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 RW peeks inside election night at National Public Radio.
See Page 44

Focus on Syndication
 New programs and contact information for dozens of leading program suppliers.
See Page 24

Radio World



The Newspaper for Radio Managers and Engineers

January 6, 1999

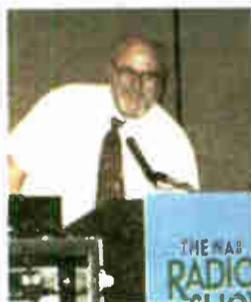
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AfriStar Digital Radio Service Nears

by T. Carter Ross

KOUROU, French Guiana The AfriStar satellite is in orbit, undergoing tests for the first weeks of the new year.

AfriStar is one of three satellite-delivered digital audio broadcasting services planned by WorldSpace.

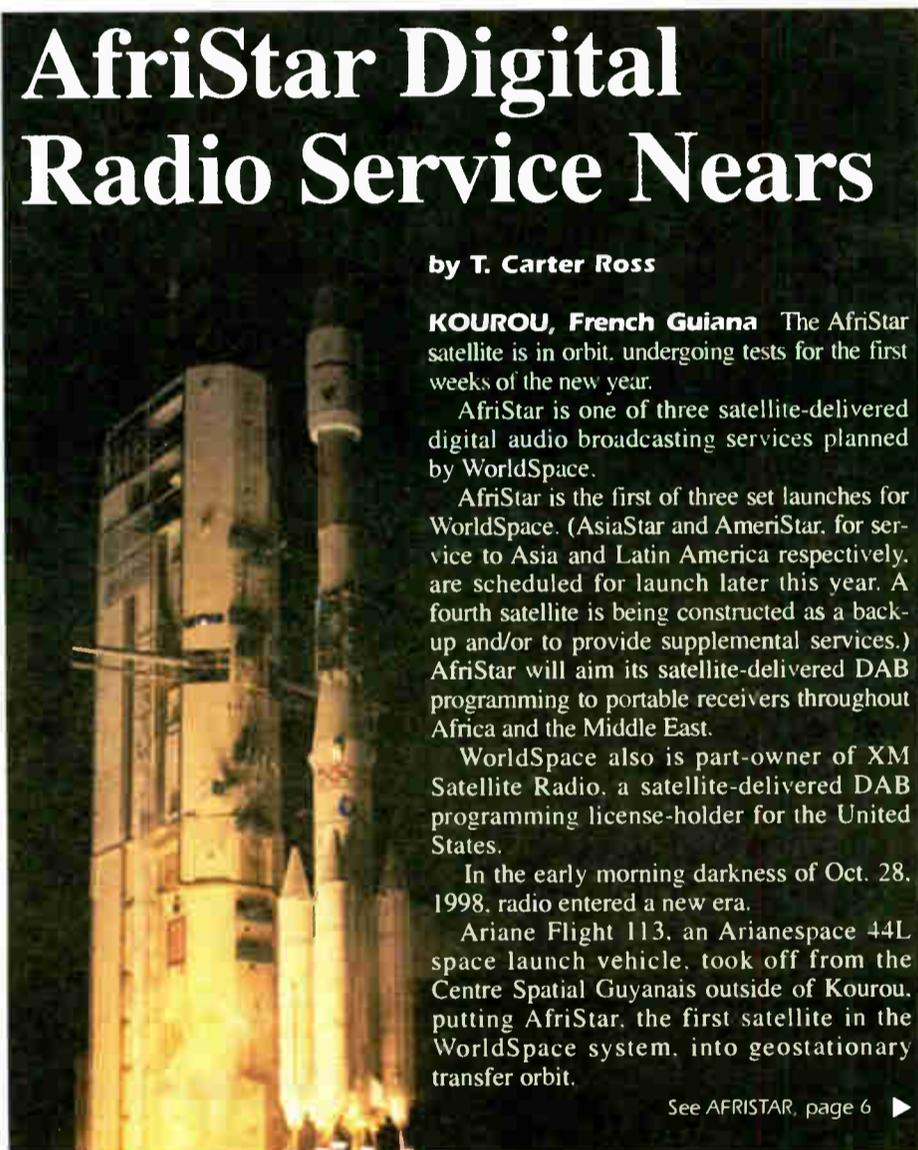
AfriStar is the first of three set launches for WorldSpace. (AsiaStar and AmeriStar, for service to Asia and Latin America respectively, are scheduled for launch later this year. A fourth satellite is being constructed as a back-up and/or to provide supplemental services.) AfriStar will aim its satellite-delivered DAB programming to portable receivers throughout Africa and the Middle East.

WorldSpace also is part-owner of XM Satellite Radio, a satellite-delivered DAB programming license-holder for the United States.

In the early morning darkness of Oct. 28, 1998, radio entered a new era.

Ariane Flight 113, an Ariespace 44L space launch vehicle, took off from the Centre Spatial Guyanais outside of Kourou, putting AfriStar, the first satellite in the WorldSpace system, into geostationary transfer orbit.

See AFRISTAR, page 6 ▶



Ariane Flight 114 takes off, putting AfriStar into orbit

IBOC Lab Criteria Complete

by Leslie Stimson

WASHINGTON Nearly one year since it was reactivated, the digital audio broadcasting subcommittee of the National Radio Systems Committee has completed what members say is perhaps



their first substantive task. Long-awaited lab test guidelines for in-band, on-channel DAB have been approved by the subcommittee.

Assessing IBOC

The guidelines, more than 60 pages, describe the lab test results that broadcasters and receiver manufacturers must see to assess the viability of proposed IBOC DAB systems. The DAB subcommittee is

See IBOC, page 10 ▶

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◆ NEWSWATCH ◆

Groups Talk Digital Interface

Continental Electronics Corp., CRL, Cutting Edge and Digital Radio Express are discussing the technical merits of a digital composite interface for the FM market.

Such an interface would permit processor/stereo generator manufacturers to preserve the digital connection all the way through the FM exciter. Now, the composite output signal from a typical stereo generator is converted from digital to analog at

the final stage in order to connect to FM exciters, even digital exciters.

Advocates of a digital composite interface approach argue that the traditional method introduces distortion into the audio signal. The question has been the topic of heated debate recently among audio manufacturers and suppliers.

"HDTV has a standard bitstream that contains all the broadcast information. We want to standardize on a single, uncompressed bitstream for FM broadcast that is equally flexible and comprehensive," said Dan Dickey, Continental Electronics vice president of engineering.

The companies also are debating if there are sound technical reasons to submit specifications for a digital composite interface to a standards organization for further debate and possibly eventual adoption.

A Third Satellite Radio Provider?

WASHINGTON There could be a third satellite digital audio services provider down the road, in addition to CD Radio and XM Satellite Radio.

A consortium of 10 wireless

communications services companies pooled more than \$13 million for spectrum in an FCC auction and now has filed an S-DARS application. The group, called WCS Radio, is based in Menlo Park, Calif.

The spectrum the group wants to use, 2310-2320 MHz and 2345-2360 MHz, is on either side of the 25 MHz split between the other two S-DARS license-holders.

When the FCC first allocated S-DARS spectrum, it said there could be frequency coordination problems with Canada and Mexico with the above frequencies, which is why the spectrum originally allocated and sold for S-DARS was reduced from 50 MHz to 25 MHz. The frequency coordination issue remains to be worked out.

Tower Near-Miss Spurs Warning

WASHINGTON The FCC has warned antenna owners to comply with tower lighting and marking rules.

The warning came after a helicopter ambulance in Texas nearly hit an unlit radio tower at night. The FCC said the incident occurred near Muleshoe, Texas, where the helicopter was forced "to alter its approach pattern" because of the unlit structure. Muleshoe police verified the

See NEWSWATCH, page 3 ▶

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Manufacturers Eye Global Dip

by Randy Stine

With economists estimating that 40 percent of the world's financial markets are in a recession, ground zero being Southeast Asia, how are American broadcast equipment manufacturers enduring the soft international market? Will the trend affect U.S. consumers of those products?

Some suppliers have been hurt more than others. Broadcast Electronics laid off about 10 percent of its workforce in early October, and blamed it partly on poor sales to Pacific Rim countries. So far, BE is the only equipment maker to acknowledge publicly that it has had to lay off employees during this global economic downturn.

Hard hit

Particularly hard hit have been Japan, Thailand, South Korea, Taiwan, Indonesia and Malaysia. Many countries have seen recessions become outright depressions. Japan is suffering through its worst recession since World War II. Taiwan's economy has stabilized since late summer.

