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The Radio Technology Leader
July 2001
An INTERTEC®/PRIMEDIA Publication
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ON THE COVER: XM Satellite Radio's first satellite, called Rock, was launched on March 18 from the Sea Launch platform in the Pacific Ocean. Photo courtesy of XM Satellite Radio.

Never Go Off the Air!
Get Scott Studios'
INVINCIBLE
Fail-Proof Digital Audio System

Scott Studios Delivers Radio's Only Self-Healing Redundant Digital System

Major stations in major markets choose Scott Studios' *Invincible*. It's a *mirrored* pair of top-of-the-line SS32 digital audio systems, plus Scott's *exclusive* diagnostic watchdog that double-checks everything several times every second by fast USB. At any *hint* of trouble, the backup automatically starts playing where the problem unit left off! *Invincible* switches so fast that most listeners hardly hear a glitch. In fact, one touchscreen controls both systems seamlessly so some announcers don't notice a switch.

Hands-free redundancy is one of many reasons why major stations in New York, Chicago, Los Angeles, Houston, Dallas, Philadelphia, San Francisco, DC, San Antonio, Phoenix and Toronto installed Scott Studios' SS32 recently. 3,500 stations in the U.S. have Scott systems and those of our sister company, Computer Concepts Corp. More stations use our systems than the second and third largest digital vendors combined! Our customers benefit from the biggest and best service and support staff in radio's digital audio industry, with 105 people at your service.

Scott's *Invincible* SS32 is the most robust digital system of all! SS32 delivers more streams of perfect uncompressed and MPEG audio than any other system. You get industrial rack computers, the fastest CPUs, mega-memory, hot swap redundant power supplies, ultra-fast RAID mirrored hard drives, extra cooling, NT networking, two premium four-output stereo audio cards per system, the best flat panel touchscreens and up to a 5-year exchange warranty! Nothing else gives so much peace of mind as Scott's *Invincible*.

Scott Studios SS32's user-friendly intuitive touchscreen is the simplest for announcers to use and gives all the features that creative major market air talent demands.

For example, SS32 delivers:

- 30 sets of 30 hot keys for instant play of jingles and effects.
- Cart walls that play song requests within 1 to 3 seconds.
- Display of last play and next scheduled play dates/times.
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- Phone recorder with audible scrub and waveform editing.
- SS Enterprise supervises 24 stations over the Internet!

For details about SS32 *Invincible*, go to ss32.com or call toll-free at 1-888-GET-SCOTT.

Shown above is the top-rated "Big Boy" morning drive personality pointing to the SS32 touchscreen at KPWR, Power 106 FM in Los Angeles. For details, visit ss32.com or call 1 888 GET SCOTT.

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Currents

News updated daily. To receive the headlines every week by e-mail, send a message to beradio@intertec.com

Studio Spotlight

WBAA at Purdue University is a work in progress. See how the project is going.

Open Mic

Have something to say? Care to opine? Send it to beradio@intertec.com and read it here.

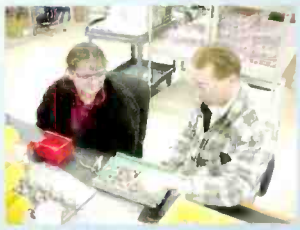
Computer Concepts and CBSI Swap Software: Computer Concepts Corporation (CCC) announced that it has acquired Wicks Broadcast Solutions' Digital Universe automation system. MORE

Sennheiser Promotes Winkler: Karl Winkler, veteran brand manager for Neumann, has been promoted to director, marketing communications, for Sennheiser. In his new position, Winkler will oversee all advertising, public relations and field communications for the Sennheiser, Neumann, Innova-Son and D.A.S. Audio brands. MORE

First Harris BMXdigital Purchased: Harris announced that its first BMXdigital console has been purchased by Premiere Radio Networks to launch the national syndication of the *Kidd Kraddick in the Morning* show. MORE

Our address has changed

...our commitment is the same



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FM 100

FM 250

FM 500

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We are committed to ushering in the Twenty-First Century with a range of technically innovative products designed to anticipate the changing dynamics of world broadcasting, while keeping the heritage of rugged reliability that is Crown.

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- Password protection of system control
- Sophisticated fault alert and logging

Remote System Management (RSM) option

- DSM structure accessible from any phone
- Natural voice communication from transmitter
- Password protected
- System operating functions evaluated and reset remotely
- Alert by phone in the event of system faults.

Crown FMX Series Transmitter models include the FMX 30, FMX 100, FMX 250, and FMX 500. DSM structure and the RSM option can also be retrofitted to current Crown transmitter models.

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A division of
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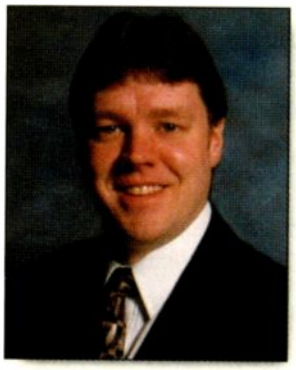
Renewed interest

Radio is about to get a shot in the arm. Satellite radio stands ready to serve millions with the start of services from Sirius and XM. Wall Street expects that the services will have a combined subscriber base of 60,000 by the end of this year. This expectation grows to a combined 8 million by 2004. That's a lot of listeners.

So where does this leave the terrestrial radio stations? IBiquity Digital is working hard and fast to complete its IBOC DAB system. The latest demonstrations show the FM process very well. While the improvement is subtle at times, the main difference is in the stereo separation and the high-frequency clarity. The AM demonstrations also sound very good, although the demos I have heard do not display the advances to their full potential because of the source material (mostly voice).



On the last few demonstrations I have attended, which were at NAB and the ARMA Expo, I listened to the material, but I have also watched the other demonstration observers. It is interesting that the level of understanding concerning IBOC development is truly digital; IBOC knowledge is all or nothing. Some people are very familiar with the concept down to fine details. Most people are not aware of the current technology at all. Most of the people I ride with have not heard the demo before.

One issue that has been raised deals with simulcasting the analog and digital signals. Lucent Digital Radio proposed sending different program material on the analog and digital carriers. USA Digital Radio did not support this idea, which has been carried through to the iBiquity method. This is mainly to overcome the digital acquisition period required when the radio is tuned. The analog audio plays immediately while the radio's buffer works on the digital carrier. A seamless transition from analog to digital then occurs.

This is a necessary step during the hybrid analog/digital phase. Until the acquisition time is reduced, no consumer will tolerate waiting six seconds until audio is produced. I expect that it will be possible to shorten the acquisition time at some point, but multicast audio is not part of the design of the current hybrid IBOC system.

Once a fully digital system is used, I see no reason why the entire data pipe could not be used for more than one audio channel. It is expected that the transition period will take up to 10 years. After that, allow the broadcasters to choose how they use the bandwidth. By then, smarter radios will be available that can adapt to varying data transmission rates and download additional encoding algorithms.

I have always felt that the improvement in audio quality will lead to IBOC acceptance. Granted, most consumers can't hear the difference between medium bit-rate and high bit-rate, but there must be more incentive to buying a new radio than a lateral move.

The added data capacity has not been a primary interest to me, but my feeling has changed. Internet radio and satellite radio offer additional information and program data. As services grow, listeners will become accustomed to this feature. Terrestrial radio will need similar enhancements to survive. Some of this capability was available with RBDS, but there was no precedent for it. It was technology in search of a market that had zero demand.

I have experienced a change of heart about IBOC. I visited the iBiquity offices after the ARMA Expo. The developers in the lab are serious about the technology. Most of the researchers and developers have radio backgrounds. They believe in what they are doing and that it will work well.

Chriss Scherer, editor
chriss_scherer@intertec.com

Editorial Excellence

ASBPE
American Society of Business Publication Editors

BE Radio picked up two ASBPE Midwest Regional Awards in the recent annual awards contest. In the *Regular Contributed Column* category, *BE Radio* was presented a Silver Award for the FCC Update column, written by Harry Martin. In the *Case History* category, we received a Bronze Award for the Sirius Satellite Radio Facility Showcase by Conrad Trautmann in the November 2000 issue.

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* ISDN module required

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COMREX

Building and maintaining a client base

By Mark Krieger, CBT

In our ongoing discussion about the business of contract engineering, we've touched upon the importance of managing records, resources and risks. This month, we'll take a closer look at what it takes to accumulate and maintain the most important asset of all, a satisfied and abundant clientele.

Getting started

When launching a full-time contract business, many engineers find themselves relying on one or two key clients to carry them through the first year of operation. There's nothing wrong with this, providing that sufficient time and energy are invested in building and diversifying the client list.

To begin the process, establish a radius that defines the extent of the geographic area over which you're willing to extend your services. Starting from the center, compile a contact list of every radio station within that area. *The Broadcasting and Cable Yearbook*, published annually and available at many public library reference desks, is one of several useful resources for this information, and includes addresses, phone numbers and the names of key management personnel. After compiling the list, add any additional information you can glean from other industry sources, such as who is currently handling technical services, and pending ownership or facility changes. In short, make a point of learning as much as you can about every operation in the market, regardless of size or class.

Getting business quick tips

- Set a service radius
- Start a direct mail campaign, followed by personal phone calls
- Establish a website
- Be active in the local broadcast market
- Seek out non-traditional sources
- Don't neglect interpersonal communication

Once you've refined your records and knowledge of stations within the service radius, it's time to begin a systematic program for making contacts with each operation. To begin with, you may want to start with a direct mail campaign that includes a personalized letter of introduction, a comprehensive list of services offered and an existing client reference list. Be sure to address these directly to the appropriate decision makers. Mailings to "general manager", or other generic titles are likely to go unread. Follow the mail campaign up with personal phone contacts. In sales parlance this is known as cold calling, and though it can be an intimidating process, it's extremely valuable in establishing credibility and rapport with the people with whom you want to do business.

Give serious consideration to establishing a website. If you need help in getting started, you may not have to look much further than your local community college or university to find competent, reasonably priced web designers. When setting up the site initially, make it lean, well organized and information-driven. Consider posting a client list (with prior permission) for referrals, and include a page of before/after photos of past projects. This is one more good reason to own a digital camera (we'll talk about more in upcoming issues). Value may also be added to the site by posting radio shareware, useful links, perhaps even a mail list server or message board for local broadcasters where one does not already exist. Once the website is up and running, keep it fresh. This gives visitors a reason to check in frequently. While it's true that websites require time and effort to build and maintain properly, they can build a dynamic presence that may prove extraordinarily beneficial to your business.

Finally, don't ignore more traditional channels. Be active in the local broadcast market by attending local SBE meetings and regional shows. These are the places to network and learn about and from your peers. State broadcaster associations also provide an excellent opportunity to make new contacts. You may also be able to purchase inexpensive professional card ads in newsletters for these organizations.

Non-traditional sources

Not every potential client owns a radio station. In fact, it's surprising how many sophisticated audio production facilities have found their way into local schools and churches. Each of these offers a potential for maintenance contracts or upgrade projects.

The proliferation of Internet broadcasters is another possibility for client development. Locating non-traditional clients may require a significant amount of networking, as

"You just have to speak to the right people."

Shannon Black, on-air talent at KRQQ FM, at the VADIS DC console.

"After looking at several options, we decided on the VADIS platform and DC consoles from KLOTZ," says John Decker, Chief Engineer, Capstar Communications, Tucson. "Why? First, our install would be much faster since most of the plant wiring could be reduced to a simple Ethernet line and a fiber optic cable connecting each room with our rack room.

"Secondly, all four stations were to be housed in the same facility, and we had to share audio sources all around the plant. This is a function that is part of the KLOTZ system. Our entire plant is now based on a digital audio 'back-bone' that provides an improved audio signal.

"We also purchased five DC consoles. The air talent finds the DC consoles simple to operate. They can put any source in our plant on any fader of the console with a simple LCD button in the meter bridge. Giving the operator the ability to call up any source to a fader is great since each operator prefers a different arrangement of sources on the console."

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- Integrated platform concept
- Fiber optic networking
- Any audio source, anywhere

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Contract Engineering

there are no readily available public domain databases to tap. For clues, check with local sound equipment suppliers and other professional contacts (remember the importance of networking) to begin building a list.

