The Latest Consoles and Studio Furniture in Buyer's Guide

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Watching the Wheels

RW evaluates the BayGen Wind-up Radio Receiver.

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The Newspaper for Radio Managers and Engineers
August 5, 1998

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Check out RW Online at www.rwonline.com

Clinton Puts China Radio to Use

by Lynn Meadows

SHANGHAI, China Understanding that "radio gets results," President Clinton used a stop in Shanghai during his recent visit to China to get personal with millions of Chinese listeners on the radio talk show "Citizens and Society," broadcast on Shanghai Radio 990.

During the same trip, United States radio listeners heard reports of dissidents being towed away or barred from radio interviews, proving that Chinese authorities also are familiar with the appeal of radio and television.

The radio pool

Regardless of the challenges on the street, producers and reporters made sure life would be as technically convenient as possible during the trip. CBS Radio Network was responsible for the radio pool feed during the China trip.

Tony Brunton, director of Radio Special Events for CBS, and his associate Stanley Cobb, alternated setting up the radio pools in the five cities Clinton visited: Xi'an, Beijing, Shanghai, Guilin and Hong Kong. CBS producer Craig Katz traveled from the Philippines to help set up the radio pool in Hong Kong.

They were able to get an ISDN line for

See CHINA, page 6 ▶

Photo by AP Photographer J. Scott Applewhite Source: Associated Press

President Clinton on the air at Radio Shanghai.

Software Developers Battle Y2K

by James Careless

REEDSPORT, Ore. Live-assist and traffic software manufacturers are working to prevent the year 2000 computer problem from affecting their radio customers.

Many older computers have a limited amount of memory, and are programmed only to store the last two digits of the year. If not corrected, those computers will read the year 2000 as 1900.

Traffic and billing computer program supplier Custom Business Systems, Inc., addressed the problem in 1980, said CBSI vice president of marketing Steve Kenagy. Since then, any new CBSI software has been year-2000 compliant, which is why the company guarantees problem-free

See Y2K, page 14 ▶

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World Radio History

NEWSWATCH

Chancellor To Gain LIN

DALLAS Hicks, Muse, Tate & Furst, which purchased LIN Television Corp. in March, is selling LIN to radio affiliate Chancellor Media in a stock transaction valued at approximately $900 million. The move gives Chancellor three media to sell as a package to potential advertisers: radio, TV and outdoor.

Chancellor Media President and Chief Executive Officer Jeffrey Marcus said, "Our next goal is to expand ... through additional transactions which will create overlaps with our existing radio station assets as well as our recently announced acquisition of outdoor advertising company, Martin Media."

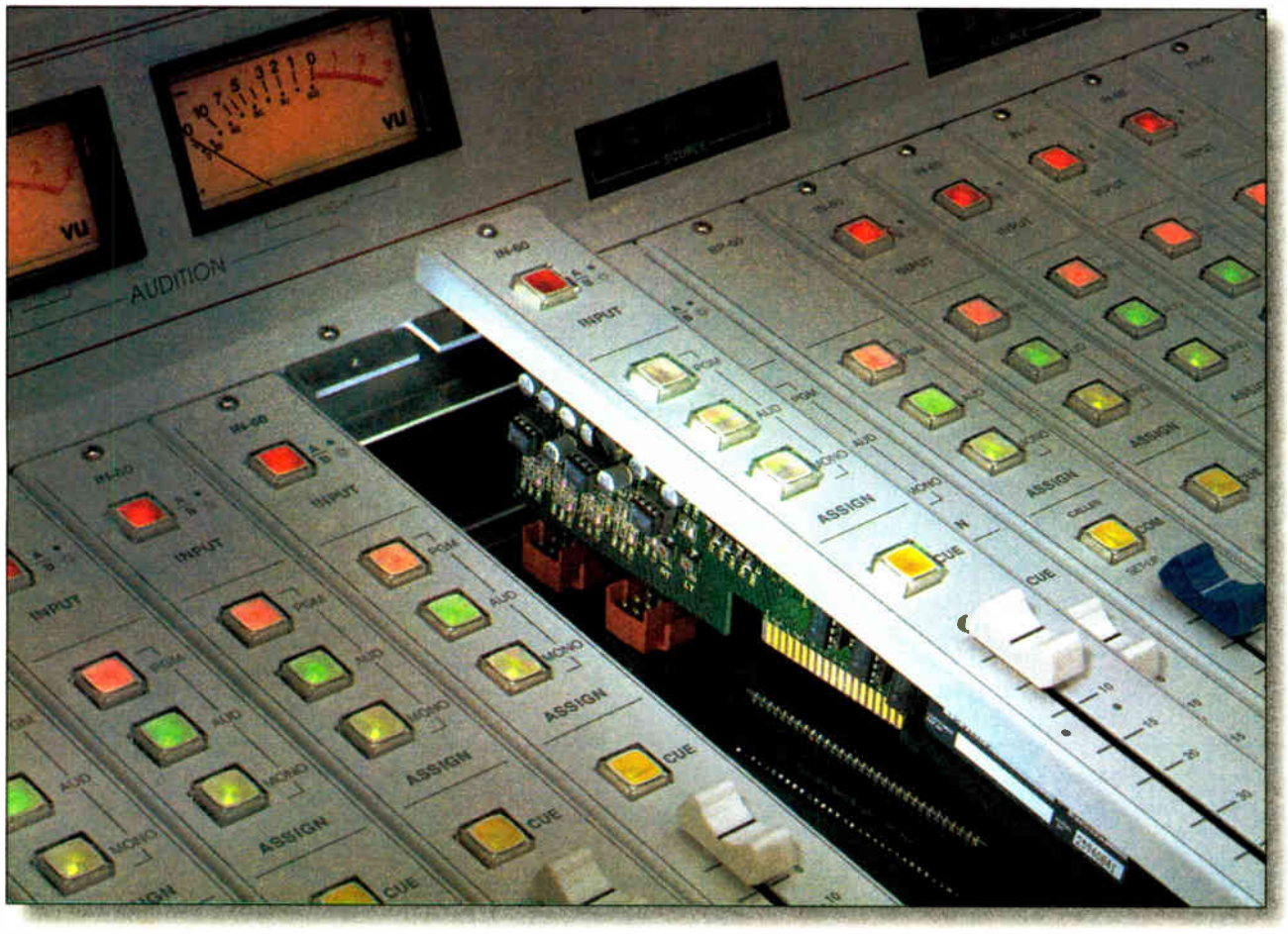
Under the terms of the transaction, Chancellor will issue 17.7 million shares of new stock to Hicks Muse. After issuing the new shares, Chancellor will have approximately 190 million shares outstanding. The deal, subject to approval by Chancellor shareholders and regulators, will boost Hicks Muse ownership in Chancellor to about 18 percent — up from approximately 9 percent. Chancellor also will assume about $769 million of debt.

The deal is expected to close in the fourth quarter.

Receivers OK For Y2K

ARLINGTON, Va. Most consumer receivers will not have a Year 2000 problem, according to the Consumer Electronics Manufacturers Association. In comments to the Federal Trade Commission on the so-called Y2K problem, CEMA assumed that since most receivers don't have a date function, they will make the transition from the year 1999 to 2000 without problems. Consumer electronic products that include a date function that CEMA has identified as subject to Y2K problems include VCRs, camcorders, fax machines, personal computers and home automation and security systems.

Take a LOOK at THIS:



Then look at our competition.

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Mic & Line, +4dBu	.004%
DIM	
Mic & Line, +16dBu	.005%
DYNAMIC RANGE	
Line	114dB
Mic	98dB
HEADROOM	
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Licenses Revoked for Felonies

by Leslie Stimson

WASHINGTON The FCC has revoked the licenses of seven stations and a construction permit held by Contemporary Media, Contemporary Broadcasting and Lake Broadcasting Inc. because of the felony sex convictions of the sole shareholder and the licensee's misrepresentations to the commission about his role in the station's day-to-day operations.

Michael Rice is the sole shareholder of CMI, licensee of Terre Haute, Ind., stations WBOW(AM), WZZQ(AM) and WZZQ(FM). CMI subsidiary CBI is the licensee of KFMZ(FM), Columbia, Mo., and the permittee of KAAM-FM, Huntsville, Mo. Rice also owns all of the issued shares of stock in Lake, the licensee of KBMX(FM), Eldon, Mo., the permittee of unbuilt KFXE(AM), Cuba, Mo., and an applicant for a new FM in Burbon, Mo.

According to the FCC decision, in 1994 in St. Charles, Mo., Rice was convicted of 12 felonies involving the abuse of five children over a five-year period. He began serving an eight-year prison sentence that September.

The commission recently reaffirmed an earlier decision by administrative law judge Arthur Steinberg that said Rice continued to run the stations from prison and that "the licensees (the three companies) misrepresented facts to the commission regarding the extent of Rice's role in managing the stations" and that, "The licensees deception was a direct result of Rice's criminal activities because there would have been no need to submit false reports to the commission had the misconduct not occurred."

The FCC takes into account a person's character when deciding whether granting or keeping a license is in the public interest. In its "Character Policy Statement" of 1990, the FCC stated, "Evidence of *any* felony conviction, not just those involving fraud or untruthfulness, is pertinent to our evaluation of a licensee's character. ... A licensee's willingness to commit felonies, which are serious crimes, bears on our confidence that it will conform to our rules and policies."

In his defense, Rice said the commission's policy is unlawful because there was no connection between Rice's sexual misconduct and the operation of the broadcast stations.

Rice claimed the seriousness of his crime was lessened because he did not receive the maximum sentence. In rejecting that argument, the commission said the crimes were willful, repeated and "committed by the individual who continues to be the sole owner, president and treasurer, and a member of the boards of the licensees."

The commission said it had memos and statements from former and current employees showing that Rice directed station employees about hiring, firing and programming decisions, as well as general upkeep of the facilities while in prison. This was contrary to documentation submitted to the FCC, said the commission, which claimed Rice was no longer in charge.

Rice said these were disgruntled former employees, who were out to "get" him.

In a decision released in late June, the commission revoked the licenses and denied the construction permit. Rice had 90 days to either wind up the station operations or further appeal the decision.

A station owner convicted

on child abuse charges has lost seven station licenses and a CP.

In another, less dramatic case, Clear Channel-owned KKND(FM) in Port Sulphur, La., may be on the hook for $6,000 fine. In a Notice of Apparent Liability, the FCC said the station aired allegedly indecent material from "The Howard Stern Show" the between 6 a.m. and 10 a.m. on three days earlier this year. In the notice, Mass Media Bureau Chief Roy Stewart wrote that the commission believes the excerpts are indecent and actionable because "they contain language that describes sexual and excretory activities or organs in patently offensive terms."

In a transcription of a tape submitted by a complainant, Stern, sidekick Robin Quivers and a caller discuss a hazing incident in which fraternity members threaten to force the caller to have sex with a pig. Another bit describes urination.

The commission said both the language in the bits and the time of day they aired made the complaint actionable.

The broadcasts aired outside of the FCC's so-called "safe harbor" for indecent material, from 10 p.m. to 6 a.m. The station had 30 days to explain why the fine should be revoked or reduced.

A Roundup of News and Comment Affecting Radio From the Nation's Capital

DIGITAL NEWS

Manufacturers Offer Eureka Receivers

LONDON Five receiver manufacturers plan to put digital audio radio receivers on sale in the United Kingdom in late summer or fall.

The BBC coordinated a special launch on July 9 for the five manufacturers — Bosch/Blaupunkt, Clarion, Grundig, Kenwood and Pioneer — who will offer car receivers.

President of the WorldDAB Forum Michael McEwen said, "We welcome the rollout of receivers over the summer months. We are now leaving the development phase and moving into the implementation and operational phase. This is a very exciting time for the broadcasting industry and listeners."

The U.K. has had DAB service since September, 1995.

Toyota Has Mobile Digital Plans

TOYOTA CITY, Japan The Toyota Motor Corp. plans to establish a joint company to begin beaming digital satellite signals to motor vehicles.

According to reports in the newspaper Yomiuri Shimbun, the new company will begin satellite-based digital broadcasts by the year 2000. Up to 30 channels of high-quality pictures, voice and data would be delivered across Japan.

The company, which has a starting capital of approximately 10 billion yen, ($71,121,00 U.S.), aims to secure a broadcasting license from the government by fall 1999.

Toyota, which will support the new company by supplying motor vehicles installed with digital broadcasting receiving terminals, hopes the move will give it a competitive edge in the stiff Japanese domestic automobile market.

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World Radio History

New York's Amazing AM Legacy

Radio in New York City has always had a special magic. There is an excitement in driving around the Big Apple, flipping on the radio dial and listening to news, traffic, music and talk from studios located in the capital of the world.

New York's AM stations, in particular, have that special something. When you are listening to AM in New York, you feel that you are somewhere *important*.

A new book aims to capture 75 years of that magic.

I was born in New York, and my first radio memories come from there. I remember my parents enjoying beautiful music on WRFM, on the junior band, and it never occurred to me that these lush, lyric-free sounds were anything different from the way radio had been for decades. Then, as a teenager, I discovered baseball and the New York Mets. For three years, the station that carried the voices of my favorite Mets announcers was 1050 WHN, which also happened to be pioneering big-city country music at the time. I was a goner. While my friends were listening to Harry Harrison on WABC, I was being won over by the crack of the bat and the twang of '70s country.

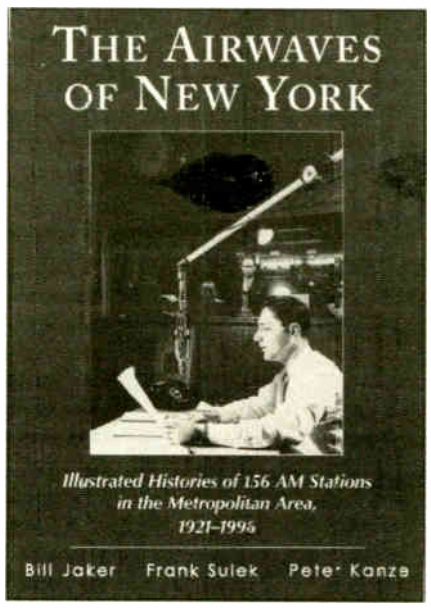
The WHN call letters are seared into my memory; the voices of the jocks ring in my ears. I still remember the day my phone call to the station got through and I won a belt buckle with the letters WHN on it.

Now Bill Jaker, Frank Sulek and Peter Kanze have put together a reference book that will feed the hunger of anyone interested in AM radio in the city. "The Airwaves of New York: Illustrated Histories of 156 AM Stations in the Metropolitan Area, 1921-1996" is 205 pages, with 75 super black-and-white photos dating from long ago and from recent times.

The book is written as a series of station listings, alphabetized by call sign. A typical listing is five or six paragraphs, detailing the ownership of the station, its formats and its notable air talent. Each listing includes a summary of frequencies and power increases. The book also gives a brief narrative history of radio in the metro area.

A lot of work obviously went into this. Jaker is a producer for WSKG Public Television in Binghamton, N.Y.; Sulek is a radio producer for the Catholic Archdiocese of Newark; Kanze manages WARY-FM at Westchester Community College. The detail and the scope of their work are startling.

If you get excited at the prospect of reading about WINS, WNBC, WMCA, WQXR, Bob and Ray, William B. Williams, Dan Ingram, Peter Tripp, Ted Brown, Barry Gray, Red Barber, Don Imus and many others, check out this book.



The book is published by McFarland & Company in Jefferson, N.C. You can order by calling (800) 253-2187. It's not cheap at $59 including shipping, but this is a hardcover book you will save and enjoy.

★ ★ ★

USA Digital Radio, the broadcaster-backed DAB research effort, continues its work toward finding an in-band, on-channel future for our business. Leslie Stimson interviewed Robert Struble, the president of USADR, in this issue. Among other topics, they discussed new competition in the DAB arena.

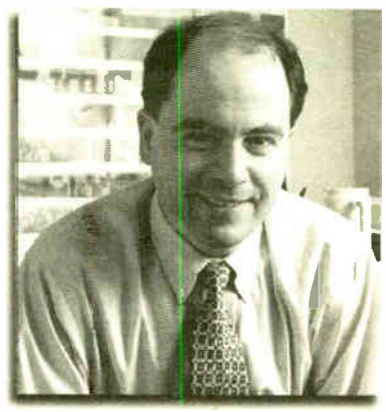
Struble on Digital Radio Express: "I find it hard to believe a few guys in a garage are going to change that kind of industry."

On Lucent Digital Radio: "If you want news, it's (that) we've looked into the eye of the competitors and guess what, we ain't scared."

On CD Radio and satellite digital services: "They've got to launch a satellite that costs hundreds of millions of dollars. They've got to put up new infrastructure around the country, if this thing is going to work. Not only towers, but repeaters and transmitters, the whole thing ... and oh, by the way, their technology is still not yet proven."

The interview starts on page 8.

From the Editor



Paul J. McLane

★ ★ ★

Are you ready for Y2K?

As James Careless reports on page 1, suppliers of computer-based products for radio sound confident that they have anticipated the Year 2000 problem and that their computer systems won't go haywire when 99 becomes 00 inside.

I'm interested in hearing from you about your experiences with equipment suppliers and computer vendors. Has *your* station undertaken any kind of formal program to ensure that all systems are checked and ready to go? Tell me via e-mail at *pmclane@imaspub.com*

★ ★ ★

Guy Wire is at it again. In a recent column on our Web site, our masked radio engineer asks some hard questions about digital audio. S/he describes a typical digital radio station air chain, put together with the best gear and all possible care, then asks why the radio station sounds "lifeless" and why the arch-rival competitor, using a 15-year-old all-analog system, is ahead in the ratings.

Is digital audio what it's cracked up to be? Check out Guy Wire at *www.rwonline.com*

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World Radio History

◆READERS FORUM◆

Letters received are the property of **RW**, and may be edited for space considerations.

Radio: The thrill is gone

Dear **RW**,

Regarding your recent editorial about how radio is boring ("Are You Bored Yet?" **RW**, May 27):

Back in the late '50s I lived in upstate New York. My friend Albert and I were avid AM radio listeners. We had long copper wire antennas strung between the trees above our houses and we could hear half the United States on a good night.

We had one contest to see who could receive the most distant station, and Albert won by receiving a station from Nogales, Ariz. We had another contest to see who would be the first to hear at least one station for every frequency between 550 and 1600. That was tough because of the clear-channel requirements, but one night I got a call and Albert said, "You hear that guy talking, right between X (which was at 1190) and Y (which was at 1210)? That's WOAI, from San Antonio, 1200 on the dial!"

Moments like that were more than just exciting; it was like traveling around the nation on the airwaves. We felt like we were there.

We had favorite radio personalities, all over the country. I remember listening to Symphony Sid, who brought live jazz from some night club in New York City. Then there was Lee Moore, the "Coffee-Drinking Nighthawk" on WWVA(AM) in Wheeling, W.Va., who would occasionally treat his listeners to his own singing on the air.

We used to tune in to WWL(AM) in New Orleans to hear jazz from "high atop the Hotel Pontiac," or something like that. On Saturday nights, of course, we tuned in to WSM(AM) 650 in Nashville to hear The Grand Old Opry live broadcast. Classic music was always available from WQXR(AM) in New York City. Or maybe catch the last 15 minutes of the Hound Dog (George) Lorenz show from WKBW(AM) in Buffalo, when he went down the hall to the second door on the left, the "blue room." I get a chill just remembering his signature howl. And I'll never forget Nervous Norvis' song "Ape Call" being used as a station identifier from WAPE(AM), in Jacksonville, Fla.

I remember hearing the scratchy, static-filled news updates from "Irving R. Levine, reporting from Moscow." Somehow, the unsophisticated transmission made Russia seem more real, and very far away. On dark Friday nights, the screeching sound of the opening door of "The Inner Sanctum" would always make me turn on the light.

To a young man in a dark quiet bedroom in rural New York, radio was a gateway to the world. Carefully turning that big glowing dial took me far from home, to another dimension of awareness. I knew what the most popular rock songs were in Boston, New York, Chicago, Philadelphia, Fort Wayne, you name it — things I never would hear on my local stations from Rochester and Syracuse and Newark. It was a wonderful time for radio.

No more. As B. B. King would sing, "The thrill is gone." If radio of the '50s was a spicy gazpacho of many flavors, today's radio is straight tomato soup — dull, and only a little better than nothing at all. Even the air personalities sound like they are stamped with a cookie cutter from the same material. Sorry folks, to someone who has been around for a while, your corporate-programmed, satellite-dumped blandness is, as **Radio World** has so well expressed it, *boring*.

To paraphrase Bob Hope, "Thank God for the memories!"

Carl Nye
Cottonwood, Ariz.

Support Your Dealer

These are interesting times to be a radio equipment dealer.

On the one hand, dealers report that business is strong. Radio owners are spending money to build consolidated facilities. The U.S. economy is at flow, and the rising tide carries all boats, including those of hardware sales organizations. Constant improvements in computer power and related technology are creating upgrade paths that generate new sales on a regular basis.

On the other hand, insightful dealers who look ahead are aware that consolidation ultimately could translate into fewer studios, fewer RF plants and fewer buyers of equipment. More immediately, the expanding power of computer-based audio management systems and workstations means that dealers now sell fewer of the traditional meat-and-potatoes items that radio stations have always purchased in quantity. After all, when your audio is stored on hard disk, you don't need as many CD players or DAT machines.

You can see the result of these pressures in the marketing strategies of companies. Dealers compete aggressively for the right to sell computer-based audio systems, and they invest a lot of resources in selling them. They also look to other industries for growth, such as pro audio and church sound. They respond to the lure of the big, glittering television marketplace, where DTV is driving a lot of facility improvements.

It might be tempting to dismiss these matters as you go about your daily routine. But if you are in a job that requires radio equipment, you should pay attention to these trends.

Radio equipment dealers offer many benefits that are easy to overlook. Knowledgeable sales people, toll-free service, equipment demos, products in stock, systems solutions — try to find all of these at a retail shop. Further, broadcast dealers do not operate on substantial margins. The markup on products can be surprisingly thin. Their business is competitive already.

We often take for granted that we will always have a ready supply of good equipment with this level of service. But just as the radio industry is convulsing in the wake of ownership deregulation, the supply business is changing, too. There may come a day when our range of choices is smaller, or when penny-wise buyers cause our suppliers to look elsewhere for their own survival.

Support your radio equipment dealers. The health and well-being of the equipment marketplace is in *your* best interest.

— **RW**

Radio World
Vol. 22, No. 16 August 5, 1998

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Radio World (ISSN: 0274-8541) is published bi-weekly by IMAS Publishing (USA), Inc., P.O. Box 1214, Falls Church, VA 22041. Phone: (703) 998-7600, Fax: (703) 998-2966. Periodicals postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041.
REPRINTS: Reprints of all articles in this issue are available. Call or write Giselle Hirtenfeld, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 1998 by IMAS Publishing (USA), Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of Radio World
August 19, 1998

Write to Us

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Noncom comments

Dear **RW**,

I am writing in response to Harry Cole's noncommercial underwriting article ("That's Enough of That Funky Stuff" **RW**, June 24).

One problem we have is convincing local stores that certain terms are not allowed. They want cheap ads that will sell, and they don't care about FCC laws.

Another problem is students who don't always remember what is (not) allowed and may ad-lib about the business.

Our license renewal was once challenged by a local station owner who accused us of blatant advertising. Our sin? We placed program listings in a newspaper with "supporter" ads below it. No underwriting on the air at all. We never did get an explanation for that harassment.

Tom Carten,
Grand Poobah
WRKC(FM), King's College
Wilkes-Barre, Pa.

Dear **RW**,

I disagree with the noncommercial radio story. How could the FCC lift its limitations on commercial station ownership, so that there are now mega-broadcasters who own virtually every other station in the area, and not lift restrictions on the actual stations who serve the community?

There is no competition for business, while megacorps are selling regional packages for advertising through big city agencies and scrambling for that small bump in Arbitrons. What do the noncoms survive on? Mom & Pop corner stores who are paying $3 and $4 a spot!

Now what Mom & Pop outlet or corner gas station is going to shell out the small money they even have in their advertising budget to "advertise" on a 50 W or 100 W public station and not be able to give prices or their phone number? How does the FCC suggest these noble broadcasters survive?

Fast-food, cola and beer commercials that advertise on the "big" commercial stations seem to do the opposite, they're so "image-oriented" that you don't often even see the product on TV. Mom & Pop stores, which are the lifeblood of most small-market public stations, don't advertise like a McDonalds or Budweiser, so what's the solution?

Public broadcasters should unite and request — and possibly for their own survival, demand — the FCC lift its regulations so that public radio and television should be allowed 30 commercial seconds every half-hour, and must air public service announcements for each :30 of commercial broadcast time.

Ed Paris
New York, N.Y.

World Radio History

Bringing It Back From China

▶ CHINA, continued from page 1

filing in each city.

"In Guilin and Xi'an, they had never had ISDN," Brunton said. "The Chinese were kind enough to extend their network for us ... We got a tremendous amount of cooperation. They wanted it to work. ISDN was fairly new in the use we were putting it to and they sent experts to each place." In Beijing and Shanghai, ISDN generally is used for video conferencing.

If the Chinese had not succeeded in extending the ISDN lines, CBS Radio pool producers were planning to use an INMARSAT high-speed satellite as a backup.

Brunton and others praised the clear quality of the Chinese cell-phone network. ABC Radio Correspondent Vic Ratner said having cell phones was quite different than when he traveled with President Ronald Reagan to China.

Phone improvements

"Fifteen years ago, when we arrived in Xi'an, the Chinese authorities had set up a tent at the edge of the airfield with telephones to get back to the United States and these were crank telephones," Ratner said.

Ratner used the cell-phone network to report live from a riverboat in the middle of the Li River in rural China while the president was on a boat caravan through a nature preserve.

He also used a cell phone to speak with KGO(AM) in San Francisco from the waterfront in Shanghai.

Ratner said, "We were all astonished that this new cell-phone system provided a connection which was clear as a bell to KGO in San Francisco, and they commented on the fact that I sounded better on that cell phone than I would have calling from Des Moines."

Ratner said he used a combination of equipment while in China but relied heavily on his Sony MiniDisc recorder. He used a combination of microphones including an Electro-Voice mic for close-ups and a Sennheiser shotgun for long-distance recording and capturing crowd sounds.

In China, said Ratner, "There's no

Radio Shack around the corner. I tend to bring three of everything: three recording devices. Three sets of microphones ... all kinds of adapters and gear which might be necessary in an emergency."

ABC, Feature

Sam Donaldson and Ann Compton also filed reports for ABC Radio, as did ABC producer Josh Gerstein. For his part, Ratner delivered more than 100 one-on-ones from different parts of China.

ABC Radio has Comrex HotLine units in both the New York and Washington offices. For simplicity, Ratner would call New York and the local producer would put the call on a satellite channel and coordinate the mix-minus with the local radio stations. In 30 minutes, they could do four custom interviews without Ratner having to dial each station direct.

Feature Story Productions used Jason Dean, a writer from the Los Angeles Times, for its coverage of China. The company combined UPI audio actualities with Dean's voice reports.

Feature Story TV and Radio Correspondent Malcolm Brown said, "On some occasions, we would send one of our own people or we would cover it from our nearest bureau, but given the nature of China, you really need someone there."

Dean fed his reports back using a standard phone line. They were edited using Cool Edit 96, the digital sound editor for Windows from Syntrillium Software Corp.

Feature Story provided China coverage to South Africa Broadcasting Corp., Vatican Radio and its own top-of-the-hour newscast "World Radio News." It also provided some coverage to Bloomberg Radio. The reports to SABC and Bloomberg were transmitted using ISDN lines. Those to Vatican Radio were sent out over a regular phone line.

WWO, NBC, Mutual

Westwood One White House Correspondent Peter Mayer travels with the president regularly, and files for NBC Radio and Mutual Broadcasting. Bart Tessler, vice president of news for Westwood One, said they relied for the most part on the pool facilities and used the pool ISDN line to file stories. Mayer also filed on cell phones, which Tessler also said sounded quite good.

Tessler said Mayer carries a Sony MiniDisc recorder along with analog backup, plus microphones and his laptop.

Although ISDN service was important, radio's coverage of the presidential trip to China also demonstrates that network reporters quickly have come to rely on codecs that transmit a digital signal over standard, or POTS, phone lines. Of all the pieces of equipment taken on the trip, everyone who used one had the most praise for the Comrex HotLine.

Mayer used a HotLine on a phone at the Great Wall to file his report back to the filing center where the feed was sent to New York and Washington via ISDN. Brunton said they used a HotLine to extend the ISDN at Tiananmen Square and several other sites.

ABC's Ratner also praised the HotLine. He used it to do live spots with good broadcast quality from places where ISDN and other technical facilities were not available. The HotLine also freed ABC Radio from having to use the pool line, which meant that Ratner could file on his own schedule.

A workin' man

Tessler said Mayer had "an extremely heavy load."

"With the 12-hour time difference, it meant working almost 24 hours a day because they were up all night working and covering the story our time, and then during the day our time is when we wanted to talk to them and stations wanted special custom pieces and live shots in morning and afternoon drive."

Mayer provided live and produced pieces every day for both "America in the Morning" on the Mutual Broadcasting System and "First Light" on NBC Radio Network, which together are cleared on about 500 stations. He also provided both live and taped pieces for top-of-the-hour newscasts for both networks throughout the day. Beyond that, a number of affiliates — mostly in the major markets — asked for one-on-ones, and Mayer obliged during morning drives.

Despite the authoritarian nature of the country, Tessler said getting people to talk was not a concern.

"That really was not an issue or problem at all. We had a lot of actuality from people over there, Chinese as well as Americans."

Ratner, however, noted some difficulty finding a willing interview at Peking University after the president's speech there.

"In general, I would get no more than a half-minute into an interview when the person I was interviewing would be nudged from behind by a gentleman wearing a striped shirt. A look of fear would come over the interviewee's face and he would turn and disappear into the crowd."

An ABC correspondent made news on the trip when Sam Donaldson arrived at the housing complex where a dissident lived to find the gates surrounding it closed and locked. The dissident was later hustled away by security forces.

Ratner said, "The first thing Sam did after he got back from going to this dissident's house and finding the gates locked and the security people outside was to come back and file a piece for ABC Radio."

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World Radio History

Gear Vendors Ready For Harris EXPO '98

The Harris Expo brings several dozen vendors under one roof.

RICHMOND, Ind. The Broadcast Division of Harris Corp. is gearing up once again for its annual one-day open house and equipment show. It's a chance for radio engineers and managers to see several dozen studio and radio product vendors, put hands on the latest gear, and learn a little bit about what Harris is doing in digital television besides.

EXPO '98 takes place Tuesday, Sept. 15, at the Leland Hotel in Richmond. Admission is free.

We have so many guys out there, taking care of so many stations ... who are unable to go to Las Vegas or Seattle.

— Dave Burns

"We started this event about 15 years ago to show our appreciation to our customers, to get reacquainted with them and to meet new people," Studio Product Manager Dave Burns said. "That's still the main reason for getting together."

The event typically draws about 250 people from Ohio, Kentucky and Indiana, as well as more-distant markets in western West Virginia, lower Michigan and eastern Illinois. Most of the visitors are engineers or other managers involved in the purchase of equipment.

Burns said the convenience of the Harris event is a big draw.

"We have so many guys out there, taking care of so many stations, as a director of engineering or as a contract engineer, and they are unable to go to Las Vegas or Seattle or wherever," Burns said. "Here's a show that's within an hour or two, at most five hours. They can make it as a day trip or stay for one night. And it's free. That's the way it always has been, and always will be."