Observers say radio stations in Asia have felt the impact. So with little money for expansion or equipment upgrades, most American broadcast manufacturers doing business in the area found 1998 to be a year of soft sales and lost income. But they disagree on what will happen next.

Brad Harrison, director of interna-

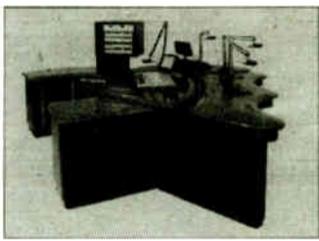
wild fluctuations are due in part to the normal business cycles that the world's economies go through.

"As an industry we are in a lull peri-

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Companies like Pacific Research & Engineering are active marketers abroad.

od for international business, but I think that is a direct result of the strong U.S. economy and the strength of the dollar right now. If we see a recession here in the States next year,

and South America, so the company doesn't expect to take as a big of a financial hit as some other manufacturers. "We have had good numbers this year in Brazil and Columbia. Even Mexico has been strong for us. In Europe, countries like England, France and Italy are the mainstays for us, and things are good there," Wood said.

International sales

Dan Dantzer is president of the pro audio division at Telex Communications Inc., makers of the Electro-Voice line of mics. About half of Telex revenues come from international sales. Dantzer said the portion from the Asian market will be smaller this year.

"Outside of good things happening in China, there isn't much to brag about elsewhere," Dantzer said the China market has been good, and is getting even better.

At Radio Computing Services, Leo Facto, chief financial officer, doesn't see the Asian economies improving anytime soon.

"Things are tough. Thailand and Indonesia are both a mess. I think things in Taiwan are looking better. Japan remains a big question mark," he said.

Facto said that radio station spending has virtually disappeared for RCS in See GLOBAL, page 7 ▶

NEWSWATCH

▶ NEWSWATCH, continued from page 2
tower is now lit. The FCC was investigating the incident.

Towers 200 feet and taller, or those in certain areas designated by the Federal Aviation Administration, must be lit from dusk until dawn, according to FCC rules. If a top tower light is out for more than 30 minutes, the FAA must be notified.

Infinity IPO Historic

NEW YORK Infinity Broadcasting began trading 140 million shares of Class A Common Stock at \$20.50 each in December.

Net revenue expected from the initial public offering was valued at approximately \$2.75 billion. The Wall Street Journal called it the largest media IPO ever. The stock began trading Dec. 10, 1998, on the New York Stock Exchange under the symbol INF.

CBS Corp. will continue to own 83 percent of Infinity after the stock sale, leaving Mel Karmazin, who was to become CBS Corp. chairman and chief executive officer on Jan. 1, in control (RW, Nov. 25).

Opinions are mixed on how severely U.S. equipment suppliers will be affected by economic problems abroad.

tional sales for console maker Wheatstone Corp., spent the month of August last year traveling to many Asian countries. While meeting with distributors, Harrison got a close look at the problems.

"It is bad, no question," he said. "The market in places like Thailand and South Korea has dried up. Japan doesn't really affect us anyway. It's almost a closed market because they buy mostly domestic-made products," he said.

Digital conversion

Harrison said most of the radio stations in the countries he visited are in the process of digital conversion, much like the United States. "They have a lot of catching up to do though. Right now the money to do so just isn't there."

International sales account for anywhere from 25 to 75 percent of revenue for Inovonics Inc. Jim Wood, president of the California firm, said those

most likely the currencies of those countries suffering now will come back a bit," he said.

Inovonics sells mainly to Europe

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So ... What Do You Think?

Radio World is blessed with a large number of readers who are involved intimately in the workings of radio. They have strong opinions. Sometimes they direct them to **RW**; and sometimes they direct them *at* **RW**.

I love it when readers react to stories. It means they are engaged in the issues that matter to them. Nothing pleases me more than hearing from an engineer or station owner that he or she reads our publication cover to cover. And I hear it all the time.

Many readers ask specifically about our policies for printing opinions. Letters, Guest Commentaries and editorials are important parts of **RW**; indeed, they are among the most closely read elements of the paper.

My goal as editor is to create a "mar-

ketplace of ideas" here. That goes beyond printing letters and interviewing industry people; it means we work to make sure that people with a different viewpoint than ours have their say.

This policy causes some readers to assume we endorse those opinions. "How can you print that?" they ask. "You're doing the industry a disservice by endorsing that view, or by giving it ink." I could not disagree more. It is far better to print unpopular or unusual opinions, and foster debate, than to print only the palatable, the popular and the politically correct.

The kinds of opinion that appear in **RW** include:

Reader's Forum: Our letters to the editor appear on page 5 in every issue. You can send your opinions via e-mail to radioworld@imaspub.com, fax to (703)

820-3245 or mail to us at the address shown on the facing page. We read all letters, and most reach print.

To maximize the chance that your letter will be published, make it short and concise. If you are responding to a specific article, include the headline and issue date. Also include your full name, title, company and address.

The most common reason we do not print letters is that they are too long — in some cases, many thousands of words. We ask the author to resubmit their piece, shortening it to fit our page.

Another reason for rejection is that letters come without a name. We do not publish anonymous letters. While this occasionally means we must turn away a thought-provoking letter, this policy assures that writers will not try to use

From the Editor



Paul J. McLane

RW to advance their agendas without taking public responsibility for their own opinions.

We extend the opportunity to submit letters to all parties involved in our industry, including suppliers. We exclude neither non-subscribers nor non-advertisers. All are welcome to express their opinions.

Guest Commentaries: **RW** seeks longer opinion pieces about the radio industry from individuals positioned to offer special insight, expertise or unusual viewpoints on a specific issue of importance to our readers. The writer might be the director of engineering for a group, a station owner, the president of a manufacturer, an FCC commissioner, a trade group official, or a litigant in a newsworthy legal case. We hope readers will reply to these commentaries with their own opinions, as well.

Columnists: Some of the finest columnists in the industry appear here, including John Bisset, Frank Montero, Troy Conner, Barry Mishkind, Steve Lampen and many others. These columnists frequently offer opinions. Readers who wish to respond to those opinions can choose to write a letter to the editor, or contact the columnist directly.

Editorial: In each issue, **RW's** editorial staff presents an opinion on a relevant topic. It appears in the shaded box on page 5.

In another issue, we'll talk about how **RW** formulates the opinions that appear in that box.

Tech Trek Wrap Party

More than 180 people gathered in the lobby of One American Center in Austin, Texas, to celebrate the conclusion of GulfStar's Tech Trek (**RW**, Dec. 9) and the opening of the GulfStar StarSystem.

Executives thanked the Trek sponsors;

record label representatives mingled with Capstar engineers, programmers and StarSystem jockeys; Capstar staff mugged for the camera; and everyone had a good time.

Frank McCoy, Gulf-Star vice president of engineering and guiding light of the

Tech Trek station bus tour, was dressed in trademark bow tie topped with a broad grin as he thanked sponsors for their support and accepted a ceremonial check.

The sponsors of the tour included Harris Broadcast, Orban, Audio Precision, Prophet Systems, Radio Systems, Gepco International, Gentner and Belar Electronics.



Left photo: Orban presents its Tech Trek sponsor check. From left: Steve Schott of Harris, Frank McCoy of GulfStar, Rick Sawyer of Orban and John Cullen of Capstar. Right photo: Don Miller, Star System talent, 'Miss Kara' Dittmer, assistant to Frank McCoy, and Michelle Manuel, GulfStar Accounting Information Systems manager, enjoy the party.

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◆ READERS FORUM ◆

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All-digital discussion

Dear RW,

In response to your query regarding "Will Radio Ever Be All-Digital" (RW, Nov. 25, 1998) my response as a 31-year broadcast veteran is: I hope not! The reasons Paul McLane cited in his editorial were quite enough for most people (except the "digital-at-all-cost" boys).

As a long-time fan of the old "Star Trek" series, I found a quote in one of the original movies that fits this situation quite nicely. The president of the United Federation of Planets in a speech made the following statement: "Just because we *can* do something, does not necessarily mean we *have* to do it."

As vice president of engineering for a small-market radio station, I am always being bombarded with "digital this" or "digital that." So far, I have yet to see a

viable reason to totally go digital. Sure, we store our commercials on hard drive — but do *not* attempt to remove my Ampex reel-to-reel from the rack! It still does a lot of the workload.

There has been a feeling, not just in broadcasting, but throughout the entire nation that anything that is more than a few years old is bad. Well, sorry guys — that isn't so. Will there continue to be digital improvements? Undoubtedly. But there's no reason to "throw the baby out with the bath water."

Jerry Arnold
Vice President of Engineering,
WTHC(FM)
Terre Haute, Ind.