Maintaining the business relationship

Landing a client is only half the battle. Once you've signed a new account, you have to provide real value in order to maintain a long-term relationship. Quality work and a fair price structure are important, to be sure, but often your interpersonal communication with a client means just as much to them as the service you provide. Remember that when a competitor comes along (and they *will* come) it's easy for them to undercut you on a per hour basis. If you don't provide a face, a voice, and a forum for feedback, on what basis does your customer have to judge you other than the bottom line?

Consider the following: Let's say you sign a transmitter maintenance contract with a client that amounts to 16 hours a month. All the contract requires you to do is perform routine maintenance, record keeping and emergency calls. If you simply perform those duties on a routine basis and nothing more, the only time the client is likely to hear from you is when there's a problem or a late payment. This is not the kind of rapport that builds positive associations. But by extending yourself personally through courtesy calls or lunch outings, you'll give your client a chance to socialize, ask questions, and genuinely develop the feeling that you are a part of their team. And that, more than any other single factor, is what builds a successful business relationship.

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

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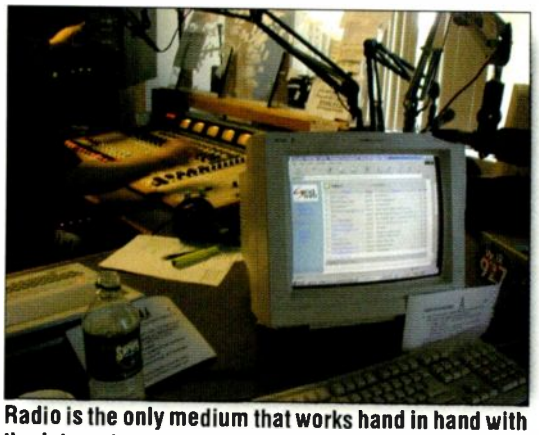
Making money on the Web (the 2001 plan)

By John Caracciolo

It is amazing how much change a year brings. At this time last year, the NASDAQ was in the 4,000 range, every radio station in the country had a revenue plan involving the Internet, and Internet advertising was predicted to grow by 70% to 80% in 2001. Everyone had a website plan to make millions.

What a difference a year makes. Gone are the days of big dollar banner advertising and the wild predictions of double-digit revenue growth and high infusions of start-up public money. Over 400 Internet companies have gone away. Is it a slowdown, a correction or a recession, or is the perception truly a reality? Can radio stations make money using the Web? How can you increase your station's bottom line using the Net?



Radio is the only medium that works hand in hand with the Internet.

Before you pack up the server, put the jock pictures back on the website and have sales start throwing the Web in as added value once again, stop. There is a way to increase your bottom line using the Web. Radio is the only medium that works hand in hand with the Internet. Radio can drive listeners to a website. It is up to the Internet site to make money with the audience. We have to think like marketers, not radio sales executives. This is a different type of medium and a different kind of sale.

In the April 1999 issue of *BE Radio*, I wrote an article titled *The Web for Profit*, and predicted an increase of more than $200,000 to the bottom line of our three radio stations. Well a year later, and a lot smarter, I can tell you that in 1999 our Internet advertising revenue line was more than $250,000, and in 2000, Jarad Broadcasting achieved more than $300,000 in Internet revenue dollars. Our budget line for 2001 is $400,000, and we are over 60% there. How did we do it?

Welcome to Oz

Radio rules do not work in Internet land. In the early days of the Web, many radio executives felt that banner ads and traditional advertising were the key to high revenue potential. It was a radio executive's dream: unlimited inventory, a captive audience, and a huge gross potential. We started coming up with these great formulas that, similar to radio, gave us a time spent viewing, number of hits and number of pass throughs, and we applied pricing that, again similar to radio, gave us a huge cost per point. We typed all this hype and sent our sales people out, armed with this new medium. Well, the results were dismal. Advertisers were not going to pay the dollars we were asking for a banner ad. The objections were the same: No one looks at my ad; no one came in mentioning the ad; your page is cluttered with ads; mine does not stand out. We were making the common mistake: Selling the Net like it was a radio station.

This is a different medium. We had to sell this medium on its own using our radio stations for the sole purpose of bringing the listeners to the site, and create new exciting ways for revenue on the Web.

Money plan

Before we get into the three ways to make money, we need to look at the overall picture of the company and define our purpose. Jarad is not a radio company, it is a marketing sales machine. Every department exists to increase the bottom line. We are in business to move product for the client. We use every tool we have, be it our three radio stations, our 47,000 square-foot venue, or our websites.

We have thee ways to make money on the Web. All three use the radio stations to drive traffic to the site, but instead of site advertising, they are separate marketing concepts that could survive on their own. We took a step back and looked at the entire picture of our company rather than looking at the Web as a separate revenue business plan. We split this into three areas:

- Classified advertising on the Web
- Ticket sales on the Web
- Special event websites linked to the station home page.

Classified advertising. On Long Island, *Newsday*, our daily paper, has a $350,000 per week business just from help-wanted advertising. This is local, lucrative advertising business that radio does not get. We needed to figure out a way to tap into this market. The Internet was the answer. By developing a classified section on our website and promoting the site exclusively on our three radio stations, traffic at the site was over 150,000 hits per week. We charge companies $250 per help-wanted classified.

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Introducing

The NEW Aphex 2020MkII

The original Aphex Model 2020 audio processor set the standard for audio quality, loudness and extended coverage. Not content to sit on its laurels Aphex continued to research ways to improve performance even further. The result is the 2020MkII.

New processing algorithms and circuit designs, in addition to the fifteen proprietary circuits* from the original, allow even greater loudness without sacrificing a clean, natural sound. The MkII's increased flexibility also gives a station the ability to create its own unique sonic signature. New features include a split band optical high frequency limiter, a low distortion overshoot compensated low pass filter* (with no spurs), improved remote control interface, RDS, and dual composite outputs.

Audition the new 2020 MkII on your station and you'll find that Aphex has really done its homework—creating a processor with performance and features unmatched at any price. The 2020MkII —in a class by itself.

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*(patented or patent pending)

Companies keep their listing for one month. The first month, we had over 70 companies listed. This is pure Internet income. The only commitment our stations have to make is promotional advertising.

Ticket sales on the Web. Our company has developed concert sponsorship advertising as a major form of non-traditional revenue. The Web has given us the opportunity to take this one step further. We developed a site that exclusively sells concert tickets to every event in our listening area whether the event is ours or produced by an outside company. If the event is a station event, the link to purchase tickets goes to an in-house representative that completes the purchase fulfillment. If the event is a non-station event, we link directly to Ticketmaster.com. Either way, we train the listener to go to our site for all their concert ticket purchases. We make all the money on our shows, and provide a service to our listeners on the others.

We were making the common mistake: Selling the Net like it was a radio station.

Special event sites. Since our company specializes in non-traditional forms of advertising and revenue, our sales department is always developing events for clients that require multimedia marketing programs. The Internet gave us one more way to promote an event and keep all the money in house.

If a client is promoting an event, naturally our sales staff sells them a radio schedule. But, for events that require multimedia campaigns, why not sell them an Internet page? WLIR.com is rated by MeasureCast as number seven in the country for streaming audio sites. Naturally, our site generates a ton of traffic per week, and our sales staff uses that information to tie clients into the traffic. Our staff sells a single announcement page on the Internet for $300. We post a link on the WLIR home page to the special event site. We allow the client to keep the link and site for one month. The client page is usually a single page with limited graphics and text, very similar to a press release. Last month our sales staff sold 40 of these.

The Internet is not dead, it just needs to be re-thought. Radio station managers must realize that for reps specializing in selling air time, this is something new. Sustainability will win the Internet game. Stations must set a realistic pace and be in it for the long haul. Radio executives need to focus their Internet business models on ideas that generate revenue and take advantage of the new Internet environment. The Net is growing. Users are embracing it more. More people are getting broadband connections. The rules have changed, and lots of the competition has dropped out. The opportunity for radio and the Internet is stronger than ever before.

John Carraciolo is vice president and general manager of Jarad Broadcasting Company, Garden City, NY.

SAS64000 AUDIO ROUTING SYSTEM

Digilog!

IN If the migration to digital is in your future, then this is the route to take. **AND** tecture of the SAS64000 sports uninterrupted signal **OUT** Introducing the big performance analog router that also speaks fluent digital. A true hybrid that allows you to scale the number of analog and digital ports as needed. And even better, the SAS64000 Audio Routing System creates a forward path to AES/EBU digital audio without creating analog obsolescence.

This means you can mix your analog and digital I/O in the same router frame. Go direct analog to analog, or digital to digital. Mix it up with automatic 24-bit conversion analog to digital and vice versa. Either way you choose, the unique architecture of the SAS64000 sports uninterrupted signal integrity and non-blocking flexibility.

And the SAS64000 is wonderfully simple to integrate, upgrade and put into service. Just plug in our new digital port expander and that's it. Welcome to digital!—co-existing flawlessly with analog—and all within the same framework.

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analog and/or digital input

analog and/or digital output

Tall AM towers

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

Usually, bigger is better. But in the case of AM towers, taller is not always better. A very tall AM radiator is not always the best radiator. In fact, without a considerable amount of expensive work, it's not possible to successfully use a tower over ⅝ wavelength (0.625λ), and the FCC would probably not accept it on the grounds of low efficiency.

The one-quarter wavelength (¼, 0.25λ or 90°) AM radiator is generally the most popular today. Its electrical length lends itself to easier calculations and efficient radiation. As AM antenna length (height) increases, radiation efficiency improves until we reach about 0.53λ. Radiators taller than 0.53λ have a slightly higher radiation efficiency, but at the cost of an often unwanted high angle lobe at about 60° for a maximum efficiency length of 0.625λ (or ⅝λ), as shown in Figure 1.

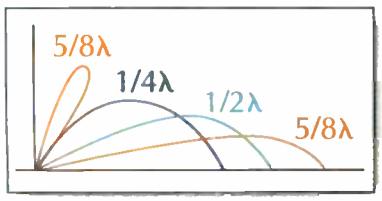


Figure 1. The effect of antenna height on the angle of lobe radiation.

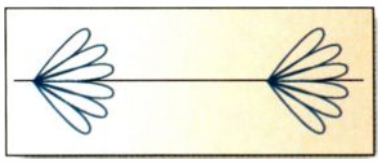


Figure 2. Radiation pattern of an antenna longer than 1λ.

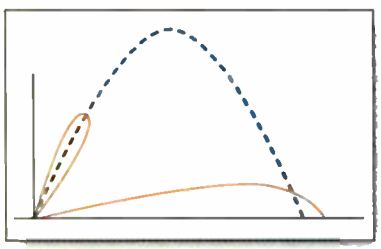


Figure 3. High angle signals cause skywave interference to the groundwave.

Daytimers with a 0.625λ tower can usually disregard the 60° high-angle lobe, because it is not often that daytime ionospheric reflections produce interference. But it is essential to examine the situation if night and/or critical hour protection is required. Nighttime operation using a directional antenna involves careful manipulation to reduce high angle radiation, and unless a strong skywave signal is required at a convenient distance, 0.625λ towers are not widely used.

FM towers for AM

In the early days of FM, and later television development, some AM stations that obtained construction permits erected tall towers for their new FM or TV operation and hoped to use them for AM as well. In many cases, the towers were too tall for AM use without electrical modification; this had to be planned prior to construction.

A horizontal long antenna of 1λ or more will have a rather useless radiation pattern (Figure 2). Lobes of radiation will spring from the antenna at various azimuths and not provide adequate coverage. Shorter horizontal antennas will have the familiar figure-eight pattern from the sides. A vertical long wire antenna of 1λ would transmit most of its power skyward and would produce horrendous skywave interference and little ground wave signal.

There are several long antennas that are very interesting but do not have a modern application to AM work. Among these, the *Polyrod* antenna is an excellent illustration of radiation from a non-metallic device with a reasonable gain and directivity. Unfortunately, it is only usable for microwave purposes because it needs to be several wavelengths long, and even for UHF work the size would be too great. However, it does fall into the region of long antennas. The tapered antenna is fed by a short piece of waveguide and performs as an endfire antenna. Dimensions are several wavelengths long and about 0.5λ in diameter, reducing to about 0.3λ.

There is, however, one type of tall AM antenna that has existed for a long time: the Franklin Antenna. Unhappily, few are constructed these days, probably because of the FAA's dislike of tall structures, cost and the lack of suitable interference/allocation clearance to take advantage of the increased service contour. It was also known as an anti-fading antenna.