Burns said the catchall phrase among vendors these days is "solutions." He pointed to several specific technical

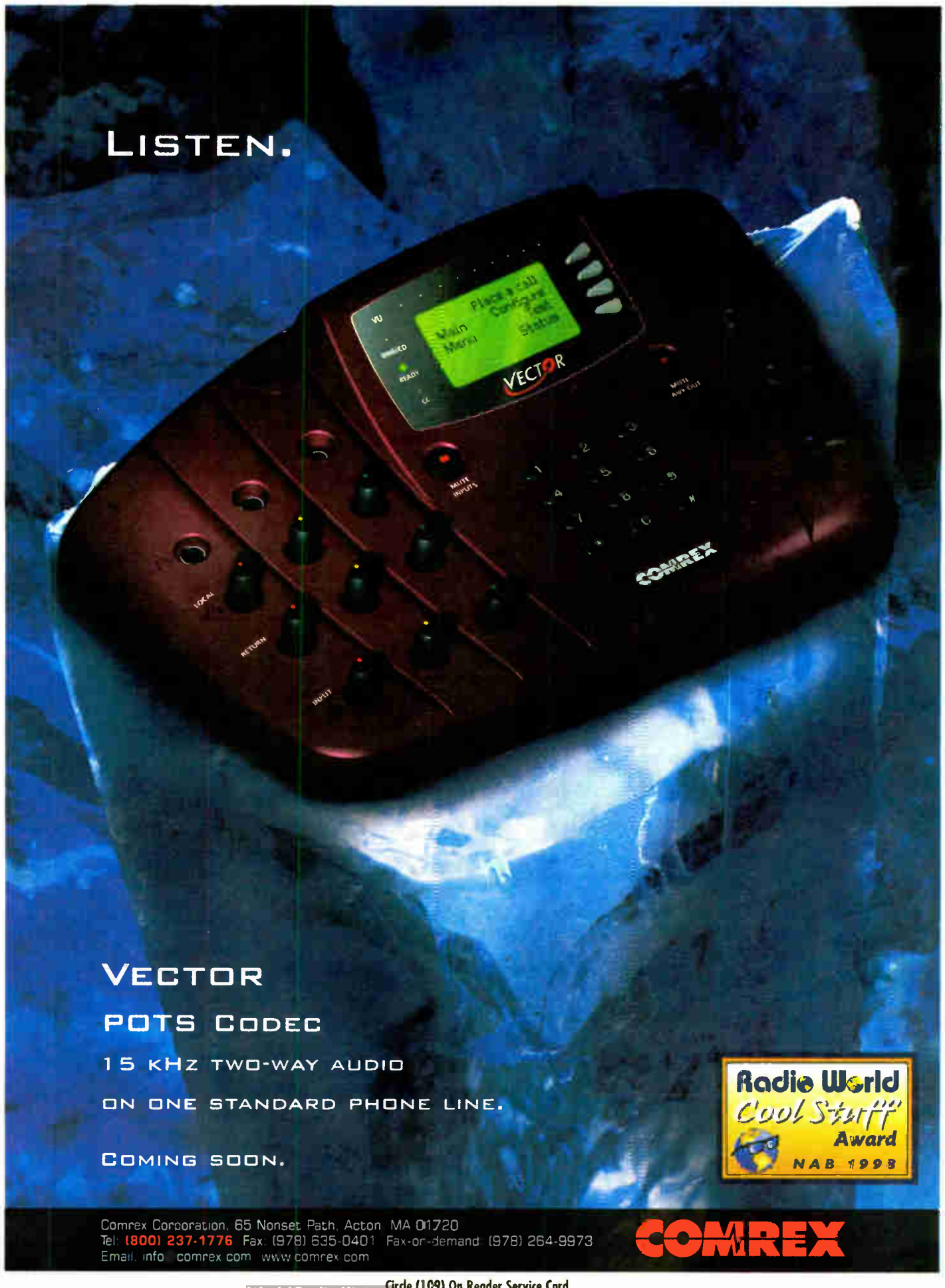
See HARRIS, page 15 ▶

The Exhibitors

At press time, these companies were expected to exhibit at the Harris Expo '98:

360 Systems
ADC
AirCorp
Andrew
Aphex Systems
Arrakis
AV Marketing
Belar
Belden
Bob White Assoc.
Burk
Comsat RSI
Denon
EVI
Gentner
Group One
Intraplex
Marti
McFadden
Monfort
Moseley
On-Line Marketing
RFS Cablewave
Roland
Sonic Foundry
Sony
Sound Marketing
Starin Marketing
Symetrix
Tascam
Ward Beck
Wheatstone
Yamaha

Source: Harris Corp.



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See Us At The ABG Southeast Expo

World Radio History

USADR Conducts Multipath Tests

by Leslie Stimson

BETHESDA, Md. USA Digital Radio began FM channel characterization tests in July, as part of its research work in developing an in-band, on-channel DAB system. These particular tests are for multipath performance and involve test equipment in a moving van. USADR expected to conduct the tests for several weeks

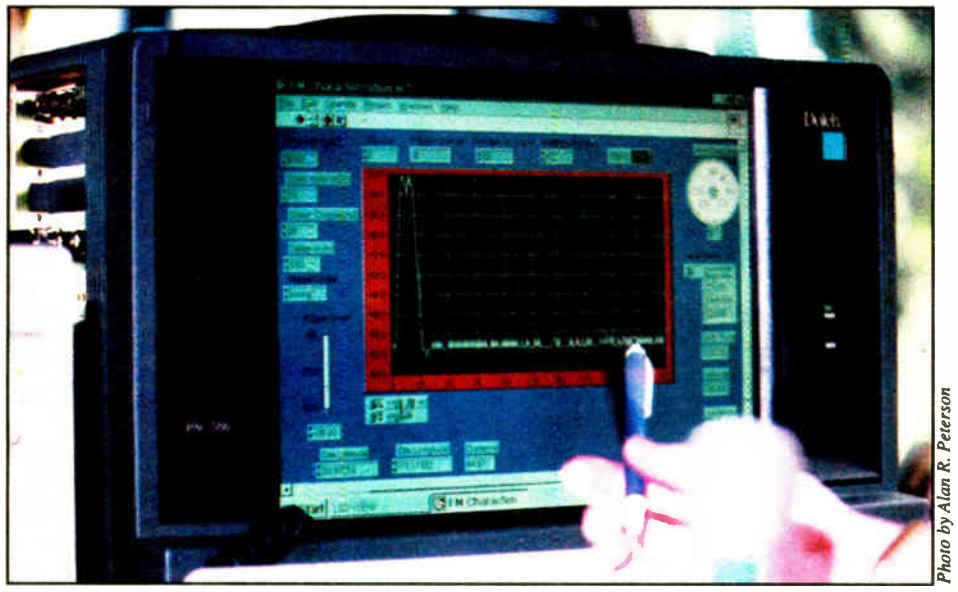

Photo by Alan R. Peterson

Near the tower, the RF pulse is viewed on a computer screen.

Multipath interference is a concern for any IBOC system. Because such systems are restricted, by definition, to the existing radio channel bandwidths, finding a technology that can mitigate the destructive effects of multipath is difficult. Noise, flutter and dropouts caused by multipath ruin many FM radio listening experiences. Eliminating those annoyances, observers say, is one of the major advantages of going digital.

USADR engineers want to know as much as they can about multipath so they can tweak their FM IBOC system to handle multipath in all environments.

USADR engineers used the back-up tower site for WARW(FM) in Bethesda, Md. as the transmission site, and a van equipped with a special receiver, spectrum analyzer and computer to record the results. In the transmitter shack, USADR set up a waveform file using a signal processing package called "MatLab" and loaded that into a waveform generator. That takes digital data, converts it to analog, filters it, and sends it to a vector signal generator to be modulated. The signal is converted to RF at 85 MHz, which is broadcast from the tower.

USADR feeds 100 watts of input power to the antenna system, which consists of two directional dual-polarity yagi antennas mounted at 226 feet on the tower, at 110 and 350 degrees, north and east.

USADR was not transmitting digital audio material, but rather an RF pulse every 100 microseconds. In the van, technicians see the pulse on a spectrum analyzer and look for "reflections" or rays of multipath that bounce off buildings, cars and other objects. Using the global positioning system, they log the geographic coordinates of every sample.

USADR has a temporary license from the FCC to conduct the FM characterization experiments on TV Channel 6 — good for tests in the Washington area, where no TV station uses that channel. The center of frequency is 85 MHz, selected to avoid any possible FM-band interference.

"We're trying to characterize the channel, to get a statistical analysis of the likelihood of having various levels of multipath at various time delays," USADR engineer Chris Cockrum said.

The Electronic Industries Alliance (formerly the Electronic Industries Association) conducted similar tests in Salt Lake City. In the current tests, USADR engineers want to see if their own lab simulations of multipath are accurate, and do the tests in an area with different terrain than mountainous Salt Lake City.

"The purpose of doing the test is to stress the system to fail," USADR Engineering Director Glynn Walden said. "There's no sense of having a demonstration of an IBOC system and only driving where it works. Where you want to spend time on is where it doesn't work ... to find where problems are and fix those problems, so that it (IBOC DAB) works everywhere."

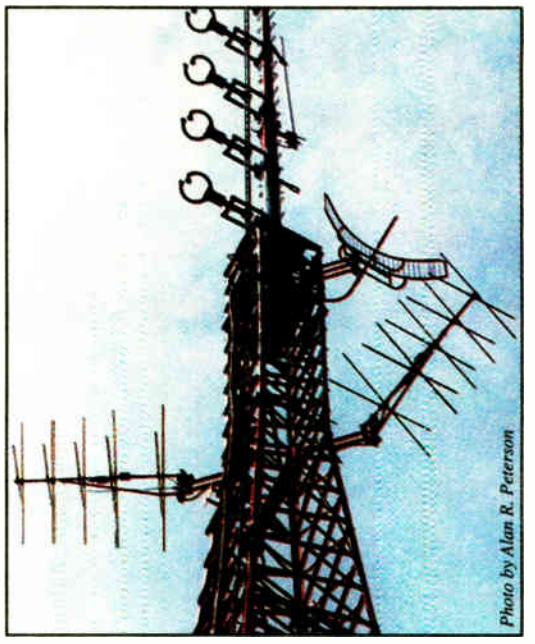

Photo by Alan R. Peterson

USADR's two directional dual-polarity Yagi antennas are mounted on the back-up tower of WARW(FM) in Bethesda, Md.

On the road again

Several **RW** editors rode in the USADR van, through residential areas where there was little multipath and into the city of Washington, D.C., where deep reflections off buildings, cars and other objects are common.

Engineers from the NAB also rode in the van during the tests. Senior Engineer David Layer said USADR was doing the industry a service by performing multipath tests. Also, Layer said, the DAB subcommittee of the National Radio Systems Committee, which is setting IBOC DAB testing criteria and whose members will evaluate all IBOC systems, "needs more than the Salt Lake City data to go on."

USADR needs to characterize its FM IBOC system as much as possible in the lab before it can run field tests, expected to begin this fall.

NEWS MAKER

Struble Pilots USADR IBOC Ship

COLUMBIA, Md. *One of the important questions observers in the development of in-band, on-channel digital audio broadcasting are asking is how IBOC DAB proponents will recoup their investments of millions of dollars and years of research. Robert Struble has had overall responsibility for USA Digital Radio since 1996 and was appointed president and chief executive officer in 1997. The 35-year-old Struble, a graduate of MIT and Harvard, outlined USADR's business plans recently to* ***RW*** *News Editor/Washington Bureau Chief Leslie Stimson.*

Robert Struble

RW: *Where will the revenue come from on this project for USADR? Is there a plan in place to license USADR technology to receiver and transmitter manufacturers?*

Struble: We will not be manufacturers of equipment. We are not going to compete against the big receiver or transmitter manufacturers. We will provide technology to them and then receive a license and stream off them. So the business model is actually real attractive. We don't have to build the plants, we don't have to hire millions of people to go do this stuff. We just need to make sure the technology works, that we do what we need to do with the regulatory authorities, keep the support of the broadcasters and then go out and strike some deals with these folks.

RW: *How soon will you have set licensing fees and see revenue?*

Struble: We're not going to have licensing fees until these things actually get made. I figure the rollout plan would call for testing to be happening late this year, well into next year. The first things rolling off the line (will be) probably late 1999 or early 2000, through that time frame, so that is when we will start to see revenue coming in.

RW: *How much was spent on this new building, your headquarters in Columbia?*

Struble: It's millions. We keep those things a little close to the vest because we're in a competitive situation. Put it this way, not something I could sign for myself. I had to go upstairs to Mel (Karmazin) and Mike (Jordan) and say, "We really need this and can we make it happen?"

RW: *Is Mel giving you a blank check?*

Struble: No, Mel never gives anybody a blank check. We are closely monitored on what we spend, and we have to justify what we do spend, but I've never heard a "No" from him.

RW: *How do you justify an expense?*

Struble: There is two ways you do it (for) CBS. I wear two hats because I am the president and CEO of USADR but I am still also a CBS employee. As a CBS employee and a broadcaster, you have got to look at this thing really in two regards. ... On the defensive side,

See STRUBLE, page 12 ▶

World Radio History

Zephyr Is Everywhere

Look around. Everyday, there are more signs that Zephyr is everywhere. So, if you've ever thought about remote broadcasts or linking up with other studios, there's never been a better time to act than now. Zephyr has quickly become the standard, with many thousands already in use.

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World Radio History

A challenge from the greatest critic of the OPTIMOD-FM 8200 - the guy who invented it.

World Radio History

"Version 3.0 is more than an upgrade. It can take your station's signature to the next level of competitive sound. Listen to it side by side with any audio processor in existence; then, let me know what you think. Good or bad, every e-mail sent to me will be answered by me, personally. bob@orban.com."

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ON AIR

BOB ORBAN is known for his critical ears. In the seven years since we introduced OPTIMOD FM 8200, perhaps no one has logged more hours listening to the best and worst in digital audio processing. Even critics have called his knack for creating louder, punchier, artifact-free sound "a gift." But make no mistake. With 30 years of experience in audio, it's Bob Orban's expertise that is written into every layer of the new Version 3.0 software. It gives you a level of audio technology that no other processor in existence can match.

NOTHING IS NEWER.

Version 3.0 software adds five new features to OPTIMOD 8200's proven digital platform. With thousands of users and millions of on-air hours to draw on, Orban's team knew exactly how to take your station's audio to the next level. 21 new presets dramatically expand your options to create a superior competitive sound. Sonic "color" controls now allow you to fine-tune tonal balance to precisely target your desired audience. Tweak the band output mix controls to add sizzle, bring vocals up front, or mellow out instrumentals. Raise the bass clipper threshold to create a more solid bass punch for urban and dance formats. Toggle Phase Rotation on/off to minimize distortion or improve music transparency. Open up the highs to effectively remove any hint of what has erroneously been called "digital grunge."

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World Radio History

'This Is a Damn Good Business'

▶ STRUBLE, continued from page 8

we have $15 billion, I guess is the last number, invested in radio and we believe that it's extremely important that we play a very important role in the transition of radio from analog to digital. If that happens in a way that is not in our best advantage, for example, if Eureka was to come in, then the value of those radio properties is not what it should be.

There is also an offensive reason to do this that says, "Look, this is a damn good business." If we get the technology to work and it goes forward correctly, we're going to make a lot of money.

Transmitter certification

***RW:** Tell me about the transmitter alliance, the certification program USADR is working on.*

Struble: The plan I am working with, transmitter manufacturers and receiver manufacturers, is to get them involved early on in the process, let them know what is going on, let them know what our technology looks like, get them prototypes and help them through testing with us.

It benefits us because we get a lot of their input and we know what is important to them in either receiver design and transmitter design. Those discussions are really important from a development standpoint, but obviously down the line from a business standpoint as well.

***RW:** Moodys has given a low stock rating to CD Radio, one of the license-holders for satellite DAB. Are you in a different situation than they are? You're both developing a new digital technology...*

Struble: We are both trying to get people in their cars, and in their homes, with a radio technology, but I think there the paths really differ. There is a completely different economic model that is associated with CD Radio. They've got to launch a satellite that costs hundreds of millions of dollars. They've got to put up new infrastructure around the country, if this thing is going to work. Not only towers, but repeaters and transmitters, the whole thing. ... and oh, by the way, their technology is still not yet proven.

***RW:** But neither is yours.*

Struble: That's right.

***RW:** You're going to have to convince people to put new radios in their cars too, to receive a digital signal.*

Struble: That's right, but at the same time that radio will receive full digital and analog, so again, it comes back to consumer behavior. You won't see any difference.

You may go to your Ford dealership in three years and have an option that says, "Do you want a digital radio or don't you?"... If the station is broadcasting digitally you will get it, if it's not, you won't. But what you do in your car doesn't change. Where CD Radio, again, (you need a) new antenna, something else in the car, and you probably have to buy something new at Radio Shack. It's a different model. I think that they are likely to be successful, at some point, but they've got a way to go yet.

***RW:** Some people question whether IBOC is the way to go as opposed to another method of digital broadcasting and whether the industry and the government can make this happen at all. Will it?*

Struble: Everything else is going digital, cell phones, TV, radio in other parts of the world and I find it hard to believe that the United States is going to stick with an aging technology when the rest of the world has moved to digital. ... We are talking about AM — and you know how AM sounds today — sounding like a CD, or near CD quality, and FM sounding better than it does today. As well, you are going to have another data channel in there to be able to do all kinds of neat things, be it sports scores, stock quotes, weather directions, traffic info, whatever you may imagine can be used in the system, printed out on the radio.

***RW:** Why IBOC? EIA (Electronics Industries Alliance) issued a report that said of all the DAB systems it tested, Eureka-147 was the best.*

Struble: The tests are ancient history as far as we are concerned. There's a little resemblance, I guess. If you are referring to the San Francisco tests, whenever they were three or four years ago ... the system that was tested then, the IBOC system vs. the system that is tested now bear very little resemblance to each other. We've got some technology behind it, and it is just a whole lot better.

For Eureka to work in the States, a couple of things have to happen. The FCC has to issue a whole bunch of new spectrum. The spectrum they want to use is used by the military, so they would have to go to the military and say, "Give this back." The Department of Defense is (not) going to be jumping up and down to do that.

Secondly, you are going to have the same issue that you've got with CD Radio, in terms of the basic economics. You'll have to build whole new radio stations, you'll have to put up repeaters everywhere. You're talking about billions of dollars of difference in the technologies for benefits that aren't there. ... We've been up in Canada because they are transmitting around Toronto. You need a lot of repeaters to make this stuff work.

***RW:** Then why is EIA so supportive of it?*

Struble: EIA has to represent their members, and Eureka is further along than we are and receivers are being built in Europe. Now, for a receiver manufacturer, it would be great to have a world standard, only one kind of radio they could sell all around the world. *(USADR is now an associate member of the Consumer Electronics Manufacturers Association, a division of the EIA.)*

***RW:** We saw the NRSC process fall apart once before. Does the NRSC have to pick one standard for IBOC DAB?*

Struble: It would be helpful. We support the process, but at the same time we are aggressively driving forward with our own testing plan. We're not going to let ourselves be bogged down by a process. We don't see that happening right now, and so we are playing a role.

Lucent and USADR

***RW:** You and Lucent had a chance to continue with your joint development agreement, but split up. Why?*

Struble: Lucent's basic expertise in this field is in compression technology. We hooked up with them originally because they had the PAC algorithm, which is developed by a bunch of folks but is being commercialized by Lucent. We were getting a lot of discussion with a lot of folks who said, "You may want to look at other compression technologies." The one that was most often cited was AAC, which actually has a similar background as PAC. ...

The second reason? Just call (it) strategic differences. We have a fundamental

Photo by Alan R. Peterson

Robert Struble

belief of how this thing needs to be taken forward successfully. We think we've got a lot of experience because we are broadcasters and also technologists, and also have a great deal of experience with the FCC, that we know the tradeoffs and the balances to going forward with those folks. We believe that in any company — and I mean CBS here — that we needed to control it. Lucent had a different view, and so we had a parting of the ways.

***RW:** Are you and Lucent fighting over patents?*

Struble: Not yet, no.

***RW:** Is that a possibility?*

Struble: We're looking at it. ... We're a technology company, so we monitor very closely not only Lucent but DRE and anybody else out there.

***RW:** How has Lucent's jumping in to develop its own system affected your progress?*

Struble: It hasn't.

***RW:** Does it put you on your toes more?*

Struble: Competition is good. ... We view it as a good thing in certain regards, in that, again, you've got another big technology company that is saying, "Yes world, IBOC is the way to go." ... Now, the competitive position, where we are vs. either Lucent or DRE, we are extremely comfortable about where we are now.

Realistically, if they are going to walk away from our technology, they are not far from ground zero.

***RW:** Lucent says it's not starting from scratch, that it has a lot of technology developed. Do you see it as a formidable opponent? Lucent has deep pockets.*

Struble: Sure, so do we. ... I think the landscape has changed and we've got new competitors out there. If you want news, it's (that) we've looked into the eye of the competitors and guess what, we ain't scared. ... We know the competition very well. We had a joint development agreement with Lucent for a long period of time. We know who they've got working on it, we know who they're got running this business and we know a lot about their approach. DRE, Derek (Kumar) used to work under contract with USADR. We know him very, very well.

***RW:** DRE says it's been working on a system for two years and didn't want to go public until it had a viable system.*

Struble: They've probably got some investment dollars. We are talking about an extremely important industry. The radio industry in the United States is not only huge, it's tens of billions of dollars, but oh by the way, we're dealing with strategic national interests and I find it hard to believe a few guys in a garage are going to change that kind of industry.

Sending data

***RW:** With IBOC, broadcasters will be able to send data as well as transmit their station's signal. Tell me what kind of data we're talking about.*

Struble: We are talking about, essentially, a pretty big data pipe, which comes into the car, so you will be able to transmit things. ... You can think of it as a pager, which would be on your radio (where) you can download your e-mail into your car and maybe build into the radio a voice recognition system that says "Check e-mail."

***RW:** Won't receivers that display this information cost more?*

Struble: You'll have your down-and-dirty model, AM clock radios that don't do any of the wild stuff, but you will have your high end, like the Pioneer super tuners now ... that are going to cost a little bit more.

***RW:** What are you discussing with the FCC?*

Struble: We've had an ongoing relationship with them and we ... share what we are doing. We travel with them internationally to the ITU *(The International Telecommunications Union coordinates frequency use, telecom interconnection, etc. — Ed.)* and to other meetings internationally. We're going to try to go into a filing process, probably later this year, where we say, "Here is the technology. ... This is the way to migrate from analog to digital." We will see how this process goes.

We need them to approve or sanction our basic approach. Which is to say, "Yes, we will be transmitting digital signals in the same space in the same spectrum as is currently occupied by the analog." We need to make sure that there's not be interference issues, that existing broadcasters are not going to be harmed and that consumers are going to get the same service that they've come to expect and that our migration plan, which is a very key part of the system, is one that makes sense for all parties involved.

***RW:** You're saying you need a 10- to 15-year transition period?*

Struble: We've said 10, but we've had receiver manufacturers tell us that it could be 15 to 20. At the end of the day I think the marketplace is going to decide. And our job is to design a system that is flexible enough to meet the demands of those market places. ... The FCC will not leave some small broadcaster out in Kansas out in the cold because he doesn't in year one, year two, or year three go out and buy a digital exciter.

World Radio History

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Circle (183) On Reader Service Card

World Radio History

Is Your Software Y2K Compliant?

▶ Y2K, continued from page 1

operations by all of its products. At NAB '98, CBSI officials said the firm's software was officially "Millennium Certified."

But CBSI's guarantee only applies to CBSI programs, and not to any computer networks on which they may be installed. This caution makes sense, said Kenagy, since the network software — which CBSI has nothing to do with — may not be Y2K ready.

In an effort to help broadcasters be sure that their systems are safe, CBSI offers diagnostic procedures for testing whether Windows 95 and non-Windows PCs are Y2K-compliant. (Macintosh computers don't have this problem, since they are designed to be Y2K-ready.) This information can be downloaded at *www.cbsi.org*

Radio Computing Services' products are also Y2K-compliant, said Bill Webber, RCS product manager for the "Selector" and "Linker" programs. That's because these databases are based on a Julian dating system; they already store dates in four digits, rather than the troublesome two. Webber said RCS had to make some minor changes to RCS products' user interfaces.

For instance, in the Selector music system, the fields for a song's or artist's "anniversary date" and a song's "chart debut date" had to be changed from two digits to four in order to avoid ambiguity, said Webber. Otherwise, Selector would not have been able to tell if the user was specifying 1900 or 2000. For Selector users, version 12.40+ and versions that follow are Y2K compatible. For Linker, version 1.14 +x and versions that follow that follow are Y2K-compliant.

Users of Dalet Digital Media Systems have nothing to fear, said DDMS President Stephan Guez. He said Dalet's data structure has been "Y2K-compliant for a long time." Dalet has been careful to modify its user interface, to ensure that its software properly interprets "01" as the year 2001, rather than 1901. For Dalet users, "all recent upgrades include these modifications and are Y2K-compliant," said Guez.

Hall Electronics is similarly unconcerned about Y2K, primarily because its network software runs on Windows 95. (New versions of Windows 95 are Y2K-compliant.) According to HE Sales Engineer Robert Alexander, Hall's Wavestation products were written with the year 2000 problem in mind, so he does not anticipate any problems in this software.

Finally, Broadcast Electronics, Inc. has been busy testing its products for Y2K problems. "For the most part we've found that they are unaffected by the changeover," said RF products manager Tim Bealor. "The millennium doesn't have any impact."

BE has had to do some fixes on its AudioVault and CORE systems.

RCS Sound Software

Updates for both will be issued during BE's regular mailout of software upgrades, usually in April and October, said Bealor.

Although this is not an exhaustive list of live-assist and traffic software manufacturers, it's still sufficient to show a trend that broadcast software companies are taking the year 2000 problem seriously.

All of this effort is for naught if station managers don't ensure that they are running the latest programs on their computers. No amount of Y2K fixes by software manufacturers will help, unless these programs make it onto station computers and networks.

What is your company doing about Y2K? Tell us about it (see address, page 5).

Suggested Y2K Web Sites

www.cbsi.org for downloading CBSI's Windows 95 and non-Windows 95 tests to ensure that your hardware is Y2K-compliant.

www.IT2000.com The National Bulletin Board for the Year 2000.

www.year2000.com/cgi-bin/clock.cgi The Year 2000 Information Center.

www.nist.gov/y2k/ National Institute of Standards and Technology Year 2000 home page.

www.nab.org The NAB home page, with links to year 2000 sites.

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World Radio History

Continental Electronics Up for Sale

by Lynn Meadows

DALLAS Continental Electronics Corp. and its two subsidiaries were put up for sale last month by parent company Tech-Sym Corp.

Continental, a manufacturer of transmitters and a dealer of broadcast equipment, is one of three businesses Tech-Sym plans to sell. An environmental business unit and a real estate investment business unit are also on the block.

J. Michael Camp, president and CEO of Tech-Sym, stated that the parent corporation wanted "to exit these businesses which have adversely affected shareholder value." No one was available to expand on that statement at press time.

Continental Electronics began in 1946 specializing in high-power, radio frequency and microwave sources and systems. Today it makes transmitters ranging in power from 50 W to 1 MW and in frequency from 530 kHz to 108 MHz, for domestic and international applications, as well as specialized broadcast equipment for government and other applications.

They have always been an excellent competitor.

— Robert Weirather

U.S. competitors reacted in different ways to the news. Robert Weirather, director of broadcaster relations for Harris Corp., said he was surprised to find that Continental was for sale.

"They have always been an excellent competitor in the business," he said, adding that he was uncertain of the reasoning behind the sale.

Tim Bealor, product manager for RF transmitters at Broadcast Electronics, said, "It comes as no surprise that the consolidation trend we have seen in recent years in the ownership side of the industry, we are now seeing in the supply side as well. The industry's single product line suppliers are finding it increasingly difficult to remain viable."

Tech-Sym purchased Continental in 1990. In 1994, Continental acquired a majority interest in Lensa S.A. The Chilean company manufactures medium-wave transmitters primarily for Central and South American markets. In 1995, CE acquired TELEFUNKEN Sendertechnik GmbH, a German company that designs and produces broadcast transmitting equipment.

DTV Express at Harris Expo

▶ HARRIS, continued from page 7

trends reflected in the exhibits this year. They include new applications of spread-spectrum technology, such as that developed by Intraplex in its "wireless T-1" system.

Hard-disk audio also remains a major area of development for many radio stations, Burns said. "It continues to be a big business. If anything, it's getting bigger. ... Finally, almost everybody is getting rid of their old tape-based systems, moving to hard-disk automation and workstations."

Also, more and more stations are making the jump to digital consoles, Burns said.

While the main focus of the event is radio, visitors also can get a tour of the big Harris digital television demo truck, the DTV Express.

Tours of the DTV Express will be available.

EXPO '98 is free, and lunch is provided. Past shows have included a high-profile lunch speaker. Hours are 9 a.m. to 5 p.m. EDT on Tuesday, Sept. 15. For registration or information, call (800) 622-0022, and ask for Marilyn Campbell or Debbie Lampen.

— Paul J. McLane

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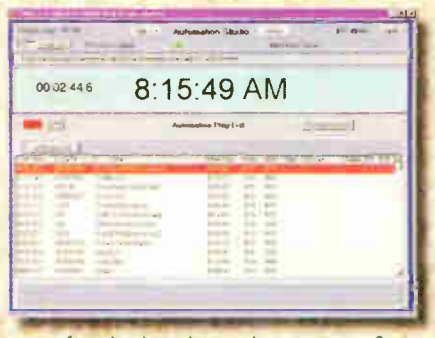

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World Radio History

Workbench

Radio World, Aug. 5, 1998

Summer Is Time to Check Towers

John Bisset

Fall isn't that far off, and the folks at BCS Wireless suggest that you check around your tower before the bad weather begins. If your tower needs painting, now is the time.

A good rule is to paint when the temperature is above 55 degrees F. If night temperatures are lower, let the steel warm up in the morning sunlight before painting. Also take an inventory of the lines and antennas that are no longer needed. They can be removed either during a repainting or inspection. Keep the overall surface area to a minimum. This will help if you encounter severe winter ice storms.

Figure 1: Use a drill to wind multiple wires into a neat bundle.

When was the last time you had your guy wires tensioned to the manufacturer's specifications? Loose guy wires cause fatigue to the tower structure. Also check the weep holes at the base of the tower, and fill out your quarterly inspection report.

If you are not getting the BCS Wireless Tower Communications newsletter, send your request to BCS Wireless, Inc. P. O. Box 730, New Glarus, WI 53574.

★★★

Speaking of towers, a consultant told me an interesting story the other day. Seems an FCC inspector cited a cellular tower for improper tower painting, even though the tower was painted with the proper red and white bands.

The problem? The tower owner had run about 10 lines of 1-5/8-inch coax up one side of the tower. The lines were uniformly spaced, and they sure looked pretty, but the lines also completely obliterated the red and white paint on that face of the tower. Two sides of the tower had the traditional red and white, but if you looked at the third side, it was black! The site owner was required to paint over the coax lines so that each face of the tower was regulation red and white.

★★★

If you originate a network program, consider a telephone line with an answering machine on it. If an emergency occurs, you can record a message informing your affiliates of the problem and what's being done to correct it. Trying to answer a swarm of calls while trying to correct the problem won't help you get the job done.

★★★

Remember the suggestion to fill copper tubing with sand to permit easy bends? (The sand prevents the tubing from collapsing as you bend it.) Dale Heidner, the chief at KGVW(AM) in Belgrade, Mont., sent me an ad for a tubing bender that's only $4.99. Unless you have a ready supply of sand — or enjoy playing in it — this bender will handle the job faster for you.

The tool is available from a company called Harbor Freight Tools. You can reach them at (800) 423-2567, and their fax number is (800) 905-5220. The tubing bender will work with 1/4- , 5/16- and 3/8-inch copper or steel tubing, and has a marked degree gauge for accurate bends up to 180 degrees.

Harbour
Freight has a handy tool for bending tubes. Cost: $4.99

The part number is ITEM 03755-3AYA. Dale has used the tool to wind tank coils for ham transmitters as well as AM work!

★★★

A client we visited recently was trying to combine a number of individual wires — hand weaving them, sort of like a braid. It was time-consuming and tedious.

I suggested he give me his drill, which was placed in the vise as shown in Figure 1. With the speed set for low, and one person holding the wire spools at the other end, the drill slowly is engaged. The drill will spin and effectively twist the wire into a very neat bundle.

This is definitely a two-person process. Make sure you take it slow, or you'll have a wiring mess. The completed bundle will look factory-made. It's important to keep the tension and speed low; smaller wires can break if too much force is used. And if you're only winding a few wires, fold over the ends so they will fit securely in the chuck when you tighten it down.

