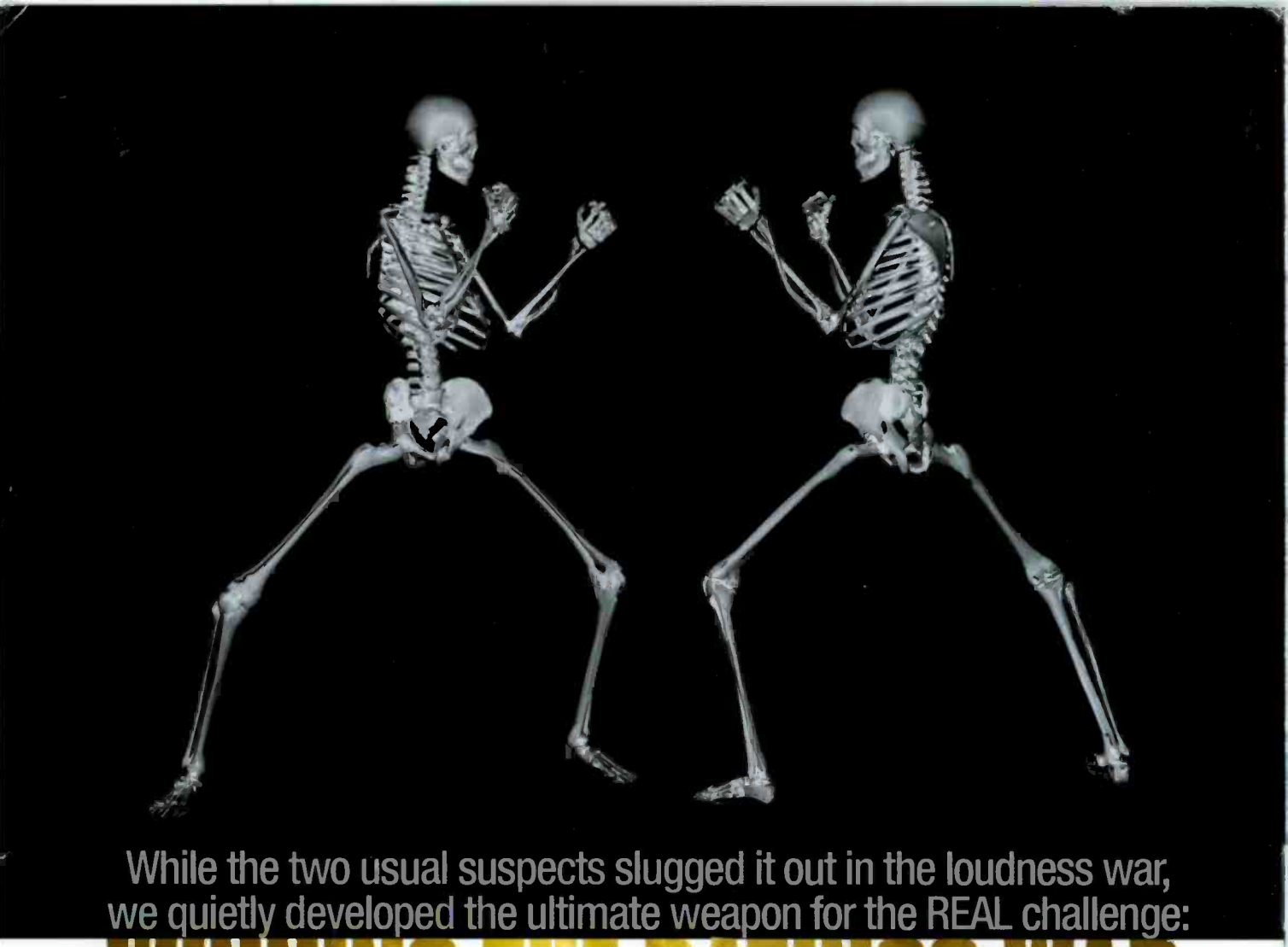

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