Many AM stations produce interference and fading signals to themselves. The Franklin anti -fading antenna was designed to eliminate or reduce these problems. A taller antenna can be used to obtain greater groundwave coverage. Unfortunately, there would often be large areas that received either interference or fading/distorted signals due to excessive skywave signals.

The interfering skywave signal was the station's own reflected skywave signal returning to earth near the further reaches of usable groundwave coverage where the skywave was stronger than the groundwave and ground conductivity was high. See Figure 3. The 60° antenna lobe was the cause, rather like a cow standing on its own tail.

More about Franklins

It was known that a half-wave radiator provided excellent radiation characteristics. So the thought was why not have two half-wave radiators mounted one above the other? In other words, a full wave antenna. Unfortunately, full wave antenna current distribution produces two half-wave lobes with out of phase currents (and voltage), as shown in Figure

On The Air

A Monthly Newsletter from Broadcast Software International Issue 5

News

BSI Partners with Dell and AudioScience

Dell has been selected as the platform provider for all of the BSI digital systems. BSI tested PCs from various providers, including Hewlett Packard, Compaq and several custom-builders. Dell provided the best combination of quality, non-proprietary hardware, service, and overall value.

BSI President Ron Burley says, "We try to provide our customers with peace of mind. They know they can rely on Dell, and they can rely on us. It's a partnership of trust."

Powered by DELL

Most BSI systems, including the $9,999 dual studio Series 110 are built upon the Dell PowerEdge 300 workstation. An exception is the $19,999 dual studio Series 210, based on the Dell PowerEdge 2550 server with dual redundant power supplies and swappable hard drives.

AudioScience has created the new $1499 4344 and $1999 4346 to be sold exclusively by BSI. These audio cards each have an on-board MP3 CODEC and are capable of four simultaneous playbacks. The ASI4346 also has an RS422 bitstream input and GPIO.

MP3 is a more advanced algorithm than its predecessor, MP2. At the same sample rate, an MP3 file will sound better than an MP2 file. To get the same broadcast quality music that you've had using MP2, you can compress an MP3 file twice as much. But, playing multiple MP3 files using a software CODEC takes up a lot of processing time, often resulting in audio breakup or system sluggishness.

"Even with the fastest CPU on the market, a card with onboard decoding capabilities is the preferred means to decode and play audio files," said Greg Case, president of Broadcast Technical Engineering.

The ASI audio cards include specialized digital signal processing chips (DSP's) that take the load off the CPU. Combine that with four balanced audio outputs and you sound great, while taking advantage of the most popular audio format in use today.

Quote of the Month

"If we have a network glitch, we have confidence that our WaveStation is fully flexible. We can just put our automation on and we're ready to go."

Matt Clark
KLEY- Wellington, KS

Calendar

Aug 23-25, WaveStation Weekend Training Session

Sept 5, Demonstration of a new automation product at the NAB. Call for an invitation.

Birthdays:
July 1 1961, Princess Diana
July 20 1947, Carlos Santana

Tip

Carts Cut Time Spent

Ever get tired of building logs with the same group of three or four events over and over? Try putting them in a cart and then calling that cart in the log. Not only will it make your logs shorter, it'll be much easier to read. A cart with the description "Fade to break" is a lot more descriptive than a group of mixfade and deckfade macros. This is also a great way to avoid running out of lines in your scheduling software.

User File

KKVV - Clive Millett

Clive works at KKVV in Las Vegas, Nevada, where they use BSI's $299 WaveCart. He says, "I was the board-op during the mornings and I was also the only production guy. I was recording all of our shows and commercials in real time. For the holidays, I spent 3 days, 11-12 hours a day, and it was a real headache. Last year I started recording it right into Cool Edit and then loading everything into WaveCart."

He started out by jumping right into things. And while we recommend reading the manual, we know that not everyone does. "Technical support was great because they were patient with me," says Clive, "At one point, we weren't segueing, and the tech finally figured out what I didn't know and showed me how to set it up so we sounded like we were supposed to."

WaveCart also had features he didn't expect. He says, "One thing we needed was triggers, and we didn't even know they were included. I was just reading through the help file and found out how to do it."

Clive says, "WaveCart really cut down on my headache time. I didn't have to sit there and baby-sit."

Send us your story.

4a. This results in poor horizontal radiation and excessive high angle signals, as mentioned earlier.

The Franklin antenna consists of two half-wave radiators mounted one above the other and insulated from each other. The lower radiator base is insulated in the usual way. The transmission line is run up inside the lower section, mounted on insulators and out of the induction field. At the insulated space between the two towers, a phasing network is mounted. This changes the phase relationships so that the currents in each half-wave section are in phase (see Figure 4b), and the efficiency of two half-wave radiators is realized in terms of increased ground wave and decreased high angle signals.

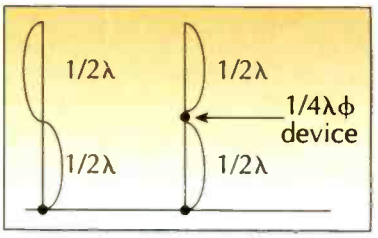


Figure 4. Stacking two ½λ radiators normally produce a phase-cancelled signal.

Many years ago, an unusual directional combination of a tall antenna and a vertical drop wire was authorized for a 50kW station, and could be again under the proper circumstances. The upper and lower elements of the antenna were driven through a modified phasor, which also controlled a single drop wire suspended from a guy wire. Each of the three antenna elements was monitored by a standard monitor loop and antenna monitor and handled like a regular directional antenna operation.

The installation ran for many years and was generally satisfactory. One troublesome problem was caused by weather affecting the mutual impedance at the center of the tower where the phasing circuit was located. This made it difficult to maintain the licensed operating parameters for the array. Eventually, allocation/interference conditions made it possible to operate with a slightly shorter, regular AM tower, and the DA section was dismantled.

There are several variations of the symmetrical vertical divided radiator in use. By changing the ratio of the lengths of the two vertical sections, it is possible to control, to a limited extent, the vertical radiation pattern, and hence the high angle interfering signal. The almost limitless ability of computers makes it possible to fully model the important characteristics of such an antenna. In the past, it was necessary to make costly helicopter measurements to satisfy FCC requirements.

In view of tower construction costs today and the scarcity of suitable sites, as well as opposition by many groups to tall towers, it is not surprising that most AM operators stick to the tried-and-true 90° tower for most installations. Its performance is well documented, and it is easier to handle in calculations; although, in these days of universal computer availability, ease of calculation is probably one of the least important considerations.

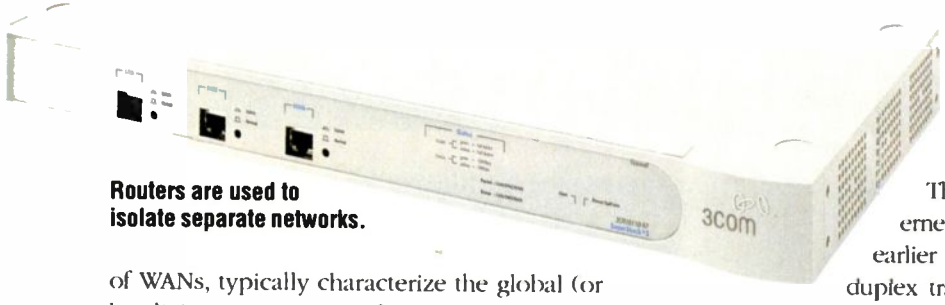
E-mail John at batcom@bright.net.

Data routers

By Kevin McNamara, CNE

Networks attached to the Internet are most likely connected by a routing switcher. By definition, a routing switcher is a device that connects two or more networks. For example, if your station is connected directly to some form of Internet access, such as a Frame Relay, T1, DSL, cable, etc., or perhaps directly to the corporate office, the network router will form the demarcation point between your internal network and the outside network connection.

The term *wide area network* (WAN) describes a model where groups of local networks, located in different areas, are connected together. Other terms, such as *Enterprise* or *Campus* networks, also considered forms of WANs, typically characterize the global (or local) interconnection of networks within a company.



Routers are used to isolate separate networks.

The Internet comprises a series of interconnected routers that permit a user to access any available server in the world. Web browsers accept a Web address as a name, in the form of http://www.yoursite.com or as an address such as http://123.456.789.000. Large routing switchers connected to the Internet pass information to each other regarding the closest path to a specific address. The *Routing Information Protocol* (RIP) established the most efficient path (shortest distance and number of hops) for a source packet to reach its destination; this is similar to what happens when you dial a number on a telephone.

What's in a name?

You may wonder how a domain name is routed. When you type a domain name into your browser, it is sent over the Internet and read by a *Domain Name Server* (DNS). The DNS resolves the name into its assigned IP address, which communicates that information to the router.

Routers are used to *segment* or isolate different networks. Routers function at the *Network* layer of the OSI model and connect networks that use the same protocols, typically TCP/IP, but will also function with other *routable* protocols such as IPX. Many will remember a device called the *Bridge*. In the earlier days of networking, particularly with Ethernet networks, the bridge was used to segment networks. In contrast to a router, the bridge operates at the *Media-Access* layer that will only work with networks of similar *access-methods*, such as Ethernet-Ethernet. Routers allow a broader range of control in terms of what can pass through the router and the path that it can take. The current generation of routers provides a high degree of security.

In the case of a WAN, this could mean networks in different buildings or states; however, it can be desirable to isolate networks within a facility. An example would be to isolate the network used for general business from the dedicated network(s) used to serve audio program materials. Ethernet networks use a *collision* protocol. Data transported through an Ethernet network is broken into small *packets* of information and transmitted randomly over the Ethernet backbone. If two or more packets transmit at the same time, each device waits a random amount of time and retransmits. The current generation of high-speed Ethernet eliminates some of the latency found in earlier versions, largely due to the use of a full duplex transmission scheme.

If too many devices connected to a common network are presenting a large amount of traffic, network performance can be affected or, in severe cases, stopped. Consider networks that broadcast (or stream) audio/video data over an Ethernet network—in this case, data traffic is almost always present. If another network used for general business functions was also connected to this Ethernet connection, overall network performance would likely be poor. Inserting a properly configured router between the two network servers would isolate the Ethernet traffic. Let's assume that the traffic department, which normally only has access to the general business server, requires the ability to download program files to the on-air audio playback system. The router can be programmed to allow data from one address to pass through while blocking other traffic.

More than a pretty faceplate

Current routers are "smart" devices. Even the simplest routers provide a high degree of control over how data is handled. Configuring a router can also be challenging, in some cases requiring extensive training and certification. The technology of a router is based on a collection of routing algorithms. The types of algorithms used vary

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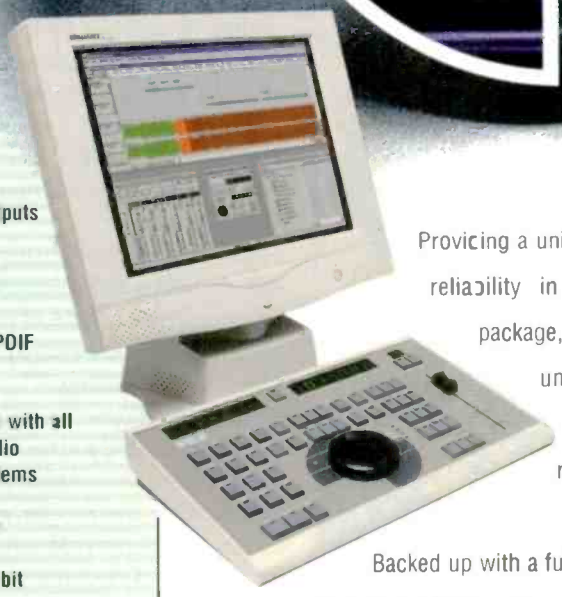

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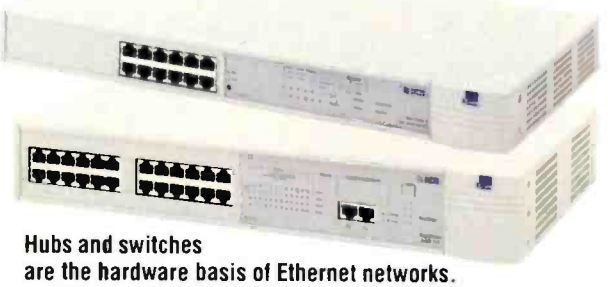
depending on the type and application of the router, but here are a few:

Single-Path routing. Supports a single path to a single destination.