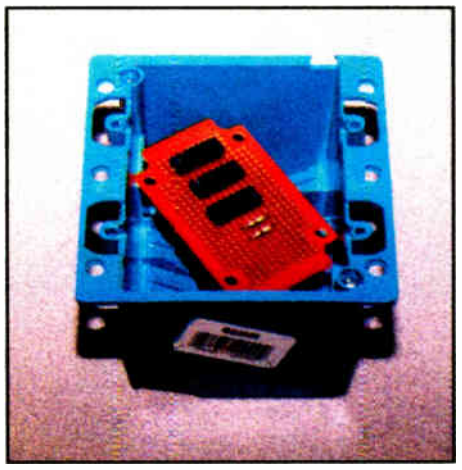

Figure 2: Perfboards conveniently fit inside electric boxes, making for inexpensive project boxes.

★★★

Larry Albert always has a way to save money, both in the shop and on the workbench. Figure 2 is one such example. Plastic electric boxes are cheap (metal boxes are also available if you need shielding), and the Radio Shack perf boards will fit nicely inside.

The mounting holes on the edges of the box permit attachment under consoles and in out-of-the-way places. Plain electric faceplates can hold switches or indicators if needed. The more-finished boxes that you find at electronic suppliers are nice, too, but when the project is going into a ceiling, or under a console, why not save the money?

■ ■ ■

John Bisset, a district sales manager for Harris Corp., has worked as both a chief engineer and contract engineer for more than 20 years. Reach him at (703) 323-8011. Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or via e-mail to jbisset@harris.com

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World Radio History

FEED LINE

Time to Turn On Your New Station

W.C. Alexander

This is the last in a multipart series about building an AM expanded-band station. The previous part appeared July 22.

In the previous part of this series, we began an examination of the proper method of measuring spurious and harmonic emissions as may be required by the FCC before program test authority will be granted. We discussed measurement location selection and proper measurement technique. We will pick up this time with a caveat for the measurement process and a discussion of what to do if the results are in excess of FCC limits.

One important thing to watch out for is receiver overload. It is easy, particularly close to a station, to overload the front end of the field strength meter and cause rectification and mixing inside the receiver. This will produce false indications of spurious and harmonic measurements. One way to check for overload is to switch to a higher scale and see if you get the proper 20 dB ratio.

If, for example, the meter reads 10 mV on the 10 mV scale (top of the meter scale) and you switch to the 100 mV scale, if the meter does not indicate 10 mV (bottom of the scale), that is a good indication of overload. You need to find another location farther from the transmitter site(s). The balance you are seeking in a measurement location is, once again, between the point where receiver overload occurs and where the ratio to other local signals is not great enough.

Suppose you determine, after double- and triple-checking your measurements at several locations, that an intermod produce is being radiated. What do you do? First, don't panic. It is not the end of the world, and by simply rechecking and touching up the tuning in some of the diplex or detuning filters, you can very likely get rid of the problem.

A properly designed and tuned diplexing system should provide more than enough isolation between stations to prevent interaction from occurring. Check transmitter tuning and neutralization as well. Don't neglect audio and remote control wiring, either. The antenna port is not the only way the other station's RF can enter a transmitter and cause intermod. Disconnect the audio feed from each transmitter and see if the problem goes away. Try lowering the power on each station's transmitter to see if one or the other makes a difference. If either or both stations has an auxiliary transmitter, switch to the aux and see if the problem still exists.

One of these tests will, in all likelihood, reveal the source of the problem and then you can treat it.

Engineering statement

When you have successfully completed your spurious and harmonic measurements, you must prepare an engineering statement detailing the results. While it is not necessary to itemize the results of the measurements on each frequency checked, you do need to provide a general description of the location, the field strength meter used (make, model and date of last calibration), and the results. You should state that all harmonic as well as second-, third- and fifth-order frequencies were checked and the field strengths on these frequencies found to be greater than 80 dB below the carrier of either station. If you measured no products on these frequencies greater than some other value, so state.

An example statement might be, "Second-order intermodulation products were observed to be more than -89 dB below the lower of the two carriers." Similar statements should be included for third- and fifth-order intermod products as well as harmonics.

If there are anomalies on certain frequencies, describe them. For example, if one of the measured frequencies is the same as the carrier frequency of the 50 kW AM across town and you could not obtain a satisfactory measurement because of the other station's signal, so state. In one set of measurements I made, there was a "mystery carrier" coming and going on one of the third-order frequencies. In my engineering statement, I noted the presence of this unidentified carrier and stated that the demodulated audio was not that of either of the stations being measured. The FCC accepted this without question and granted the application.

In the event that your new station is diplexing with an existing directional station, you should make a statement describing how the sampling system for the directional antenna is isolated at the new station's frequency. This is usually done with traps and filters in the antenna monitor, but other means are sometimes used as well.

If the antenna monitor was modified, you should include a statement that it was calibrated and certified as accurate by the manufacturer following the modification. If the sampling system was modified (i.e., the sampling transformers

See AM, page 19 ▶

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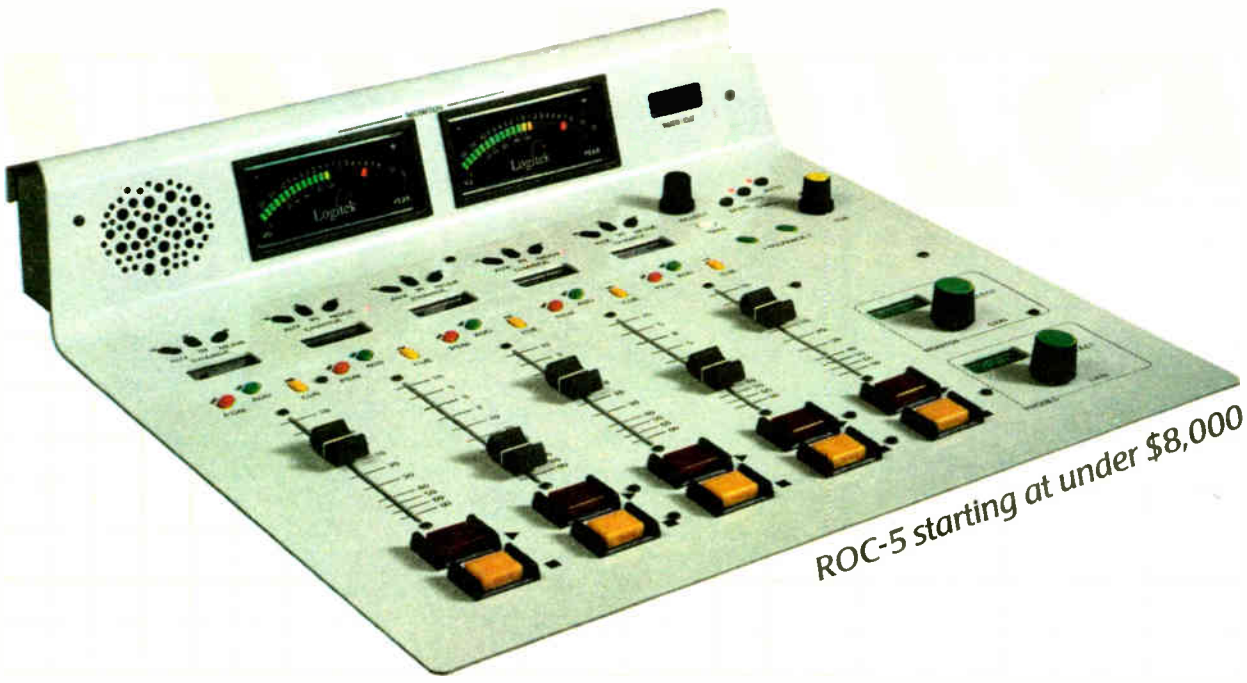

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World Radio History

▶ AM, continued from page 18

relocated to another point in the system, behind diplex filters, for example), a partial proof on the directional station probably will be required to support the new operating parameters that will result.

With all the "extras" required by the construction permit, such as resistance measurements, partial proof and spurious/harmonic measurements in hand, there is little else to do but fill out the FCC Form 302-AM. This form is simple and mostly self-explanatory. It is a good idea not to leave anything blank. If a section does not apply, so state. Answer all the questions on the form.

Time is running short for most stations that received expanded-band construction permits.

The only technical data required by this form are antenna resistance/reactance, antenna current day and night, tower height figures and coordinates. One other item not specifically asked for on the current form that you should nevertheless provide is the antenna registration number. If you do not provide the registration number, the FCC will have to follow up and ask for it, delaying processing of your application.

Once the Form 302-AM is complete, you must submit it to the FCC in Gettysburg, Pa., with the appropriate filing fee. If you are not eligible for automatic program test authority, you should submit the form at least 10 business days prior to the date on which you desire to begin program tests. There is no guarantee that you will receive program test authority within that 10-day period, but 10 days is what the FCC rules say.

Don't forget to place a copy of the filing in the local Public Inspection File ("Public File") as required by the FCC. Keep a copy for yourself as well.

The end

This wraps up our series on constructing an expanded-band station. We have covered the project from inception to completion, and it is my hope that I have answered in advance many of the questions those of you about to undertake such a project may have had. For most who received an expanded-band construction permit, time is running short. If you haven't yet begun construction, you may not have time to complete it before your CP expires. The FCC is looking at CP extension applications with a much more critical eye these days.

So how did my own expanded-band construction project turn out? It turned out fine. My expanded-band project diplexed the new station into one element of a three-tower 5 kW array. There were some design problems early on with the diplexer, but the construction and tune-up went fine. The station is now on the air and operating in the Portland, Ore., market on 1640 kHz.

As your expanded band construction project gets under way, drop me an e-mail so I'll know how it is going. Good luck!

■ ■ ■

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. Contact him at (972) 445-1713 or via e-mail at cbceng@compuserve.com

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts: Night	Power in kilowatts: Day

2. Station location

State	City or Town

3. Transmitter location

State	County	City or Town	Street address (or other identification)

4. Main studio location

State	County	City or Town	Street address (or other identification)

5. Remote control point location (specify only if authorized directional antenna)

State	County	City or Town	Street address (or other identification)

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☐ No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? ☐ Yes ☐ No

☐ Not Applicable

Exhibit No.

Part of FCC Form 302-AM

INSIGHT ON RULES

ASRN: On the Fence Over Tower Signs

Opinions Differ on Where a Radio Station Should Post Its Tower Registration Number

Harold Hallikainen

Is your antenna structure number displayed properly? Could you be at risk of an FCC fine as a result? The answers to these questions are not as clear as you might think.

As we discussed in a previous article, the FCC adopted its Antenna Structure Registration program in November 1995 with Docket 95-5. The web resources on this program are excellent. Extensive information is available at *www.fcc.gov/wtb/antenna/Welcome.html* . (Remember to include *http://* before all Web addresses included in this article.)

I find it interesting, however, to follow the requirements as the FCC describes them, as we move farther and farther from the Report and Order. It seems a bit like the children's game "telephone," in which the meaning of the message changes slightly each time it is repeated. I find contradictions in a fair number of FCC policies and the rules as written, or the rationale for adopting the rule, as described in the Report and Order.

The rule

In this instance, the rules seem fairly clear as to where the antenna structure number must be posted. However, FCC inspectors and FCC checklists seem to be requiring something different.

Rule 17.4(g) states, "Except as described in paragraph (h) of this section, the Antenna Structure Registration Number must be displayed in a conspicuous place so that it is readily visible near the base of the antenna structure. Materials used to display the Antenna Structure Registration Number must be weather-resistant and of sufficient size to be easily seen at the base of the antenna structure." Paragraph (h) provides an exemption if the sign would detract from the appearance of an historic landmark.

Stations worry that tower registration signs simply help vandals find their towers.

Clear enough! The number must be displayed *in a conspicuous place so it is readily visible near the base of the antenna structure.*

Posting guidelines

The FCC ASRN posting guidelines available at *www.fcc.gov/wtb/antenna/antguide.html* state: "A site owner who is considering whether the

See SIGNS, page 22 ▶

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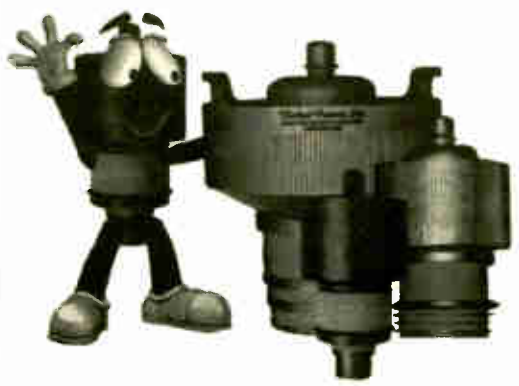

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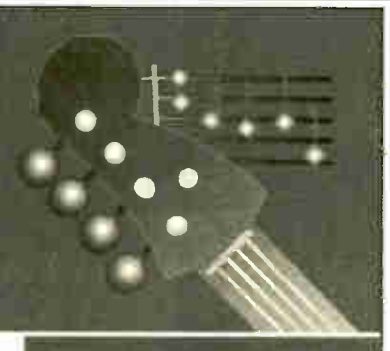

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World Radio History

GUEST COMMENTARY

Practical Tips on ISDN for Radio

Some Radio-Specific Advice to Help You Get the Most Out of Your ISDN Service

Rolf Taylor

The author is customer support manager for Telos Systems, a manufacturer of equipment including codecs for ISDN use.

I read with interest the article "Does ISDN Work for Your Station?" by Robert Donnelly and Dick Slezak (**RW**, June 10). It was quite refreshing to see an article with hands-on information for ISDN users. I'd like to add some additional advice.

ORDERING. I strongly suggest you order your lines in writing. Be sure to include a termination date if the line is to be temporary. Include with your order the pages from the Terminal Adapter (TA) manual which include the line provisioning information. Donnelly and Slezak's advice about ordering early and checking out the installation rings true. Do it!

SPIDS, Service Profile Identifiers. These are the numbers, provided by the phone company, that must be entered for ISDN equipment to work. These must be correct. Be advised that what the telco business office has in their computer and what is actually programmed into the switch are quite often different. If in doubt, ask to speak with someone who can log into the switch. If you are in a hurry, many equipment vendors are familiar with typical SPIDs used by various telcos. For the *national* ISDN protocol, always try area code + number + 0101.

Understand the 10 XXX codes. They can be invaluable.

SPIDs

The terminal equipment must send the complete and entire SPID. While the test sets used by some phone companies will add a 00 or 01 automatically, the terminal adapters used by broadcasters generally do not.

Understand that the SPID and the phone number (DN or Directory Number) have absolutely no fundamental relationship to each other. The SPID is basically a random ID number. If the switch programmer leaves out a digit, you need to do the same. Always enter the complete SPID. Never add anything to it; this is not like a phone number where sometimes it needs a 1 and area code and sometimes not.

LONG DISTANCE. Most interexchange carriers (IXCs) cannot handle the Circuit Switched Data capability which is what you need. Most likely you will need to go with MCI, AT&T or Sprint if you will need long-distance connectivity.

Because the calling party's IXC carries the call, it is not necessary that both ends have the same carrier. Routing is determined from the calling end to the receiving end. Quite often a call from site A to B might work while a call from B to A might fail, even if the same carrier is used. This can be a helpful workaround in case of problems. Another useful tip is to try dialing at both 56 kbps and 64 kbps. Often one will prove more reliable than the other. You may wish to try 10 to 20 calls at each rate to check which works most reliably between the sites in question.

If you will be dialing sites around the world, your choice of IXC is more critical. MCI has service to 65 countries while AT&T has service to 49.

Know the code

As mentioned in the article, you can manually choose the carrier for a call by using a 10 XXX code. Phone companies are now phasing in 10 XXXXX codes due to growth in the IXC business. These codes can be very useful for both troubleshooting and to get on the air when things are not working. The codes we use are 10 10 222 (MCI), 10 10 288 (AT&T) and 10 10 333 (Sprint). You may not get the best rates if you use these codes without setting up an account with the carrier first. Nonetheless, they can still be invaluable. You will either get a bill directly for these calls, or an extra page on your local phone bill. Let your accounting department know to expect these bills so service will continue.

Note that AT&T often will not work using the above codes, or by requesting AT&T service through your local telco, if you have not set up an account with them first. All digital calls are handled by a separate division of AT&T, which charges a surcharge for data calls. While sometimes they may set up a temporary account without notification, quite frequently they will cancel these accounts if

See ISDN, page 22 ▶

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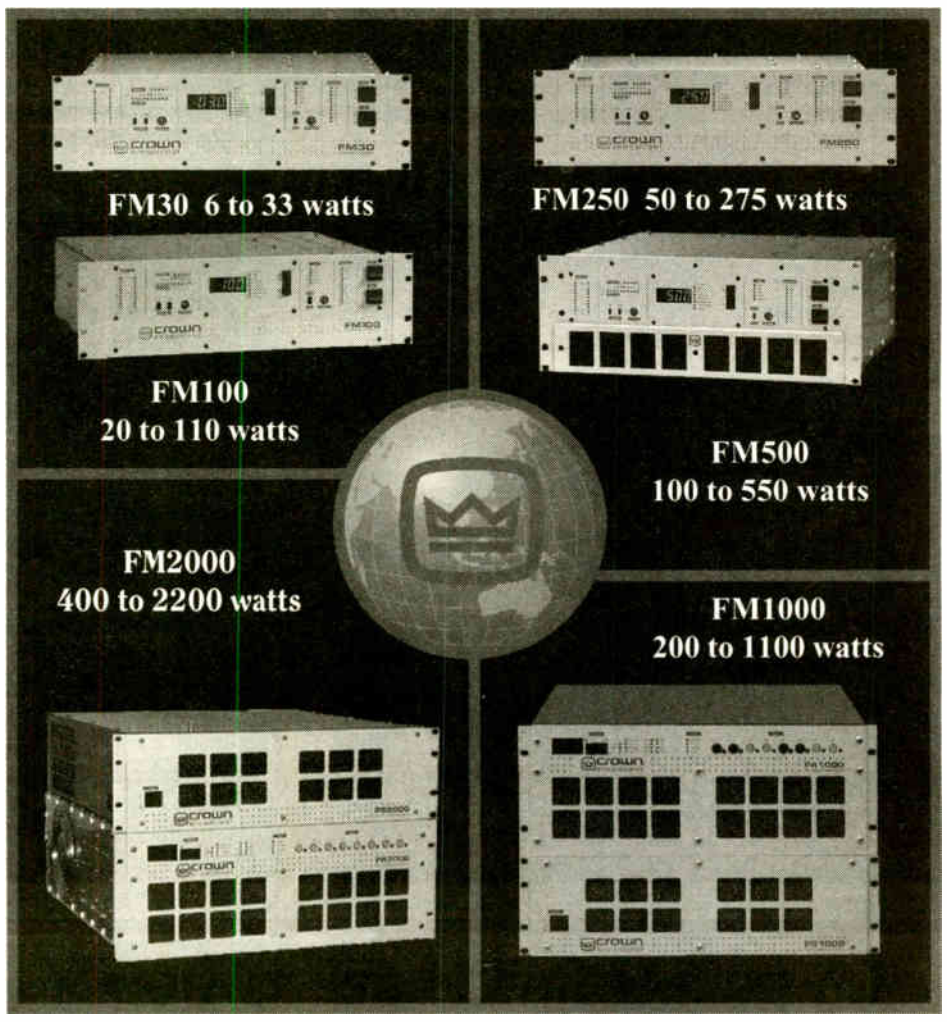

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World Radio History

'Conspicuous' Sign Debate

▶ RULES, continued from page 19

Registration Number is properly posted will want to keep in mind the following principles. In addition to providing general guidance, they serve as the foundation for the answers to the hypothetical situations listed below.

"The Rules do not prohibit multiple postings of a Registration Number. An owner still unsure whether the structure is in compliance may wish to post the Registration Number at several points along a perimeter fence, or at both the gate to the access drive and adjacent to the base of the antenna structure.

"Because the purpose of the Rule is to aid public identification of antenna structures, owners are strongly encouraged to identify the number as the FCC Registration Number.

"The owner should rely on common sense when posting the number. Ask 'Is this readily visible to someone who doesn't have access to the site?' If a location is conspicuous enough to post a 'No Trespassing' sign or the owner's name and logo, then it is likely an appropriate place to post the Registration Number."

Somehow, we went from the clarity of the rule (post it at the base of the tower) to something about posting at points along a perimeter fence and gate to property. The suggestion about posting along the fence seems to apply to owners "still unsure whether the structure (registration number posting) is in compliance." Those who are sure the posting is conspicuously visible at the base of the tower seem, to me, to be sure they are in compliance.

Further, note that the Guidelines specify that the purpose of the rule as "to aid public identification of antenna structures." However, the Report and Order adopting the rules describes different purposes: "By these actions, the commission seeks to reduce the number of filings to the commission regarding changes to antenna structures, to expedite application and notification processing, to unify and streamline federal painting and lighting regulations, to ease the public and governmental burdens associated with filing and processing certain applications, and to increase safety in air navigation."

The Report and Order makes no mention of aiding the public identification of antenna structures.

The FCC's AM and FM Self-Inspection Checklists contain similar wording:

"Once a tower (or towers in the case of an AM Directional station) is registered, then the registration number(s) is to be displayed in a conspicuous place so that it is readily visible near the base of the antenna structure(s). When the tower is located where the number cannot be seen without access to the property on which it is located, then the number should also be placed on the gate or fence leading to the tower where an outside observer can see it."

It appears that the FCC is *requesting* an action beyond what the rules require, but will not actually *require* that action.

Note, however, the use of the word "should." This appears to be a way to tell stations to do something beyond what the rules require.

Skyscraper question

Paragraph 36 of the Report and Order answers concerns raised by the owners of the Empire State Building. They were concerned that the rules would require the registration number be posted at the base of the building. However, this paragraph states, "Therefore, in the case of antenna structures located on top of buildings, we will clarify the rules to require that the registration number be posted at the base of the antenna structure, not the base of the building."

Because the public does not have access to the base of the antenna structure, which is on the roof of the building, it appears that identification of the tower by the general public was not a major concern in the rulemaking.

An inspector speaks

In the June 24 issue of **Radio World**, FCC Inspector Ronald Ramage wrote, "The rules indicate only that it is to be posted near the base of the tower. Unfortunately, in many cases the tower base is not visible from the entrance gate to the property. I do not climb fences. The purpose is that people can identify the owner of the tower, so use common sense and your best judgment. Post the number where it can be seen easily."

During an inspection, I would expect a station representative to accompany the inspector and unlock any gates necessary for access to the base of the tower, where the registration number should be readily visible. I wonder: Are stations cited for complying with the rule?

An FCC attorney speaks

In researching this story, I e-mailed the FCC and ended up in a telephone conversation with an attorney there. Our conversation was "on background."

He stated that the FCC suggests that the ASRN *should* be posted where it is readily available to the public, but only *requires* that the number be readily visible near the base of the tower. The FCC would like the public, the FCC and the FAA to be able to identify a tower without having to get access to the site to readily report tower lighting and marking problems to the FAA. He also said the word "conspicuous" in the rules might be interpreted as preventing the registration number from being posted on a tower pedestal behind a locked gate at the base of a tower.

Thus, it appears the FCC is requesting an action beyond what the rules require, but will not actually require that action. It will be interesting to see how the rule is enforced.

Who cares?

My research into this rule was prompted by stations being concerned that a sign with the tower registration number would identify to vandals that yes, this indeed is the gate to go through to get to that tower. My reading of the Report and Order indicates that the ASRN posting is a bit like posting a serial number on a piece of equipment. When you are at the base of the tower, you can positively identify the tower in the FCC database. If you are in a field with several towers (such as an AM directional array), the registration number posting at the base of each tower positively identifies which tower is which.

■ ■ ■

Harold Hallikainen is president of Hallikainen & Friends. Reach him at (805) 541-0201, via e-mail to harold@hallikainen.com *or on the Web at* http://hallikainen.com

Also visit the FCC Rules Online at http://hallikainen.com/FccRules

ISDN: Playing Sherlock For Better Performance

▶ ISDN, continued from page 21

you do not call them with credit and account information. While MCI and Sprint do not require notification, you will get the best rates if you contact them directly.

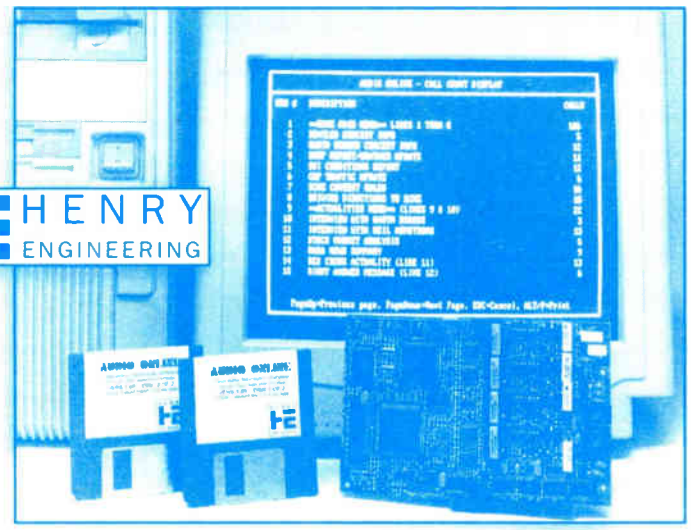
TROUBLESHOOTING. I can only cover so much here, but here are some useful tips. If your codec and TA allow you to place a call from one ISDN B channel to the other, you may have a valuable tool to isolate problems. If this setup works reliably, and you get your audio back without interruptions, then your codec, TA and line are good. Test the other end as well. Remaining areas for concern are the long-distance carrier (try the codes above) and the local telco's tandem trunking, which is common to all the long distance carriers.

Be prepared to play Sherlock Holmes. Remember, your equipment is part of the largest network on earth. Keep notes on what you tried and what the results were. Your equipment vendor should be able to assist you through the process.

■ ■ ■

Rolf Taylor is based in Cleveland. Contact him at (216) 241-7225.

Information System Problems?



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HE **DARED** TO GO THERE.

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PRODUCT EVALUATION

BayGen 'Cranks' Out the Tunes

Alan R. Peterson

You can buy a radio practically anywhere and at any price — from simple $9 Walkman clones, to full-blown home receivers with hundreds of watts of power. So what is it about the BayGen Freeplay radio that makes it so darn interesting?

It doesn't look unique — a standard on/off switch, volume control and tuning dial. It has but one speaker, so no stereo here. There is no tone control. A headphone jack, AC adapter plug and AM/FM band switch are found on the side. It looks like a plain vanilla radio you would keep in the garage or basement workshop for "wallpaper" music.

But surprise, this is the battery-less, self-powered radio written about in Sunday newspapers and in-flight magazines. It is in Montgomery Ward and Sports Authority stores. You read about it here in **RW** nearly three years ago when it was introduced in Africa, where the Freeplay is manufactured.

The Freeplay takes no batteries, but runs on an internal generator wound up with good old muscle power. Sixty turns on the retractable crank gives you up to 30 minutes of music, talk or news programming. No batteries to buy or leak, and a quickie upper-body workout to boot.

Not merely a novelty, this self-powered radio can be a lifesaver in areas affected by severe weather, power outages or man-made hazards such as industrial plants or nuclear facilities. In an emergency, a Freeplay radio could save your life; there are no batteries to fail when you need your radio the most.

Watch for more self-powered products. BayGen is testing a wind-up weather band radio and EAS receiver.

The original BayGen Freeplay radio reaped awards from the BBC and at the 1998 Consumer Electronics Show. It has received acclaim from the British Red Cross, United Nations agencies and more than 30 humanitarian organizations.

The credit is well-deserved. I could see the BayGen Freeplay become very popular in states where tornadoes and other natural disasters are a way of life. Some enterprising station, group owner or regional broadcast association in those areas would do well to make Freeplay radios a giveaway item or provide a quantity to emergency preparedness organizations in their markets.

RW tried out a model FPR2S-C, the basic crank-powered receiver augmented by a solar cell panel, inside a high-impact, transparent plastic case.

First impression: It was fun to observe the works inside the receiver.

The actual circuit board is a mass-produced AM/FM board, not much bigger than a 3-by-5 index card, with many discrete parts replaced by an IC. A four-inch speaker completes the front. Minus the generator, the entire radio might only be the depth of a hard-cover novel.

The generator mechanism consists of a flat carbon steel spring wound around a pair of spools. Cranking the radio winds the spring onto one spool. It unwinds through a plastic gear train and drives a DC generator.

The generator charges a 6.3 V 22,000 µF electrolytic capacitor, providing steady current to the radio. A regulator circuit constantly balances the juice provided by the solar panel/generator combination and "hits the brakes" when the radio is not in use, idling the spring-driven motor.

The spring motor winds with a loud ratchet sound, but the generator runs silently. You may hear an occasional creak as the spring settles during windout.

The solar panel takes over completely in full sunlight. We ran the Freeplay radio all day at a Northern Virginia apartment complex swimming pool without once having to wind it.

It also got the attention of the pool's lifeguards. Tired of running out of battery power on their own radios, they asked where to get their own Freeplay receivers.

Ear test

It would be a waste to place a generator into a radio that sounded lousy, so the BayGen Freeplay radio sounds reasonably good. The FM band sounds as good as the four-inch speaker will allow, and the radio's AM section has decent selectivity and fidelity.

The radio covers the AM expanded band to 1700, but the tuning indicator at the other end dips curiously down to 520 kHz where the aeronautical beacons are. There is not a lot there to hear domestically (remember, the radio was made in South Africa), and whatever audible honks and squeaks there are below 540 kHz quickly become dull.

AM fans: our receiver was able to DX beautifully. Without the AC line noise characteristic of cheap AM radios, the generator-driven Freeplay picked out some fairly distant stations. The old wrap-the-telephone-cord-around-the-radio trick may improve reception.

The Freeplay is not a DXer's receiver; there is no external AM antenna connection. However, BayGen also makes the original FPR1 receiver with AM, FM and shortwave, so Radio Moscow junkies and BBC fans alike can listen anyplace they wish.

One issue I hope BayGen addresses is the way the case fits together. I braced the radio against my body with an underhand grip on the handle to wind it. The sharp edge where the halves did not line up cut my knuckles twice.

I could fix this myself with duct tape, but a radio costing $79.95 list ($69.95 without the solar panel) should not be *causing* injuries while informing me how to *prevent* them during emergencies.

Watch for more self-powered products to become available. BayGen is testing a wind-up weather band radio and EAS receiver overseas and has successfully run an Apple E-Mate portable computer with a similar human-powered generator.

Talks are also underway with General Electric to improve the efficiency of the power generation system, and with Battalle to create military applications such as wind-up global positioning system (GPS) receivers and crank-powered mine detectors.

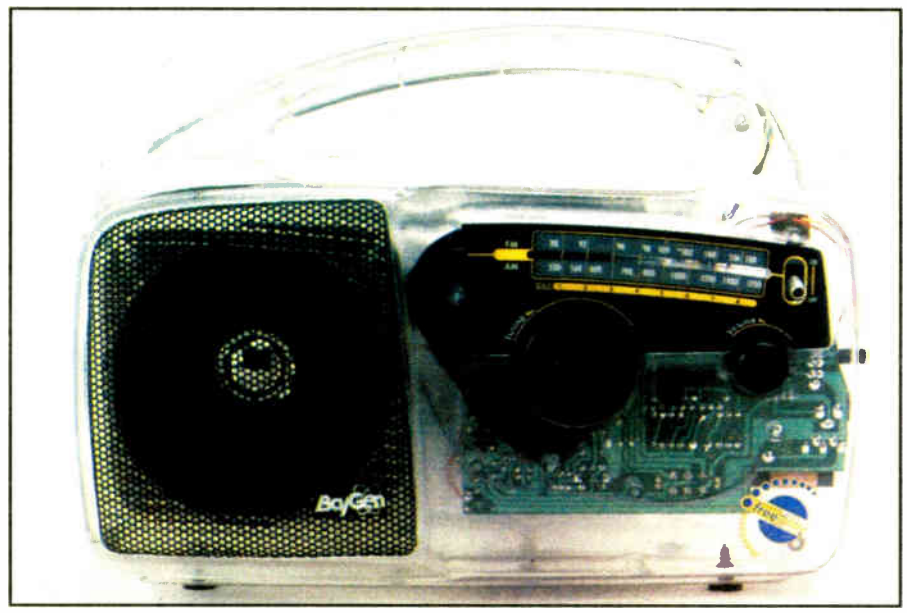
For now, the Freeplay series of receivers is a suitable and useful application for wind-up power generation. Cranking up a radio like a Model T Ford every 30 minutes may get tedious once the novelty wears off, but the Freeplay also accommodates a 3 to 12 VDC (center positive) AC adapter, appealing to us truly "casual" radio fans.