Perfect Paul ponderings

Dear RW,

Our area NWS office got cut and we were one of the first areas to get "Imperfect Paul" ("Perfect Paul: NOAA Voice Not So Ideal," Oct. 28, 1998).

It sounds horrible. We can't understand half of what he says, much less try to get our listeners to. The NOAA radio alerts are always extremely delayed to our weather wires. One of those systems is the EMWIN system and NOAA never comes close to it. If we were to start air-

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Next Issue of Radio World
January 20, 1999

New Year's Resolutions

It's hard to keep New Year's resolutions. It's much more fun to make them for other people.

In 1999, radio pirate Stephen Dunifer should apply for an enforcement job at the FCC Compliance and Information Bureau.

Chancellor, CBS, Clear Channel, ABC, Cox and Entercom should merge and decide to manufacture an Internet browser.

The major TV networks should hold a joint press conference to announce that they tried HDTV, and it worked OK, but they think their new spectrum would be much better used for ham radio.

The NAB should find a new city to host its spring convention, one without a single hotel with clown paintings on the walls. Honolulu would be nice.

At the spring show, DAB proponents Glynn Walden, Suren Pai and Derek Kumar should meet on the first tee of the annual charity golf tournament. The one who hits the longest ball gets to establish the IBOC system for the United States.

The FCC should create a fund using money from PCS fees. The money would be used as bonuses to keep radio engineers from taking jobs in other technical fields.

In 1999, the National Weather Service should replace its automated weather alert voice with that guy who gets the crowd fired up at basketball games. ("The following is a tornado alert. OK, Omaha, let's get ready to r-u-u-m-m-m-b-l-e!")

If the FCC is going to allow satellite radio, it should also issue rocket licenses to station owners to try to shoot the satellites down. What's fair is fair.

General managers should try wearing their engineer's beeper for one week. Engineers should try one week of sales calls.

In 1999, Rush Limbaugh should put some flesh back on his bones. Dr. Laura should cover hers up. Tom Joyner should stay just like he is. And Art Bell should phone home.

Happy New Year from the staff of ...

— RW

Write to Us

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ing the EAS NOAA over the air it would make us give out weather statements with a huge delay, compared to how we get them out now. We do print out the statements from the EAS, for record-keeping.

Mark Huber
General Manager
WVSM(AM)
Rainsville, Ala.

Networks vs. local programming

Dear RW,

This is in response to the Oct. 14, 1998, letter from Bob Foster who was responding to Paul McLane's earlier editorial "A Dinosaur Frets About Extinction."

No one has said that networks are a bad thing in general. It is when a radio station becomes nothing more than a terrestrial repeater for a network that the station and its associated owners get cast into a bad light.

Where do you think the talent pool for the networks come from? They are not grown on an island in the South Pacific and then imported in when needed. They work their way up from the "farm team," or local stations. If the talent pool for qualified announcers on the small-market level is shrinking, where do you think that will put the talent pool for the net-

works in a few decades?

Let's also take a look at how the television networks have affected local television over the past 50 years. There is a local CBS affiliate in this market that has been on the air for 45 years. Long ago and far away, the network only supplied three hours of nightly programming. The other 15 or so hours of the day were filled by local programming. There was even less network programming on weekends. The television stations developed a local brand by the programming they had to come up with to stay on the air.

Now, the only local branding is the bug that seems to have become a staple of local programming. There are, excluding news programs, one and a half hours of locally produced programming on this very same CBS affiliate 45 years later.

I now take off my industry experience hat and put on my listener hat, and say this as a disenfranchised listener. How about instead of adapting to new trends, setting a few new trends of your own? I don't want to be in Valdosta, Albany, Macon and Savannah, Ga., hearing the same national network on five stations. I want to hear programming and talent from those cities. Radio was unique in that way. The key word here is "was."

There is still some good radio to be done at the grassroots level if you get away from the satellite receiver and get back to farming and developing your own talent.

Scott Cason
Former Radio/TV Engineer
Macon, Ga.

Readers to the rescue

Dear RW,

We need your help with what seems to be an impossible question to get an answer to.

A WWII buddy of mine presented me

with the question, "What was the music that accompanied the introduction of Tokyo Rose's broadcasts?"

I must confess that even though I listened to her many times in the South Pacific, I have no recollection of that music.

Many others that I questioned also could not remember.

Perhaps one of your readers can come to our rescue.

Norm Gertz
Retired Communication Consultant,
Retired Colonel USMC,
61-year Amateur Radio Operator
Orlando, Fla.

Disappearing engineers

Dear RW,

In response to "Know Any Good Engineers?" (RW, Oct. 14, 1998) — yes I do! They all work in a field that maybe they don't even enjoy as much as broadcasting *but* they can afford to feed their families.

Broadcast engineers are disappearing quickly as the value of their positions erode. Why would you want to work excessive, erratic hours for very low pay and have to fight to buy repair parts, let alone do anything preventive?

I have only worked for one general manager who was smart enough to figure out that there was no way to beat the maintenance cycle. Most GMs think they are the ones that are smart enough or lucky enough to be able to reduce that ugly thing known as "maintenance."

Where do we find qualified engineers? Just look around. There are plenty of them out there, but you won't get them, unless, of course, you are willing to pay them and support them.

Mike Seaver
Engineer
Qui-

WorldSpace Service

► AFRISTAR, continued from page 1

The launch capped three and a half years of work by WorldSpace and its partner Alcatel in the development of a three-satellite system for delivering high-quality digital audio.

"Today is a major milestone for WorldSpace's vision of using new satellite audio technology to deliver programming to three-quarters of the world's population that lacks radio reception and program choice," stated Noah Samara, chairman and CEO of WorldSpace Corp. in a press release announcing the launch.

"This is the result of eight years' work by a dedicated international team that believes in our goal of providing information affluence to areas that are not adequately served with high-quality news, knowledge and entertainment at an affordable cost," he stated.

The AfriStar satellite arrived in geosynchronous orbit at 21 degrees east on Nov. 3 and was set to undergo tests through the first few weeks of this month.

The tests were conducted not only to make certain that the satellite survived the rigors of launch and then made it into its proper orbit, but to test reception and receiver function in the field before mass production of receivers begins.

Preproduction units

Hitachi, Matsushita (Panasonic), Sanyo and JVC all delivered preproduction versions of their receivers to WorldSpace for the tests. After what WorldSpace has termed an "extensive validation testing process," commercial broadcasts from AfriStar to the whole of Africa and the Middle East will commence in spring 1999. (See receiver story below.)

The orbital "parking" of the satellite and its testing were overseen and controlled from Centre National d'Études Spatiales (CNES) in Toulouse, France, by a team of Alcatel, Matra Marconi and WorldSpace experts.

By the end of this year, WorldSpace will have three satellites in orbit, delivering digital radio to most all populated regions of the Southern Hemisphere. A fourth satellite, constructed as a backup, also will be available to provide additional services to a region or to serve a new target area.

"There is a paradigm shift with the WorldSpace system," said D.K. Sachdev, senior vice president of engineering and operations for WorldSpace. "Basically, we are changing radio from a local medium to a regional and global information system for billions of people."

With the WorldSpace system, broadcasters will be able to deliver programs to a wide geographic area in a variety of levels of audio quality. Each satellite can

downlink three L-band beams.

Each of the three beams on the satellite can provide up to 192 channels of mono audio, 96 channels of stereo audio, 48 channels of stereo music-quality audio, 32 channels of near-CD-quality audio, 24 channels of CD-quality audio, or a combination of services. The maximum downlink capacity for the satellite is two 1.536 megabits-per-



WorldSpace Senior Vice President of Engineering and Operations
D.K. Sachdev

second streams on each beam.

Revenue will flow to WorldSpace through leased capacity on the satellites, licensing revenue from the sale of receivers, advertising on WorldSpace-developed programming and other content. Sachdev said WorldSpace was considering the possibility of including subscription channel and multimedia pay services in the program-offering mix, too.

In all, each beam will include 50 to 60 digital audio services. According to WorldSpace, these services will include 16 channels of unique, new content, including 13 music channels, a long-form news program and children's programming.

Programming deals

Five to 10 of the channels will feature international brand-name programming, such as "Bloomberg Business News" and CNN International; five to 15 channels will feature regionally known broadcasters, such as Radio Sud of Senegal; five to 10 channels will include unique regional content, such as Africa Information Service; five to 10 channels will be used by national broadcasters, such as the Kenya Broadcasting Service.

The remaining five channels will be devoted to developmental programming from the WorldSpace Foundation. Using digital radio to provide health, development and educational programs to the

developing world has been central to Samara's vision for WorldSpace.