Multipath routing. Permits multiple paths of data to a single location, permitting more efficient data transfer and inherent redundancy

Flat routing. Operates only in a peer-to-peer mode.

Hierarchical routing. Operates at a higher level, acting like a *backbone*, i.e. large routers, such as those used by fortune 500 companies; governments and universities form the backbone of the Internet using the hierarchical algorithm to pass address information to each other.



Hubs and switches are the hardware basis of Ethernet networks.

Static routing. Uses fixed table mappings that are established by a network administrator, typically in small networks where traffic is predictable.

Dynamic routing. Builds mapping tables based on traffic within prescribed constraints. The router handles changes in network configurations. Most dynamic routers allow the network administrator to program certain static functions, if necessary.

Intradomain routing. Permits routing only within a particular domain.

Interdomian routing. Allows the router to communicate with other domains.

Link State routing. Allows the router to send part of the information within its routing table to all other routers on an internetwork; also called shortest path fist algorithm.

Distance Vector routing. Allows the router to send as much information as necessary to routers directly adjacent to it.

Host-Intelligent routing. Employs this algorithm and assumes the initiating source will handle all routing tasks and will store and forward packets; also called source routing.

Router-Intelligent routing. Assumes that the initiating source has no information as to the routing of data and will provide the proper routing.

This should provide a fundamental knowledge of network routers. Next month we will look at network switches and hubs.

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

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

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Streaming under attack

By Harry Martin

Webcasters that survived the Copyright Office's December royalty decision have been dealt another nearly fatal blow. Beginning this year, radio stations nationwide have been receiving notices from advertising agencies demanding that they stop streaming the commercials of the agencies' clients over the Internet or face liability for breach of contract.

Last fall, advertising agencies signed a new contract with the American Federation of Television Artists (AFTRA), which represents actors who voice radio commercials. The new contract pays the actors 300% of their normal fee if radio stations play their ads on the Internet as well as on the radio. These fees must be paid by the advertisers and advertising agencies, not by the radio stations.

As a result, advertising trade groups began sending advertisers letters reminding them of higher royalty fees. In turn, advertisers and advertising agencies have been ordering broadcasters who stream their signals on the Internet to stop streaming their made-for-radio commercials.

Currently, there are two kinds of streaming: passive and active. Passive streaming occurs when a radio station simply streams its entire broadcast over the Internet without consent or advance notice. Active streaming, however, occurs when a radio station either offers streaming of commercials to advertisers as a value added feature and/or charges a premium for streaming. In active streaming situations, the advertiser or agency has advance knowledge of the streaming and has either approved or authorized the streaming of its clients' commercials. However, both types of streaming commercials trigger the advertisers' and advertising agencies' obligation to make the increased talent payments.

As a result of the agency notices, numerous stations have ceased simultaneous streaming of their stations, and others have sought to delete or cover up the affected commercials. There are a few stations, however, that have agreements with AFTRA that allow Internet broadcasts of commercials at no extra cost.

Stations that simultaneously stream their signals should carefully review their media contracts to determine whether they contain provisions that limit the authorization to stream to situations in which the advertiser or agency has provided written authorization. It is important to identify the advertiser's or ad agency's position. Station-friendly provisions contain language that holds the station harmless for streaming commercial matter.

Pending notification from advertisers and advertising companies, stations may continue to stream commercials. If and when a station receives notice, it can either stop streaming altogether or delete or cover up the affected commercials. If a station chooses to cover up the affected commercials, it may want to consider the option of ad insertion technology. Essentially, ad insertions are Internet-only ads that take the place of over-the-air ads. By using such technology, stations can avoid the liabilities associated with the streaming of made-for-radio commercials.

The American Association of Advertising Agencies and the Association of National Advertisers, which represent the interests of advertisers is negotiating with SAG and AFTRA for lower rates, but no relief is on the horizon.

Newspaper-radio on hold

Chairman Michael Powell withdrew the broadcast-newspaper cross-ownership notice of proposed rulemaking from the May meeting agenda. Powell had expressed interest in re-examining the rules, stating: "I don't know why there is something inherent about a newspaper or a television station that means they can't be combined." However, disputes between the then sitting Commissioners, especially between Commissioners Tristani and Furchtgott-Roth, over the wording of the Notice of Proposed Rulemaking, forced Powell to pull the item for the time being.

Commissioner Tristani reportedly did not wish to include language in the NPRM that indicated a willingness to ease restrictions. Commissioner Furchtgott-Roth, on the other hand, was unwilling to include language that suggested that there was any justification for retaining even the current restrictions. While Commissioner Ness was willing to begin a rulemaking, she too was seeking concessions.

It is expected that this notice will be deferred until the three new Commissioners, recently sworn in, become familiar with the issues.

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

Dateline

Commercial and noncommercial radio stations in the following states must file their biennial ownership reports on or before August 1: California, Illinois, North Carolina, South Carolina and Wisconsin.

July 10 is the deadline for placing in stations' public files their quarterly lists of community problems and responsive programming broadcast during the period April 1 – June 30.

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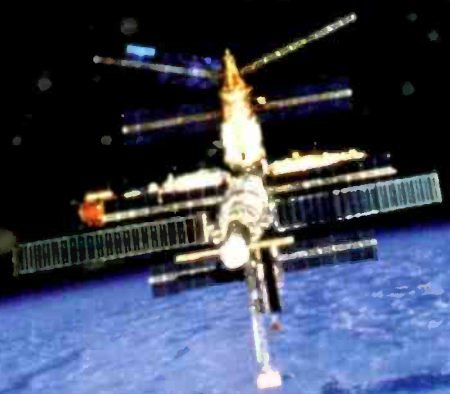

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THE FINAL COUNTDOWN for satellite radio

Poised for their service launches, Sirius Satellite Radio and XM Satellite Radio have built state-of-the-art studios and a satellite transmission network to provide a radio service.

By Chriss Scherer, editor

Radio currently has three different forms: terrestrial, Internet and the newest innovation, satellite radio, which delivers multiple audio channels directly from the sky to the listener. Apart from the delivery method, the most unique difference between satellite radio and the other forms is the subscription-based business model. Subscription services are not a new concept. In fact, many cable TV systems already offer audio entertainment channels as an option, but these channels are typically jukeboxes without any announcers—or personality.

The two satellite radio service providers, Sirius Satellite Radio and XM Satellite Radio, have assembled talented programming staffs to format many of the 100 audio channels each will offer. The providers plan to offer many niche programming choices, but will draw from a much larger population, so the niche audience will also be greater.

Satellite radio basics

Both Sirius and XM have satellite systems in the sky ready to go. Because satellite reception requires a line-of-sight signal path, both providers are building terrestrial repeater networks to supplement coverage in metropolitan areas. The exact number of repeaters varies for each location. In some major markets, the terrestrial network is complete and ready for use. Some terrestrial networks will not be completed until after the service officially launches.

Let's look at the audio chain and move through the system. Sirius has built a studio complex in New York City (see the Facility Showcase in the November 2000 issue of *BE Radio*), and XM has built its studio complex in Washington, DC (a Facility Showcase on XM will be featured in the October 2001 issue.) Both facilities use the latest technologies to route audio and data through their facilities. In addition, both providers have agreements with program source providers, so some content will be created by an outside source and then transported to these network facility control centers. XM has also built a studio facility in the Country Music Hall of Fame in Nashville.

From these extensive studio facilities (where digital audio file storage is measured in terabytes and approaches petabytes), the audio and data are uplinked via X-band to the orbiting satellites. The satellites then transmit the signal back to Earth on S-band. Both providers have footprints that cover the continental United States. Agreements are in place to prevent the signals from extending into Mexico and Canada.

Repeaters are needed in areas where satellite reception will be hindered by buildings and other obstructions in the line-of-sight path.

XM's Roll takes off from the Sea Launch platform. Inset: A proton rocket lifts one of the Sirius satellites into orbit.

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SGP-5	$5,300	10Kw
SGP-6	$6,100	10Kw

FM Antennas
Low power circular polarization

GP-1	$350	1.5Kw
GP-2	$1,350	3Kw
GP-3	$1,900	5Kw
GP-4	$2,600	6Kw
GP-5	$3,150	6Kw
GP-6	$3,700	6kw

Other power configurations contact OMB America

FM Antennas
Educational circular polarization

MP-1	$250	0.6Kw
MP-2	$680	0.8Kw
MP-3	$980	0.8Kw
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MP3-6	$2,740	3kw

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THE FINAL COUNTDOWN

While both services will launch nationally, only some of the terrestrial networks are completed. As additional subscribers are obtained, the repeater networks outside the largest cities will be completed.

The main difference between the systems are the satellite orbital paths. XM has two satellites in a geostationary orbit at 85° and 115°. This places them 22,223 miles above the equator south of the Alabama/Georgia and the California/Arizona borders.

Sirius has three satellites placed in highly elliptical orbits. At any given time, at least one of the three satellites is visible to receivers. Each satellite is over the United States for about 16 hours each day at an angle of 60 to 90 degrees. Figure 1 shows a comparison of the orbital paths for each service. Figure 2 shows the effective flight path of the Sirius satellites after combing the theoretical flight paths with the Earth's orbit.

The XM (above) and Sirius system control centers monitor the satellite parameters.

The terrestrial repeater network works with the satellite signals to provide a more robust transmission system. A listener can receive up to three signals at any time: two satellites and a repeater. A listener's radio need only receive one of the three signals to function. The terrestrial repeater network adds another level of redundancy to the system.

Spectrum use

Signal reception of the two systems are similar in their basic theories but differ in execution. Because of the geostationary orbits, it is easier to start with the method that XM uses. The signal is divided into two *ensembles*, each containing half the data being transmitted. These signals are sent to both satellites

(named Rock and Roll) where they are received, downconverted to S-band, and then transmitted back to Earth. While XM has a total licensed spectrum of 12.5MHz, notice that each satellite only uses a portion of this space, as shown in Figure 3. The listener receives the data from one or both satellites. The terrestrial repeaters also receive the satellite signal and then retransmit it on the appropriate frequencies. In addition, each satellite and repeater adds a finite amount of time delay (up to a few seconds) to the signal, which provides greater robustness. The overall system data throughput is 3.28Mb/s.

This method provides three kinds of diversity. Spatial diversity is provided by the physical differences in the location of the satellites and terrestrial repeaters. Frequency diversity is provided by the placement of signals across the spectrum allocation. Finally, time diversity is provided by the small amounts of delay added to the signal from each source.

Sirius divides its X-band spectrum into two portions, each containing the entire data package. The two two portions are then sent to the two visible satellites.

Each packet of data has a unique identifier so that a receiver can properly reassemble the datastream regardless of the source. As the receiver moves, the signal strength from each source will vary. The receiver will constantly search for the data it needs to reconstruct the signal.

Many existing broadcasters have expressed concern over Sirius and XM providing local content through the terrestrial network. While every repeater site does have a direct connection back to the providers' operation center, this link is only for telemetry and control. There is not enough bandwidth to provide additional audio services. Besides, with more than 1,000 repeater sites across the country, the cost of connecting each of these sites would be quite high. Also, the X-band uplink does not have the capacity to carry the additional localized programming.

The Sirius method transmits two different signals to the two satellites visible at that time. Both uplink signals contain the complete programming data. The satellite then converts and retransmits the signal back to Earth. Figure 3 shows the S-band spectrum division. Since there are three satellites and two signals, the frequencies rotate between them as each satellite comes into view. One

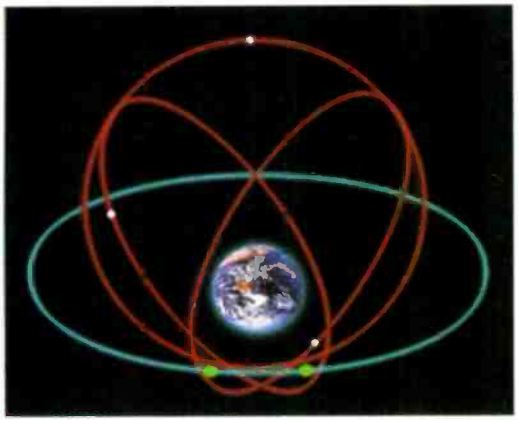

Figure 1. The two providers are a study in satellite technology. XM uses two satellites in geostationary orbits (blue path), while Sirus uses three satellites in highly elliptical orbits (red paths).