For information on Freeplay receivers, contact Steve Ellison at Harris Corp. at (765) 962-8596.

■■■

The BayGen company is at 80 Amity Road, Warwick, NY 10990; telephone (914) 258-5660, or visit the company Web site at www.freeplay.pair.com

Alan Peterson is technical editor of ***Radio World****.*



A look inside the self-powered BayGen Freeplay radio receiver.

Product Capsule:
BayGen Freeplay Radio

Thumbs Up
- ✓ Innovative use of alternative power sources
- ✓ Good sound
- ✓ Shortwave model available
- ✓ Clear-case model fun to watch

Thumbs Down
- ✓ Somewhat pricey for a basic portable radio
- ✓ Slight case misalignment

For more information contact Stave Ellison., at Harris Corp. (765) 962-8596. The BayGen Web site is *www.freeplay.pair.com*, or circle **Reader Service 136**.

The Stand-By: You Don't Miss It Till It's Gone

A Stand-By Transmission System Offers Your Station the Ultimate Redundancy

Troy Conner

Many of the small- and medium-market stations I visit every year have no backup broadcast systems. It never ceases to amaze me that these same stations obviously spend considerable sums of money each year on all manner of other things — things that arguably are less important, in terms of maintaining the actual audio chain (i.e., reaching from DJ to listener).

You FM folks have to ask yourself: In the event of a direct lightning strike, a real burnout involving total loss of transmission line pressure (air or nitrogen), how long would you be off the air or at reduced power?

Would you find yourself reaching frantically for the phone to call in a rigger, or worse, a full tower crew? Or would you calmly be flipping a lever in your transmitter room, to switch power from the main system

to your stand-by?

Given the aged state of their towers, many small, single-radiator AM stations should give real and considered thought to what happens in the event of a partial collapse. If nothing else, it would be wise to

See STEEL, page 26 ▶

World Radio History

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World Radio History

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Back-Ups Need Not Be Costly

▶ STEEL, continued from page 24

consult several local tower firms. Inquire how soon a small replacement structure could be erected if something were to happen. The most invisible part of redundancy is planning.

Enough doom and gloom for now. I know some readers already are tuning out, thinking, "Oh man, he's talking a lot of money!"

Start somewhere

You can't think that way. You have to look at a project of this magnitude as a process of budgeting. In the time frame of a couple of years, a typical station should be able to afford some degree of redundancy.

Not knowing precisely how your system is configured, I can't begin to tell you exactly how you should go about making your system more reliable, but let's look at some fairly obvious places to start. How many spare chain links do you have for your chain?

Foremost, you must enter into a certain mindset. You must consider the audio chain as the ultimate link to the listening consumer, not just in terms of signal quality but also with regard to reliability. To me the ideal back-up system is an independent, stand-alone affair. Unfortunately, in a vast number of cases, complete redundancy simply isn't economical or even possible.

Are you prepared for a
tower collapse, blown line or failed antenna?

A back-up transmitter or low-power exciter is, however, an excellent place to begin in the quest for the ultimate redundancy. It doesn't have to be new or even powerful. Even the most primitive broadcast plant should have an additional RF power source on hand.

By networking a bit and hunting through the classifieds in trade magazine, you can good operating equipment. A national computer search of more powerful stations on your frequency might turn up "pre-tuned" equipment. Bear in mind that many of these big players may be running on third- or fourth-generation equipment, and thus be willing to part with some of their surplus equipment — your treasure!

I have been in stations at which the original transmitter had been replaced long ago with a larger, more powerful unit, but no thought had been given to "plumbing" the smaller, older transmitter into the system so that it might offer assistance. I see dusty, disconnected transmitters at many stations. These devices would require very little to reconnect to the transmission line system.

The next thing to look for is a source of back-up power. Again, hunt the classifieds, and ye shall be rewarded. Even if you can't afford a new, high-power, automatic-starting and source-switching generator, perhaps you can find a surplus unit that will enable you to stay on the air at half or even quarter power.

One bay better than none

For the FM station, the next step is a back-up antenna. Now hold on. It doesn't need to be expensive, or new, or even more than a couple of bays. In some cases a single-bay antenna and a short run of 7/8-inch line are all that are required to provide redundancy on the tower.

In fact it doesn't need to even be on the tower. Even if the back-up system is still in pieces in the back room of the transmitter building, you are still way ahead of the game. You have the parts. Remember, redundancy is a state of mind. All of us get caught with our proverbial pants down at times, but with a little foresight and by budgeting accordingly, we can mitigate many emergencies.

Next month I hope to be able to provide a few photos detailing the installation of a small, stand-alone, FM back-up system. For now I have run out of article, before even really scratching the surface of the topic. Phone or fax anytime. Let me know how your station has implemented back-up plans, and I'll share your experiences with our readers.

■■■

Troy Conner is the owner of Tower Maintenance Specialists. Reach him by phone at (704) 837-3526 or via fax at (704) 837-1015.

Eliminate Carts for $5,000

At last! A "cart" replacement system that *works like carts*, but with digital audio quality that *sounds like compact discs*.

It's Scott Studios' new Spot Box. It's the *easiest* hard disk digital system to use!

There are two parts: A triple-deck "cart" player on the left, and a "Wall of Carts" pick list on the right.

The triple-deck digital player has everything you would expect. Big green Play buttons, bright red Stop buttons, VU meters, large countdown timers, flashing End-of-Message signals, and large legible "cart" labels.

You can start each spot manually from the screen, from remote Start buttons (and run lights) on the console, or touch the Auto-Manual button to have Spot Box smoothly start the next deck itself.

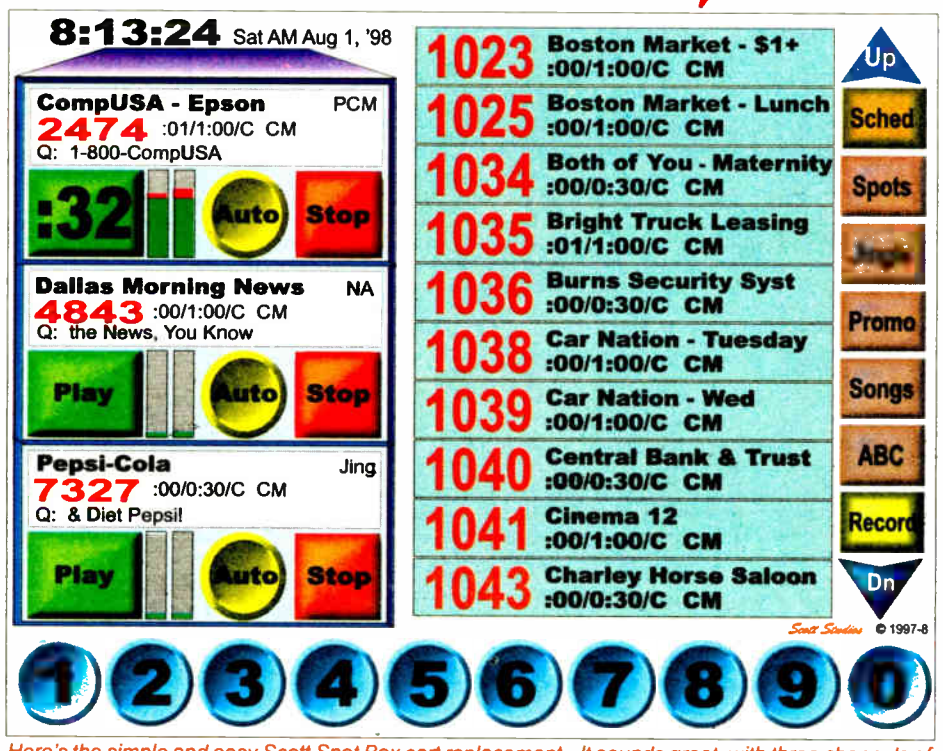
Spot Box is really easy to use. There's only the one screen, so jocks never get confused. Even though Scott Studios uses Windows 98, 95 or NT, Spot Box works like carts, *not* a computer.

If you use a paper log, load any cut quickly with the blue number keys at the bottom of the touchscreen, or type them in with a 10-key pad. Or, pick and play any recording by number or name from the scrolling "Wall of Carts" showing all your spots, promos and jingles in ABC or 123 order.

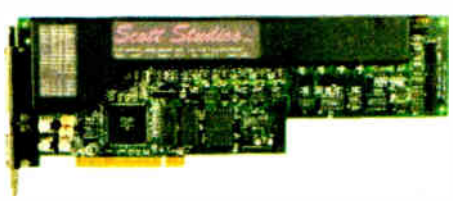
As an option, Spot Box can import logs from your traffic computer by diskette or Local Area Network.

You get detailed printouts showing exactly which spots played and when. With the traffic import option, you see at a glance the comparison of schedule and air times.

If you have several stations under one roof, record a spot only once. There's no limit to the number of Spot Boxes or hard drives you can connect by LAN for additional studios and redundancy. Every spot can be instantly played in every studios' Spot Box. Recordings can be locked so they only play on designated stations, days and times.

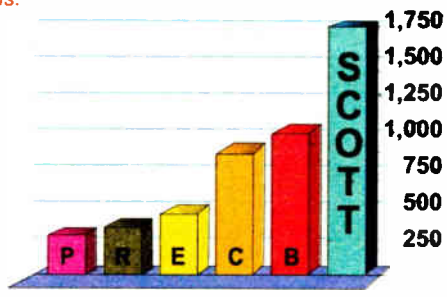


Here's the simple and easy Scott Spot Box cart replacement. It sounds great, with three channels of uncompressed digital audio on three console channels.



Scott's non-proprietary 32-bit audio card is superior to anything else: >90db signal-to-noise, ruler flat frequency response, and your choice of MPEG II, uncompressed or both, intermixed at all sample rates. Others use inferior 8- or 16-bit audio cards designed 5-10 years ago.

It's a fact: over 1,750 radio stations have 3,950 Scott digital workstations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more.



Scott Systems are best due to:

- the easiest user interface;
- uncompressed digital audio;
- 3 product lines--Good, Better & Best.

Scott Studios' digital audio is *affordable*. A triple-deck Spot Box Pentium recorder-player with touchscreen starts at $5,000!

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World Radio History

GM Journal

Radio World — Resource for Business, Programming & Sales — August 5, 1998

'Native America Calling' Page 28

RADIO ADVERTISER

The Perks of a Coffee Campaign

John Montone

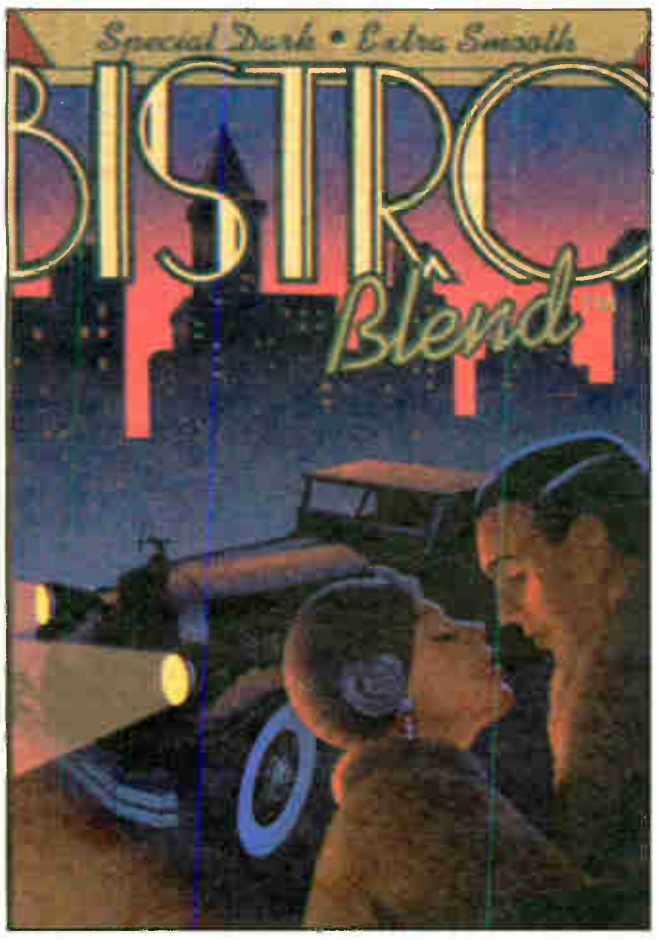
A man and woman meet on the riverbank. Their words convey love, but also danger. What are they doing?

Selling coffee, of course.

Outer Planet, a radio writing and production company based on Bainbridge Island, Wash., and the Seattle studio of Clatter and Din, recently collaborated an unusual and highly successful radio campaign for Seattle's Best Coffee.

Seattle's Best was introducing a new product called Bistro Blend. It had already come up with the packaging, a silhouetted couple standing on the waterfront, a surreptitious meeting with a film noir feel to it.

As soon as he saw that, Ken Bennett, the founder of Outer Planet, said he decided to stress the "intrigue and drama" of the coffee and he quickly hit on the idea of 1930s- and '40s-type radio series. He and sound designer Vince Werner from Clatter and Din began listening to old radio shows like The Shadow. Bennet said, "The dialogue and pacing and tempo were pretty evident," but recreating that sound was a challenge.



This visual inspired the radio campaign for Seattle's Best Coffee.

Bennett said as he listened to the tapes, he was "able to hear the dialogue very well and mimic it. It's kind of over the top, over-acted so I directed the actors to be melodramatic for a tongue-in-cheek effect."

Werner had to use his all-digital studio to reproduce the work of a Foley Artist.

A Foley Artist is the person who works in-studio to create sound effects on the air. He might stomp for footsteps or actually slam a door. So what Werner had to do to get this vintage radio theater sound was to "find just the right amount and flavor of good old fashioned analog distortion and tonal balance." He also had to "exercise restraint" in the use of sound effects. "Where there are virtually no limits on the precision with which effects can be manipulated to paint the picture," he said, "I needed to keep in mind that the effects used for these spots had to sound as though they were only what could be performed live in a '30s radio studio by a Foley Artist."

Werner was pleased with the effort. "The result," he said, "was a convincing piece of audio, but more importantly, a successful part of a well-integrated marketing effort."

The client also was pleased.

Charlie Severn, the retail marketing manager for Seattle's Best Coffee, said the spots created "quite a buzz" and boosted awareness of the new blend. Severn said, "The creative tied in with the product and the positioning we were

See COFFEE, page 30 ▶

BOTTOM LINE

Do You Have a Radio Business Plan of Action?

The Purchase of a Radio Station Is a Process That Demands Care, Planning ... and Money

Frank Montero

So you want to buy a radio station. You have the smarts and the experience. Perhaps you cut your teeth as a general manager with a larger group owner, or you earned your stripes as the top seller or program director with a station in town. Now you're ready to go at it on your own. You may even have a station in mind;

that one in the under-served market with weak ratings that has largely gone unnoticed, and you know you can turn it into a winner.

You have selected a winning format and you have connections with the local advertisers. Now all you need is the money. How do you convince the banks or the venture capital investors or your rich cousin (whom you haven't talked to in three years) that your idea will work? You need a plan — specifically, a business plan.

Almost all entrepreneurs who have been successful in obtaining early-stage and seed financing credit their success to one thing: presentation. Many start-up companies have great and often unique ideas. You may have a new format idea that will revolutionize the radio market or a new marketing scheme that will reach those ad dollars going to the local TV station and the town newspaper. You may have put together a great team with years of experience that will join you in making your idea a reality. However, only a company that is able to sell such ideas to prospective lenders and investors through its business plan will be able to raise money with any measure of success.

So what is a business plan? Basically, it is your pitch in writing. It is made up of, among other things, an executive summary of your idea (that is, the brief outline at the beginning) followed by the details of your business idea. It should include a description of the investment, that is the station you wish to acquire, how

See PLAN, page 34 ▶

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World Radio History

OFFBEAT RADIO

'Native America Calling' on the Web

Dee McVicker

That's not a drumbeat in the distance. It's the up-close and personal sound of Native American programming in RealAudio.

Radio has long had a foothold into rural Indian territory, but not until the Internet became widely available have programmers been able to reach the streets of Los Angeles, Chicago and San Francisco — where, according to some estimates, almost 60 percent of the Native American population now resides. The story is one mirrored elsewhere, as groups and organizations that have struggled to find more outlets for their programming via radio and other media discover the power of programming online.

"We had to find a way to reach those listeners who are not served by our current affiliate members," said Preston Thomas, the business development director for Native American Public Telecommunications, based in Lincoln, Neb.

NAPT is affiliated with American Indian Radio On Satellite (AIROS), which is a public programming network aimed at Native American public stations and funded by the Corporation for Public Broadcasting, among others. The network's programming is distributed by NPR satellite to more than 40 affiliate stations, most of which are in remote areas such as the Black Hills of South Dakota or the pueblos of New Mexico.

Late last year, AIROS signed on live at *www.nativetelecom.org* for those Native Americans who live off the reservation and in the cities and towns not covered by public Native American radio. The idea was to make AIROS programming such as "Native America Calling" — what some call the voice of the Indian Nation — available to everyone.

"Native America Calling," the AIROS flagship program that is produced at University of New Mexico station KUNM(FM) in Albuquerque, is the first known radio talk show for the Indian Country — a country that spreads as far east as it does west. AIROS estimates 15,000 to 20,000 listeners tune into the hour-long program each day to hear about topics ranging from dreams and gambling to gun control and whether to teach creationism or evolution in school.

"You talk about talk radio," remarked Harlan McKosato, the producer and host for the show, who has just returned to his desk after hosting a heated debate on California casinos, a topic important to the Indian people. Kevin Gover, assistant secretary for Indian Affairs, U.S. Department of the Interior, was a featured guest on the show.

"This is the first national show to deal with Native American issues. It's definitely a first," McKosato said.

Producer and host Harlan McKosato (right) interviews 1997 Elder of the Year Sheldon Katchatag.

Coming up on its third-year anniversary, "Native America Calling" needed more reach. Even by the most conservative estimates, less than half of the Indian Country population lives on reservations covered by public stations. "Native America Calling" and other shows like it were underserving the market.

AIROS acquired RealAudio encoding and a PC server, and went live on the Internet in October 1997. AIROS started by streaming audio live from "Native America Calling," with plans to do the same with the majority of its Native American programs, some of which are produced by AIROS and others which are produced by independent producers from a variety of tribal nations: Hopi, Inupiat, Navajo, Cherokee, Zuni. Shows to be presented live on the Internet are: "Native Sounds-Native Voices" featuring traditional and contemporary Native American music; "AlterNative Voices," which features music, news reports and information relevant to the Indian Nation; and "Oyate Ta Olowan" (Songs of the People), a show featuring a different Native American musician every week.

When AIROS began broadcasting on the Web, people started logging on, first a few at a time, and then at double the rate every month. In November 1997, AIROS recorded 167 hits a day to the site. By April, there were 2,012 hits to the site. Some were logging in from as far away

See OFFBEAT, page 41 ▶

Circle (162) On Reader Service Card

World Radio History

COLE'S LAW

Summer Season News Snippets

Harry Cole

Because everyone's attention span tends to shorten up some in the summer, we'll spare you any detailed analysis of things and instead provide "USA Today"-style snippets suitable for consumption at the beach or pool.

First, a couple of updates.

EEO

Several issues back, we wrote about the April decision by the U.S. Court of Appeals here in Washington, which found that the FCC's equal employment rules were unconstitutional. At that point, the Team Cole's Law Bureau of Constitutional Affairs thought that the court's decision on EEO was sound and was unlikely to be reversed on appeal. We still think that. However, in the meantime, the FCC has sought reconsideration from the court. As a technical matter, that means that the court's decision has not yet taken effect, and will not take effect until the reconsideration petition (and any further appeals) are disposed of.

That, in turn, means that the EEO rules are still on the books. As a result, all broadcasters should be sure to maintain all the various records of hirings, firings and promotions necessary to demonstrate compliance with the EEO rules. Additionally, as things now stand, it appears likely that the EEO rules will still be in effect in September, when the next Annual Employment Reports are due to be filed — which means that you will probably be expected to prepare and file those reports as always.

Pirates

Over the last year or so we have devoted a fair amount of ink to the question of pirates (or, as some prefer to be called, microbroadcasters). The FCC scored a big win in U.S. District Court in California in June, when a judge rejected various arguments concerning the authority (or lack thereof) of the FCC to require a license before a person can broadcast on the airwaves. This case — involving Stephen Dunifer, who used the handle "Free Radio Berkeley" — had been pending for some four years, and there had been some indications that the judge was leaning in favor of Mr. Dunifer. The pirate/micro community had hoped that the judge would endorse Dunifer's arguments and effectively validate the notion that low-power broadcasting is not subject to FCC regulation.

No such luck. The judge issued a ruling strongly in favor of the feds, finding that the FCC regulatory scheme is constitutional. As reported in **RW** last issue, Dunifer is appealing. But for the moment, the constitutional argument against the commission has been rejected.

With the Dunifer case in the bag, the FCC then proceeded to shut down another unlicensed station in Philadelphia in late June. And a judge in North Dakota permanently enjoined another unlicensed operator from continuing to operate his station.

Cole's Law operatives have heard that the head of the FCC's Compliance and Information Bureau (the enforcement folks) has a map showing all unlicensed operations known to the FCC, and that there may even be a schedule for shutting all of them down. If you are aware of an unlicensed operation which you believe should be shut down, you may want to advise the CIB. You should do it in writing, registered-return receipt requested, so that everyone will have a record that you put the word in.

Meanwhile, the FCC inquiry into the possible creation of a microbroadcasting service proceeds apace.

Despite the recent fines, don't look for any new challenge to FCC indecency standards.

Indecency

Perhaps it was just coincidence, but in the last two weeks of June, the commission issued three decisions fining licensees for the broadcast of indecency. Each of the three decisions raises interesting points.

One case involved a simple (maybe even sophomoric) gag — one announcer uses the word "crap," the second announcer assures the first that such use is permitted, the first announcer then says "crap" six times, and the second

See COLE, page 33 ▶

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World Radio History

Seattle Coffee Spots Clean Up

▶ COFFEE, continued from page 27

trying to get out to the consumer. We were trying to position it (Bistro Blend) as dark-roasted with a smooth aftertaste. Between the packaging and the radio spots it created romance."

The term "radio spots" generally is used to mean the same spot ran many times. But in this case there really were "radio spots," three of them.

Bennett stayed true to the old-time radio format by writing a three-act drama. In the first act, which ran for one week, he established the characters of the man and woman and their romantic yearnings, while interjecting a sense that something was terribly wrong. A car pulled up, thugs got out and hauled the man away. An announcer, in classic cliffhanger style, then told the listening audience to stay tuned for the second episode of Seattle's Best Coffee's Bistro Blend Theater. Naturally, within the drama there were several references to the product in the form of memories of that first meeting at a bistro sipping coffee.

ning entry was professionally produced and aired on both stations.

Finally, Act Three. It is revealed that the leading man was kidnapped by a master criminal named Mr. Big, who is looking for the secret to richer, darker, smoother coffee.

The punch line is that Mr. Big is too late. The coffee he dreams of making is already on the market.

Seattle's Best Coffee

In week two there was a new spot. With her secret lover gone, the woman is talking to an older man who predicts she will never see him again, that their entire relationship was a plot to rob her of her inheritance.

Even before the third act ran, there were many possible endings. That's because two of the six radio stations running the commercials tied into the campaign by airing a "Bistro Blend Thriller Contest." People listening to KMMT(AM) and KPLZ(FM) were invited to write their own conclusion to the radio drama. Many did, and the winSevern described the campaign and the response "fantastic."

"It's definitely a departure from the typical talking-head announcer campaign. We think that's why these spots stand out as impressively as they do."

Nothing like keeping your clients happy unless it's impressing your peers. Another Bennet and Werner collaboration for a Washington-based brewery called, "B.Y.O.B" won the prestigious $20,000 Radio Mercury Award in the Music and Sound Design category.

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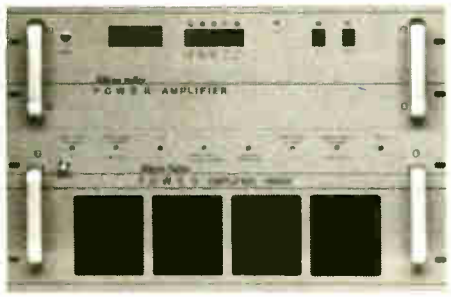

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World Radio History

Enforcement Costs Radio Stations

▶ COLE, continued from page 29

chimes in "just can't say s—t." That's it. The whole gag took, maybe, 15 seconds in all. The cost? Two thousand dollars, reduced from the original fine of $3,750. The fine went out to WYBB(FM), Folly Beach, S.C., the licensee of which is L.M. Communications of South Carolina Inc.

The second case, which was first sent out to the licensee last August but wasn't released to the general public until June, involved the one-time broadcast in 1996 of a song by Prince. To be sure, the song was "Erotic City," which features repeated use of the "F-" word and which had already been the subject of a 1990 FCC decision finding that the song was indecent. The cost? Seven thousand five hundred dollars. The station was KBZR(FM), Gilbert, Ariz.. The licensee is NPR Phoenix L.L.C.

Fees are due
to be paid between Sept. 14 and 18.

The third case involved various portions of several days' worth of Howard Stern material concerning various sexual matters, including references to bestiality. The price tag? Six thousand dollars. The fine went to station KKND(FM), Port Sulphur, La., whose licensee is Clear Channel Radio Licenses Inc.

We don't know whether the timing of these decisions is coincidental, or whether it indicates a return to indecency enforcement. In recent years, indecency questions had quieted down considerably, following an effective settlement between the commission and Stern's employer. The terms of that settlement seemed to let everyone save face and put the issue behind them, and the expectation on the part of many has been that the commission would not engage in any aggressive anti-indecency enforcement activities as long as broadcasters reined in their "outrageous" programming to some degree.

The recent decisions may be aberrations, but they certainly could raise concerns. After all, the first example (involving the one-time use of the word "s—t") can hardly be deemed a gross and excessive affront to most sensibilities. While the Prince song may be farther down the line in terms of the language used and the extent of repetition, it at least is a song by a respected and well-established popular artist whose material has long been in the mainstream.

Rightly or wrongly, 20 years ago the Supreme Court authorized the commission to regulate "indecency," but with the very strong admonition that any such regulation would have to focus on the "context" of the broadcast. In that case, involving the famous George Carlin "seven dirty words" monologue, the court seemed swayed by the fact that the broadcast featured rapid-fire repetition of the dirty words over a period of 10 to 15 minutes. That seems a far cry from the "context" of the most recent decisions by the FCC.

Still, in view of the relatively low amounts of the fines, don't look for any new challenge to FCC indecency standards. It will probably be cheaper for all the stations concerned simply to pay the fines as a cost of doing business and not bother to mount a years-long First Amendment challenge likely to cost in the six figures.

In other news, the commission is proposing to automate the process of changing call signs. Under the proposal, which is out for comment, licensees could reserve the call signs of their choice over the Internet. This could mark the beginning of online broadcast applications. While a number of practical aspects still have to be worked out, look for some form of online call sign reservations to be ready to roll by early to mid-1999.

Finally, not to dampen your spirits or anything, but in June the commission also announced its 1998 Regulatory Fee schedule. Fees are due to be paid between September 14 and 18 of this year (if you want to avoid a 25-percent late penalty). You should check with your communications counsel to figure out exactly how much you are supposed to send in, but rest assured that it will almost certainly be more than last year. In fact, the highest radio fee (for Class B, C, C1 and C2 stations serving more than 1,000,000 people) has doubled to $4,000. Since these fees are supposed to be "cost-based fees for services" which are limited to recovering "the costs of enforcement, policy and rulemaking," Team Cole's Law has a tad of difficulty comprehending exactly how a 100-percent increase in any fee can be justified, but we doubt that our slowness in that regard will change things between now and September.

If you have any questions about any of these items, you should be sure to contact your communications counsel.

■■■

Harry Cole is a principal in the Washington-based law firm of Bechtel & Cole, Chartered. He can be reached at (202) 833-4190 or on the Internet at coleslaw@erols.com

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World Radio History

Strategy Pitching: Ideas, Details

▶ PLAN, continued from page 27

much money you will need for the acquisition and for working capital to get your ideas in motion.

You should include an analysis of the market, a description of your management team and financial projections, with an explanation of why your ideas will make money and when. Lenders and investors want to know what their money will be used for, how long it will take you to "turn the corner" and start making money, and what are the risks. They may also want to know your "exit strategy." How do you plan to get out if things turn sour?

A business plan often is a company's first and only introduction to a potential investor. Likewise, the executive summary frequently is the only introduction to your business plan. Therefore, when preparing your plan, don't ignore the executive summary. It is the hook that catches the fish. As a result, a summary that is both sweet and short is critical to piquing interest. Typically, when preparing the executive summary, a company remembers to be short but sometimes forgets to be sweet. By giving a clear, concise description of the company's product or service, showing the company's target market, and highlighting the management team's accomplishments to date, a company can give a prospective lender or investor an opportunity to review the basics of the business plan.

Stewart Cahn, an investment banker with Cahn Capital Corp. in New York City, has considerable experience preparing and reviewing company business plans in the communications industry. He advises, "A good business plan should be correct and factual and not redundant. A book that is long and repetitive," he said, "turns off readers."

An executive summary also should include a description of the economic strength of the company's target market, show current and evolving consumer trends, and explain why the company's vision and structure is ideal for achieving its objectives better than the competition. Such a summary can sweeten the business plan for prospective investors.

Cahn said, "A good business plan memorandum should include full disclosure of all information, both good and bad. It should include a detailed listing of assumptions to the financial projections followed by sophisticated projections for a period of time to cover the full payment of debt from cash flow." Such disclosure and thoughtful analysis can encourage investors to delve into the detailed substance of the plan where the company describes the means through which it will get its product or service to market, explains how the company will spend the investors' money and how and when the investors will get their money back.

Know your audience

Due in large part to the strong U.S. economy and the exceptionally high returns that have been seen in the radio industry, the number of investors (institutional lenders, private individual investors and venture capital groups) have increased in recent years, and these investors appear more willing to back higher-risk broadcast ventures than was once the case in the radio industry.

Anyone who unsuccessfully tried to get a loan for a radio station acquisition in the early 1990s will attest to that. But how times have changed. Today, the issue is not whether there is money out there, but rather how to find it. As a result, a start-up company in search of financing must consider retaining an investment banking firm with a strong background in the radio industry to help raise the capital required, or do its own due diligence on fund sources. Companies should not simply cold-call banks and venture capital or other investment groups with a business plan. Instead, early-stage companies should begin by researching their regional funding networks and determining what kind of capital is available to companies with your profile.

Once the field is narrowed, a company must determine which funding sources best fit its priorities and goals. Use your connections and then get in your plane, train or automobile to meet with them directly. Let them see you, and at the same time you can see them. Never underestimate the power of the "smell test."

In much the same way that a good radio station's programming constantly evolves to keep up with the interests of its listeners, keep in mind that a good business plan is not a static document. Chances are you will not succeed the first time out of the box. However, use those early failures to your advantage. When a prospective lender or investor turns you down, don't just walk away disappointed. Find out what they thought of the plan. A business plan should evolve with feedback from each prospective lender or investor.

In fact, the company should ask everyone who reviews its business plan to discuss what they liked and disliked, regardless of whether they are going to invest, and make changes to the plan accordingly. On-going analysis, evaluation and revision of the business plan will likely improve a company's presentation throughout the process of raising early-stage capital and increase a company's chances of actually raising capital from its target investors.

In the end, the best advice is to not be too discouraged by the early failures, and don't be too inflexible. Be persistent, but also be open to criticism, and take that knowledge with you.

Meet Frank Montero

Frank Montero is a partner at the Washington communications firm of Fisher Wayland Cooper Leader and Zaragoza, where he specializes in representing broadcasting and telecommunications clients in the areas of FCC regulatory counseling, corporate finance, asset and securities acquisitions, and real estate and commercial transactions.