Broadcasters participating in the WorldSpace system have two ways to uplink their programs to the satellites: common-hub mode and distributed-access mode.

With the common-hub mode, all the programming is brought via telecom, satellite or radio links to a central site for processing and uplinking. With the distributed-access mode, program providers send their programming directly to the satellite. In the latter case, processing of the program audio is conducted on board the satellite (see sidebar, page 8).

From the satellite, the signals are downlinked in L-band to the receivers, which can receive two sets of 48 channels, half of which come from the common-hub mode stations, half from the distributed-access mode stations.

Although the WorldSpace system operates in the L-band, there are no concerns about possible conflicts with Eureka-147 DAB, which also operates in the L-band.

According to Sachdev, WorldSpace and Eureka 147 operate at different ends of the L-band, and both groups have worked with the International Telecommunications Union frequency regulation committees to ensure that there are no conflicts.

"The biggest problem will actually be with existing terrestrial microwave links, which are not very well documented," Sachdev said. WorldSpace is developing filters for the receivers to handle this problem.

To support the WorldSpace satellites, Alcatel constructed ground systems on five continents. The regional operational centers oversee a variety of administrative, business and technical issues or the system. Telemetry, command and ranging stations keep the satellites in proper orbit and

ensure that communications flow freely between the earthstations and spacecraft.

The technical support services center in Toulouse, France, oversees system integrity for all the WorldSpace satellites. The communication systems monitoring stations ensure that the signal strength and audio quality meet the needs of WorldSpace customers.

Satellite operations

For the recently launched AfriStar satellite, regional operational functions are handled out of WorldSpace headquarters in Washington, D.C. Technical support functions are handled by earth stations in Bangalore, India, and Port Louis, Mauritius. Communication systems monitoring is handled by a facility in Libreville, Gabon.

In total, more than 700 people working for Alcatel and its subcontractors were involved in design and construction of the WorldSpace spacecraft and the support infrastructure. The total contracts for all the work were worth some \$700 million, according to Jean-François Gambert, vice president for business development and strategic alliances at Alcatel.

For Arianespace, the flight also marked a milestone — the heaviest payload ever launched by the company.

AfriStar weighed about 6,083 pounds at liftoff; with the weight of its copassenger, GE-5, and that of the Spelda adapter that makes a dual launch possible, the total payload weight for Flight 113 was about 10,817.4 pounds. The previous record was 10,808.6 pounds for Ariane Flight 93.

The Arianespace 44L space launch vehicle used for the launch is the most powerful launch vehicle in the Arianespace 4 family of rockets. It used four liquid booster rockets to increase the thrust of the vehicle.

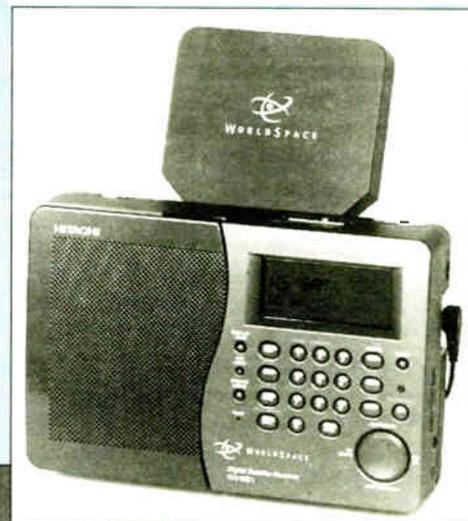
Manufacturers Unveil WorldSpace Receivers

by T. Carter Ross

WASHINGTON Digital satellite broadcasting has become more than technology as receiver manufacturers have turned out their first production units.

Fifteen months after the first chipsets for proprietary WorldSpace receivers were developed, four receiver manufacturers unveiled their first production units.

Representatives Hitachi, JVC, Matsushita (Panasonic) and Sanyo showed what they said are the first



The JVC FR-DS100 (left) and Hitachi KH-WS1 (top) include FM, mediumwave and shortwave reception capabilities alongside L-band reception.

digital satellite radio receivers at WorldSpace headquarters here in Washington last month.

WorldSpace Chairman and Chief Executive Officer Noah Samara said See RECEIVERS, page 8 ►

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U.S. Handles Asian Market Slide

► GLOBAL, continued from page 3
some countries in Southeast Asia, especially in terms of new business. "Radio stations just don't have any money right now. We have many stations under long-term agreements that are struggling to make payments. In fact, some radio stations are going under," he said.

RCS services Southeast Asia accounts from its office in Singapore. Facto said business for RCS in China is robust.

At Pacific Research & Engineering, Don Naab, president and chief operating officer, said the console maker has seen a "negligible impact" on international sales due to the Asian crisis. "Things are very tight, no question. We will wind up down a bit for that region. But, we have actually increased market share to a great number of those countries," he said.

China sales 'explosive'

Naab, like Facto, points to China as a country where sales have remained strong. "With the privatization and digitalization of radio in China, we've picked up a big boost there. I would term the sales as explosive in China," he said.

Harris Corp. has no intention of giving up on Southeast Asia. Jim Woods, vice-president of radio broadcasting for Harris, said times like this demand patience.

Lost sales in Asia have been made up for in other parts of the world.

"We have a main office in Malaysia that will continue in what I call a maintenance mode until things are better. That's all you can do right now. Asia has always been a very good market for us. Right now it is down, but not zero," he said.

Most broadcast equipment manufacturers contacted by RW for this article believe that what has been lost in Southeast Asia this year has been made up elsewhere in the world. One of the benefits of being global is the ability to survive recessions in different parts of the world.

Australia has been strong in sales for some manufacturers. Woods of Harris said, "They are primed for digital on all fronts. Actually, we have had a bit of a sag, but only because broadcasters are looking to see what everyone else will do. I think when it busts open, it will in a big way."

The economies of most of the former Soviet republics are flagging. American companies looking to sell in Central Asia find poor economies and unsettled political hierarchies six years after the collapse of the Soviet Union.

Wheatstone's Harrison said, "Russia is troubled right now. I think they have caught the same cold as Southeast Asia. We just made a major sale in Kazakhstan, but at this point they are few and far between."

The review on Europe is mixed, with

some manufacturers finding healthy markets in England, Poland, France, Germany and Italy, while others have found things a bit tighter.

American broadcasters

Will U.S. broadcasters be paying higher prices for broadcast equipment due to the economic difficulties of Southeast Asia? While every situation is different, general economic theory states that steep price hikes in one market cannot make up for slumping sales elsewhere.

"We don't foresee any major changes in price structure for the coming year," said Woods. "If you boosted prices here in the States over and above normal

expected levels, you would run the risk of losing market share and making imports look even more attractive."

The strength of the dollar against foreign currencies has meant cheaper imports here and more expensive American-made goods overseas.

Dr. Mordechai Kreinin, an economics professor at Michigan State University, said that in some Asian countries, currency values have fallen 50 to 60 percent against the U.S. dollar in the last year.

"Because of that, prices of imports from places like Korea and Japan are down, making them even more competitive with American manufacturers." That presumably benefits international compa-

nies that import audio products to the United States, under names like Sony, Panasonic and Tascam.

Slowdown in '99?

While the low cost of foreign goods is helping to keep inflation under control in the United States, Kreinin said manufacturing layoffs in the United States due to the Asian downturn are causing recession fears here.

"We are really an island of prosperity, surrounded by a sea of depression. With exports down across the board, I expect we'll see even more layoffs from the manufacturing sector in the first quarter."

American broadcast equipment manufacturers hope the U.S. economy can avoid a slowdown in 1999. That, coupled with a recovery in global markets, would make for a happy New Year.

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WorldSpace Target: 500,000 Units

► RECEIVERS, continued from page 6
the units on display were actual production units, not mockups — the same units that would be on store shelves in Johannesburg, South Africa; Nairobi, Kenya; Casablanca, Morocco; Cairo, Egypt; and other cities throughout Africa and the Middle East in 1999.

The receivers are expected to cost between \$250 and \$350, depending upon manufacturer, model and local import tariffs. The price is expected to decrease as more receivers are sold. WorldSpace expects 500,000 receivers to be sold during its first year of operation.

Samara said that WorldSpace figures there are some 200 million to 250 million households in the service areas that can afford receivers at the initial price. This figure is based upon the number of households in Africa, the Middle East, Asia and Latin America that own satellite television disks, VCRs and other home electronics, he said.

Although the four receivers sport different features and capabilities, they all provide full access to the WorldSpace satellite-delivered digital programming and can be powered by AC power or DC batteries.

Each receiver includes a program selection process that allows users to search for programming based on language and program type. Users can select a number of presets to return to favorite channels.