THE FINAL COUNTDOWN

satellite uplink feed is delayed by four seconds to introduce time diversity.

Instead of receiving the S-band transmission and rebroadcasting it on the terrestrial repeaters like XM, a separate VSAT link is used to send data to the terrestrial network. Data is uplinked on 14GHz and then downlinked on 12GHz to the terrestrial repeaters. Because the Sirius satellites appear higher in the sky and are not over the equator, fewer terrestrial repeaters should be required to fill in the built-up areas.

Both providers are using the Lucent PAC (Perceptual Audio Coder) algorithm to encode the audio. While the first generation of receivers will only be able to receive the service of one provider, Sirius and XM have an agreement to work together on receivers that can receive both services.

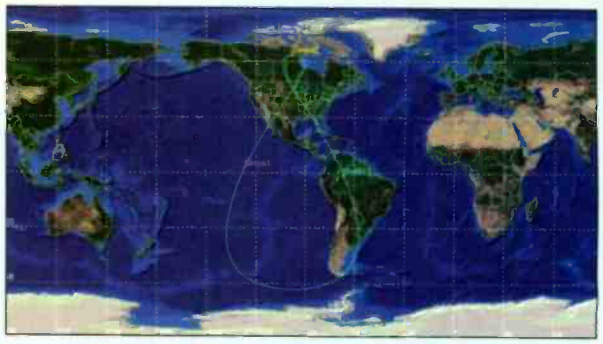

Figure 2. The effective Sirius satellite coverage factoring the orbital paths and Earth's rotation.

Not just audio

While satellite radio is an audio service, it has one feature that will draw obvious listener attention. In addition to digital audio, *Program-associated data* (PAD) is transmitted to the receiver. FM stations have been able to transmit RBDS data for several years with limited acceptance. Because the new services require a new receiver, the data capacity can be included from the beginning.

The PAD content is stored on a server and recalled as needed. Most

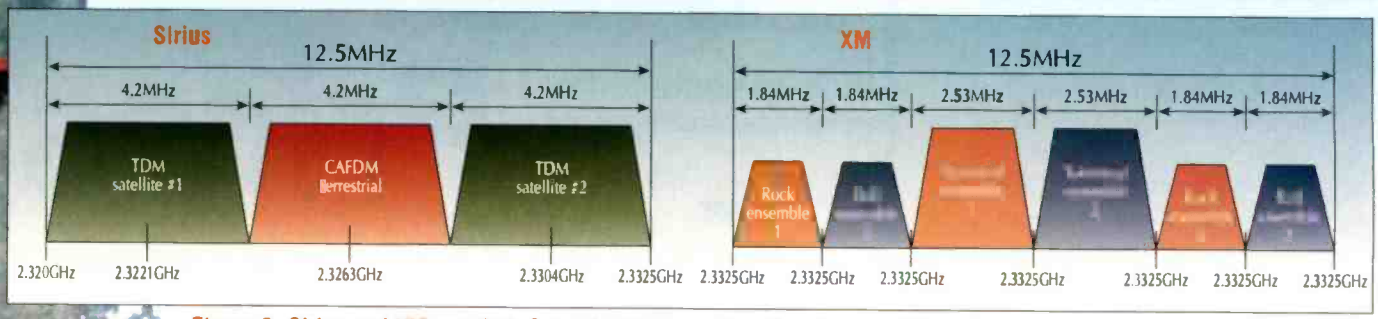

Figure 3. Sirius and XM use their S-band frequency allocations in very different ways.

Manager's perspective

By Jim Paluzzi, CBT

Satellite Radio will change the rules of audience engagement for most public radio stations.

For thirty years, many public radio stations built their public service model by broadcasting programs purchased wholesale from national program producers. This retail broadcasting approach worked well because few markets had multiple competing public radio services.

However, because of this lack of competition, most public radio stations had little incentive to develop their local program production capabilities. It was simply too easy—and economical—to clear a national program, rather than trying to produce one in-house.

Even today, local programming at many public radio stations too often consists of announcers spinning CD's, with little production support. Satellite radio broadcasters can't wait to steal this audience away from our stations, using their high-end production values.

For terrestrial public radio to thrive in a world of satellite radio, stations must develop high-quality, listenable, local programs that cannot be heard anywhere else.

Jim Paluzzi is Professor of Broadcast Technology at Boise State University, and serves as General Manager for Boise State Radio.

This same approach applies to commercial radio stations as well. Localism will continue to be the key factor in the success of terrestrial radio. —CS

on-air audio playback systems from outside the United States can provide this type of data storage and manipulation, mainly because RBDS (or RDS as it is called in Europe) has seen a much greater acceptance. Some domestic systems can also store and manipulate this data as well. Sirius uses a Prophet Systems system, and XM uses a Dalet system for audio storage and playback. In addition to PAD, *Non-program-associated data* (NPAD) can also be stored and displayed as needed.

For the listener, a subscription-based radio service will be something new. The anticipated monthly cost will be $12.95 for Sirius and $9.95 for XM. Wall Street analysts predict that by the end of 2001 Sirius will have 10,000 subscribers and XM 50,000, with the numbers reaching about 2 million subscribers each by 2003 and 4 million by 2004.

Satellite radio will provide another entertainment and information source to potential radio listeners. The additional data and display capability will add a new spin to the long-established medium. An evolutionary step in radio is about to take place.

Problem & Interfaces Solvers

By Allan Soifer

When the ins and outs don't match, save the day the easy way.

My start in radio was as a part-time helper to a busy chief engineer. One of my first tasks was to demonstrate that I knew how to solder. I was handed a mic cable, and told to make an adaptor cable to connect a portable broadcast mixer to a consumer reel-to-reel tape deck.

I hesitated, and suggested that a well-known (to the burgeoning music and audio industry) brand of adapter plug be used to save time and money, and was reprimanded so severely that I never again brought up the subject of adaptors in this engineer's presence. At the time, it was considered beneath a self-respecting engineer to fool around with anything that was not made expressly for the job or was not constructed entirely by the engineer himself for the need. Adaptor plugs were relegated to the junk and toy end of the audio realm.

Times have changed for the better. Now technicians often depend on specialized adaptors and interfacing devices to properly derive input signals, convey outputs from a console to auxiliary devices, and even to ensure the success of a remote or logging recorder. It's possible to find any number of adaptors or custom interfaces in the electronic chain of the station.

Despite the ever-increasing collection of equipment designed expressly for the broadcast studio, it seems that programmers, producers, engineers, and even station owners will find a need for consumer-type devices and equipment. Indeed, some consumer or pro-sumer appliances function as well as their broadcast counterparts. For a small-budget station, specifying only the pro brands of equipment may wreak havoc with the bottom line. I have seen examples of not-for-profit FM outlets that could never have gotten on the air—nor stayed there—without interfacing consumer-level equipment into their air chain.

Interface needs

Let's start by listing some usual situations and the devices that end up being inserted into the air-chain that do not come with a balanced-to-ground connection with a 0dBm level reference. There are CD players, cassette decks, open-reel tape decks, portable cassette decks, tuners, temporary phone connections for audio or data, PA systems for remote location use, connections to a client's paging or background music system on a remote, computerized audio storage and playback devices, special effects or audio processing equipment, musical instruments for live-to-air performances, and more. What can be quickly seen is the need for both secure hum-free audio connections and a way to adapt differences in signal levels between the outboard goodies and the main console or patching facility.

It would be nice to plan a patch bay that includes such ready-to-use interfacing, but this is seldom the case due

continued on p. 42

Radio. hear and now.

Walter Mossberg
Columnist
The Wall Street Journal

Larry Wilson
President and CEO
Citadel Communications Corporation

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to budget constraints. Thus, the adaptor plug, or venerable black box, comes into play. A few manufacturers have had success in creating special adapting circuitry as retrofits for existing pro equipment.

Adapters and splitters should be a part of a complete interface kit.

What is presented here is hardly an exhaustive listing. As the phrase goes: your mileage may vary.

Why do it?

This question could easily be posed by many newcomers to the field. After all, professional equipment is supposed to be adaptable and have a wide range of input and output levels. While it's true that most broadcast equipment is sturdy and forgiving of abuse, the audio signal that passes through it is rather fragile and easily wounded.

Improper level matching can easily cause overloading of successive line amps and devices in the processing chain and might result in distortion on-air. Imbalances going the other way, as insufficient level, can elevate the noise floor of the audio chain and cause gating and pumping of background hiss.

Impedance mismatches can also cause level over- and under-loads, and more critically, high differentials of impedance interfere with the correct transfer of audio from one device to another–the primary result being a skewed frequency response. Often, a bad audio impedance match will rob almost all the bottom end, making the station sound like a two-way radio dispatcher.

Another consideration is safety. Proper grounding and safe electronic interfacing and interconnection of components will do much to remove the shock hazard sometimes posed within a broadcast facility. It does little good to install a new condenser mic if the announcer creeping up on it gets a nasty shock. Common sense, as well as power company regulations, require care in the mating of different pieces of equipment.

One final reason for using an interface device is to convert unbalanced to balanced status. Balanced lines are always preferable, due to their superior hum and noise rejection. Mic lines are typically 150Ω standard, and line level devices usually output 600Ω or less. The actual impedance may be any given figure depending on the

We've been around the bases a few times, and it's a big field.

Regis Lee / FSU Photo Lab

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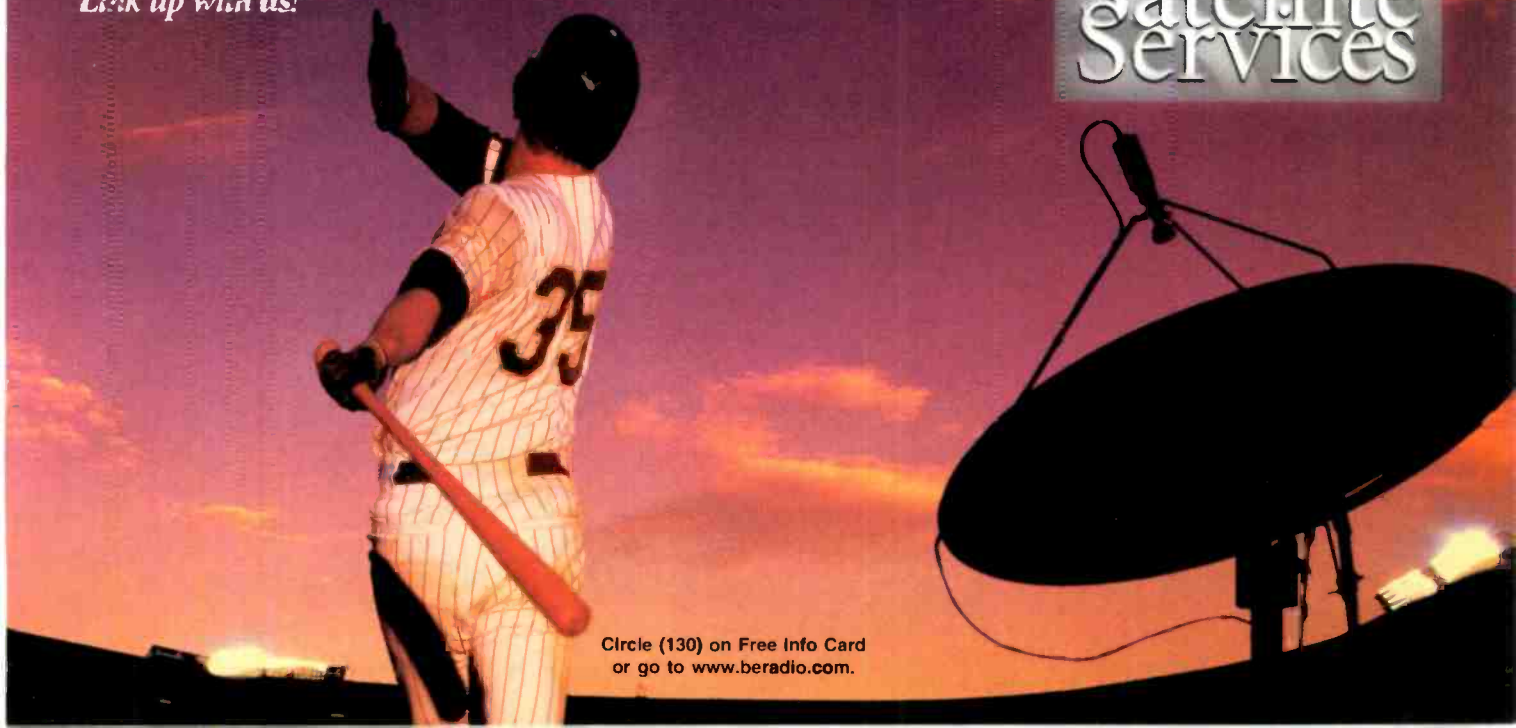

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Devices to convert balanced and unbalanced signals like these from Sonifex, Henry Engineering and Aphex are necessary for proper level and impedance matching.

audio passing through a device within a given moment; those numbers of 150 and 600 are reference points adopted many years ago.