Frank Montero

He has represented radio and television broadcasters in connection with FCC regulatory compliance, license renewals and the negotiation of acquisition and financing agreements. Frank is co-chair of the Communications Bar Association's transactional practice committee, and a frequent speaker at NAB and state broadcaster conventions, including the NAB's license renewal seminar series. He began writing the column *Bottom Line* on radio station finance for **Radio World** in 1994. The column appeared in sister publication Tuned In from 1996 to 1998, and now returns to **RW**.

Frank was born and raised in Brooklyn, N.Y., where his parents still run Montero's Bar & Grill on the Brooklyn waterfront and where he once was a bartender. As to his experience, he said, "If you think the radio business is cutthroat, try working the night shift at a longshoreman's bar."

Frank received his Bachelor of Arts degree with Honors from the University of Michigan and his Juris Doctor degree from the George Washington University Law School. There, he served on the George Washington Law Review. It was in law school that Frank met his wife Patty. They live in Washington with their daughter Anita.

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World Radio History

ONLINE RADIO

Streaming Meemies on the Web

Choices Multiply for Streaming Your Signal and Other Material Over the Internet

Kim Komando

Microsoft Chairman Bill Gates recently speculated that some time between the next three to 10 years, the number of devices such as cameras connected to the Internet would be more prevalent than personal computers. He's probably right, but you don't have to wait to see the influence of broadcast media taking place on the Internet. A technology called "streaming media" is changing our broadcasting and our listener's Internet usage habits right now.

It's all in the name

As the name implies, streaming media flows onto your computer system as you are listening to it, much like you watch television programming. In other words, there's no wait for the media file to download, because you experience the media as it is transferred from the host or station site to your personal computer.

To take advantage of streaming media, listeners need a browser player plug-in — a program that translates the media into a format that is accessible using a browser. Player plug-ins are free to consumers. The software companies make their money by selling the development tools to the companies who stream the media.

There are different competing streaming media formats, and choosing the right one for your site is important. You want to service your listeners as well not be stuck with a Web site that because of some new technology, requires extensive redevelopment and programming.

The most popular streaming media format today is the RealSystem format (a.k.a., RealAudio format) from Real Networks (*www.real.com*). To experience RealSystem audio or video content, listeners first must download the RealPlayer browser plug-in, which is available on the company's Web site.

The current version is RealPlayer 5.0, but Real Networks is now testing RealPlayer G2 (as in second generation), which will offer some great new features. For example, RealPlayer G2 provides both a sound and a graphic equalizer so you can tweak sounds to your liking as well as adjust brightness, contrast, and hue.

There are different competing streaming media formats, and choosing the right one for your site is important.

If you want to see RealSystem media in action, visit The Daily Briefing (*www.dailybriefing.com*). This showcase site for RealSystem media provides news content from some 60 different sources including ABC News, Air Force Radio News, ESPN, FOX News and National Public Radio. Remember, before you can use the site, you need to download and install the RealPlayer browser plug-in.

Another increasingly popular streaming media format is VivoActive, from Vivo Software (*www.vivo.com*). This format also requires a special browser plug-in — in this case, VivoActive player — which is available for download on the company Web site.

The VivoActive format seems especially popular with Hollywood. The official Web sites for both "Titanic" (*www.titanicmovie.com*) and "Godzilla" (*www.godzilla.com*) use the VivoActive format to present movie clips to online viewers.

While it's not intended as an audio format or for displaying full-motion video, Macromedia's Flash (*www.macromedia.com*) is useful for streaming somewhat simple animations. The Flash file format is compact, meaning that Flash animations play fairly well even over slower modem connections, or those at 14.4 kbps.

Choices

To view Flash animations, you have two choices. You can download and install the Flash plug-in from the Macromedia Web site, or you can download the full Shockwave plug-in, which includes support for Flash, from the same site. There's not much point in downloading only the Flash plug-in when you can support for both Flash and Shockwave (a format for presenting Macromedia Director content online) in a single plug-in. Guaranteed, you will find the Shockwave plug-in valuable if you regularly surf the Web because many sites are using it.

There is also NetShow, Microsoft's entry in the field of streaming Internet content (*www.microsoft.com/ntserver/netshow/*). Microsoft designed NetShow as more of a development platform than anything else. By that, I mean that other companies can design enhancements for the core NetShow technology. For example, Real Networks and Vivo Software both make development tools for the NetShow environment.

NetShow has two shortcomings that I

See STREAMING, page 39 ▶

L.A. Jock Launches Into Success

Los Angeles radio personality Chris Leary chose an original way to celebrate the success of the nationally syndicated radio show "Fox Kids Countdown" when he allowed himself to be launched out of the World-Famous Thrill Sport Bungee Rocket Launcher Arch.

The host of the popular radio program was celebrating its 200th broadcast, which aired July 7. The "Top of the Hour Launcher" event was staged at the 106th Orange County Fair in Costa Mesa two days later.

Leary was propelled 100 feet in the air at 60 miles per hour at 3.5 Gs to zero gravity. The "Fox Kids Countdown" host is preparing for the show's TV debut this fall.

— Stephanie Muller

Chris Leary's launch as seen on TV.

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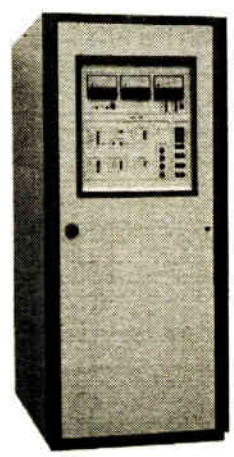

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▶ STREAMING, continued from page 38

think will keep it from becoming the streaming standard for home users. First and foremost, Microsoft Media Player, the software required to view NetShow content, runs only under Internet Explorer. While Internet Explorer continues to gain market share, NetShow still leaves the majority of Web surfers who use Netscape out in the cold. Sorry.

Also, at this writing, Media Player 5.2 (the current version) is only available for Windows 95, with UNIX and Mac versions promised. By providing a product that can only be used by Windows 95 users that also run Internet Explorer, Microsoft has severely limited the market for this otherwise impressive product. And if you choose NetShow as the streaming media standard for your site, so will you.

The thing to remember is that listeners don't really have much of a choice of which streaming technology they use. If you want to view a site that requires RealPlayer, you have to use RealPlayer. Likewise, if a site uses the VivoActive format, you're forced to use VivoActive Player. This is why Web surfers are likely to end up with a hard drive full of browser plug-ins to can handle every streaming media format out there. Talk about a hassle.

One possible alternative is offered by GEO Software through its Emblaze line of products (*www.emblaze.com*). Like the other companies mentioned here, GEO sells development tools that let Web content creators produce streaming Internet media. The difference is that all multimedia created with Emblaze Creator is Java-based. This means that as long as you have a Java-enabled Web browser (any one released in the last year or so) you don't have to worry about any plug-ins. All Emblaze multimedia plays as a Java applet within the browser window. This makes good sense.

Good old radio ...

Frankly, I doubt very seriously that streaming Internet media will ever replace the good old radio or television. It reminds me of when CB radios were hot, before the rush to purchase cellular phones. Considering I can tune a radio station or find a television program in about 30-seconds, it's not all that convenient to turn on your computer, log onto the Internet, locate the site, and find the programming desired. Furthermore, if Internet traffic is high, the program that you want to hear using the Web may have more snaps, crackles and pops than a bowl of cereal.

Streaming media will continue, however, to be an influence and a niche application for many years to come, offering important access solutions in certain situations. For example, the Internet can reach places that standard radio waves cannot — such as the heart of big office buildings located in congested downtown areas. Since many radio stations are beginning to Webcast, or broadcast over the Internet using streaming audio, people in these big buildings don't have to miss their favorite radio programming.

■■■

Copyright 1998, The Komando Corporation. All rights reserved. Kim Komando is a national talk radio host, TV host, Los Angeles Times Syndicated Columnist and the computer editor for "Popular Mechanics." Reach her via her Web page at www.komando.com

You Read It Here

Five Years Ago

Well, it's been about three months at the new gig in Harrisburg, and I sure am being kept busy.

Between games with the WINK Wackos volleyball team, softball squad and occasional forays onto the lanes with the WINK bowling team, not to mention my activities with music and local theater in the Capitol City, I sometimes force myself to bang out a dub or two during the day. ...

Actually, I used the time to generate a fiendish document, one shamelessly packed full of demented lies, flowery embellishments, arrogant half-truths and just plain old cow flop. I updated my résumé.

Alan R. Peterson
(Now RW Technical Editor)
"The Long and Winding Road to Harrisburg, Pa."
Aug. 25, 1993

Ten Years Ago

Six broadcast organizations have written to the FCC about what they see as the commission's relaxed attitude toward interference. The groups pleaded that it address the "trend" permitting "mounting interference and other forms of technical degradation to the public's over-the-air broadcast service."

News Item
Sept. 1, 1988

Fifteen Years Ago

Approximately 60 stations using the Harris AM stereo exciter were forced to switch back to monaural broadcasting when the FCC ordered that the marketing and use of the STX-1 exciter cease by Sept. 1, 1983. The directive came after the Office of Science and Technology determined that the STX-1 differed from the exciter described in Harris' application for type acceptance.

News Item
Sept. 15, 1983

World Radio History

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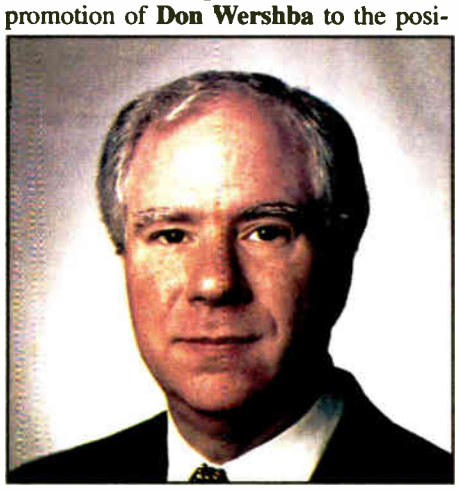
See Us At The ABG Southeast Expo

SSL Promotes Wershba

Solid State Logic has announced the promotion of **Don Wershba** to the position of vice president of music, Eastern region.



Don Wershba

Wershba's new responsibilities include expanding the company's leadership position in the music recording market, with a specific focus on SSL's premier analogue consoles and the new Axion-MT all-digital mixing system.

Wershba has been with SSL since 1991. He is based at the company's New York office.

Chancellor Appoints Karnedy

D. Scott Karnedy has been named to the newly created **Chancellor Media Corp.** position of vice president/director of sales and marketing for New York.

Karnedy is now responsible for developing value-added sales and marketing programs for local and national advertisers across Chancellor's portfolio of five New York FM stations, including WLTW(FM) , WKTU(FM), WHTZ(FM), WAXQ(FM), AND WBIX(FM).

Karnedy previously served as vice president/national sales manager with Knight Quality Stations.

Chancellor Media owns and operates 108 radio stations in 22 of the nation's largest markets with stations in each of the nations top-ten markets.

Maki Named to VP/GM Position

Emmis Broadcasting Corporation has named **Val Maki** as vice president and general manager of KPWR(FM), Power 106 in Los Angeles.

Val Maki

Maki, who previously served as vice president and general sales manager of WKQX(FM) in Chicago, replaces Marie Kordus, who was recently named director of sales for the new Emmis Television Division..

International Datacasting Hires Foster

C.J. Foster has stepped in to a new position at **International Datacasting Corp.** as sales manager. Foster is now responsible for all U.S. Sales west of the Mississippi.

Foster is now based in Phoenix and previously served as a sales representative of DVB products with Radyne Corp.

International Datacasting is a Canada-based corporation specializing in the design, manufacture, installation and support of advanced products for the satellite broadcasting industry.

Pucher Promoted at DMX

Martin Pucher has a new title at **DMX** — he has been promoted to senior vice president in charge of technology, including network operations, information/communication services and DMX engineering.

DMX, a subsidiary of TCI Music, Inc., programs, markets and distributes worldwide its digital music service, Digital Music Express.

Lambert Joins Otari

Radio industry veteran **Mel Lambert** has been appointed to the staff at **Otari Corporation of America**. Lambert will serve in the newly created position of international marketing director.

Lambert will be responsible for directing

See SOUNDWAVES, page 41 ▶

THE NAB RADIO SHOW
October 14-17
Seattle, Washington
1998

RW

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Fax this completed form to 202.429.5343

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Country Email Phone Fax

World Radio History

Voice of The Indian Nation

▶ OFFBEAT, continued from page 28

as Norway, Australia, England, Italy, Oman and Switzerland.

The site's success was a vision realized by many at NAPT, which, a decade earlier, had seen the usefulness of uniting a diverse, scattered group of people through an electronic bulletin board service. The BBS planted the seed for the AIROS Web site.

Growing communications

AIROS plans to grow Web communications as technology permits. Currently, the biggest challenge facing it is a common one: with its Web site such a big hit, the bottleneck is access. The local Internet Service Provider has started to overload under the weight of too many people logging onto the site. The immediate solution will be to install more T1 lines, either at a station-sponsored ISP or the local ISP. For the future, AIROS, like other Webcasters, is counting on multicasting to alleviate congestion.

Thomas, for one, is holding out hope that someday soon the Internet will use multicasting to deliver sound clips.

Multicasting sends a single data stream, which is forwarded to each person, and therefore the data file is sent only once from the server. Compared to the unicasting system done on the Internet now, which sends a single data stream for each person accessing the server, multicasting will go a long way to solve the bandwidth problems typical of live, online access programming.

Meanwhile, AIROS is striking out into new territory regulation-wise. Because the Internet is not dictated by the same rules as the broadcast bands, for example, AIROS is considering Webcasting commercials between live data streams of shows. But because some affiliate stations will be taking the AIROS feed directly off the Web site and feeding it through the station board, there's some uncertainty as to whether or not the Web site now falls under the jurisdiction of the FCC and thus, the rules of the commission.

All of the above hardly diminishes Thomas' enthusiasm for what's just over the horizon.

He sees the Web as an important new frontier for the Indian Nation, with boundless opportunities for on-demand Webcasts of archived shows, Webcasting live from conferences or government hearings, and live audio streams from AIROS affiliates with their own programs to distribute.

■ ■ ■

Dee McVicker is a regular contributor to Radio World. She can be reached at (602) 545-7363 or via e-mail at roots@primenet.com

▶ SOUNDWAVES, continued from page 40

all marketing activities for Otari's worldwide subsidiaries, as well as determining new product opportunities and direction.

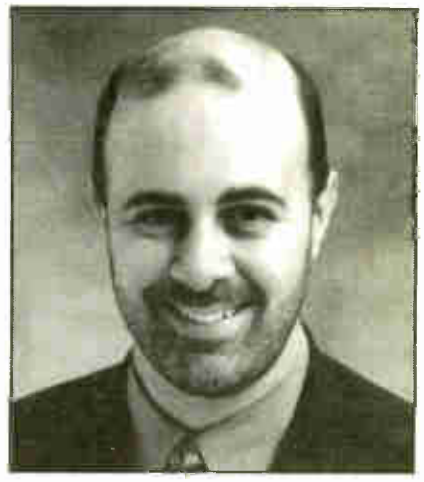
Arbitron Taps Verdino

Greg Verdino has been appointed to vice president and general manager, Internet information services, **Arbitron NewMedia**.

In this newly created position, Verdino is responsible for establishing new information services for media and marketing companies that are using the Internet as a tool for marketing and commerce.

Verdino previously worked at Blau Marketing Technologies, a subsidiary of Snyder Communications as vice president and media director.

Arbitron is an international media and marketing research firm serving broadcasters, advertisers and advertising agencies in the United States and Europe.



Greg Verdino

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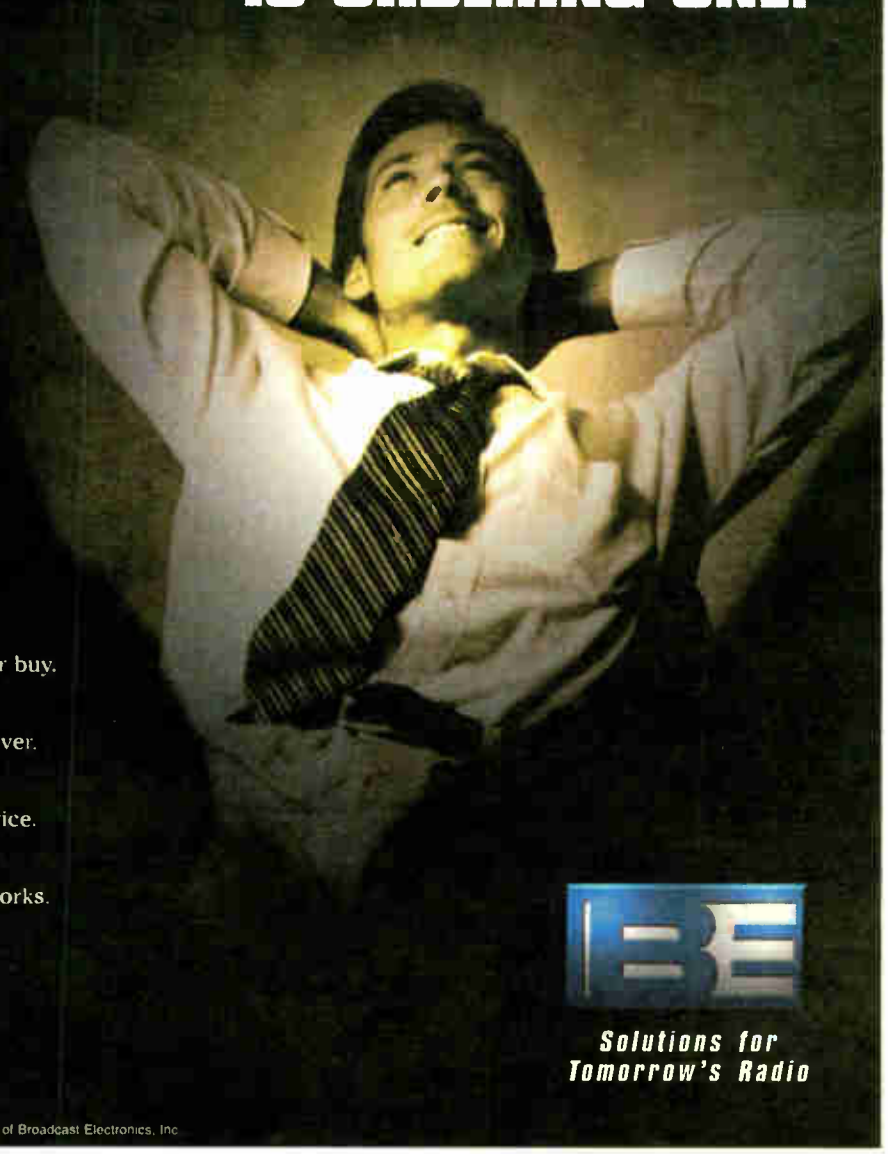

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World Radio History

Studio Sessions

ISDN Trials and Tribulations
See Page 45

PRODUCT EVALUATION

Audix Monitors Used in Webcast

Alan R. Peterson

Back in March, we had the opportunity to check out a set of Audix PH-15 Power House self-powered monitors here in our editorial offices.

Normally, products such as these are sent along to professional studios and recording facilities for review in these pages. But because one of the suggested uses for the PH-15 monitors was multimedia production on computers, we decided to put the speakers to work right here to help create our "**RW Online**" audio Webcast (in conjunction with Telos Systems) for the Las Vegas NAB show this past April.

The project was documented in the May 13 **RW** ("Roll the Tape and Hold the Mayo," page 78), so a recap of the events is unnecessary. This time, the Audix PH-15 monitors are the stars of the show; specifically, the Audix PH-15-VS, designating a vented and shielded enclosure.

The PH-15 monitors are part of a product line intended for use in small studios, post-production, personal recording and desktop computer production. These speakers can be used as nearfield or midfield monitors in radio production and air studios.

Audix PH-15 Power House Monitors

The speaker cabinets are a black-finished wood composite material. A polymer tweeter and 5-inch rubber-surround woofer are mounted on the face of the cabinet. A half-inch-tall bass port runs along the entire bottom edge. For a decidedly serious high-tech look, the fabric grille can be detached, exposing the speakers and composite surface of the cabinet.

The PH-15 monitors come as an "A" and "B" set. The "A" speaker contains the power supply, amplifier and volume pot. Two RCA jacks handle the input to the "A" speaker and a quarter-inch phone jack connects the passive "B" speaker to the stereo amplifier. It is likely the volume pot will be set only once on the initial room tune-up, then forgotten. Most level adjustments will be done from the monitor level pot on the console.

Magnetic shielding is a necessity, as a speaker magnet placed too close to a computer CRT can warp or otherwise distort the image on the screen. The shielding on the PH-15 monitors worked fine. No induced hum was picked up in the monitors from the CRT either.

No wall warts to be found here. Full-strength AC power drives the PH-15 on a standard IEC three-prong cord into a safety fused socket. Because the entire computer industry uses these power cords, replacements can be obtained nearly anywhere.

Why a set of RCA jacks to feed the speakers? Professional broadcast studio monitors normally have screw terminal strips or 5-way banana posts on the back.

One would see this as a rather tinker-toy approach for a studio speaker, until it is remembered that these speakers are intended for smaller studios and multimedia use. These venues are likely to use a "small" mixer, most of which are equipped with RCA Tape Out jacks that can feed the PH-15 speakers. And for better or worse, soundcards in all price ranges have eighth-inch I/O jacks and stereo mini-to-RCA plug cables also can be found nearly anywhere. It is not what we are used to in broadcast studios, but given today's hardware, it makes sense.

In the room

You may remember from the May 13 article that our studio was actually a

See AUDIX, page 46 ▶

PRODUCT EVALUATION

Meek Name Lives on In Mic Compressor

Flip Michaels

"If it sounds right, it is right," said British audio producer-pioneer Robert George "Joe" Meek back in 1964. Some 35 years later, Meek's name has come to represent a vintage standard of fat, rich, full sound to popular artists like Robert Plant, The Rolling Stones, Rod Stewart and Brian May.

Tragically, Meek's professional success was followed by self-destruction, as he took his own life after murdering his landlord in 1967.

Ted Fletcher, a former colleague of Meek, has preserved the Joe Meek sound and has made it available to professionals on this side of the mighty Atlantic with a series of high-quality "JoeMeek" audio components in bright green rackmount cases. For us radio production types, the VC3 Pro Channel is one such product worthy of a look.

Photo by Alan R. Peterson

JoeMeek VC3 Pro Channel: A lot of 'squeeze' in a little green box.

Meek developed this experimental technique while producing acts like The Blue Men, Ford & The Checkmates, and The Tornados — the group that topped the Billboard charts in 1962 with its single, "Telstar."

The VC3 combines three separate types of equipment into a one-half rack-width package: a mic preamplifier, an

See MEEK, page 47 ▶

Costly Standards, Galaxy Gags

Should International Digital Standards, Administered by World Bodies, Be Made Available Without Cost?

Rich Rarey

Apologies right up front for not accounting for our absence earlier, but we have been very distracted lately, training the newest addition to the Public Domain editorial staff.

Adam Burton Rarey joined our operation April 4, and we have been simply beaming ever since. Adam arrived at 7 pounds, 14 ounces, and has become the most robust member of the staff, nearly doubling his weight in the successive months. Still, he manages to look handsome with that weight gain. We offer a peek at his progress at *www.serve.com/thompsonrarey*

PUBLIC DOMAIN

Oh yeah?

We read with interest an e-mail from one John Cone. Cone took issue with the position stated here that international standards, as administered by world bodies, should be available without cost.

Our complaint was that it seemed impossible to decipher the bit structure of ISO MPEG Layer II data without spending over $100 for a copy of ISO 11172-3, known as "Coding of Moving Pictures and Associated Audio for Digital Storage Media at Up to About 1,5 Mbit/s — Part 3: Audio [1993-08]."

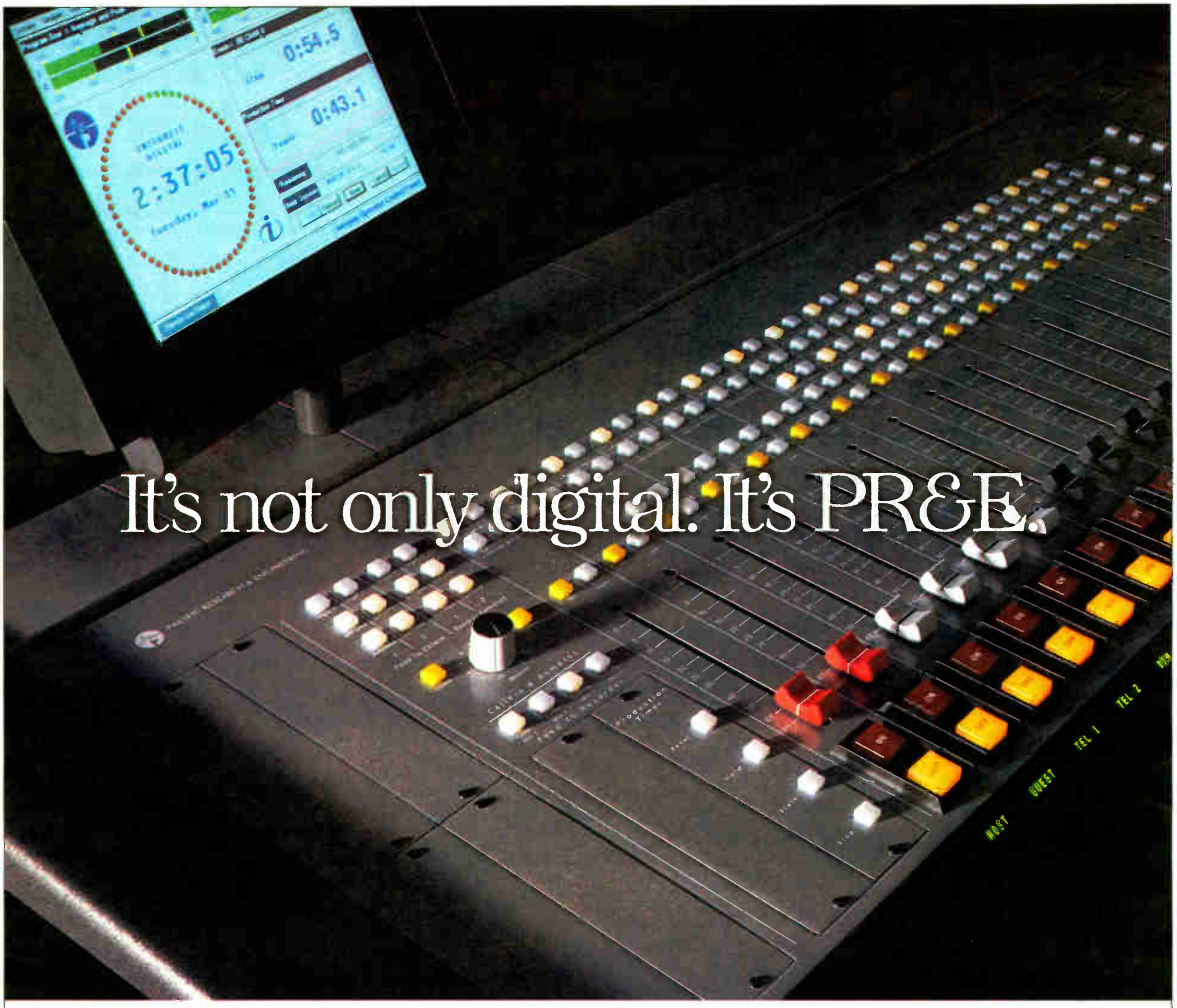
Cone administered a gentle admonition for our "flame" (funny, it didn't feel like a flame).

"Yes," he said, "standards cost an arm and a leg, if you are pricing them by the page. The price of the standard, however, covers part of the price of our country's admission to the whole standardization process."

Quoting the Introduction to ANSI/American National Standards

See DOMAIN, page 46 ▶

World Radio History



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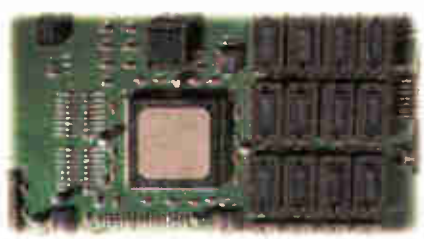
The LCD displays audio levels, time-of-day clocks, session status and event timers with a Windows® interface to powerful configuration management and session-based features.

Integrity's difference is more than just digital. It also offers four special-purpose buses to provide automated mix-minus for telephone and remote feeds, each with IFB.



Integrity uses an array of state-of-the-art floating-point digital signal processors to perform its mixing, routing and other functions.

Each fader has a 10-character alphanumeric display. The display changes when another audio source is assigned, which can happen either manually or at a preassigned time.

PACIFIC RESEARCH & ENGINEERING

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PRODUCER'S FILE

Blood on the Lines: An ISDN Story

Ty Ford

ISDN, some will quip, stands for "I Still Don't Know," a dig targeted at local phone companies and their record for not always getting it right the first time. In my experience, the description still fits.

You can contract with some companies to handle the setup for you, but if you are determined to do it yourself, the following may be helpful.

I had two reasons for switching to ISDN: faster Internet access and audio connectivity to recording studios, radio and TV stations for whom I provide voice tracks and audio production. That meant getting an ISDN modem for the computer and a codec for the audio.

Pony up the cash

Even before the challenges of ISDN, you must first decide which codec to buy or lease. The $4,000 or $5,000 or more purchase price for each box is significant, and remember, you need one on each end of the phone line.

The broadcast community leans toward MPEG-based codecs. The production studio community prefers APT-based codecs. The divide is breaking down, however, as the two exclusive communities find reasons to do business with each other.

DolbyFax is yet another exclusive standard, mostly used by film studios on the west coast. If you have one flavor of MPEG codec, you will most likely be able to connect to another MPEG-based box, but you cannot connect directly to the APT or Dolby boxes.

EdNET offers bridging services, but that gets expensive. You call the bridge, it receives your audio, then squirts it over to the other codec and connects with the other site.

Although it has been suggested that cross-compatibility across MPEG and APT codecs (the two most prevalent platforms) would open up the marketplace — resulting in a boom for codec manufacturers and ISDN service — the owners of the patents have yet to see the big picture.

As they continue to "tough it out," they expose their flanks to companies like Lucent Technology. Its PAC algorithm and deep pockets may possibly help it own the ISDN codec marketplace by coming in with a good-sounding $2,000 to $2,500 solution that could turn today's codecs into door stops.

The big "if" in that scenario is whether or not the 96 kbps algorithm currently used in the PAC algorithm would need to survive further cascading algorithms, or whether a less-compressed version would need to be created.

ISDN 101

The two bearer channels that comprise a standard ISDN line can be configured to handle voice and/or data. Last time I checked, ISDN telephones were still a bit pricey, but a lot of ISDN modems and codecs come with analog phone jacks, allowing you to plug in and use regular phones and fax machines on either ISDN bearer channel.

The ISDN rates offered by Bell Atlantic are a pretty good deal; my plan, which costs $40 per month, provides an hour of one bearer channel (or 30 minutes of two bearer channel use per month). Over that time period the rate is one cent per minute per bearer channel. Having two phone lines for less than you would pay for two analog lines (plus the ISDN capability) is good bang for the buck.

ISDN modems do not have fax capability yet, so I use my analog fax modem connected to one of the analog ports of my ISDN modem. Now when I want to connect with my Internet service provider, my ISDN modem makes a data connection.

Pushing my voice through a codec and down the ISDN line is also a data connection, because the codec turns my voice into data.

If you are planing on using the ISDN line for Internet connectivity, contact your ISP. You may find, as I did, that while your ISP offers ISDN connectivity, it does so with one bearer channel instead of two. That means connecting at 56 or maybe 64 kbps instead of a full 128 kbps.

For e-mail and surfing, 56k is fine, but if you're planning on sending audio or video clips, 128k is a minimum.

Your friendly phone company

The local phone company is next. It took me three calls, a series of frustrating navigations through phone mail and long on-hold times to reach an ISDN representative.

I explained that I needed a line provisioned to handle voice and data on both bearer channels, and that the codec I would be using would be mux'ing (multiplexing) the two bearer channels together to carry one stream of audio as data. I also explained that I would be connecting my "not quite 56k" analog modem through one of the ISDN computer modem analog ports so that I could continue to send and receive faxes.