The receivers include an LCD screen to display the program name and other information, as well as a data in/out port for connection to a PC, allowing users to take advantage of future satellite-delivered multimedia and data services.

Each receiver is individually

addressable, allowing for the future introduction of subscription-based pay audio and multimedia services.

Because the units are receiving a satellite-based signal, reception requires a line-of-sight path to the sky. Therefore, the antenna on each of the receivers is detachable and can be placed 10 feet to 16.5 feet from the receiver. This dis-



The Panasonic RW-WS10 (top) and Sanyo DSB-WS1000 (left) are designed as WorldSpace-only L-band receivers.



tance can be extended up to 33 feet with an additional cable.

New receivers

Of the receivers, the Panasonic RW-WS10 and Sanyo DSB-WS1000 are designed as WorldSpace-only L-band receivers, while the JVC FR-DS100 and Hitachi KH-WS1 include FM, medium wave and shortwave reception capabilities alongside L-band reception.

The Hitachi KH-WS1 is a compact portable unit with 10 preset memories, a mono 200 mW speaker and stereo headphone/line outputs. It also includes clock and alarm functions.

The JVC FR-DS100 looks like a typical "boombox," with large speakers flanking a center control panel. Yoshikazu (James) Yamamoto, general

manager of the JVC international sales division, said, "JVC has embraced digitization from the start and the company is happy to apply its technology to the WorldSpace project."

Three-year R&D

The Panasonic RE-WS10 features two full-range 3.2-inch, 2.3-ohm speakers, clock/timer functions, preset EQ and up to 10 station presets.

The Sanyo DSB-WS1000 is designed for portability and includes a shoulder strap. Features include 32 preset memories and a digital optical output for stereo connection to an MD recorder or similar gear.

WorldSpace spent three years working on the development of these receivers. Its partners included SGS-Thomson Microelectronics and Micronas Intermetall for the development of chips, Rohde & Schwarz for the development of test equipment, the Fraunhofer Institut for the development of the MPEG 2.5 Layer III encoding algorithm, and the four Japanese receiver manufacturers.

WorldSpace Satellite Payload Specifications

AfriStar and the three other WorldSpace satellites were built by Alcatel on the same design.

At the front of each unit is an X-band receive antenna, which receives signals from both the common hub-mode stations and the distributed-access mode stations. Each satellite can accept up to 576 signals of 16 kilobits per second, downlinking 192 16 kbps channels on each of three beams in the L-band.

From the antenna, the signals are directed through a splitter that divides the signal, called a two-way hybrid, to the six transponders. Half the signals flow to a three-way hybrid, the others to an on-board baseband processing system.

According to Jean-Noël Giralldbit, WorldSpace system executive director for Alcatel, AfriStar will be the first commercial satellite to use this processing system, although it has been tested and used by NASA.

In the processor, the signal flows first

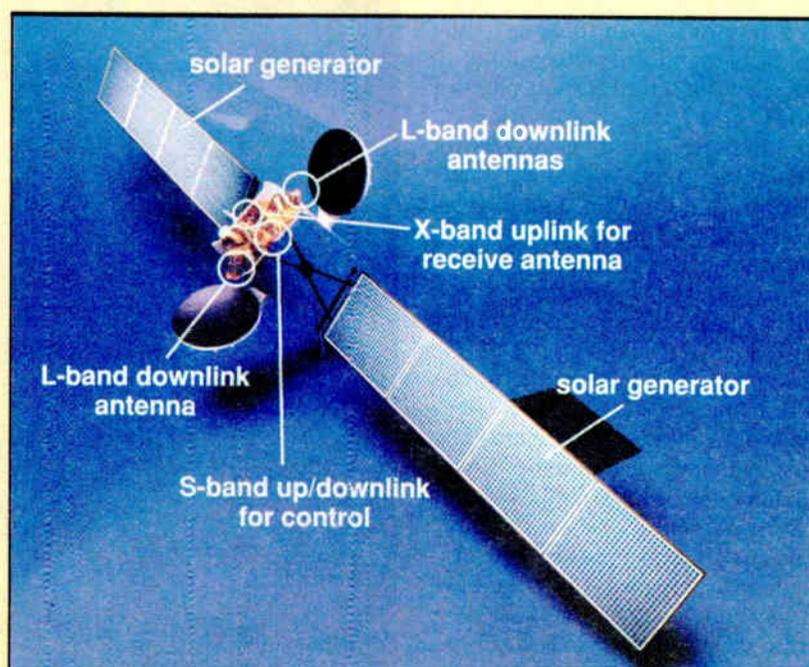
through a multicarrier demultiplexer and demodulator, then through a routing switch, which divides the signals into three groups for transit through the TDM generator and L-band modulator.

The transparent signals that flow through the three-way hybrid are split into three groups for transit through an IF demultiplexer and L-band upconverter. Because these signals originate at a common hub-mode station, processing is applied before the signals are uplinked.

All six groups of signals then pass through an L-band 300 W TWTA amplification stage before being passed along to the two antennas that bounce the three L-band beams to WorldSpace receivers on the ground.

To ensure high audio quality with low-bitrate signals, the system employs an MPEG 2.5 Layer III encoding algorithm developed for WorldSpace by the Fraunhofer Institut.

— T. Carter Ross



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IBOC Road Maps Well on the Way

► IBOC, continued from page 1

evaluating "each of the proposed systems to see if they are significantly better in quality and durability than the system we have today," said NRSC Chairman Charles Morgan.

System development

Because each of the proponents are at different stages of development for their systems, the NRSC does not plan to compare one system to another. That does not preclude another body, such as the FCC, from comparing one system to another, Morgan said.

Unlike the prior DAB test program in which the NRSC participated (the EIA trials in which both in-band and

out-of-band DAB systems were tested in 1994 and 1995) when multiple systems were tested simultaneously, these guidelines are designed to support independent testing of systems either by the proponents, with third-party oversight, or by independent test contractors.

The lab test guidelines discuss proponent submissions, subjective evaluations and test results. Although the subcommittee is releasing the lab and field test guidelines separately to keep the evaluation test process moving, it does not want data submitted in two parts. As reported by *RW* earlier, the DAB subcommittee is only interested in evaluating data submissions on complete sys-

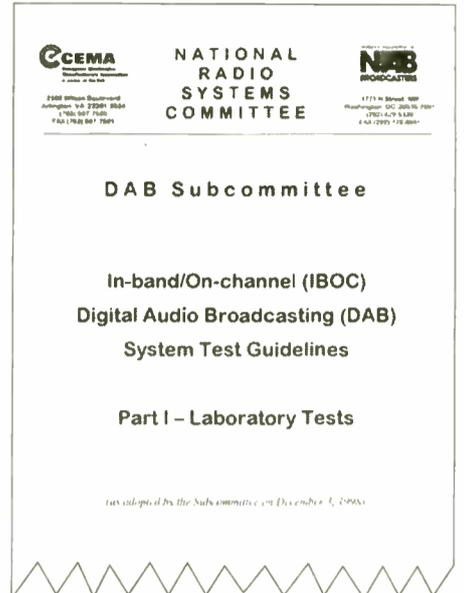
tems (both AM and FM). Submissions should include a detailed system description, with transmission and receiver operational requirements.

Evaluations

Two forms of subjective evaluations are discussed: formal and informal audio tests. Formal evaluations are suggested, which, for unimpaired audio, involve listening tests comparing IBOC quality against analog AM and FM as a reference. For audio obtained under impaired conditions, such as multipath, expert listeners will make observations about threshold of audibility and point of failure, or what one observer called unlistenability.

Informal long-form evaluations involve recording long amounts of audio in multiple programming formats. IBOC audio would be compared to the same material sent through NRSC-approved AM or FM analog air chains.

Test results to be submitted range from unimpaired audio quality to per-



formance with multipath interference. Compatibility issues, such as how the inserted digital signal interferes with the host and adjacent main analog signals, would also be documented.

Proponents have raised the issue of how to evaluate all-digital IBOC systems, specifically, the integration of all-digital approaches into hybrid systems consisting of both analog and digital carriers, and the transition from hybrid to an all-digital system.

Traditional IBOC

NAB and the Consumer Electronics Manufacturing Association, which co-sponsor the NRSC, have told the committee that for now, hybrid technology — what the group terms "traditional IBOC" — is what the group should be focused on evaluating.

The lab test guidelines were to be sent to all proponents. The group plans to focus on field test guidelines next.

"Now we can begin putting together an evaluation subgroup to determine how the data (submitted by proponents) will be evaluated," said Morgan. He hopes to have that group together and an evaluation plan in place for a vote by NAB '99.