Passive and active adaptors

Most passive adaptors are found in the hi-to-low level adjustment and impedance matching areas. Don't let the word passive deceive you into thinking cheap or not useful. I have many times corrected hum-ridden audio feeds with a simple direct box. Inside a small steel container are a multi-tapped audio transformer, some connectors, a switchable resistive pad, and a ground lift switch. These components purchased separately would cost about $65.00 or so, plus the labor of building the device. The real cost savings is the construction time. Basic impedance flips are done with straight matching transformers. Shure, Switchcraft and Whirlwind have several transformers and mic accessories that ease the burden of level and impedance matching. Of course, the most basic passive adaptor is a piece of shielded cable, with different connectors on each end. Don't overlook an assortment of these in various configurations.

We can't get away without mentioning simple audio pads. For balanced signals, use an H-pad. A T-pad is used for unbalanced signals. Watch the quality of components when making them. One percent precision resistors are needed for the pad to function well and not lop off the audio response. Most textbooks on audio have resistor tables for

pads, and I have often referred to the *Audio Cyclopedia*, and the Yamaha audio manual for this information. One critical factor is component packaging. Although it's technically feasible to squeeze an H-pad into the shell of an XLR mic connector, don't try it. Failure rates are fairly high on those contraptions. Build them inside of small steel boxes with chassis-mount connectors or an inline connector shell designed to house such projects.

Many manufacturers also offer premanufactured pads, phase reversal adapters and gender changers. The cost of the manufactured device will be higher than the components themselves, but the time saved easily justifies this.

An active box is one with various electronic circuitry within. The list of manufacturers is endless: ATI, Benchmark, RDL, Aphex, Ward-Back, Henry Engineering, Sonifex and SBS are but a few who make audio amps that have variable inputs and outputs for matching the typically lower (-10dBs) pro-sumer level to broadcast norms (+4dBm).

Remote broadcasts

Remotes are often one of the most challenging situations that a radio engineer faces. Under the watchful eye of the public, the boss and client must be satisfied and the announcer needs to be reassured. One device that caught my attention was a remote audio coupler and controller from Circuitwerkes. The DR-10 takes audio from any POTS line, or an auxiliary input, and interfaces into the console, while allowing the remote talent to control station automation from a touch-tone phone at the remote. Many manufacturers offer similar devices. It's ideal for those smaller, tight-budget stations that would like to do weekend sports remotes, but come up short staffed. The remote announcer can break into the music programming, bring the remote audio up, and trigger spots and breaks from the site.

Most remotes still use some form of line to connect to the studio, either POTS or ISDN. The mixer-couplers from JK Audio are interesting, offering telco line management, flexible headphone patching, and quiet mix channels. Check them out for cell-phone and land-phone interfaces for quick audio interconnects, especially handy in the newsroom.

It is likely that you will find a small utility device to fit any need you may have.

Problem & Interfaces Solvers

Telco tie-ins

Grabbing audio from a POTS line in a pinch is a basic task, but few engineers are equipped to properly terminate the line. Likewise, sending audio back up the line and nulling crosstalk is not a capability for most toolboxes.

For stations that extensively use telco services, it is wise to carry a hybrid. Gentner, Telos, Microtel and others make wide varieties of phone management equipment. Radio Systems has an inexpensive hybrid, and JK Audio has an extensive line of telephone interface and adaptive products.

Telephone audio interfaces often provide a simple method of transmitting audio.

Not just audio

Interfaces go beyond audio applications. One of the most inconvenient situations is the extended distance that may be needed between the CPU (tower) and the keyboard, mouse and monitor. Standard sets of extensions for PCs and Macs are available, usually at your local computer outlet. What may not always be at hand is a long extension for the monitor. I have run into several situations where I needed to extend the monitor 30 or 40 feet away from the CPU.

Despite what the guy behind the computer counter says, such extensions are made and used all the time. Talk to a local audio/visual presentation firm. They often use 50 or even 100-foot SVGA extensions to drive video projectors from a speaker's lectern in conference rooms or hotel salons. The video is quite stable as long as the cable is low capacitance and well shielded. You may have to make one yourself or obtain it via mail or online catalogue since they are not a standard item.

No article on interfacing and adapting would be complete without paying homage to Switchcraft, ITT Cannon, Amphenol, and other connector manufacturers. Over the years, they have devised whole kits of various adaptor plugs and accessories to facilitate the plugging of almost anything into something else. While some of the offerings are unbalanced only, the incredible variety is very comforting to carry around in the engineers' bag of tricks. A smart tech will carry several gender changers for mic and line level audio, computer connections, and a few Y adapters. One or two phase reversers are also a good idea, as is a pocket tone generator.

Allan Solfer is a recording and mixing engineer who works in Eastern Canada.

FUNCTION & DESIGN on Puget Sound

By Richard Schrag

New Century Media builds a functional new home with a view, but without unwanted sound.

Relocating a media corporation with four radio stations can be a challenging task. When that relocation involves a building that is already under construction next to a railroad switching yard, with 11'-4" from one floor to the next and less than twelve months to completion, it becomes an imposing undertaking indeed. Two years ago, The Ackerley Media Group decided to move its operations, including its radio broadcasting component, New Century Media, to new offices in a development near downtown Seattle. The building overlooks beautiful Puget Sound, with an impressive view of Mt. Rainier and Safeco Field, but the nearly constant rumble of freight engines running on the tracks that occupy the narrow strip of land between the water and the building presented formidable acoustical challenges.

Knowing that, under those circumstances, careful planning and predictable results would be key to the success of the project, New Century Media hired Dallas-based Russ Berger Design Group, a design and consulting firm with extensive experience in recording and broadcast facilities. RBDG was responsible for all the technical spaces within the 35,000 square-foot facility—from layout, sound isolation and air conditioning concepts to acoustical finishes and interior design. Harris Pacific was chosen for technical systems design, and Studio Works was selected for onsite installation.

Acoustical challenges

New Century Media owns and operates 95.7 The Beat KBTB-FM, Fox Sports Radio 850 KHHO-AM, KUBE 93 FM and Sports Radio 950 KJR-AM. Even if the train noise hadn't threatened the acoustical isolation of the studios, the different formats of these four stations and their proximity to other company divisions (who would not necessarily be sympathetic to loud music) made it imperative that the technical spaces incorporate excellent sound isolation design. In addition, the studios are on the third and fourth floors of the building, which makes vibration control much more difficult both from environmental sources like the trains and from adjacent rooms. The acoustically sensitive rooms were designed with floating floors and completely isolated walls and ceilings. As a result, the trains cannot be perceived on-air.

Each of the four on-air control rooms has an adjacent screener/producer booth.

cient capacity in its chilled water system to handle the significant heat load of the broadcast equipment, the air handling systems were designed for standard office use and could not supply enough airflow to cool the technical spaces. To solve both problems, instead of having ducts running above the ceiling to a central unit, each control room has its own dedicated fan coil unit and an enclosed system, using an elaborate path for air to get in and out of the rooms without allowing excessive mechanical noise. In addition, by incorporating the wire management systems into the floating floors, a few more precious inches were gained for the overall ceiling height.

A further challenge to the design team was the building's limited structural floor-to-floor height which made clearance extremely tight. In addition, although the building had suffi-

Studio acoustics

Director of Engineering John Miller knew that acoustical performance, particularly the sound of the rooms, is often a secondary consideration in a facility relocation, but early on he made it a top priority for RBDG's design efforts. Although the four stations offer listeners everything from sports talk to contemporary music, Miller wanted the studios to 'sound' comfortable to the audience, and also to feel comfortable for the on-air talent, which enhances how they relate to their listeners. That same philosophy extended to the ergonomics of the custom furniture and the efficiency of the layout in operational workflow, but acoustics remained a paramount concern.

Another central design goal was to keep the control rooms as similar as possible. This would ultimately improve overall cost efficiency, since the rooms could use consistent design elements and would benefit from easier maintenance and greater portability of projects from one production space to another.

Each control room (and the associ-

From the talk studio, the trains can be seen but not heard.

ated studio or producer booth where applicable) has a dedicated rack room. Except for wiring specifically related to that suite of rooms, all signal paths are routed to the Technical Operations Center (TOC). The TOC houses 28 equipment racks and is co-located on the fourth floor with the Engineering area to allow technical personnel immediate access to the broadcast equipment and to afford New Century Media expansion capabilities for their technical hub. The Internet and the company's internal LAN create a separate layer of infrastructure that, for the most part, is separate from the on-air operations, but is similarly centralized in an adjacent equipment area.

Flexibility

Even though the new facility nearly tripled the space of New Century Media's operation and added significant production capabilities, flexibility remained a key focus of the facility design. This forethought allows the company to accommodate future needs such as a change in format or possible future syndication of their programs. The rooms have enough space that people could easily be added to a show if needed. On the other hand, if the station wishes to be more efficient with fewer operators, the design allows for that as well.

Knowing the certainty of change but the difficulty in predicting its direction, the rooms were designed with as much flexibility for future needs as possible, including extra cable capacity, easy access to the wire management systems, and extra rack spaces. The importance of flexibility also affected the facility

Partial Equipment List

- Denon CD players
- Digidesign ProTools and ProControl
- ENCO DAD Pro32 system
- Genelec monitors
- Harris Pacific AMX, RMX and SMX consoles
- HHB CD Recorders
- HHB mic processors
- Impart truss system
- Leitch master clocks
- Panasonic DAT recorders
- SAS 64000 (audio) and 32000 (intercom) routers
- Soundelux microphones
- Tascam cassette decks
- Telos 2x12 ISDN phone system
- Telos TWO ISDN hybrids

The six production rooms are laid out to be similar to their on-air counterparts. Each commercial production room has a dedicated voice booth.

layout. For example, two small edit rooms that were designated for station-wide access were located in close proximity to the "Sports Pit" editing workstations, should a breaking sports story require overflow capacity. Because they are fully isolated however, under normal use they can also be used for high-quality phone interviews or commercial voice-over tags.

Fast-track construction

The timeline for construction was quite short for a project having such a large complement of broadcast spaces. Turner Construction, the project's construction management firm, was charged with executing the demanding details of the technical spaces while keeping to an aggressive schedule. The technical and acoustical design included many materials and construction techniques that a contractor would not encounter in typical interior fit-up work. Efficient planning and exemplary cooperation between the design team and construction team kept the project on schedule,

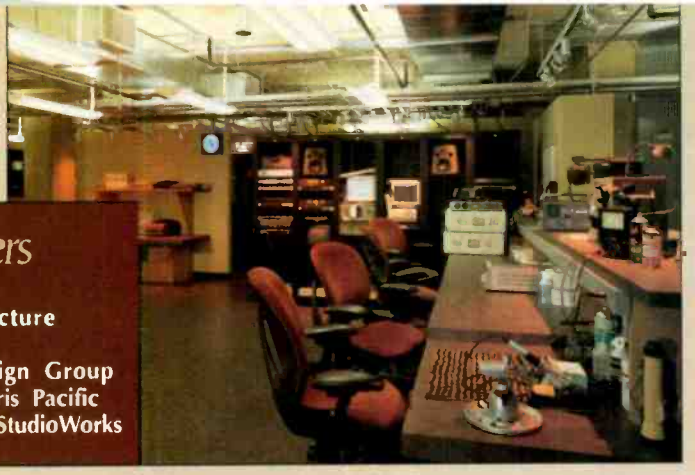
and certificates of occupancy for both the shell building and the interior construction were obtained almost simultaneously.