I was told that could be done with the "S1" connectivity package. I did not have an ISDN modem at the time and the price for the 3Com Impact IQ modem sold by the phone company was good, so I asked that to be sent to me. I was given a date about three weeks away for installation.

Three days before that date I received a call from the local carrier confirming my service would be available two weeks after the original quote. I asked her to look into it and on a subsequent call was told that they had discovered that I needed a repeater installed somewhere between the central office and my house.

I also asked when I would receive the ISDN computer modem. The representative said there was no modem on the order. During that time I also received two unrequested CDs from the local carrier containing connectivity software to their ISP service. I tossed the first one, but noticed that I had been charged a shipping fee on the second one that would be added to my phone bill.

After another chat with the ISDN office, preceded by a long wait on hold, the charges were removed.

I had chosen to convert my existing fax/data line to ISDN. The local carrier warned that I might be without service for up to 48 hours during the changeover. The first day, nothing worked. Some said they saw no work orders for the line. Others said work had begun, but had not been completed.

On the middle of the second day, the phone technician came into the house and tested the jacks. I now had connectivity, but the ISDN modem was still not connecting. The configuration screens looked right. During a call to the modem support line, we tried the "power-down/power-up" trick, which reset the modem. I had 56K connectivity to my ISP.

Codec connectivity brought more challenges. I could only get one line up and no long distance. After many frustrating attempts I called CCS/MUSICAM technical advisor Sam Agin.

He has been through the ISDN wringer many times. It turned out that the S1 capability package I had been given was for voice on *one* channel and data on the *other*. What I explained to the ISDN office was I needed voice and data on both. That was an "R" capability package.

Agin also referred me to several setup pages in the MUSICAM manual that are designed to be faxed to the ISDN carriers. When I called the ISDN center to fax these pages to their technicians, I was told they did not need them. I convinced the operator that he should go check with them.

The operator came back and said the techs would very much like to see the documentation. I faxed it and the next day I could connect locally ... but could not make long-distance connections.

Agin, again

Another call to Agin sent me on a round of calls to MCI, Sprint and AT&T. He said they were the only long-distance carriers that could do reliable ISDN long distance. Sprint offered a $15/month charge and 24 cents a minute per bearer channel. AT&T offered no monthly charge at 35 cents a minute per bearer channel.

Based on my immediate needs (and stock holdings), I went with AT&T. Those last calls were on a Friday.

The following Monday I rang up an associate in Boston and began working with the MUSICAM Roadrunner. But I'll save that story for next time.

■■■

For more on getting the most out of your ISDN service, see the Guest Commentary on page 21.

Ty Ford's commercial and narration demos are available at www.jagunet.com/~tford *where you will also find an upgraded list of preamp reviews, production music and SFX library companies.*

The PAC algorithm may help

Lucent produce a solution that could turn today's codecs into door stops.

Hello? Hello?

Greg Lukens at Washington Professional Systems tells an interesting ISDN tale.

It seemed the company kept losing their ISDN line. After numerous outages, they found local telephone company linespeople had been searching for unused pairs by listening for dial tone.

Their rationale: If there was no dial tone, it must be an open pair, right?

Bzzzt! Wrong! ISDN does not have a dial tone. That's progress for you.

— Ty Ford

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PROBLEM: How to get the competitive edge and maintain your format's quality sound in an ever-consolidating radio market.

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World Radio History

Standards Available for a Price

▶ DOMAIN, continued from page 43

Institute pages on the ANSI Web site, *web.ansi.org/public/about.html*, Cone wrote to us, "ANSI is a private, nonprofit membership organization supported by a diverse constituency of private and public sector organizations."

Feeling a little ANSI

He continued, "It is not a government agency, although some government agencies are members. Their support comes from membership fees, and sales of standards. One of the major sources of income for country standards organizations — ANSI in the USA, BSI in the UK, DIN in Germany, AFNOR in France and OeN in Austria — is the sale of standards. That is what keeps the organizations alive, so they can organize creation and revision of country standards and participation in standardization at the international level."

Cone went on to say that ANSI does not itself develop American National Standards, or ANSs, but rather it facilitates development by establishing consensus among qualified groups. This includes obvious high-level organizational activities. It also gets down to the money-consuming nitty-gritty, like designating and recording delegates to standards organizations, keeping official minutes of meetings, distribution of the minutes, registry and distribution of official working documents, conduct of voting processes for acceptance of new standards, and publication of standards.

Even for international standardization activities, many of the practical details are delegated to country standards organizations, rather than handled directly by ISO/IEC.

"Because all of the country standards organizations depend on sale of standards for support," Cone said, "they are mutually quite protective of their copyrights. You won't find official or unofficial copies of very many national and international standards posted on the Net, because one posted copy would kill all the sales of that standard in every country where that language is used."

To back up his point, John offered us this clincher: "For what it's worth, I did write an international standard. I was editor of ISO 9241 Part 7 for most of its development and was a part of an ANSI working group as well. Even the people who write a standard do not get free copies when it is officially published."

We searched the online ANSI catalog for John's work and found it was titled "Ergonomic Requirements for Office Work With Visual Display Terminals (VDTs) — Part 7: Requirements for Display With Reflections."

The price? $72.

Bird humor

On the lighter side of the Galaxy IV failure, Chief Engineer Bill Fawcett of WMRA(FM), Harrisonburg, Va., distributed a PanAmSat "Theme Song Contest" on the PubRadio listserver shortly after the failure.

The idea was to submit song titles appropriate or thematic to the satellite failure. Entries were received from the entire public radio system. As it turned out, a few were contributed by Al Peterson of **RW** as well.

Included on the list was "Telstar" (Tornados), "Wipe Out" (Surfaris), "This Could Be the Last Time" (Rolling Stones), "Not Fade Away" (Buddy Holly), "I'll Tumble For Ya" (Culture Club), "No Reply" (Beatles), "Bits & Pieces" (Dave Clark 5), "Breakin'" (Ollie & Jerry) and "Make Me Lose Control" (Eric Carmen), among a healthy number of others.

More? Okay, there was "Recovering the Satellite" (Counting Crows), "Sleeping Satellite" (Tasmin Archer), "Bye Bye Birdie" (Broadway soundtrack), "Come Down" (Bush), "You Spin Me 'Round Like a Record" (Dead Or Alive), "Straighten Up and Fly Right" (Nat King Cole) and "I Know You're Out There Somewhere" (Moody Blues).

Bill had promised that a winner of the contest would be named on May 27, but as he told us recently, "I couldn't get anyone's attention to judge the entries." Apparently, the winner remains undecided.

Smile for the camera

Thinking that there would be a ton of activity around the system, we solicited images from public radio stations, illustrating their activities during the outage. The response was immediate.

To showcase these efforts, we created a Web photo gallery within the NPR "Engineering Update" site *EUonline*. The gallery will remain open to the public for the remainder of the summer. Some images we received, were, shall we say, unexpected. Do see for yourself at *www.npr.org/euonline/*

Until next month, I remain,

Your ob'n't eng'r.

■■■

Rich Rarey is technical director for the NPR program "Talk of the Nation." He can be reached at rrarey@npr.org

Special kudos go to

nine individuals for their work after Galaxy IV failed. Many others will go unsung.

Satellite Heroes

It has been widely reported, in this newspaper and elsewhere, about a certain satellite failure that caused certain problems for public radio stations. In debriefing meetings (held standing up, in the hallways) a special acknowledgment seemed in order for individuals in our industry who made it possible for public radio to stay connected.

The list we came up with, in alphabetical order, includes: Phil Avner, AP Radio; Jeffery Blair, PBS; Bob Donnelly, ABC; Eric Hoehn, WETA-FM; Peter Chin, Chuck Jutras, Mike Danschyshyn, and John Hollinger, CBC; and Ralph Scheutz, PBS.

Many, many other engineers and managers worked very hard during the outage to get public radio programs to the listeners.

To all those otherwise unsung heroes, the folks behind the scenes at *Public Domain* say a big "thank you."

In Session With Audix PH-15s

▶ AUDIX, continued from page 43

converted lunchroom annex. The lack of acoustic treatment on the walls was sure to affect the overall mix.

Hearing it right

Producing Internet audio is a lot like producing a radio commercial, inasmuch as accurate monitoring is a necessity no matter the environment where the project was actually authored. Without the time to properly tune the room and tack up some absorption material, we just had to depend on the nearfield performance of the Audix monitors to come through for us.

And come through they did, even inside our ersatz studio. The short throw of the woofer and shallow cabinet volume could not move huge volumes of air, and in so doing, limiting the monitor's bass response. Still, the low frequencies coming from the ported cabinets provided plenty of up-close beef for the mix. No problems with the mids or highs, either. All recorded speech was clear and punchy.

Like lots of radio production folks, we love laser zaps and audio punctuators too, and our project contained lots of them. The Audix PH-15 monitors never clipped or fizzled when encountering them.

The specifications show the Audix PH-15 monitors can handle a maximum power output of 45 W per channel, and can reproduce 55 Hz to 18 kHz, ± 3 dB. The robust 45 W power rating filled the lunchroom with sound when it came time to play back the works-in-progress to management.

Speakers in slumberland

The PH-15 shifts into a Sleep mode after detecting no audio on the inputs for several minutes, turning the green LED power indicator red. If you are not used to this, you might think your speakers died on you ... or at least got bored from the lack of activity.

When the sleeping PH-15s sense incoming audio, the speakers come back on with a soft "thump." Many larger amplifiers and powered monitors have non-thumping power-ups when turned on, so this might surprise you if, again, you are not used to this.

The combined weight of both speaker enclosures is 18 pounds, most of which comes from a compact but hefty toroidal power transformer inside the "A" speaker. The amplifier circuit card is mounted so the back panel functions as a heat sink, and all heat-generating components are generously greased with silicone for effective heat transfer.

Thermal-sensing components are securely mounted between the power transistors on the back plate. Because nearfield monitors are run at relatively low levels with respect to their larger counterparts, thermal runaway is not a great concern. But Audix thought it important enough to put in there, so enjoy it; you may someday be happy it is there.

Springback jack

I was quite pleased with the performance of the PH-15s in our humble little room. The only snag I encountered was a loose quarter-inch jack connection on the passive "B" speaker, which caused an intermittent connection on that one channel. This was easily remedied by me by bending the spring metal contact inside the jack to hold the tip of the plug more securely — a lot easier than sending the whole package back to Audix.

Whether you are producing an Internet audio project or a spot for actual on-air play, it is impossible to predict what kind of system is going to be in use at the receiving end. Accurate monitoring of your work is essential. The Audix PH-15 Power House monitors are clean and capable. These are good monitors for mixing speech with music and effects. Users in smaller studios may appreciate the compactness and the power offered by the Audix PH-15 monitors, especially radio users creating audio content for a station Web site.

■■■

For information, contact Audix Corporation in Oregon at (503) 682-6933 or circle ***Reader Service 88.***

Special thanks to ***RW****'s sister publication* ***Pro Audio Review*** *for help in procuring the Audix PH-15 units used for review.*

World Radio History

Meek Makes Mark With Mics

▶ MEEK, continued from page 45

opto-isolated compressor and an enhancer.

The mic preamp is used simply to increase the mic gain. The VC3 does this with ease while lowering noise and distortion. What has always been my concern using mic preamps has been the level of hiss that seems to creep in and take over the microphone.

I decided to hook-up my Neumann U 87 for the test, knowing that this model is a hypersensitive, great-sounding studio mic.

After setting up the processing chain, the sound from the mic actually had less noise than normal. That in itself is such great news, I will say it again: *The sound from the mic actually had less noise than normal.*

Which leads me to the compressor. Every production pro wants to add a little punch to their voice-overs. The JoeMeek VC3 Pro Channel hits high marks there too.

Say your studio is equipped with nearly everything digital. You are struggling to find a means to create some kind of warm'60s- or '70s-era compressor sound. You might be able to pull it off with some esoteric software plug-in, but instead, try out the JoeMeek.

The compressor in the Pro Channel is unique, as it is a re-creation of an early photoelectric compressor in use from the mid-1960s. It pulls voices forward, controls recording levels, helps with internal mix balance and adds presence.

For compression control, set the ratio up with the Compression knob, then decide whether you would like to use fast or slow mode compression. For this there is the "Attack F/S" control. By the way, there is a Bypass switch for this feature on the front of the unit.

Pushing in the F/S button gives you the fastest attack, which is ideal for instrument compression, such as on drums. In my test drive, I found that the slower attack gave my voice a less-obvious compressed sound, keeping it both fat and warm.

Please release me

Next is to set the Release time, during which the path gain returns to normal after compression. The longer the release time, the less it will sound like you are using compression.

The salt of this unit is the enhancer, or exciter. When cooking with salt, you could ruin a meal by overusing the stuff. The same applies with the VC3. Add just the right amount of enhancement and mmm, what a sound. Bright and clear.

The enhancer works by skimming the higher frequencies out of the sound, compressing and dynamically altering them, then mixing them back with the original signal. The Drive knob controls the source of the enhancement signal, while the Enhance control sets the amount of skimmed highs that gets mixed back into the main signal path. "Q" is an extra control feature which will give you a little resonant-enhanced effect, if desired.

Hooking up the unit required only locating my studio mic cords and a wall outlet.

The other side

The back panel of the VC 3 includes two quarter-inch balanced TRS output jacks connected in parallel. Also back there is an input for line level unbalanced signals from instruments or other equipment. This is not normally used for mics, except maybe battery-powered electret types capable of line-level outputs.

A great little afterthought is a quarter-inch mix input which mixes with the normal mic or line. This could be used possibly for stacking up other Pro Channels when overdubbing voices, or maybe as a mixed second input for musical instruments. Either way, you have options, and that is what really matters.

Summary

The JoeMeek Pro Channel VC3 is an exceptional piece of gear for producing. Priced at $399, the unit has captured the Meek sounds of yesteryear, and has the capability to inexpensively equip everyone from a station intern to the general manager with a simplified technique for achieving total vocal bliss.

The vivid green face panel may clash with the studio design scheme, but that is really getting picky.

JoeMeek products range from rack-mountable stereo compressors, tube channel mic amplifiers and line tracking devices to enhancers and 2-channel line level equalizers. Any professional looking to achieve a fat, warm, rich and full sound should test drive the JoeMeek VC3.

JoeMeek products are distributed by PMI, 23773 Madison St., Torrance, CA 90505. Find the company on the Internet at *www.joemeek.com*

■■■

Flip Michaels is the production director for WGMS(FM), the classical radio station in Washington, D.C. He can be reached at fmichaels@wgms.com

Product Capsule:
JoeMeek VC3 Pro Channel Preamp/Compressor/Enhancer

Thumbs Up
- ✓ Easy to use
- ✓ Small/compact
- ✓ Inexpensive
- ✓ Ideal for basic mic processing and studio applications

Thumbs Down
- ✓ Use caution on enhancer controls

For information, contact PMI in California at (310) 373-9129 or circle **Reader Service 36.**

Ear vs. Gear and the Damage Done

Gowan Gray

Have you noticed your production room console is weak in one channel? Even though the meters say everything is balanced, you know the right channel is definitely louder than the left one.

Maybe your monitoring amp is soft on the left side, so you tweak the control a little bit to compensate. Then you notice the left channel is going bad on your home stereo as well.

"What is wrong with manufacturing techniques today?," you wonder. "Why are left-channel amplifiers all over the place going bad?"

It's not the gear — it's your ear.

The human left ear is at an unfair disadvantage in today's world. Drivers with their windows rolled down experience high dB levels for prolonged periods without even realizing it. Office telephones and automobile cellular units tend to get tucked into the left side of the head when in use.

I endured a droning air conditioner on the left side of the room at one job. One station I worked in the mid-'80s had a tape-based live-assist system in the air studio: The constant whine of capstan motors and ventilation fans from the left side of the room was fatiguing. When I rode backseat on a friend's Honda cycle, I was obligated to wear a communications headset optimized for — you guessed it — the left ear cutout inside the helmet.

One exception: many dance-club jocks that use vinyl discs cup their single earpiece headset on the right ear, freeing up their left hand to scratch and slip-cue their records.

No amount of dial-twiddling will put back the highs.

The loss of sensitivity in one ear (or both) adds up along the way, and often in a way not noticed until that volume pot creeps higher or more highs get mixed in. Maybe the EQ trick worked well back in analog tape days when heads would wear down or cheap tape formulations sounded bad to begin with. Today's hard drives do not lose highs — your ears do.

What can you do about it? Begin by doing mixes at lower volumes. A lot of listeners will not have their receivers turned up to the levels experienced in most production rooms. Commercial mixes sound good at moderate levels, too.

Headphone strips on many consoles come with two-band EQ controls. Try rolling off the highs when using cans. The general purpose of headphones is to get a feel for the levels in the mix, not to experience the "Oh-don't-I-sound-just-wonderful-in-these" phenomenon. Do it now, for someday well into your career, those highs will roll off forever and no amount of dial-twiddling will put them back.

It is the American way to roll down your car windows and have the wind blasting across your head at high speed, but the hearing damage done is subtle and very real. A soft cotton ball placed (not stuffed) into the ear before a long drive will offer some protection.

I realize how grandmotherly that sounds. Cotton in your ears is like rubber slip-ons for your shoes when it rains. Think of it as employment insurance: just as bowlers wear wrist protection and police officers doff earcups on the firing range, protecting your ears is every bit as important as protecting your voice.

Being aware of loud sounds and the directions they come from means your ears will not conflict with what the meters say.

■■■

Gowan Gray can be reached c/o ***RW.***

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The Harris DRC 2000 Digital Radio Console now includes linking and reverb. (optional)

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- Built-in mix-minus

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World Radio History

Studio Furniture
See Page 60

USER REPORT

SFX Picks the NuSt★r 3000 System

by James L. Reese
Chief Engineer
KODA(FM),KKRW(FM),
KQUE(AM)
Houston

When my corporate engineer suggested I purchase the then-brand new Auditronics NuSt★r 3000, I was skeptical. This was a new design, with hot-off-the-press software, and I was going to trust the No.1 station in Houston to this?

Well, this turned out to be a good decision. The 3000 fit our application like a glove.

The NuSt★r 3000 is an all-digital console, now handled by **Broadcast Electronics**. The control surface and the audio circuitry are in separate racks that can be up to 500 feet apart. An RS-422 data connection sends control signals from the control surface to the audio rack.

I purchased three identical NuSt★r 3000 consoles for use in the new studio facility built to consolidate SFX Broadcasting's four Houston stations. Our facility was designed around a central engineering plant, and the design of the NuSt★r allowed us to locate the electronics unit in the engineering plant. This kept most of the wiring out of the studio.

The NuSt★r can mix and match analog and digital inputs. For our application, analog inputs were used for the microphones, telephone, and line selector. CD players, a DAT deck, and our BE AudioVAULT went in on AES/EBU inputs.

The console digital output feeds our Mosley DSP-6000 STL encoder directly.

The NuSt★r has four mix busses instead of the usual two or three. This makes it easy to set up multiple feeds. I use one bus to feed a tape recorder for the jocks to use, and another bus feeds a phone hybrid so jocks can feed bits and other audio to callers on the phone.

In addition, the console has four DIP switch-selectable mix-minus busses for

Auditronics NuStar, Now Handled by BE

The console also provides analog outputs that we use to feed the Sage EAS unit — and someday I hope all EAS manufacturers switch over to AES/EBU.

telephone use. These can be either pre- or post-fader on a per-module basis. Post-fader feeds are independent of the console on/off buttons, so the jocks can select which of the four mix-minus busses feed the phone. The telephone module in the NuSt★r is very flexible, providing both the send and receive functions in a single module.

The console is very serviceable. The control unit can be powered down without affecting the audio path. If you have to work on a module or change a DIP switch setting, you can power down the control unit, remove the module, change the switches, and power back up without changing the state of the console. This has come in very handy when I wanted to change something in the middle of the day. The listeners never knew what happened!

I have had two minor failures in the consoles. One console was shipped with a defective power supply. Another console lost a main DSP board to infant mortality after the first few weeks of service. I replaced it with the spare and it has been running perfectly ever since. Through it all, the Auditronics service department was excellent. They replaced the defective parts quickly and both consoles have been flawless since that time.

My only complaint with the console is the cheesy control room Monitor pot. The part used is not up to the constant abuse that jocks dish out. Consequently, I must replace it about every 4 months. According to BE, the company has addressed this problem, adding a more robust pot to the console's newest incarnation, the NuSt★r 3001 model.

Overall, I am very pleased with the product. It is very flexible, very serviceable, and the consoles have given no problems. The jocks love them. I would definitely recommend the Auditronics NuSt★r by Broadcast Electronics, to others.

*For information, contact Broadcast Electronics in Illinois at (217) 224-9625; or circle **Reader Service 62**.*

USER REPORT

Peach State Public Radio Taps Harris Digital Mixer

by Al Korn
Director of Engineering
Georgia Public Broadcasting
Atlanta

On Aug. 18, 1997, Peach State Public Radio moved from a cramped analog control room to its new digital facility. The network is comprised of 13 (soon to be 14) transmitters and one translator. The outbound digital signal is delivered via satellite.

The new digital facility has four control rooms: Air, Talk, Production/Recording and News. The design concept for this new facility was simple: each digital control room would be identical in the placement and complement of equipment layout, and only control surfaces would located in these areas. The active electronics would be located in a tech core within the complex. The radio unit also had to be interfaced with the TV facilities and share digital routing, switching and transmission.

The **Harris** DRC-1000 digital mixing console was selected by the design team for the three active control rooms. Each console has a 10-channel base unit and a 10-fader control extender. Each console is supported with an RC-100 input router to extend the input complement beyond the 20 inputs. This gives the operator the options to assign any input available in the radio or TV plant to any input on the console.

With the ability to assign the inputs, each operator can customize the board to his or her liking, then take a snapshot of the setup for restoration on a later shift.

Carry that weight

The uniformity of all control rooms has a benefit when maintenance needs to work on one of the areas. A board operator is able to carry the setup to any of the three outbound control rooms and have the custom configuration available with the recall of the snapshot.

Each control room output is available on the digital router, so setting up in the talk studio will allow the program to originate from that control, or it can be routed into an input of the air console and delivered to transmission

See PEACH, page 53 ▶

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World Radio History

USER REPORT

SSL Successful for WCPN(FM)

by Jim Young
Director of Engineering
WCPN(FM)
Cleveland

Although Cleveland's National Public Radio station is only 14 years old, WCPN(FM) has distributed locally recorded jazz programs via the Public Radio Satellite System to many noncommercial stations across the country. Recordings of area concerts have been recorded directly to two-track, in spite of the fact that our remote truck is fitted with an eight-track console. We have never had a mixer with the inherent flexibility to easily accommodate multitrack recording, mixdowns and live-to-air broadcasts. We needed a **Solid State Logic** SL 8000GB series mixing desk.

We started planning a multitrack studio two years ago. I had seen mixing desks from SSL and called, expressing our interest in their product to Don Wershba. Over the next year, Don helped us refine our requirements, including the capacity for multitrack recording, live-to-air mixing or both simultaneously.

We required a state-of-the-art mixing desk and studio with the capability of recording and remixing, but we also had to easily go direct to air live with multiple mix-minuses, IFBs, telephone, ISDN and two-track record/play.

Last winter, we received our SSL SL 8000GB on-air production and multitrack console. Engineer Al Dahlhausen and I performed the installation.

Twenty type 611GB I/O modules for mic or line inputs and four 611SB stereo input modules comprise our SSL desk. Each channel includes a four-band parametric EQ plus high- and low-pass filters, a compressor/limiter and expander/gate in the dynamics section. Auxiliary sends include one stereo and four mono sends with mode switching; individual aux bus equalizers are included in the 651 master module where the echo returns are also located.

Al Dahlhausen and Jim Young use the SL 8000GB at WCPN(FM), Cleveland.

Any channel main fader can be used independently or switched to any one of eight VCA group faders in the center section. For example, a drum kit mic setup might include eight microphones. Once balanced, these faders can be switched to one VCA control group where just one fader will adjust the entire kit. Any multimic input setup that would benefit from a single fader control can be set up this way.

The 12-fader center section comprises a 651 master module with a stereo compressor, four stereo subgroup faders and the eight VCA control group faders. At the right end is a comprehensive jackfield. The meter bridge is fitted with complete analog channel metering and six stereo plasma bar graphs, presenting a VU or PPM display. Additional meters are provided for phase, subgroups, Aux Sends and studio monitors.

The internal architecture of the 8000GB series is uniquely suited to a multiple use application. Three modes of operation are provided for: Record, Remix and Broadcast. Each conveniently and instantly makes switching changes to the internal channel paths and monitor paths, setting up configurations most suitable to the particular application. For example, selecting the Broadcast mode sets up mic inputs as channel sources through the EQ and dynamics modules to the large fader. Channel outputs can be sent to any or all of the multitrack busses, the stereo subgroups and the main Stereo 1 or Stereo 2 outputs. The 24 multitrack busses or stereo sub-groups can be conveniently configured for numerous mono or stereo mix-minus outputs.

Complex internal switching occurs by selecting the other modes. In Remix, the large- and small-channel faders are reversed and the multitrack returns appear on the large faders. Additional permutations are permitted by activating the fader reverse and bounce functions.

A particularly nice feature of the desk is the status lock. In the broadcast mode, the status lock inhibits functions of the console that would be unfortunate should they be activated in an on-air situation. Mode changes are prevented, as well as subgroups to Main Outputs, Solo-in-Place and Oscillator-to-Main outputs, to name a few.

We have had few problems with the SSL 8000GB thus far. The only failure has been the stereo compressor in the center section which is intermittent and SSL will correct. I feel the operational documentation provided could be improved. As supplied, there is comprehensive information on the G-series consoles, but one must constantly refer to a supplementary booklet that details the GB (broadcast) variant. This is confusing and could be substantially improved for those not familiar with the G-series.

The console is provided with dual redundant power supplies and a switchover panel located in an adjacent room for noise and heat containment. Ancillary equipment in our studio includes Tannoy System II mid-field monitors driven by McIntosh 2002 amps, multiple Alesis M20 ADAT decks providing 24 tracks and SADiE digital editing. The analog tapes are Studer 810s with Dolby SR noise reduction.

For information, contact SSL in New York at (516) 784-7865; or circle ***Reader Service 188.***

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USER REPORT

PR&E AirWaves Are Board Warriors

by Donald Boggs, GM and Gary Brummitt, Station Manager
WQME(FM)
Anderson, Ind.

In 24 years of operation, we have signed off on purchase orders for millions of dollars of broadcast equipment and facilities. A recent decision to purchase three **Pacific Research & Engineering** AirWave boards for WQME(FM) has turned out to be one of the best calls we believe we have ever made.

WQME is a commercial FM radio station owned by Anderson University, providing top-notch programming to the Indianapolis market and educating students in the profession of radio broadcasting. These two goals often come into conflict and present difficult situations to management.

One such challenge came a few months ago when we began the process of renovating one air and two production studios. As with any station, our requirements for selection included reliability, operator-ease, serviceability and value.

However, because students are the primary personnel at the station and also utilize production studios for broadcasting class assignments, we had to place extra emphasis on ease of use and "survivability" under the extreme use of 50 to 60 rookies each semester.

Budget constraints precluded buying in at the top tier of consoles. However, we discovered a second tier in the PR&E AirWave, with specifications that were clearly top tier: frequency response of +0 dB/-0.5 dB from 20 Hz to 20 kHz and -95 dB line input noise.

See WARRIOR, page 51 ▶

World Radio History

PR&E Units Sensible, Versatile

▶ WARRIOR, continued from page 50

We immediately took a closer look.

The AirWave comes in a 12- or 20-input mainframe. We selected 20 inputs for air and production A and 12 inputs for production B. In some sense the numbers are misleading, as each board comes with a monitor, timer control, output amplifier, microphone preamp and remote-line selector.

The AirWave Console in use at the WQME(AM) Studios

Room for more

This means there is room for 12 or 20 inputs and two accessories (inputs, telco or custom) in addition to these included modules. The effective number of total sources is doubled with each input module able to handle one of two sources. The AirWave has two independent stereo outputs plus Cue and a Mono Out, and all modules are interchangeable.

The layout of the board is clean and simple with no clutter and all controls in sensible and convenient positions. The console can be surface-mounted or dropped into furniture. One of the nicest features from our engineer's perspective is the "hood," which can easily be opened to access the logic switches and wiring for each module. It is not immediately obvious how to do this, but it is simple. The ease of access for maintenance and protection from rookie students is a tremendous asset.

Another attraction is the presence of remote line selectors (RLS). These enable us to select at the board what will feed the various recording devices in the studio. For example, in production, two RLS modules allow the individual selection of seven different feeds to cart, cassette, MD and reel decks. External patching and routing is a thing of the past.

All of these items add up to a versatile board with tremendous value. Experienced professionals can sit down and make things happen immediately without any instruction or orientation, and students take to it easily.

After 6 p.m., the doors open to student class productions. The AirWave boards take slightly more abuse in these sessions but have come through fine.

There are always features that could be added and would inevitably raise the price. We would prefer independent selection of headphone and speaker monitoring, as the digital processing delays the off-air sound a bit too much for the announcer's comfort.

A switchable talkback would also be desirable, but on the other hand, our engineer accurately describes the telco interface as "idiot-resistant," and it truly is.

One of our units came with a bad VU meter lamp which Pacific quickly replaced with a new one and several spares. Pacific was clear and accurate about shipping dates, which we appreciated a great deal.

The decision to buy these units was a "no-brainer." We wish the calls we made each day were all this easy.

*For more information, contact Pacific Research & Engineering in California at (760) 438-3911; fax (760) 438-9277; or circle **Reader Service 214.***

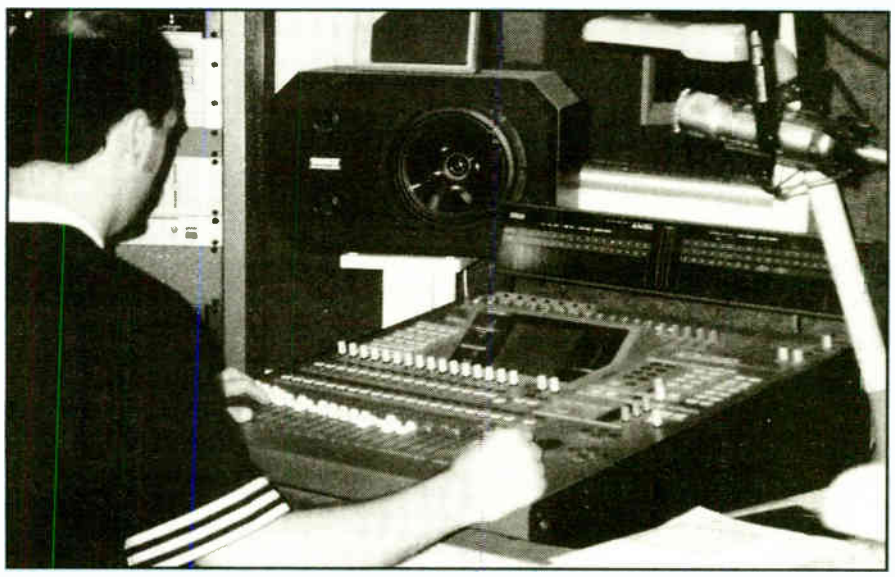
USER REPORT

The Positive Effects of The Yamaha O2R

by Gary Alan Kline
Chief Engineer
WAZY-AM-FM, WGBD(FM)
Lafayette, Ind.

Even though CD players, DAT decks, digital satellite links and other digital sources have supplanted their analog forerunners, stations have been slower to upgrade to digital recording consoles.

This is not much of a surprise given the cost and complexity of digital consoles until recently. The **Yamaha** O2R is an excellent representative of the newer generation digital consoles that offer the audio quality, flexibility, and features only possible with digital.



WGBD(FM) afternoon jock Steve Clark uses the Yamaha 02R.

At Artistic Media Partners in Lafayette, Ind. —WGBD(FM) and WAZY AM & FM — we recognized the desirability of an entirely digital audio chain. When we renovated our facility recently, we were able to make it entirely digital with the substitution of a Yamaha O2R digital console for our older analog mixer.