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The RØDE Broadcaster On-Air Microphone

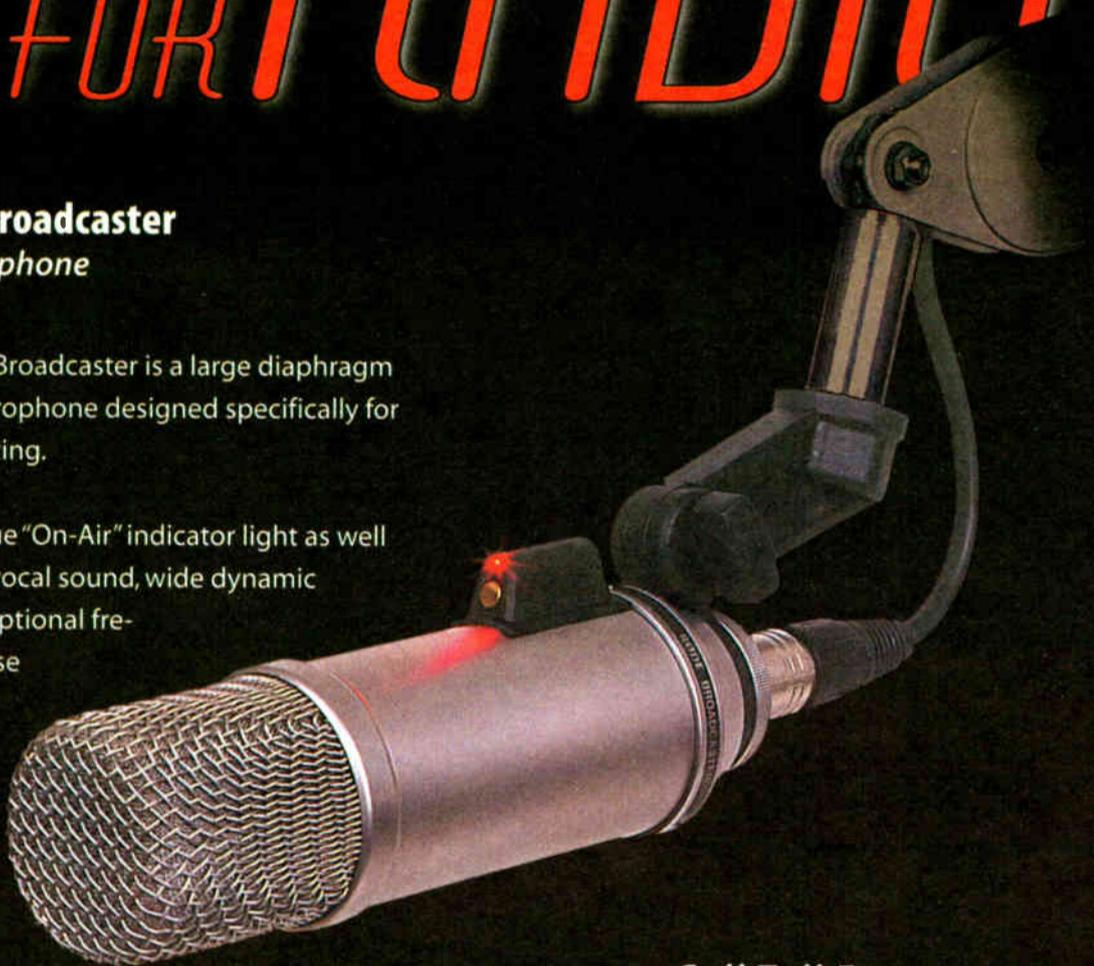
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- RW Tests Out the Whirlwind PressMite And Audio-Technica 7000 Series Wireless Mic System

Know Where Your Service Is?

Charles S. Fitch

This is the third in a series of articles explaining the National Electrical Code. The previous part appeared Nov. 11. All articles to date are available at www.rwonline.com

In previous installments we discussed the general structure of the NEC as it relates to the electric system in your station. We covered definitions and got down to details with a review of conductor wire types.

Let's put this together with an overview of the first part of the system that you probably are responsible for, namely the "service." By NEC definition, the service is comprised of the conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served. This is usually the first point where the utility hands the power over to you. Theoretically, you are responsible for the installation and maintenance of the electrical system in your station starting with the service, and onward.

We used the word "probably" earlier because your utility's line of demarcation can vary based on local practice and regulation.

Power path

Ordinarily your power arrives at the studio or transmitter via a neighborhood distribution system. This most often is via aerial cable, which is less expensive for the utility than underground wiring. Because the utility does not like people hassling with their poles or working near main high-voltage lines, they make the demarcation

point somewhere other than the pole.

To keep you off the poles, the utility usually installs, and quite often supplies, the service cable to the wall of your building. Your demarcation point then is at the connection point on your building wall, and you supply the service run from there to your meter and into the building.

At the least, the utility performs the connection and any other on-pole work.

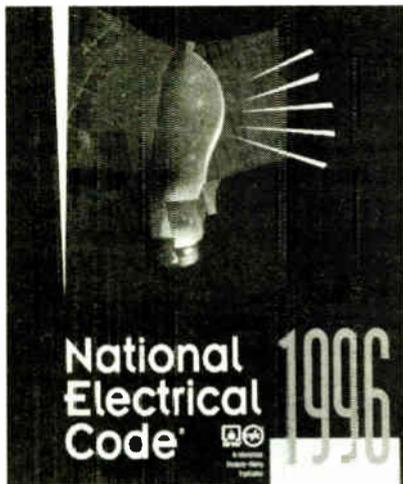
The balance of services nationwide are underground. When these are all on your property (no crossing under streets and the like), most often you or your contractor will be responsible for them. If you need to install a new one, or repair or modify an old one, you must call to "dig safe," to identify any nearby underground utilities. We definitely do not want to start our trench excavation for the underground service work by destroying with a misguided backhoe the telephone, water, sewer, gas, cable and subterranean endangered species that also serve your station.

In the trenches

Then you will trench down for the underground service. You will supply and bury the service conductors (see sidebar story on page 15).

Unless your service originates at a ground-level transformer, these conductors will come above ground near or at

the utility "riser" pole to make the utility connection. If that pole is close to the road or any vehicular traffic or any other worrisome circumstance in which the cable is subject to physical damage, the



NEC dictates that these wires or cable must be protected by metal or PVC schedule 80 conduit, as a minimum, from 24 inches (for direct burial) below ground to a height of at least 8 feet above ground level (AGL) on the pole. Many local utilities substitute their own, more stringent installation requirement for those of the NEC, based on local weather

and circumstances. One New York utility specifies metal conduit on all roadside poles because, in many places over the years, road widening has moved the poles almost to the curb. People can sometimes bang into the pole even when parking!

Diameter of this metal or PVC conduit will be set by the size of the total conductors directly from the NEC's conduit fill charts and formulas.

The next major device in the service, when you are the only customer on it, is normally the utility metering. In the past, when meters had to be read visually, that meter was almost always outside, preferably in a convenient place for the meter reader. Today, everyone is into radio, and most new meters are read via automated radio metering (ARM) protocols by "transponding" the meter. A vehicle equipped with a logging computer can drive down your street and selectively transpond your meter using its unique number to get the usage data from it.

This allows the meter to be located indoors, in a safe place not subject to vandalism.

As a sop to the utility industry, it was decided (by powers that be more wise than I) that metering equipment is not service equipment and so not completely subject to the NEC. As a result of this, it is not only subject to the NEC for grounding, construction and installation; it also is covered by several other industry codes. Your meter's "can," the meter itself and the conductor connections to it usually are subject to inspection not only by the local inspector but also the utility's inspector.

In the details

Substantial details related to the location, installation and connection standards for your meter are set by the utility. Ask it for a standards book before you begin any work. The arcane subject of conduit on poles, meter can elevations and related topics also are covered in this book.

Meters are divided into two classes, consolidated and split, and two types, linear and demand.

Most homes and small businesses have consolidated meters. These are the classic beauties that plug directly into the meter socket. Current actually flows through them.

Larger users, above 400 amp service, normally have split units, where the current consumed and voltage delivered are sensed by separate current transformers (CTs) and voltage transformers (PTs). The P in this case is for potential, which, as we all know, is a nice Victorian word for voltage. Andy Rooney once told me that potential always sounds more scary and lethal than voltage. Someone who works around potential should be paid more than someone who works around just voltages, doncha think?

Linear meters simply total the number of kilowatt hours (kWh) used. Demand meters not only annotate the linear accumulation of kWh used, but also they log the peak kW demand of your consumption that the utility has to supply on that meter.