New Century Media, like many of its media counterparts, has moved away from the button-down atmosphere that a less enlightened parent corporation might otherwise have imposed. They sought to build an efficient workplace that would be a fun and creative environment for employees and guests alike. RBDG selected finishes for the studios that would echo some of the materials and design elements used by lead architect Callison Architecture in the lobbies and public spaces.

Unique approaches to design helped create an identifiable aesthetic for the technical spaces that is consistent with the rest of the facility. While acoustical treatments are a necessary element in these kinds of rooms, RBDG found fabrics, perforated metals, and millwork pieces that would give the rooms a very tailored design while still meeting their very specialized functional needs.

Among the distinctive features of the design is a floor-to-ceiling window between the talk studio and the control room and the use of hardwood flooring instead of carpet in the control rooms, which may not be an obvious choice but actually enhances the rooms' acoustics. If it also makes an impression on people when they first come into the room, then one of the primary goals of the new facility—an optimal balance of function and design—has been met.

Richard Schrag is a project manager with Russ Berger Design Group, Dallas. Thanks to John Miller, director of engineering, New Century Media, for his assistance in preparing this feature. Photos by James F. Wilson, Dallas.



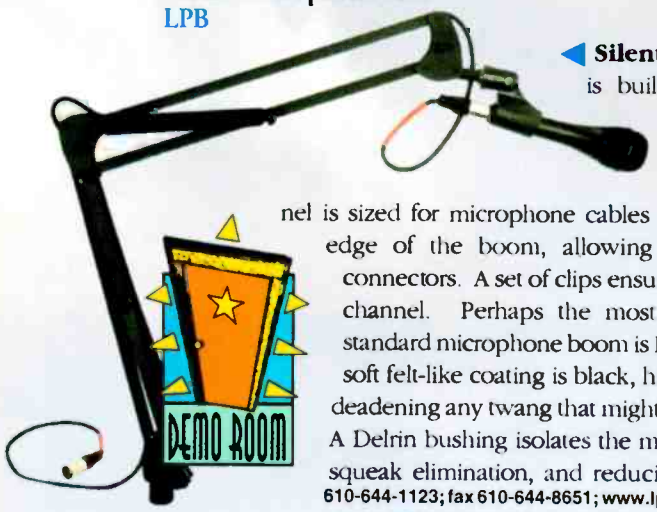
Engineering houses the nearly 30 equipment racks in the technical operations center.

The Players

- Lead architect: **Callison Architecture**
- Studio architect: **Russ Berger Design Group**
- System design: **Harris Pacific**
- Onsite installation: **StudioWorks**

New Products

Studio microphone arm
LPB



Silent Boom: This microphone arm is built from custom extruded solid aluminum stock, eliminating the echoes found in hollow frames. The extruded channel is sized for microphone cables to be dropped into the outside edge of the boom, allowing threading of any cable with connectors. A set of clips ensures that cables are secured in the channel. Perhaps the most striking visual change to the standard microphone boom is LPB's use of flocked springs. The soft felt-like coating is black, hiding the springs from view, and deadening any twang that might occur from impact or operation. A Delrin bushing isolates the metal base from its riser, ensuring squeak elimination, and reducing metal fatigue.

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Furniture series
Wheatstone

Preference, Eclipse and Techline: Three design choices are available. The Preference Series offers rounded edge wood-trimmed cabinet panels that use horizontal grade high-pressure laminates. Preference countertops have radiused corners and rounded wood trim. The Eclipse furniture features plentiful rack space in the wing counters, steel machine-tapped components, built-in top and bottom ventilation, removable doors, dual access punchblock enclosure, and ample rack space included in the console counter pedestals. The Techline Series embodies all the interior structural features and details of the other series, but features countertops edged with a rugged vinyl bullnose. All three furniture lines accept the Wheatstone Wiremax studio interface system that allows standard off-the-shelf cabling to interface to Wheatstone, Audioarts and Auditronics products via source-machine native connectors.

252-638-7000; fax 252-637-1285; www.wheatstone.com; sales@wheatstone.com
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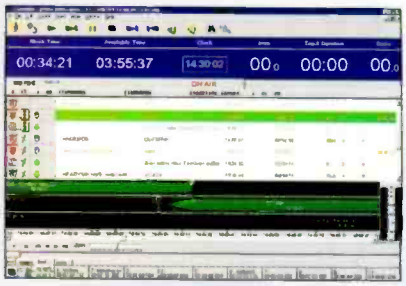
Content management
Jutel



Radioman: The RadioMan broadcast content management product is designed for major broadcasters. RadioMan enables digital content to be created, scheduled, organized, broadcast and archived simultaneously to multiple media channels, such as radio, Internet and wireless. RadioMan is built on state-of-the-art technology and has an open architecture based on industry standards that provide a combination of scalability, suitability to different operational environments, integration capability and compatibility with future technologies. By providing new possibilities and ways to make programs, effective material sharing, easy reuse of existing content and shorter production time, RadioMan enables broadcasters to increase productivity, to broaden range and quality of services offered and to provide convenience for journalists, producers and technical personnel.

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Audio accessories

Ward-Beck

POD 17 and POD 19: Two units join the POD series. POD17 is a six output AES/EBU digital audio distribution amplifier available in 75Ω and 110Ω versions. It features level adjustment (local and remote) and sample rate conversion. Level control can be set, used as a trim or volume control. POD 17 can mono the input signal and correct phase by inverting channel B. POD19 can decode four embedded groups of audio. The four decoded audio channels are coded into to AES signals. SDI lock and AES presence tallies are located on the front panel.

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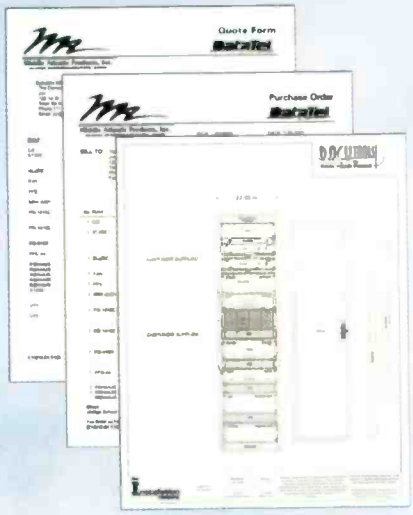
Software program

Middle Atlantic Products



▲ **RackTools v.1.5:** This version enables users to create elevation drawings of racks, enclosures and studio furniture. RackTools v.1.5 gives users the power to update the program via the Internet and download current information. RackTools requires Visio and allows the user to drag-and-drop Middle Atlantic Products components into systems drawings to create proposal and layout drawings. Visio shapes for amps, receivers, and other components can also be included. Engineers and designers can request a copy of RackTools on the application website at www.RackTools.com.

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Automation kits

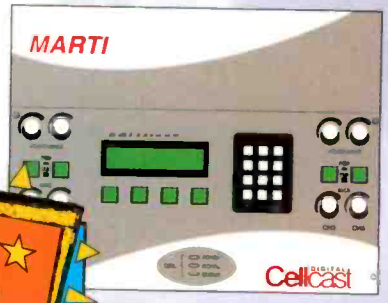
Broadcast Software International

Studio kits: These kits come in three configurations: Studio Kit 100 is geared towards smaller markets and single stations. The Studio Kit 200 provides the versatility and power required in mid-sized markets. The Studio Kit 300 is a package for major markets and enterprise broadcast facilities. Each Studio Kit contains all of the hardware and software needed to equip a production and air studio. Among the products included in the Studio Kits are BSI's acclaimed WaveStation digital automation system, Cool Edit Pro editing software from Syntrillium Software and professional audio adaptors from AudioScience. Each Studio Kit also comes with one year of free technical support and software upgrades.

888-BSI-USA1; fax 541-338-8656; www.bsiusa.com; Info@bsiusa.com
Circle (253) on Free Info Card or go to www.beradio.com

New Products

Remote broadcast interface
Marti Electronics



Digital Cellcast: This line consists of products that will operate on the different cellular systems around the world and will replace the analog AMPS Cellcast unit. The lineup will start with a CDMA unit and will be followed by a Tri-Mode system (CDMA, PCS, AMPS) and a GSM model. Features of the Cellcast include: cellular or land line (POTS) transmission; three power options: AC power, battery or 12V (cigarette lighter) adaptor; two-line, 20-segment back-lit LCD display; RJ11C six-pin land line connector; and a four channel mixer, program or cue selectable.

817-645-9163; fax 817-641-3869; www.martielectronics.com; marti@flash.net

Circle (259) on Free Info Card or go to www.beradio.com

Ad Insertion technology
Everstream

Encoder wrapper: This ad insertion product, marketed in conjunction with radio equipment provider Broadcast Electronics, allows radio stations an option to digitally replace commercials that use AFTRA talent with local internet-only advertising as it is being converted into the internet stream. Everstream helps stations forego an additional royalty payment and offers them an opportunity to generate new advertising placements. This can be accomplished without missing any tracks from the station's terrestrial signal.

888-842-1717; fax ; www.everstream.com; info@everstream.com

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Tower designs
Stainless

Design services: A Tower requires more engineering, both civil and structural, than any other element in the supply chain of a broadcast facility. Stainless engineering draws on decades of real-world experience with working towers in almost every conceivable environment. Company designers use the most up-to-date computer-aided design technology. The result is tower designs that perform as expected, without costly delays in construction.

888-486-3333; fax 215-699-9597
www.talltowers.com; sales@stainlessinc.com

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or go to www.beradio.com

Automatic membrane dehydrators

Andrew

MT1000 and MT2000 DryLine: These dehydrators are automatically regenerative. The MT1000 dehydrator is appropriate for medium-volume systems from 50 to 550ft³. The MT2000 dehydrator is suitable for large-volume systems from 100 to 1100ft³. Both dehydrators produce dew points better than -50°F. The MT dehydrators use remote automatic pressure sensing for activating and deactivating the compressor, this enables the units to operate only when needed, minimizing wear and tear and reducing the need for maintenance. This feature also enables precise control of system pressure. The units automatically start when system pressure drops to 3psi and shut down when the pressure reaches 8psi. Additional features on both units include full alarm, pressure indicator, lighted on/off switch, a resettable breaker, and run-time meter.

800-DIAL-4-RF; fax 708-349-5444
www.andrew.com; rose.wolski@andrew.com
Circle (250) on Free Info Card or go to www.beradio.com

New Products

Streaming audio codecs
Orban

▶ **Opticodec:** A line of streaming audio codecs with three models. All are ISO/MPEG standards Layer II and Layer III fully compliant, with two models also TCP/IP and UDP addressable over the Internet. Orban Opticodec technology is designed to meet the needs of anybody moving audio over the Internet, and of those working in radio and television broadcast, and in voice, music and other audio-on-demand environments. Opticodec reduces the bandwidth required to transmit audio between the source and remote, studio or other TCP/IP, UDP, or ISDN receiver location.

510-351-3500; fax 510-351-0500; www.orban.com; custserv@orban.com
Circle (262) on Free Info Card or go to www.beradio.com

Mobile RF field-strength meter/base band analyzer
Audemat

FM-MC4: A mobile RF field-strength meter and modulation analyzer that automatically measures up to 99 stations or programs simultaneously. The results can be displayed in various forms including on a cartograhic map. With the addition of new filters, the FM_MC4 is the perfect tool for measuring in high interference environments. Co-channel analysis software (available as an option) is adapted for controlling frequency interference (LPFM). FM_MC4 includes: high performance FM receiver; GPS receiver and RDS/RBDS decoder; in-depth analysis of sub-carrier components; modulation measurement; cartographic map; IF selection filters; co-channel analysis software and a user-friendly software portal. The unit is available with Goldenear evaluation software.