This not only made sense technically, but also economically: A new analog console configured to meet our needs was more expensive than the Yamaha O2R. Considering the superior audio quality of digital, the compatibility with today's digital equipment, and the avoidance of the sound degradation associated with converting back and forth between analog and digital, the choice was easy.

When making the transition to the Yamaha 02R, it was necessary to look at each piece of equipment which would be connected to it and calculate the number and type of inputs and outputs needed. The console comes standard with 24 analog and 16 digital inputs. Cards are available to configure the O2R to accept or output different types of digital signals, such as AES/EBU,

See YAMAHA, page 54 ▶

Affordable
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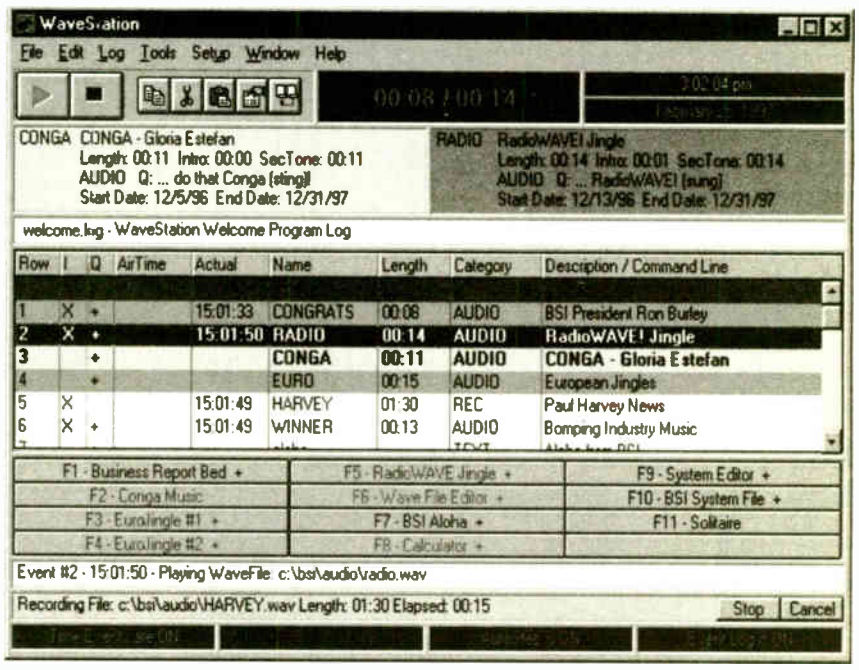

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Excalibur Electronics

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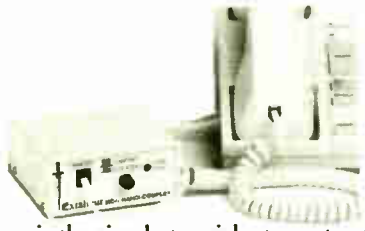

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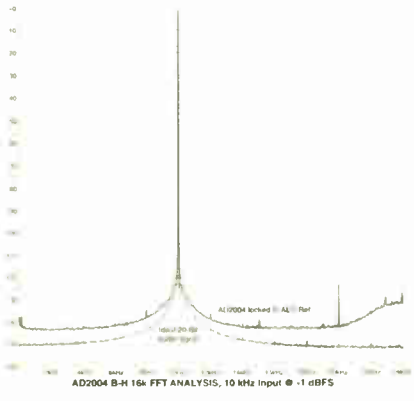

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World Radio History

SPECIAL REPORT

Autogram Survives Trial by Fire

by Grady Bingham
Consultant
Eden, N.C.

I have been in radio about 40 years, following in my dad's footsteps. He was in radio long before me.

I recently looked over some records of a 50,000 W station I have been involved with for the last seven or eight years. We began with used equipment for a short time and then converted it all into new equipment. The only exceptions were the boards in the main production room and the main studio.

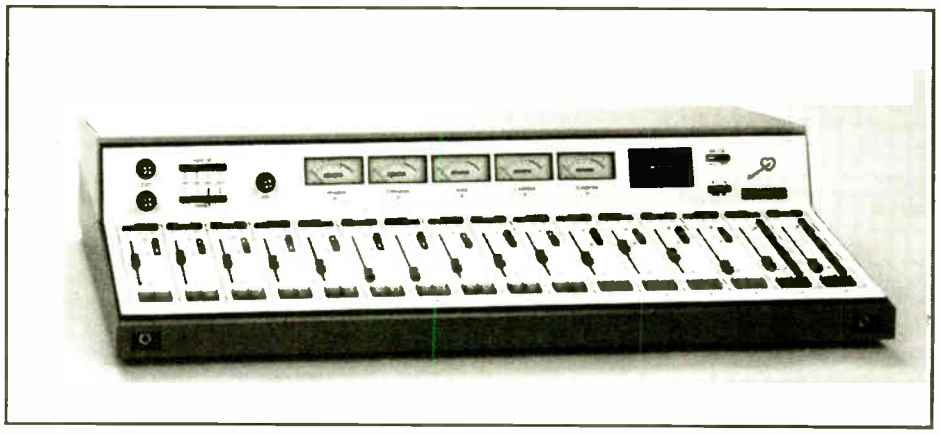
Everything seemed to be going smoothly once we got on the air. The equipment was working well. Shortly after the station was launched, a board broke down. We began to broadcast from the main studio into the production room, then go from the production room back to the studio to avoid any downtime. We finally sat down, took inventory of the board, and determined it ought to be replaced.

We had a limited amount of room and a lot of equipment. After much consideration, we decided we could only spare exactly 24 inches for a new board. That would give us extra room on the end for CD players and some other equipment we wanted to install.

Looking over all the options we had, we came up with the Pacemaker by **Autogram**. The Pacemaker had a lot of versatility we could really use and it had enough channels to cover what we needed without doubling up on the inputs. It also gave us room for adding additional equipment as well as the capability to add stereo.

After installing the board and getting it up and running, we monitored it carefully and noticed our signals increased to a higher degree of clarity. The board also had a lot of RF protection built into it. We began to look down the road and decided to go stereo.

When we did so, we conferred with the engineers at Autogram to find out if it was feasible and permissible to install some switches to alternate between mono and stereo — a lot of cassettes and taped church programs were still in mono. We installed a couple of SPDT switches in the end of the board so the operator could throw them in one position for spoken mono programs and another position for stereo music. We now had the best of both worlds.



The Pacemaker Console From Autogram

Just as I thought everything was in good shape, I got a call about 5:30 one morning. A gas explosion had blown up the studio and burned nearly the entire building to the ground. The only things that remained were a couple of pieces of equipment in the rack that were scorched a little, but not burned.

The new Pacemaker board had gotten blown against the wall from the concussion and it was black from one end to the other. Looking at the board, we thought it was totally inoperable.

We moved into our transmitter building as a temporary location. I cleaned the Pacemaker up with some non-damaging solvents and applied infrared heat to dry it out for three or four days. I then checked it out, put some signals through it, gave it a few days burn-in, then put it back in the main studio at the transmitter room and went back on the air.

That board ran for another four years without any problems.

In a transaction, the studio was eventually moved to another town. An upgrade to an automation system meant the board was no longer needed, so it was donated to a tape ministry for their production room. Last month I looked in at the board, and it was still running and performing very well.

The Pacemaker board was blown against the wall and was blackened all over.

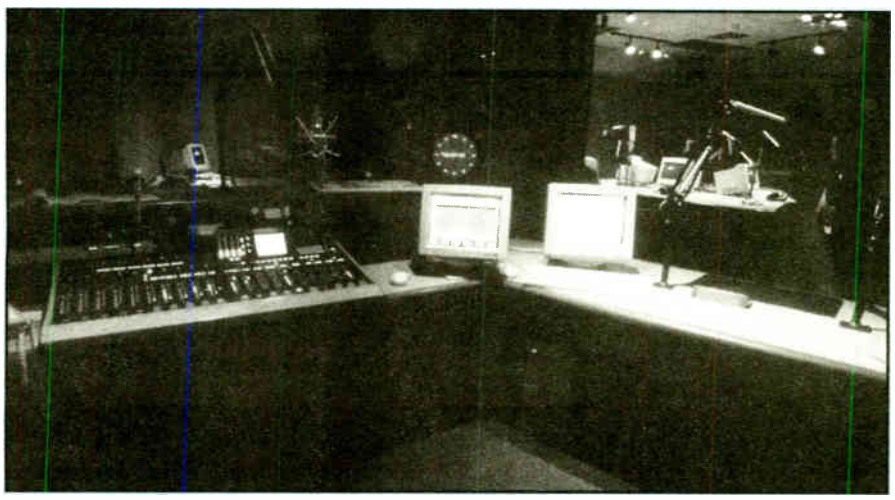
This goes back to the saying, "You get what you pay for," especially when you buy equipment. Too many times, we jump the gun and buy something because we can get it quick or because it is cheaper or prettier, but the end result is sometimes devastating. Buying good equipment, obtaining good service and proper installation make for good radio and good listening when you have them all in perfect harmony and perfect sync.

*For more information, contact Autogram in Texas (972) 424-8585; fax (972) 423-6334; or circle **Reader Service 7.***

Harris DRC-1000: Proof Is in the Sound

▶ PEACH, continued from page 49

from there. News control, being an identical complement to the air and talk rooms, allows prepackaged pieces to be prepared with all the digital resources available in the house and captured on the ENCO DAD network for use on workstations in all control rooms. This versatility is becoming more and more useful as the workload volume increases.



The Harris DRC-1000 is shown in use at Peach State Public Radio.

The proof is in the sound. Both radio and TV are standardized at 48 kHz AES/EBU digital, and any input that varies from this format is converted in the console or externally prior to mixing.

The learning curve was steep, even though the concept of mics, faders and busses was the same. Overall, the flexibility of the features and the configuration versatility of the DRC-1000 opened up a new and better way of creating the network digital sound. Our listeners agree.

*For more information, contact Harris in Indiana at (800) 622-0022; fax (765) 966-0623; or circle **Reader Service 33.***

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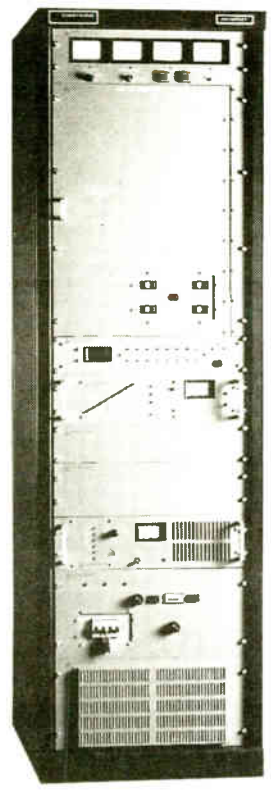

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USER REPORT

Arrakis 12K Console Strikes Gold

by Bill Spitzer
Contract Engineer
WLS Communications
Rapid City, S.D.

I have been installing **Arrakis** consoles from the early days. Let me start out by stating that for the small- and medium-market station, I feel there is no better console for the dollar than the Arrakis 12,000, or as I like to refer to it, the A-12K. In fact, I would install the 12K in any size market. It has the important bells and whistles for high-powered operations, as well as low-maintenance dependability for the seldom-engineered facility.

The 12K's flexibility, along with its elimination of the '80s-style motherboard configurations and fixed bus mainframes (still hyped as "new" by several manufacturers today) are what sold me on the system.

Specifications

The Arrakis 12,000 comes in three mainframe sizes: eight, 18 and 28 channels. There are four types of input modules with two inputs and three stereo outputs on each.

Mic modules can be had with or without pan pots, and line modules come with or without mode select. There are also option modules for turrets, DAs and remote selects as well.

All input modules feature VCA control, P&G faders, ITT Schadow switches, and a set of DIP switches that allow assignment of mix-minus, in control room and studio muting, setting start and stop relays to momentary or sustained closures and allowing the console's 10-minute timer to be reset by that channel.

Calibration pots on each input channel allow input levels from -12 to +8 dB. The factory sends out the 12K calibrated to +4 dB in and out.

The three stereo outputs are metered individually along with the capability to monitor external inputs and check for phasing. There also are balanced outputs for program and audition, along with unbalanced mix-minus outputs for both. Each module has all innards attached, so servicing is simple: remove two screws and pop out the module even while hot.

All chips are socketed and the pots are plug-in types. Lights can also be replaced while on air, and for a $5 fee, Arrakis will engrave those lens covers — slightly more expensive if you get overly fancy. Call the factory or your equipment supplier for a brochure on the Arrakis 12,000.

Sharing the wealth

Because I have installed a few dozen 12Ks, I thought I would pass along some ideas and observations. The initial cabling is somewhat time consuming, but having the flexibility of the Molex-type patch panel is worth it.

I use three-pair shielded cable for the stereo inputs with remote start, and two-pair shielded for the rest. All balanced outputs are brought out to four dB pads, then to Type 66 blocks so everything has a constant load.

The stereo program outputs feed the airchain to the transmitter. I frequently use the stereo utility bus as a backup to the transmitter. The mono program output is fed to a skimmer recorder and to the program director's office.

The stereo audition outputs are fed to recorders. Audition mix-minus is fed to the phone hybrid through a matrix system I designed that energizes with the mic switch.

In the de-energized mode, the hybrid is fed by a mic mixer. This allows the air talent to operate the phone system hands-free while off the air, and the listener can hear anything that might be sent from the console while on the air. The operators seem to enjoy this system better than holding the handset up to the speaker as we did back when I was jocking.

Rather than configure my 12Ks with mic-level input channels, I use all line-level input modules with an external mic mixer, so my home-brew phone hybrid interface is needed. Plus, it allows all mics of a Morning Animal-type show to operate through one channel.

Confessions of an engineer

Now for the tell-all part of the article where I point out everything wrong. Well, sorry; other than routine bulb and pot replacements, the 12K keeps on ticking.

Sure, we have had jocks mash selector switches. We even had a part-timer skate across the carpet in patent leather shoes and fire off six cart decks, three CDs, two mics and the phone simultaneously with a static electricity discharge from his fingertips.

When he called to explain that everything was "locked up," I told him to push the red button on the power supply, count to five and push it again. I asked if everything was back to normal, but he said he was still counting.

I then told him to push the red button, take off his shoes and unlock the back door, as his replacement was on his way.

I must mention the cue system. Talkback goes into the cue circuit, and the circuit includes a monitor override. Any pot dropped into the cue-detent position dims the monitor audio — adjustable to 20 db — and allows the cue to override it in the monitor speakers as well as the headset.

Some words of caution to this end: *do not* get caught with your headset on, thinking something went wrong with the monitor system. You will crank it up, then find you have a pot in cue. Should you take it out of cue without first removing your headset or lowering the level, you will end up with your own Freddie Fender hairdo.

For more information, contact Arrakis in Colorado at (970) 224-2248; fax (970) 493-1076; or circle ***Reader Service 59.***

Circle (57) On Reader Service Card

Yamaha Transition a Success for WAZY

▶ YAMAHA, continued from page 51

S/PDIF consumer digital, ADAT, TDIF and others. Inputs and outputs are configured in groups, which in most cases means that users will wind up with some capacity which is at first unused. This simplifies future expansion.

Our studio has the following key pieces of equipment, which heavily influenced the configuration of our console: Panasonic SV-4100 DAT (AES/EBU, 48 kHz); Denon DN-650F CD player (S/PDIF 44.1 kHz); a DGS commercial system (AES/EBU, 48 kHz); a DCI commercial system (AES/EBU, 44.1 and 48 kHz); Spectral Prisma Workstation (TDIF, eight channels bi-directional, 48 kHz); Tascam 122-MKIII cassette (balanced analog); Otari MX-5050 reel (balanced analog); and Arrakis DL4 hard drive storage system (AES/EBU, 32 kHz).

Obviously, our production room includes several other pieces of analog gear, but these are easily connected to the generous number of single-channel analog inputs and outputs.

Purchasers of the O2R need to realize that the console does not have an on-board sample rate converter. If devices with different sample rates are to be connected and mixed at the same time, an external sample rate converter may be necessary for those devices not locked to the master clock frequency.

The Yamaha O2R includes the features users are accustomed to in analog boards, but adds a tremendous amount of additional flexibility and capability.

For instance, each channel on the board has its own compressor, expander, gate/ducking, and soft and hard compander. This is in addition to separate EQ, phase and attenuation, delay, pan, routing, and meters for each channel.

While some of these features were also available on better analog mixers, one huge advantage of digital is memory: Settings and all adjustable parameters on the board can be stored in memory for later recall and use. Yamaha calls each memory storage position a "scene."

One use of these "scenes" would allow different announcers to store a preferred set of microphone EQ and compression settings. Even more useful is the ability to set up a complicated mix on the console, store it, and recall it any time in the future. The Yamaha 02R uses motorized faders, recalls the dynamics and EQ settings and resets the level of each channel to the position where it was left. This makes it a snap for our production staff to pick up where they left off on a major project.

Through the use of scene memories in our studio, our ad clients who frequently update or change spots can be assured that new versions will have the same sound as previous ones.

One of the most important operational differences between the Yamaha O2R and analog boards is the functions displayed on an LCD monitor similar to that of a notebook computer. This drastically reduces the overall size of the mixer, since control duplication is minimized. However, users must select which parameters to view on the monitor, as they are not all visible at once. Users accustomed to having instant visual access to all the settings of an analog board may need to learn to review each setting more carefully to avoid overlooking a setting someone else may have changed.

One major advantage of the O2R is the incorporation of two separate audio effect processors, eliminating the need to purchase this equipment separately. Reverbs, delays, flanging, chorus and many others are part of the built-in capabilities of the O2R. Additional effect processors can be patched into the system using the available inputs and outputs.

Considering the cost of the Yamaha O2R, its features, and its capabilities, the mixer is an excellent choice for a station in need of a new recording console and desiring the enhanced performance and power of digital control.

For more information, contact Yamaha in California at (714) 522-9011; or circle ***Reader Service 85.***

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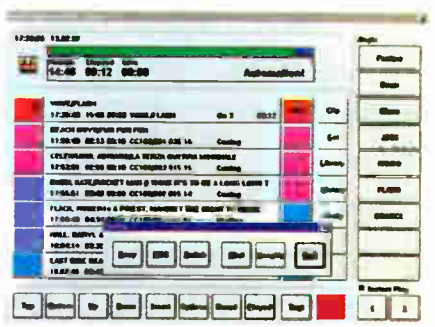

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World Radio History

TECHNOLOGY UPDATES

Wheatstone

The new D-500 digital audio console from **Wheatstone** has the power of 40-bit floating-point DSP processors to handle the jobs it performs.

The D-500 can accept both analog and digital input signals, process them in the digital domain and then provide output signals from the console in both digital and analog formats. Any pre-existing analog equipment can still be used and

the D-500 can accommodate future digital equipment as acquired, making for a smooth transition to digital.

The control surface of the D-500 is familiar to air talent, avoiding disastrous QWERTY keyboard "accidents." Four stereo program busses, input source channel selection, machine sequencing functions, individual channel faders (digital level control) and channel/machine On-Off switches are all included on the D-500 console.

A more advanced feature is a Save button on the master module that preserves an entire control surface setting. This is advantageous for talent when first stepping into the control room, as personal setups can be retrieved instantly. Multiple settings for different segments of one particular show can also be saved and recalled with this function.

The D-500 has a master RS-232 control port that allows modem transfers between Wheatstone and the console for software upgrades, machine control revisions and diagnostics. This master port can also be used to control the console from outside the facilities, and it allows a communication link directly to management and traffic.

Talk segments are well-suited to the capabilities of the D-500; microcontrollers and DSPs are applied to the console for this type of broadcast. The D-500 can automatically generate a digital, error-free mix-minus signal from a selected bus and feed it up to two telephone callers. The console can be preset so specific inputs are selected when a phone module bus select is in use. These inputs automatically signal their status so the operator knows which channels are busy.

All direct digital inputs have sample rate converters, eliminating rate conversion issues. Output sample rates are selectable between 32, 44.1 and 48 kHz.

*For more information, contact Wheatstone in North Carolina at (252) 638-7000; fax (252) 637-1285; or circle **Reader Service 111.***

AEQ

The BC-300 console from **AEQ** has a practical and modern design to ensure easy operation and a quick learning period.

The console has a telephone hybrid with ring capability, as well as on-hook and off-hook function. The BC-300 is switchable to permit the use of an external hybrid. A built-in buzzer and LED indicators alert the user to incoming calls.

VU meters for Program/PFL monitoring and a headphone connector are included.

The console comes in two standard configurations: BC-306 and BC-312. Both can be used in AM (Mono) and FM (Stereo) applications.

Also included is a Stereo Master output, three recording outputs and two auxiliary mono outputs.

*For more information, contact AEQ in Florida at (954) 424-0203; or circle **Reader Service 137.***

Tyros Trade

The BTM22 console from **Tyros Trade** integrates the features of the Tyros BTM21 console while adding other elements such as an automation control system.

The BTM22 includes a 36-command key ensemble and high-resolution mouse. The mixer can then replace both keyboard and mouse during live operation, freeing the work area and making the operator's tasks easier to accomplish. Other characteristics of the new console include XLR output and input connectors and remote control of outboard source equipment such as CD, MD and DAT decks.

The integrated compact design has sophisticated control electronics developed on top of a microprocessor, so the BTM22 can be connected to the keyboard port of a PC, either replacing the keyboard entirely or placing it in series between the standard keyboard and the PC.

*For more information, contact Tyros Trade in Argentina at 011-541-796-0339; or circle **Reader Service 163.***

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World Radio History

TECHNOLOGY UPDATES

Klotz Digital Audio

New from **Klotz Digital Audio** is the Paradigm digital audio console for on-air radio broadcast use, a winner of a Cool Stuff Award from **Radio World** at NAB'98.

Features of the Paradigm include voice processing and high-pass filtering on all mic inputs, sample rate converters on all digital line inputs, machine control on all line inputs, mode, pan and phase reverse on all inputs and two faders with six analog/digital source selectors.

An LCD flat-panel screen displays a large clock and an event timer, and the screen doubles as a password-protected intuitive central control for console setup.

The console layout of the Paradigm can be configured, saved and retrieved by each user.

The console boasts familiar "in-hand" controls and a transparent mix-minus operation. Busses are PGM, REC, TEL and PFL (cue) with cue speakers as well as headphone, CR and studio monitor outputs.

Rather than meter audio levels on the flat display screen, the Paradigm uses a separate unit. This way, operators can monitor air levels while accessing other console capabilities.

Options for the Paradigm include a dual fail-safe power supply, profanity delay and additional faders.

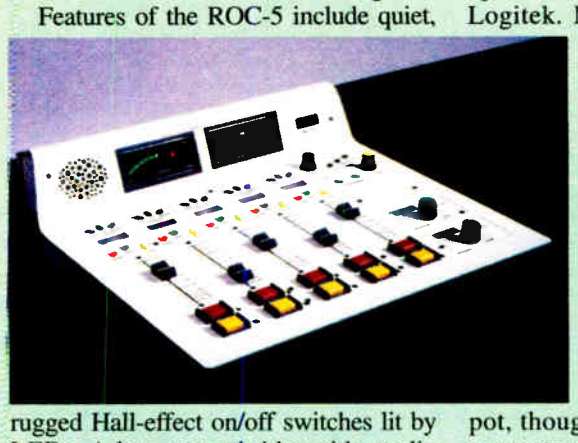
For more information, contact Klotz Digital Audio in Germany at 011-49-89-462-3380; fax 011-49-89-462-3318; Visit the Web site at www.klotzdigital.com *or circle* ***Reader Service 189.***

Logitek

The ROC-5 compact digital console from **Logitek** is a five-fader, assignable control surface for the Logitek Audio Engine.

The small size of the ROC-5 makes the console ideal for satellite/automated stations, production, talk booths and newsroom environments. Only one cable is needed to link the ROC-5 to the Audio Engine.

Features of the ROC-5 include quiet, rugged Hall-effect on/off switches lit by LEDs. A low meter bridge aids studio line of sight. Faders, on/off buttons and meters are on ribbon cable and the entire control surface can be replaced without affecting what is being broadcast.



The Change section controls infrequently modified mixer functions, such as input sources or mode. Fader functions can be altered by pressing one of several buttons and turning the Select knob. When the desired setting is displayed on the LCD screen, press the Take button to make it permanent. Sources and devices can be added, deleted, re-labeled or restricted to a fader or faders with special software provided by Logitek. Mode and Auxiliary can be modified in this same manner.

Bus Assign buttons control whether the mixer connects to the program or audition channels. The PGM and AUD busses are defined, though the system can have as many buried busses as it has outputs.

The Cue Bus control is independent of the slide pot, though the control system can be set to turn off cue when the slider is brought up or go into cue when brought down.

For more information, contact Logitek in Texas at (713) 782-4592; fax (713) 782-7597; or circle ***Reader Service 215.***

ATI

The Vanguard Series of stereo broadcast consoles from **ATI** features four models: the BC6DSL with six linear faders and 10 stereo inputs; the BC6DSR with six rotary faders and 10 stereo inputs; the BC8DSL with eight linear faders and 12 stereo inputs; and the BC12DSL with 12 linear faders and 24 stereo inputs.

The end result of a rigorous re-evaluation of the traditional on-air console design, Vanguard consoles offer a lighted, quiet, snap-action panel switch array sealed from all contaminants. They digitally select all mixer inputs, outputs and monitoring functions.

Vanguard consoles feature DC-operated VCAs on all level controls which completely eliminate fader noise and tracking errors. They also reduce the need for costly premium audio faders. Effective RF protection, punchblock-type connections and jumper plug gain-matching of input and output levels make for quick, easy and foolproof installation.

Modular plug-in cards provide fast board substitution for non-technical personnel. A mono-sum, post-fader cue output is available from all mixers.

For more information, contact ATI in Pennsylvania at (215) 443-0330; fax (215) 443-0394; or circle ***Reader Service 8.***

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World Radio History

TECHNOLOGY UPDATES

Studer

The Studer On-Air 2000 digital on-air console, now in 100 installations worldwide, incorporates a new "Touch n' Action" concept, simplifying program

functions, levels, balance and EQ. The operator is able to reach most of the functions from the "sweet spot" in the center position, in front of the touch-sensitive screen.

The console is available in 6 to 24 channel configurations. Each can be equipped with analog or digital input cards. Both analog and digital outputs are available. Personal PCMCIA memory cards allow individual talents to store console snapshots and configurations optimized for specific shows.

The Studer DigiMedia software package works with the On-Air 2000 to automate playlists and schedule event playback. Management of up to 4,000 CDs is possible and an editing tool is also in the program. DigiMedia works under Windows 95 and NT 4.0

For information, contact Studer in the U.S. at (615) 360-0465; or circle ***Reader Service 34.***

AMS Neve

The Libra Live from **AMS Neve** is a full-featured broadcast production console, providing standard broadcast capabilities and operational benefits inherent in a completely digital architecture.

Libra Live has comprehensive routing and networking capabilities, plus the ability to store and reset setups quickly. A component system comprising a control surface with separate processor and interface racks, Libra Live allows mono and stereo channels to be configured in any position on the control surface from session to session.

The unit also enables the processor to be used as a router, connecting any system input to any channel, virtually eliminating the need for a patch panel.

Audio interface racks connect to the processor rack via MADI (Multichannel Audio Digital Interface). This allows direct connection to third-party MADI equipment such as tape machines and station routers. MADI is particularly powerful when several studios must be interconnected to share resources or for redundancy.

Libra Live includes a relay and opto-isolator package for providing mappable fader starts and mic light tally systems. The unit allows the storage of console setups and configurations to hard disk or removable media. Libra Live features full and selective snapshot automation of control settings with thousands of memory locations.

For more information, contact AMS Neve in England at 011-44-1282-457011; fax 011-44-1282-417282; Visit the Web site at www.ams-neve.com *or circle* ***Reader Service 86.***

Zaxcom

The Arria digital audio mixer from **Zaxcom** is mechanically and electronically designed to fit into a range of environments, including radio applications, and is converted easily to each use by different software packages.

Arria moves beyond traditional program/preset operation with its TIMELINE capability. Tied directly to the editor interface, TIMELINE allows pre-programming of up to 10 different audio events within one edit. It executes crossfades on any combination of fader channels. An onboard graphic display shows the TIMELINE points for a single edit, and edits can be individually adjusted and edited.

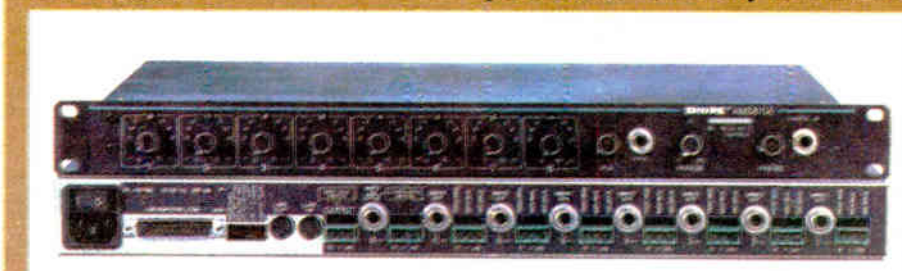
A digital compressor/limiter is included on each channel of the Arria. The compressors offer full-function threshold adjustments, variable attack time from 0 to 100 ms, variable release time from 0.03 to 3 seconds and gain boost to 24 dB. Each channel also has independent audio gates with adjustable threshold, attack and release times.

Special on-air provisions such as power-down audio bypass and redundant power options are available, and the included audio processor provides plug-in circuit cards for access to active components.

For more information, contact Zaxcom in California at (201) 652-7878; fax (201) 652-7776; or circle ***Reader Service 112.***

Shure

The AMS8100 automatic mixer from **Shure** merges the directional microphone activation attributes of the company's AMS mixers with IntelliMix, the automatic mixing system employed by their SCM810 and FP410 mixers.



This combination resulted in the Shure "Directional IntelliMix" direction-sensitive microphone activation technology, which serves as the operational backbone of the new AMS8100 Automatic Mixer.

This technology allows the AMS8100 to activate microphones only when sounds originate within a 120-degree "acceptance angle," eliminating false triggering from off-axis sources.

With the aid of proprietary MaxBus circuitry, the AMS8100 has the capabilities of automatically gating only one microphone per sound source, or multiple microphones when multiple sound sources are in use.

This feature, along with a defeatable last-mic lock-on function, guarantees seamless automatic mixing performance with nearly no instances of false activation.

Occupying only a single rack space, the AMS8100 requires the use of the Shure AMS microphones for proper operation.

The AMS8100 can be expanded for installations requiring up to 400 input channels and can be linked with the FP410, SCM810 and SCM800 mixers from Shure.

For more information, contact Shure in Illinois at (847) 866-2200; fax (847) 866-2279; or circle ***Reader Service 60.***

Calrec

The X Series all-digital radio console from **Calrec** features a simple control surface allowing use by non-technical operators while providing complex functions for technical users.

Processing is distributed to allow hot-swapping of modules without first having to take the console off-air and powering down.

The control system is based on previous Calrec assignable desks that have proved reliable over 15 years. Should the control system shut down, the program output is not affected, and a control surface reboot takes less than 10 seconds.

The X Series control surface is available in multiples of six faders to a maximum of 24. Any available input source can be routed to any fader to create a preferred layout. These layouts and related settings can be stored to memory.

Bidirectional communication to external scheduling and sequencing systems is provided to allow the console to be remotely controlled, permitting unattended or remote-site working.

For more information, contact Calrec in England at 011-44-1422-842159; fax 011-44-1422-845244; Visit the Web site at www.calrec.com *or circle* ***Reader Service 138.***

World Radio History

TECHNOLOGY UPDATES

Soundcraft

The B400 broadcast console from Soundcraft closely resembles the company's B800 console, but is more closely designed for radio production. This console also can be used as an on-air mixer.

The B400 comes in five frame sizes

that match the number of modules it holds (anywhere from 24 to 56). The console offers a selection of mono, stereo and stereo telco input modules, and either mono or stereo groups, all of which are just a single module in width.

The B400 features three important modules: Stereo Master, Monitor and Communications. These modules complete the console bus structure of eight audio groups, separate stereo and mono outputs, three mono Aux and one stereo Aux.

The Stereo Master module denotes the power supply status and boasts an on-air button to disable certain features. Four Aux master level controls, an insert point, and a simple limiter with threshold frequencies are some of the features in this module. The Monitor module has the ability to bring in eight external sources, and can pick up any of six jumper-selected internal sources. Headphone levels and splits for monitor and cue are set with this module.