The peak demand is a dreaded creature
See NEC, page 15 ▶

A Wiring Nightmare Before New Year's

Troy Conner

It was a tragedy, a travesty and just a plain shame, not to mention being time consuming, redundant and costly.

The names will remain anonymous to protect innocent and guilty alike. In fact, I myself take no small degree of responsibility in this affair.

What, you ask, was the tragedy? The tragedy was having to replace 1,100 feet — or about a ton — of electrical wiring, which had only just been installed. It had been found to be faulty about two weeks after the original tower crew had left for their next venue. It fell victim to the first significant rain storm. More than three-fourths of the wires in the bundle were shorting intermittently.

As any electrician, technician or engineer will confirm, an intermittent electrical short is one of the wildest rascals to track down. You think it's fixed and that it's working. Turn your back and the next thing you know it's like Jack Nicholson in "The Shining" or that kid in "Poltergeist."

"I'm b-a-a-a-ck!"

The intermittent nature of the shorts also contributed to the ensuing dilemma.

The tower company sent a small crew to diagnose and, more optimistically, repair the problem.



During the original wiring, the bridge, the horizontal run from transmitter to tower, had proved to be a real bear to pull. Several times we broke the rope used to pull the wire bundle, and had to re-pull the same run a number of times.

Because it had been such a tough pull

See STEEL, page 16 ▶

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DA Workshop Loaded With Ideas

Thomas R. McGinley

As consolidation moves forward, many groups are rebuilding, improving or moving old AM directional arrays. Owners are finding out that engineers with AM antenna knowledge seem to be an endangered species.

The NAB Radio Show had the ticket to help today's station engineer who is in charge of maintaining or rebuilding an AM directional antenna system. Two of the industry's pre-eminent experts in the field presented an all-day, tag-team workshop on this enigmatic subject. If you missed the show, you can still take advantage of their expertise by ordering the audio tapes. Ordering information appears at the end of this article.

Ron Rackley of duTreil, Lundin and Rackley Consulting Engineers joined Ben Dawson of Dawson and Hatfield to update this unique workshop, now in its second year of a restructured format. The program focuses on proper maintenance techniques, including troubleshooting tips, proofs of performance, handling all modes of failures, how to stay out of serious trouble, and, when all else fails, when to call for the consultant or other kinds of expertise.

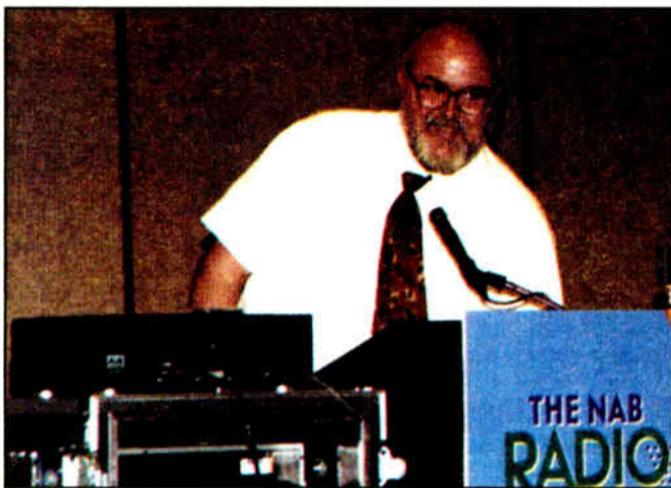
Much of the math and theory presented in earlier formats of this workshop have been eliminated.

The basics

The day's syllabus was divided into five topics, beginning with Introduction to DA patterns. The background of why directional antennas are required was covered, including the need to protect the groundwave and skywave service areas of existing stations, as well as improving service in desired directions. The six different DA operating modes (DA-N for night pattern, DA-D for day, etc.) were described. In non-mathematical terms, the basics of theoretical, standard,

modified and converted standard patterns were discussed.

For most engineers, knowledge of the standard or expanded pattern which includes maximum radiation values for all measured radials of a pattern is the most useful. Directional antenna system building blocks were introduced, showing how tower geometry (height, orientation and spacing) and the field phase and magnitude radiated by each tower in an array forms the shape of the pattern. Pattern size or RMS is determined by power input, less the losses of design shortcomings, the feeder system, and the ground system. The difference between theoretical parameters (math-



Ron Rackley of duTreil, Lundin and Rackley

ematical design numbers) and the operating parameters (actual antenna monitor indications) were explained fully.

Two sessions on DA hardware and system design covered the function of coils and capacitors and how they work together to form a phasing and branching system, plus tower base matching networks. The inductance of coils forms inductive reactance which can be offset or canceled by capacitive reactance produced by capacitors. Combinations of both coils and caps form networks which can both match

impedances and introduce phase delay or phase advance in the current flowing through them.

The instructors discussed typical power dividing and network designs, including traditional methods and modern techniques. Characteristics of typical transmission lines used to deliver power from phasor to tower bases as well as return tower samples to the antenna monitor were explored. Most modern systems use foam dielectric semi-flexible cable. A sample two tower system was dissected and explained, one block at a time.

Maintenance

The all-important maintenance aspects of system hardware and why failures occur was covered carefully, including proper cleaning and lubrication of variable and mechanical components with moving parts. Ron Rackley advised giving special attention to RF contactors and variable inductor wipers. Both instructors stressed the need to conduct regular inspections of all tower base and system hardware, looking for signs of overheating, lightning damage, pest infestations, corrosion, etc. so that impending failures may be caught ahead of time and prevented.

The antenna sampling system was considered thoroughly. Typical sampling elements such as the toroidal transformer and the fixed loop were analyzed, including the advantages and limitations of each. Toroids usually are preferred for towers less than 110 degrees in height; they are installed and maintained easily inside the tower base tuning box. The height and orientation of a loop are critical for proper operation.

Installation guidelines were discussed. Metal structures or other towers near a DA array can have disastrous effects on establishing and maintaining a pattern. Rackley described the proper techniques used to detune such structures, including power lines and support towers. Reradiation is "tuned out" by producing electrical isolation of the structure through a drop wire or detuning skirt and a variable capacitor. In the case of a base-insulated tower, a series inductor across its base tuned to produce a current null one-third the distance up the tower will effectively prevent reradiation.

After the lunch break, afternoon sessions were devoted to DA troubleshooting principles and practices, plus all of the FCC compliance and paperwork issues that govern ongoing legal operation and modifications.

Rackley divided troubleshooting problems into immediate and gradual types, affecting both internal and external areas. Internal problems can involve either the radiating or the monitoring system, while seasonal variations, landscape changes and development, plus water-table fluctuations comprise external factors not normally controllable. He stressed the importance of keeping good records, always recording settings and readings before taking any action.

"A good parameter log over time will often reveal gradual changes, such as

drifting component values or deteriorating ground systems," he said.

Failure modes

When attacking a problem, consider multiple factors simultaneously. Rackley cited six specific examples of failure modes wherein either the sampling system parameters were changing, monitor points were changing, common point parameters were changing, or a combination of any of the three.

If the radiating system and pattern are changing together, parameter changes of several towers should be noted. If only a monitor point changes without other parameter changes, suspect reradiation along the radial or near the monitor point. Several different kinds of tests were discussed, including switching sampling lines to the antenna monitor, plus bridge measurements of lines with known baseline values to help isolate problems.

The use of appropriate test equipment for problem solving was also covered, including the required field strength meter, an operating impedance bridge (OIB), and an RF Generator/Detector.

Ben Dawson offered a summary history and overview of FCC regulatory and procedural matters involving the operations of stations using directional antennas. The process of filing an application for major or minor changes requiring a construction permit, as well as an application for station license to cover a CP, or for direct measurement of power were explained.

A thorough examination of FCC rules regarding legal operation of DA's was covered, with emphasis on monitor point

When you are attacking a problem, consider multiple factors simultaneously.

and antenna monitor parameter maintenance within the specified limits. This session also featured a lengthy discussion of how to handle operations during construction, emergencies and operating with parameters at variance involving requests for special temporary authority.

Above all else, Rackley said, do not lie or embellish the truth when requesting an STA.

"Be specific as to what exactly happened and how you propose to operate until the station is returned to normal operations," he said. He also discussed the conditions under which the Emergency Operation Rule (73.3542) can and should be invoked.

This was an interactive workshop with lots of questions from the attendees. Those fully registered for the convention were able to attend free for the first time. Attendees received a certificate signifying completion of the workshop, to be used for SBE recertification credit.

To order audio tapes of the workshop, call (805) 295-0504 or visit the Web site www.mobiltape.com and type the word "directional" into the search field.