866-AUDEMAT; fax 703-433-5452
www.audemat.com; info@audemat.com
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2 Please check the ONE type of facility or operation that best describes your primary business classification:

A ☐ Radio Station & Network (including education, government and religious)
M ☐ Streaming Media – Network Provider/ISP/IDC/Telco, Internet Content Provider/Web Publisher, Services, Software Provider
C ☐ Recording Studio (including education, government, religious, production and research)
D ☐ Consultant
E ☐ Contract Engineer (including maintenance, technical support)
G ☐ Dealer or Distributor
F ☐ Other (please specify) _____

3 Which of the following best describes your title? (Check only ONE box.)

A. Company Management:
01 ☐ Chairman of the Board
02 ☐ President
03 ☐ Owner
04 ☐ Partner
05 ☐ Director
06 ☐ Vice President
07 ☐ General Manager
08 ☐ Other Corporate/Financial Official (including corporate sales)

B. Technical Management & Engineering:
19 ☐ Vice President Engineering
09 ☐ Technical Director/Manager
10 ☐ Chief Engineer
11 ☐ Other Engineering or Technical Title

C. Operations & Station Management/ Production & Programming:
12 ☐ Vice President Operations
13 ☐ Operations Manager/Director
14 ☐ Station Manager
15 ☐ Production Manager
16 ☐ Program Manager
17 ☐ News Director
18 ☐ Other Operations Title

D. Other (please specify) _____

4 Which statement best describes your role in the purchase of equipment, components and accessories? (Check only ONE box.)

A ☐ Make **final decision** to buy specific makes, models, services or programs
B ☐ **Specify** or **make recommendations** on makes, models, services or programs
C ☐ Have **no part** in specifying or buying

5 Which of the following types of equipment will you be evaluating for purchase in the next 12 months? (Check ALL that apply.)

01 ☐ Audio distribution services
02 ☐ Audio mixers
03 ☐ Audio monitoring
04 ☐ Audio processing
05 ☐ Audio recorders/players
06 ☐ Automation equipment
07 ☐ Consulting, contracting & design services
08 ☐ Data compression codecs
09 ☐ Digital audio workstations
10 ☐ Information services
11 ☐ Microphones and accessories
12 ☐ Racks, studio furniture and cases
13 ☐ RDS/RBDS & subcarrier equipment
14 ☐ Routing/switching
15 ☐ Satellite equipment
16 ☐ STL, RPU, & remote site control
17 ☐ Tape/optical storage
18 ☐ Telephone interfacing/POTS and ISDN
19 ☐ Test & measurement equipment
20 ☐ Transmitters/antenna systems/towers
21 ☐ Wire and cable
22 ☐ Internet/streaming audio equipment & software
24 ☐ Facility support equipment
25 ☐ None of the above

6 What is the budget for equipment and services you are evaluating for purchase in the next 12 months? (Check only ONE box.)

1 ☐ Less than $10,000
2 ☐ $10,000 - $24,999
3 ☐ $25,000 - $49,999
4 ☐ $50,000 - $99,999
5 ☐ $100,000 - $299,999
6 ☐ $300,000 - $499,999
7 ☐ $500,000 and up

7 If you checked A on question #2, what is the MSA rank of your market? (Check only ONE box.)

A ☐ Top 20
B ☐ 21 to 50
C ☐ 51 to 100
D ☐ Over 100

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805-373-1828; fax 805-379-2648
www.tcworks.de; us@tcworks.de
Circle (264) on Free Info Card or go to www.beradio.com

Professional CD recorder
Yamaha

▶ **CDR1000:** This unit features Apogee Electronics' UV22 Super CD Encoder, allowing 16-bit encoding of sources recorded at higher bit rates, without additional equipment. A built-in sample rate converter handling a variety of digital sources (29.76 to 48.80kHz) and a word clock input, providing AES/EBU in and out connection pass-through are additional features. The unit provides S/PDIF and analog XLR connectors with an impedance rate of 20kΩ (with +4dB/-10dBV switch). Selectable copy protection modes, front-panel foot switch input, on-the-dot recording start feature, and full function I/R remote control are also included. An index recording function enables users to place libraries within a single track while providing 16-segment level meters with peak hold function, and a quad-speed finalize capability. A parallel I/O port is included.

714-522-9011; fax 714-522-9522; www.yamaha.com/proaudio
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Have you found the mic hidden on each cover of BE Radio? You'll need to know where they are in December.

Editorial Excellence

BE Radio received two ASBPE Mid-west Regional Awards in the recent annual awards contest. For the Regular Contributed Column, BE Radio received a Silver Award for Harry Martin's FCC Update. We also received a Bronze Award for the Sirius Satellite Radio Facility Showcase by Conrad Trautmann in the November 2000 issue.

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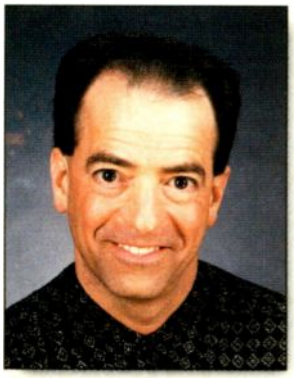
The wireless revolution revisited

By Skip Pizzi, contributing editor

There has been considerable interest and discussion of late in the area of wireless. To most broadcasters, this term has a connotation quite different from the current application of the word. It conjures archaic rather than futuristic concepts, with images of Marconi, DeForest, Armstrong and contemporaries tinkering with various technologies that eventually became radio. That development process has some interesting parallels to today.

Back then, wireless was short for wireless telegraphy. Marconi's original intent was point-to-point message delivery to ships at sea or other remote locations unreachable by telegraph lines. The content of these transmissions was Morse Coded-data via Continuous wave (CW) modulation. It wasn't until later that the application of public, point-to-multipoint service using audio via AM emerged, and the broadcast industry was born. The core technology took some twists and turns before it finally attained killer-ap status.



The core technology took some twists and turns before it finally attained killer-ap status.

Today, wireless is short for wireless Internet, which attempts to extend the Internet to portable devices. In the new wireless, content is still represented via data pulses using an efficient coding algorithm (albeit at substantially higher throughputs than the old approach). The Internet was also initially designed for point-to-point communications, but has been later adapted for a point-to-multipoint modality by some applications.

The Internet has already come a long way from its start as a haven for government and academia to its current role as an important engine of commerce. Its next logical step involves shedding the tether to the desktop, allowing mobile and portable usage. This presents yet another parallel to radio: Although always a wireless medium, the original radio receivers were large, homebound devices. Portability didn't enter the consumer radio environment until decades later.

Worlds apart

So much for similarities; now let's consider the differences between these two wireless environments. Perhaps most fundamental is that because the Internet is inherently a two-way communications system, any wireless device used by Internet consumers requires both a receiver and a transmitter. This makes the wireless Internet device more like a cell phone than a radio.

As a result, the first wireless Internet devices have taken the form factor of enhanced cell phones or PDAs. Targeting or re-versioning of content for the different displays found on these devices is a current area of development. Doing this in a broadly compatible way is a challenge. Radio also faced this issue, but only to the extent of handling stereo and monaural audio compatibly. Internet devices must consider display of text, graphics and streaming content, plus a wide range of applications and content types.

Another distinction between broadcast radio and the wireless Internet is the short-haul vs. long-haul variation in the wireless data world. Two-way wireless data interchange standards have been developed for large-scale transmission similar to broadcasting's coverage zones. Broadband versions of this modality are being developed under the terms of 2.5G, 3G and 4G wireless systems. Meanwhile, standards have also been developed for smaller-scale wireless coverage zones, such as within a single user-domain. This implies that a home might have broadband Internet access via a traditional wired service (e.g., via DSL or cable modem) but redistribute such a service to various nodes (receivers) around the home in wireless fashion. Examples of short-range wireless are Bluetooth and IEEE 802.11.

A final contrast is the cost and installed base of these systems. At present, there *is* no comparison. The bar has been set quite high by radio for penetration and low-cost, portable service. New entrants will have to become very cost-effective very quickly and/or offer substantially different and more appealing content. For this reason, it seems likely that even if emerging wireless services enjoyed stupendous success, broadcast radio will not be replaced but only supplemented by wireless Internet. Further, if wireless is a hit, broadcast radio providers are well positioned to move into the market themselves and extend their established brand via cross-promotion to the new platform. Ultimately, therefore, broadcasters needn't worry much about the new "wireless," but neither should they ignore its development. If played properly, broadcasters can hold a dominant position in both the old and the new wireless worlds.

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The *Diga* ***ProPack*** offers you the functionality and reliability found in large stations. ***ProPack*** gives you everything you need to compose, produce and manage your audio whether it's last-minute stringer reports, jingles or full-blown multitrack productions.

Here's what the *Diga* ***ProPack*** comes with:

- DigaStudio rackmounted A/D converter and desktop control console made by **STUDER**
- Intel PIII 800MHz, 256MB RAM, 30G HD, CD-ROM, 6 PCI slots in a rugged 4U (19") rackmount
- Windows 2000 Professional
- DigaSystem software bundle: DataBase Manager Personal Edition and EZ Track 3-track editor
- 15" TFT flatscreen display
- **Digigram** PCX 924 professional I/O card
- Keyboard and mouse

The DigaStudio is a combination A/D audio converter and desktop controller console. Designed by D.A.V.I.D. in cooperation with STUDER, it features balanced inputs, phantom power and onboard DSP. The desktop controller includes a 3-channel mixer, smooth jog wheel and illuminated function keys.

Save a Bundle on this Bundle

Software features:

- √ Easy to use database application with drag-n-drop
- √ Automatic file format recognition & conversion- MPEG, WAV, AIFF and BWF
- √ Auto-save and 99-step undo
- √ Time correction matches the audio clip length to available time
- √ Multiformat clipboard capable of storing both audio and RTF text clips
- √ DirectX plugin support, crossfade mixing, looping, auto-duck and scrubbing

Upgrade to Multitrack Editor available

Diga ProPack

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Upgrades Available - Call or Check our Website for Details

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DIGITAL AUDIO NETWORK ROUTER

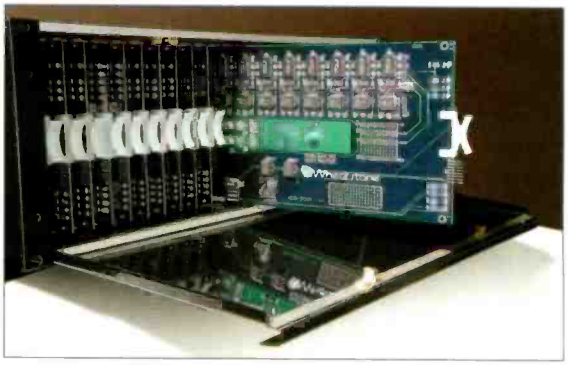
- *BI-DIRECTIONAL FIBEROPTIC OR CAT-5 INTERLOCATION CONNECTIVITY*
- *ALL DIGITAL DOMAIN AES SWITCHING*
- *ANALOG OR DIGITAL (AES SAMPLE RATE) INPUTS*
- *BOTH ANALOG AND AES DIGITAL OUTPUTS*
- *SERIAL CONTROL AND DISPLAY WITH WHEATSTONE CONSOLES*

THE 2001 MAKES AUDIO NETWORKING PRACTICAL. It's simple to install, easy to learn, and certain to reduce system costs. Compact enough for small applications, yet stackable for tremendous growth potential, it's design consists of 7"rackmount digital routing cages, each capable of handling 512 simultaneous audio channels on its backplane.

Units can be stacked to suit particular card complements (analog or digital input and output cards or optical network cards) but more significantly cages can be separated by great distances and network their audio through either bidirectional fiberoptic links or a single CAT-5 wire. ONE INTERCONNECT DOES IT ALL: 64 channels of simultaneous bidirectional digital audio, intercage communication, X-Y controller commands plus auxiliary RS-232 data streams. This single interconnect between your studio and central rackroom can save you tens if not hundreds of thousands of feet of wire in a typical installation.

The 2001's graphic based setup software is intuitive and easy to use, with all the authorization and security levels you could want. And of course we have a full complement of control panels and PC applications to choose from—all designed for straightforward operation and a rapid learning curve.

With 25 years of experience, Wheatstone has the infrastructure in place to help you build your OWN infrastructure. Contact us for answers.



MIXED SIGNAL SWITCHING is easily accomplished with a choice of AES digital or ANALOG 24-bit A>D input cards, and of course 24-bit digital or 24-bit D>A ANALOG output cards, all of which can be serviced from the front of the cage. All signals are routed entirely in the digital domain.

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