The Communications Module houses the oscillator features, including slate and oscillator routing. It covers the talkback section with gain and routing, level controls for studio and guest headphones, and feeds to the studio monitor.

*For more information, contact Soundcraft in Tennessee at (615) 399-2199; or circle **Reader Service 164**.*

Dan Dugan Sound Design

The Model D Automatic Mixing Controller from **Dan Dugan Sound Design** is ideal for recording or live broadcast of multiple mic talk situations.

The eight-channel rackmount controller patches into the user's audio console for smooth automatic mixing of multiple live mics. Because the Model D frees the user to focus on balance and sound quality, faders are unnecessary. Late fade-ups are eliminated without choppy-sounding gate effects.

Model D incorporates three Dugan-patented technologies to offer quality mixing capabilities: Dugan Speech System, Dugan Music System and Dugan Gain Limiting System. The Dugan Speech System automatically manages any number of live mics in talk situations while the Dugan Music System offers automatic soft muting to reduce feedback and noise pick-up. The Dugan Gain Limiting System provides a continuous, stepless number of open microphones master gain adjusting system to prevent feedback and ambient noise build-up in the Music System.

All eight inputs and outputs are located on the back panel of the unit, along with the music system threshold input. Connections are provided for an upcoming Dugan automatic level control product that will further extend the capabilities of the Model D.

*For more information, contact Dan Dugan Sound Design in California at (415) 821-9776; fax (415) 826-7699; or circle **Reader Service 221**.*

Audio Technica

SmartMixer automatic mixers from **Audio-Technica** offer precision automatic input mixing with a digital microprocessor control.

There are two SmartMixers on the market: the AT-MX341 four-channel automatic mixer and the AT-MX351 five-channel automatic mixer. Both deliver fast, quiet and "smart" performance for a variety of applications.

By keeping the number of open microphone channels to a minimum, background noise and other distractions are reduced. Both mixers provide

See SMARTMIXER, page 60 ▶

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World Radio History

▶ SMARTMIXER,, continued from page 59

instant, transparent switching between channels.

SmartMixers feature priority pre-select switches for each channel. If all channels are "priority off," no single mic has priority and the system opens just one microphone at a time, switching to the next one only after the controlling channel falls quiet. The operation is fast and silent.

A single channel set to priority "on" will override all the others, useful for moderators and chairpersons. If all channels are priority "on," any number of people can speak at once. SmartMixers also have a switchable manual mode that allows them to function as conventional mixers.

*For more information, contact Audio-Technica in Ohio at (330) 686-2600; fax (330) 686-0719; or circle **Reader Service 216.***

Radio Systems

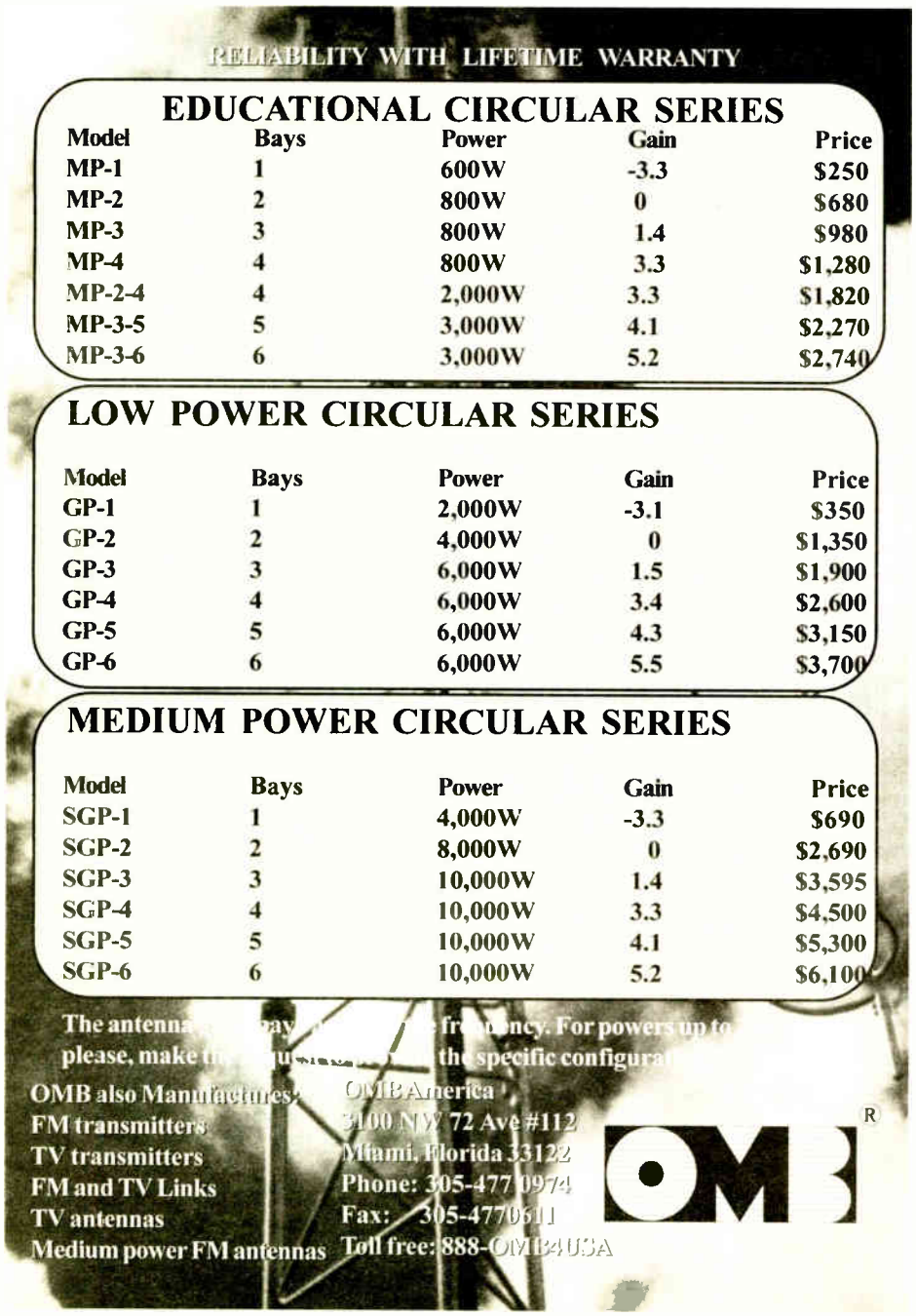
The new Millenium consoles from **Radio Systems** are available in 6, 12, 18 and 24 channel sizes. All sizes feature three output busses, remote control and metering, a monitor section with a standard eight position selector and a clock/timer. The soft-touch rubber keypads offer high

dependability and feature high-brightness LEDs that will not burn out.

Millenium consoles make extensive use of VCA technology and electronic switching, which means there is no audio path through any switch or fader. As these controls collect dirt over time, the quality of audio will never be affected. Minimal internal audio wiring and long cable runs assures high RFI immunity and overall low noise levels. Remote control is accessible on a 15-pin "D" connector for each channel. There is no need for external interface boxes to gain access to all channel remote outputs and logic inputs such as channel on/off control and lamp control.

A rugged, external rack-mount power supply provides all operating voltages. Each supply is fused separately and has its own LED indicator as well as a separate ground return to minimize crosstalk and RFI.

*For more information, contact Radio Systems in New Jersey at (609) 467-8000; fax (609) 467-3044; or circle **Reader Service 9.***



Circle (187) On Reader Service Card

USER REPORT

Studio Technology Setup Is Eye Catching

by Ken Cardosa
Chief Engineer
WWMX(FM), WQSR(FM)
Baltimore

When American Radio Systems (now CBS) decided to consolidate WWMX(FM), WQSR(FM) and WOCT(FM) in the same building, management wanted the air studios built around the lobby and visible through large glass windows.

WWMX and WOCT were already in the building. This meant the construction of six new studios and the conversion of the old air studios into production rooms. I needed a company who could handle building and installing top-of-the-line custom furniture for the lobby studios as well as revamping the old air studio furniture for production rooms.

I chose **Studio Technology**, mainly because they had done the work on the existing studios and I new they could handle the new ones.

Photo by Alan R. Peterson

Studio Technology Furniture is prominent at WWMX(FM)-WQSR(FM) in Towson, Md.

The first step was design. I met with Vince Fiola from Studio Technology to discuss the needs of our studios and what I wanted to accomplish. The studios are the first thing seen when entering the lobby, so they needed to jump out with a "wow-cool" effect, while maintaining a successful major-market radio image.

I wanted these studios to have a very open feeling with lots of counter space and no hard 90-degree edges. It had to incorporate multiple computer monitors in an exceptionally clean fashion. I wanted the rack layout to provide easy user access and accent certain pieces of equipment while hiding others. Studio Technology's design provided all of this with a multi-level countertop design.

Studio Technology only builds furniture for the broadcast industry. The company understands all the considerations needed for studio furniture. The access panels are removable without tools, and the base cabinets are very open and accessible. All of the racks are vented.

In our studios, I needed large punch block areas and places to hide multiple computers and other less-attractive gear. We decided to have the racks above the counters open with the equipment visible and the lower racks recessed behind panels. The valances have cutouts for custom headphone panels.

Mic risers were a challenge as I needed as much clear counter space as possible. We came up with triangular shaped risers that held three mic arms in a minimal space. In one studio, the riser comes down from the ceiling.

Kenny Campbell from WWMX produces songs while on-air. I needed a way to house all his gear in a very small space. Vince designed a unit that fit everything in and was very convenient to use.

I wanted plenty of wood accents. We chose cherry as the accent trim. The counter tops have rounded bullnoses. The mic risers are wood as well as the valance, rack fronts, and the kick plates.

Vince suggested that I have the consoles sent with unfinished wood sides so he could stain them with the rest of the studio wood. I had my monitor speakers shipped to Studio Technology to install cherry speaker mounts. The company built wooden reel-to-reel racks, copy stands, and mic risers all to match. CD racks were constructed that angle the CDs upward to make labels easier to read. A tabletop stand was also constructed to hold an Ensoniq musical keyboard.

The best time to start furniture design is before the studio walls are constructed. This allows you to slightly alter room sizes if necessary. After reviewing my equipment list and layout needs, Vince discovered a problem. Two air studios were too narrow to use the layout I liked best because of the large console I needed to use.

Angling the console about 45 degrees toward the lobby windows made up some of the difference. I did some slight rearranging on the blueprints to make up the rest. I would not have been able to use the best layout if the walls had already been built.

It does not matter how well furniture is designed, how it looks or how well its made if it is installed poorly. The last thing I wanted to do was damage this beautiful furniture by trying to install it myself or hire a local contractor. Luckily, Studio Technology includes installation in the price.

See STUDIO, page 61 ▶

World Radio History

USER REPORT

College Picks Advanced Furniture

by Michael D. Dawahare
Assistant General Manager
and Ned Keller
Chief Engineer
Georgetown College Public Radio
Georgetown, Ky.

Georgetown College received FCC permission to upgrade its 140 W student station to 50 kW in 1997.

Early in the planning process for the station upgrade, college officials also decided to syndicate programming on the Public Radio Satellite System in an effort to pursue underwriting on both the local and national levels. With these general goals established, a modest budget of about one million dollars was set in place to build both the station and the uplink facility.

AFS Studio Furniture is in use at Georgetown College Public Radio.

Working within the parameters of such a limited budget, Ned Keller and Michael Dawahare began a rigorous search for the right equipment at the right cost. Our approach centered on a design that was both engineering and on-air friendly. In short, Keller was the engineer and Dawahare the architect.

Near the end of the project, we realized they had neglected the studio furniture. We explored Wheatstone, but our budget made that choice cost-prohibitive. Custom-built furniture was an option, but a relative new studio furniture vendor, **Advanced Furniture Systems (AFS)**, caught our eye. After examining costs and the various design options offered by AFS, we decided on the young company.

For just a little less than $9,900, we purchased a short-U, long-U and unbalanced-U shape configuration in gray (AFS also offers a beige version of the same furniture) for our three studios. We also ordered copy stands and news desk attachments for the booths.

Looks are very important to the overall morale and comfort of the folks that spend time in-studio. A good idea from an engineering standpoint might be a disaster for the end user. A good rule of thumb is to find a product with plenty of knock-out doors, rack space, and places to hide things.

AFS comes equipped with ample knock-outs, floor openings and front and rear access panels. Another feature that will save you even more dollars is the "scaleable" rack covers. A simple piece of lamented board that matches your furniture can be easily cut with a circular saw to give continuity to the places set aside for expansion.

Make sure you have ample room to add 17-inch-plus monitors. Leave extra counter space for those pesky mice and keyboards. And don't forget to take a look at the newly designed copy stand. AFS has streamlined the look since last year, and it can easily be removed to access the meter bridge of your console.

Take plenty of time to design your cable runs and plan in advance where you will place your power outlets. AFS will custom cut and mount a cable tray under your console for easy wiring and assembly. This brings me to what actually arrives on your doorstep.

Plan the day of delivery ahead of time. The furniture is modular and comes just as you pick them out of the catalog. This means that some of the units will be rather large and we would not recommend trying to move them alone. Make sure you have several people ready to help put the pieces of furniture in place.

Our three studios arrived with some assembly required. If you don't already own a screw gun, now would be a good time to invest in one. With a cordless drill we were able to assemble each room in about two hours.

For more information contact AFS in Colorado at (970) 663-4123; fax (970) 663-6338; or circle ***Reader Service 35.***

Studio Technology's Attention to Detail

▶ STUDIO, continued from page 60

The guys that build the stuff install it. When they build it, they plan for slight room size changes and come prepared to handle it. They cut holes and set the console and cut feed-throughs in the countertop. They pay attention to all the little details, and even make modifications to compensate for oversights on my part.

This holds true whenever I buy furniture from Studio Technology, not just the high-end custom stuff. I have purchased 10 rooms of furniture from Studio Technology ranging widely in price. They do offer a modular line although I have found that their custom products rivals the price of most companies' modular furniture.

After the lobby studios were completed, it was time to rework the back studios. I did not have the budget I did up front, so we needed to be creative in the reworking of this furniture. What I like most about Studio Technology is their versatility. They came up with some very creative and cost-effective reworks to these rooms.

Studio Technology builds very solid, well-made furniture. Any style and manufacture of laminate can be obtained, including Corian. The company will work with all varieties of wood. The crew's construction techniques are of the highest quality and their installation is top-notch. If something is not right, they come back out and make it right.

As our needs have changed, Studio Technology has come back to make changes to meet our needs, no matter how minor.

For more information, contact Studio Technology in Pennsylvania at (610) 640-1229; fax (610) 296-3402; or circle ***Reader Service 61.***

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The Master Control Studio, shown right, is one of seven Arrakis studios in Sony's Manhattan network origination center for SW Networks.

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World Radio History

USER REPORT

Mager Systems' Very KOOL Studio

by Gary Blau
Chief Engineer
KOOL-FM, KISO(AM)
Chancellor Media
Phoenix

When faced with building the new KOOL-FM home for the next millennium, we wanted something that would stand out from the crowd. We hoped to offer a thrill to our talent that would result in their having infectious fun on the air by simply working in such a "KOOL" studio.

The key was involving Mager Kizziah of **Mager Systems** in the design of our five studio layouts and cabinetry before the floor plan was devised. This way, we built the rooms around our needs instead of trying to fit our operation into an arbitrary box after the fact.

In our main FM air studio, we created something not only very different, but very exciting. Instead of the typical boxy, boring, square room with angular furniture, we designed a sensuously rounded and curved work environment, with no square corners on the cabinetry. Thermal-formed compound curves were incorporated to add to the organic feel of the furniture.

To fully complement this bold style, we even modified the audio console by removing the modules from the mainframe and arranging them into a sweeping arc in front of the operator, built directly into the solid-surface countertop. This not only presents a striking visual appearance, but it also enhances the ergonomics for the operator by placing the console controls within a natural and easy-reach radius. It also never fails to put a smile on a visitor's face.

The uncluttered, low-profile layout presents a sweeping, open view to the operator, out through the ample studio windows to the city beyond. There is also plenty of room for our four-person morning show, plus guests.

The solid-surface countertops are extremely durable and easy to maintain. Any scratches that occur from abuse can be easily and completely buffed out with Scotchbrite, restoring the factory-new appearance. You cannot do that with plastic laminate; one scratch and it is there forever.

Although this raw material is initially more expensive than wood and laminate, it actually takes less labor to produce highly stylized and unusual curved shapes in the final design of custom layouts like ours. Contrary to common misconceptions, it can actually cost less to produce the end result compared to a wood and laminate design. It is very cost-competitive.

However, working with these materials requires special skills and great experience in design and fabrication. Mager Systems is the industry leader in using these and other exotic materials, with an 18-year track record to its credit. My advice is to be very wary of other fabricators who claim to be able to build studios with these materials.

Mager also uses advanced engineered lumber, high-temperature glues and construction techniques to build the most structurally solid cabinets in the business. De-lamination is never a worry, and there are no knock-down particleboard shortcuts. This is how the company can offer a 10-year warranty on materials and workmanship.

KOOL-FM in Phoenix employs Mager Systems furniture.

Mager Systems also includes full on-site custom installation of each studio it builds. Every engineer who has faced the false economy of do-it-yourself, bolt-them-together bargain cabinets can appreciate the value of installation in a large studio project. There are simply too many other technical things for you to accomplish.

Finally, buying direct from the manufacturer also gives you more purchasing power. There are no distributors or salesmen taking a cut out of your hard-fought-for furniture dollar.

Our experience with Mager Systems was a big success, and our jocks undoubtedly have the KOOLest studio in the country worthy of our name. Maybe that is why we went to number one in the 25-54 category after moving in ... ?

*For more information, contact Mager Systems in Arizona at (602) 780-0045; fax (602) 780-9860; or circle **Reader Service 87**.*

USER REPORT

Custom and Unique Studio Furniture

by Robert Eller, N8KER
Audio Director
Sola Scriptura
Grand Haven, Mich.

Compared to reviews of the latest "gee-whiz" audio and radio gear, studio furniture may seem a bit ho-hum. However, anyone about to equip a studio or who has already done so knows furniture is a substantial budget item that deserves careful consideration.

The Air Studio at Sola Scriptura features Audio Broadcast Group furniture.

Having worked for 17 years as an information systems manager, I have seen the difference in productivity that proper furniture can make. When I made a career change and was given the responsibility of equipping a private recording studio, I knew furniture would be an important element of the design.

This part of western Michigan arguably is the contract furniture capital of the world. Among the office furniture giants like Steelcase, Haworth and Herman Miller, there is a company that specializes in furniture and equipment for studios — **Audio Broadcast Group**.

ABG was recommended highly to us by associates in the Christian radio field. ABG looked at our studio site, offered many helpful suggestions above and beyond furniture considerations, and then custom-designed a furniture plan to fulfill our requirements.

Particular needs

Sola Scriptura is a Christian ministry devoted to the affirmation of the authenticity, accuracy and authority of the Bible. Because of this, our studio had to be designed primarily to record Christian radio programs in various formats. We needed to accommodate a single talent, one-on-one interviews, and a one-host, four-guest roundtable discussion.

The first of two key items was a well-designed interview table. The second was the control room furniture. The 10-by-7-foot control room area would need to accommodate a digital recording console, near-field monitors, multiple cassette and DAT recorders, a DAW and duplication equipment for cassettes and CDs. Obviously, we needed to maximize the available space.

While ABG was developing the design, I visited an area installation to see how their finished product actually performed and also checked the prices of competitors. Satisfied that we had the right company for the job, we chose a laminated surface we liked and placed the order. Surface laminate material can be selected from a large selection of high-grade Pionite products.

The furniture was delivered and set up in less than one day. Mic and headphone jacks in the interview table and mic arm cables were wired and tested on-site. The control room features two 28-inch-high rackmount turrets, angled for easy access and viewing of outboard gear, with a third rack installed underneath.

The Control Room at the Sola Scriptura's Studios in Grand Haven, Mich.

A monitor riser and adjustable swing/tilt keyboard surface comfortably accommodates the DAW. Roll-out shelves provide convenient access to the PowerMac and cassette duplicator. Wiring is accessible but hidden by access panels, and all furniture features solid oak trim, which protects the laminate edges.

I have found this furniture to be attractive and durable, providing a significantly higher level of functionality and space utilization than would have been possible with pre-fabricated products. The only disadvantages are the higher cost and the need to plan ahead, since custom furniture can take more than two months to design and build.

*For information, contact Audio Broadcast Group in Michigan at (616) 452-1596 or circle **Reader Service 113**.*

World Radio History

TECHNOLOGY UPDATES

Wright Line

Wright Line offers a wide range of furniture solutions for technical and broadcast environments.

The international company designs, manufactures, markets and installs a complete line of technical furniture that fits well into studio and production areas. Information technology product offerings also include KVM switches and uninterruptible power supplies.

One line of furniture desirable

for radio is LINX, a modular computer support furniture system that combines ergonomics with high product quality to match a wide range of user needs. A full complement of storage, seating and panel options are available to provide a technical workstation solution.

Also from Wright Line are Optimedia storage cabinets for secure storage of double and single CD jewel cases, cassette tapes, diskettes and DAT tapes, as well as supporting documentation and files. The Optimedia line features more than 50 interchangeable components to meet the needs of a studio setting.

All systems are built-to-order under strict quality and safety standards. Skilled CAD engineers and architectural designers bring free design and layout capabilities into the workplace. All Wright Line manufactured products are guaranteed for the length of ownership.

For more information, contact Wright Line in Massachusetts at (508) 852-4300; fax (508) 853-8904; or circle ***Reader Service 139.***

Broadcast Electronics

Broadcast Electronics offers an extensive new line of modular studio furniture for the radio industry.

The furniture line features finished interiors, sustaining a sleek look inside all cabinets and eliminating exposed rough wood. The solid-wood trim features a contoured bull-nosed corner design, and is available in white oak, red oak or maple.

Stand-up and sit-down studios are designed with the needs of radio operators in mind. Cabinets feature built-in rack rails for convenient rack-mounting of equipment, as well as pre-cut wire chaseways providing a path for routing and concealing wires and cables. High-density fiberboard cabinet panels require no additional structural support, thereby increasing air flow and internal space.

Broadcasters can create individual styles through multiple color schemes for laminate panels, counter tops and trim. Additionally, interiors are finished with the user's specified laminate.

For more information, contact Broadcast Electronics in Illinois at (217) 224-9600; fax (217) 224-9607; or circle ***Reader Service 10.***

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TECHNOLOGY UPDATES

PR&E

PrimeLine studio cabinetry from **PR&E** features total modular design flexibility.

Available in sit-down or stand-up configurations, 21 inches of rack space are present in the pedestal units of the sit-down versions, and 28 inches in the pedestals of the stand-up versions. Combinations of basic building blocks (center section, returns and turrets) plus custom components are available for each room.

Clean lines and one-piece working surfaces characterize PrimeLine cabinetry. Hand-rubbed hardwood at all corners eliminates chipping caused by laminate-to-laminate joints, and the radiused upper edge on the horizontal trim adds softness to the appearance of the furniture. Integrated "Unibody" guest wings can take the abuse of aggressive users.

Large cable access holes and vertical cableways make wiring simple. Top-accessed leveling feet keep the user from lifting, guessing, turning and dropping. Euro Clip hinges allow silent operation, positive closure without latches and a long service life.

*For more information, contact PR&E in California at (619) 438-3911; fax (619) 438-9277; or circle **Reader Service 191.***

Anthro Corp.

The Model D Automatic Mixing Controller from **Dan Dugan Sound Design** is ideal for recording or live broadcast of multiple mic talk situations.

The eight-channel rackmount controller patches into the user's audio console for smooth automatic mixing of multiple live mics. Because the Model D frees the user to focus on balance and sound quality, faders are unnecessary. Late fade-ups are eliminated without choppy-sounding gate effects.

Model D incorporates three Dugan-patented technologies to offer quality mixing capabilities: Dugan Speech System, Dugan Music System and Dugan Gain Limiting System. The Dugan Speech System automatically manages any number of live mics in talk situations while the Dugan Music System offers automatic soft muting to reduce feedback and noise pick-up. The Dugan Gain Limiting System provides a continuous, stepless number of open microphones master gain adjusting system to prevent feedback and ambient noise build-up in the Music System.

All eight inputs and outputs are located on the back panel of the unit, along with the music system threshold input. Connections are provided for an upcoming Dugan automatic level control product that will further extend the capabilities of the Model D.

*For more information, contact Dan Dugan Sound Design in California at (415) 821-9776; fax (415) 826-7699; or circle **Reader Service 190.***

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Nigel B.

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High-grade steel is used in the manufacture of the furniture and is welded and reinforced at key areas. Proper wheels are a standard feature for moving furniture as needed, and different wheels can be fitted. Adjustable rack rails can be moved to fit the depth of installed equipment.

Extensive cable management systems are utilized throughout Nigel B. furniture. Cable grommets are mounted in work surfaces; raceways and cable-access ports neatly conceal signal and power cables. Attention at the design stage and computer-controlled manufacturing equipment ensure ease of assembly.

*For more information, contact Nigel B. in California at (818) 769-9824; fax (888) 4 NIGEL B; or circle **Reader Service 217.***

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- ☐ A. Commercial AM station
- ☐ B. Commercial FM station
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- ☐ E. Network/group owner
- ☐ F. Recording Studio
- ☐ K. Syndicators/Radio Station Service Providers
- ☐ G. Audio For Video (TV Station/ Teleprod Facility
- ☐ H. Consultant/Ind Engineer
- ☐ I. Mfg. Distributor, or Dealer
- ☐ J. Other

2 Job Function (check one)
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- ☐ B. General Management
- ☐ C. Engineering
- ☐ G. Sales
- ☐ H. Programming/News
- ☐ J. Promotion
- ☐ F. Other _____

3 Purchasing Authority
- ☐ A. Authorize/Make Final Decision
- ☐ B. Evaluate/Specify/Recommend
- ☐ C. No Purchasing Authorit

4 Equipment/Services Purchases in the Next 12 Months (Check all that apply)
- ☐ A. Transmission, STL/RPU
- ☐ B. Antennas, Towers, Cable
- ☐ C. Audio Procession Delays
- ☐ D. Telco, Codecs, Remote, Field, Audio
- ☐ E. RDS/RBDS & Subcarrier Equipment
- ☐ F. Delivery Systems & Satellite Equipment
- ☐ G. Digital Editing & Production
- ☐ H. Live Assist, Automation
- ☐ J. Consoles, Mixers, Cabinetry
- ☐ K. Headphones
- ☐ L. Microphones
- ☐ M. Monitors/Speakers
- ☐ N. Studio Audio Sources & Switching
- ☐ O. Syndicated Programming
- ☐ P. Test, Monitoring & Remote Control

5 Equipment Budget For Next 12 Months
- ☐ A. Less than $25, 000
- ☐ B. $ 25, 00- 99,999
- ☐ C. $100,000 - 249,999
- ☐ D. $ 250,000- $499,999
- ☐ E. Over $500,000

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002	037	072	107	142	177	212
003	038	073	108	143	178	213
004	039	074	109	144	179	214
005	040	075	110	145	180	215
006	041	076	111	146	181	216
007	042	077	112	147	182	217
008	043	078	113	148	183	218
009	044	079	114	149	184	219
010	045	080	115	150	185	220
011	046	081	116	151	186	221
012	047	082	117	152	187	222
013	048	083	118	153	188	223
014	049	084	119	154	189	224
015	050	085	120	155	190	225
016	051	086	121	156	191	226
017	052	087	122	157	192	227
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019	054	089	124	159	194	229
020	055	090	125	160	195	230
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026	061	096	131	166	201	-
027	062	097	132	167	202	-
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030	065	100	135	170	205	
031	066	101	136	171	206	
032	067	102	137	172	207	
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EMPLOYMENT

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Radio Engineer

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Send resume to: Simone Mullins, Radio World, POB 1214, Falls Church VA 22041. Attn: Blind Box #98-8-5-1RW.

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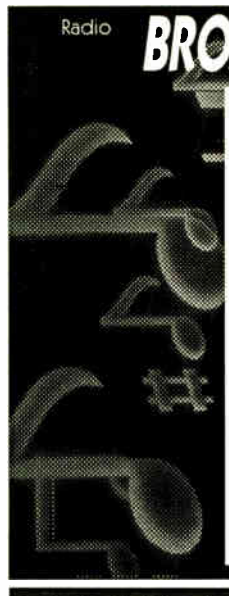
Radio **BROADCAST ENGINEER**



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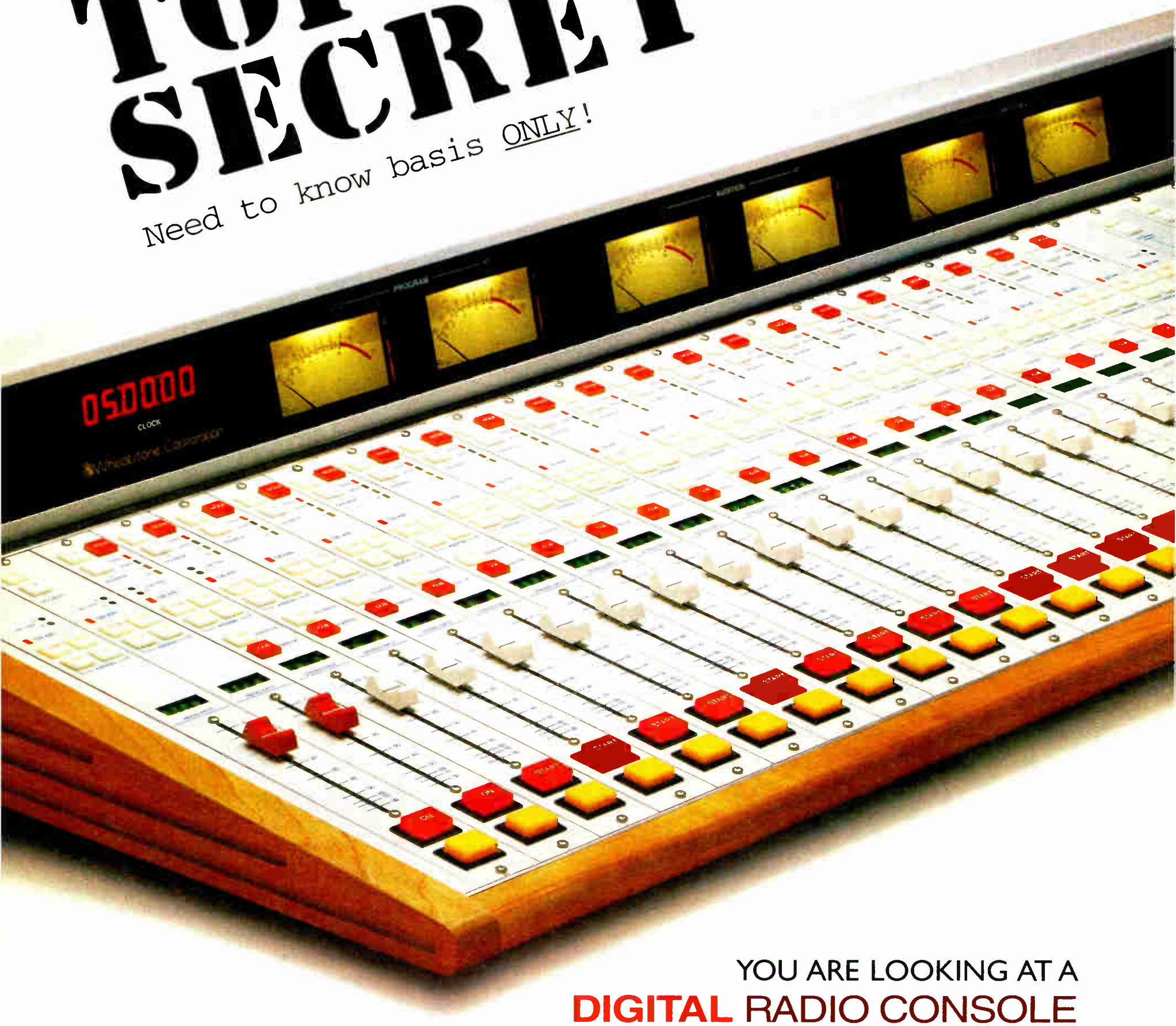

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