Tom McGinley is chief engineer of WPGC-FM/WARW(FM) in Washington, D.C., and technical advisor to RW.

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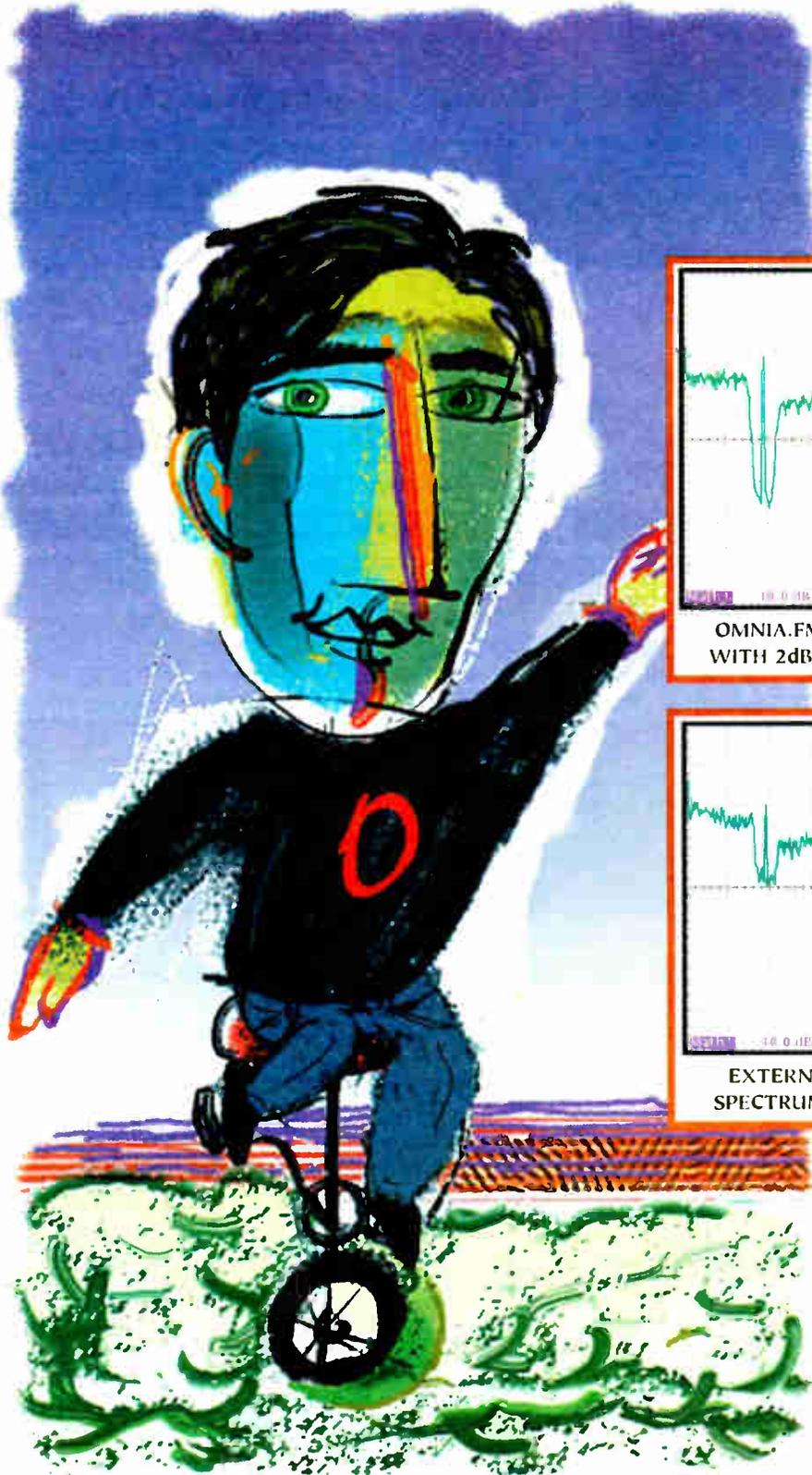
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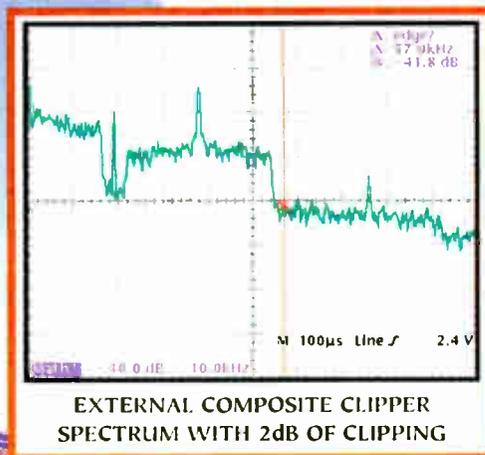
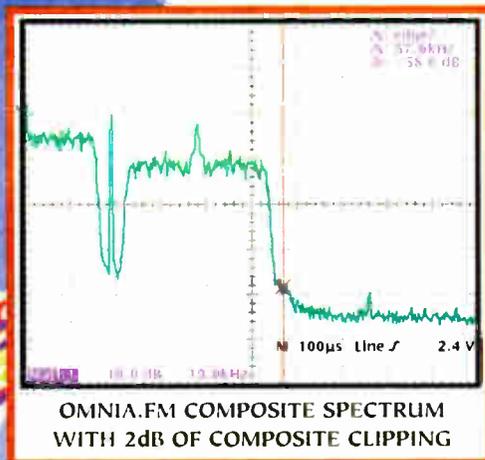
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For a complete technical report, call us for a copy of our paper entitled "Omnia.fm: An Engineering Study." Or visit our web site at: www.nogrunge.com.



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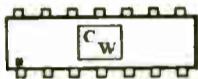
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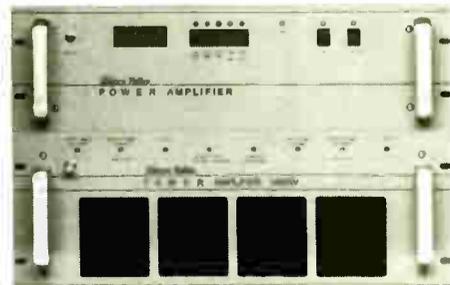
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Service Types

Unless you are a major consumer, say, a stadium, and you have your own sub-station, your power ordinarily is delivered at one of the following voltage levels:

120/240 volts single phase — A three-wire service in which the voltage available at the two phase wires is 240 volt. 120 volts is obtained between either phase wire and the center tap. This pedestrian service is the ordinary house and small office service voltage arrangement. The phase wires run 180 degrees apart in phase and the center tap is normally grounded and from that point on is considered the neutral.

120/208 volt three-phase wye — This is a four-wire service in which the voltage is 208 volts between any two phase wires and 120 volts from any phase wire to center tap, which normally is grounded and from that point on is considered the neutral. The phases are 120 degrees apart. (Occasionally you will be given 120/208 volts single-phase three-wire, which is two phase wires and the center tap, for a single-phase small consumption service.)

277/480 volt three-phase wye — Same arrangement as above but higher voltages for larger power delivery using the same size wire. You furnish your own step-down inside your own plant for 120 volt loads.

480 volt three-phase delta — A less common service in which you are given just three phase wires, with one of them normally grounded. This service usually is given only to locations where the largest load is delta bridge delta, such as a very large 480 volt transmitter.

Most station sites obtain their supply from the neighborhood delivery system. External to your plant is a transformer to step down the utility voltage (typically 13 kV but as low as 2,400 volts to use lower poles) to supply your and other nearby services.

About one in 50 stations owns this transformer. It is a major cost item to the utility, and it would love to pass the cost onto you. The good news is that if you own it, you are the only person on the secondary.

If the utility owns it, everyone and anyone it wants to attach to the secondary side can be on it. All the noise present on their loads is presented to all users. A quick but adequate example was the high-frequency SCR switching trash from a building elevator that drove a radio station crazy until an isolation transformer was installed just for them.

At a minimum, the utility service for your station should supply sinewave waveform purity, low or no system noise and adequate regulation. If any of these qualities are missing, it is time to get the utility out to your station for corrective action.

In the past, broadcasters have had real problems with the "open delta" transformer configuration. As a cost measure, at locations where most of the load is delta bridge delta such as the 480 delta above, the utilities have created a three-phase delta using just two transformers "deriving" the third phase. The problems associated with this type of installation related to voltage regulation and hum in filtering are legend, and most of these installations have mercifully gone away.

However, if you have three-phase service at your site and you have only two transformers on the pole, it is time to call the utility.

The Basics of Your Service

► NEC, continued from page 11

because it is used as a penalty multiplier of your electric bill. The utility says it must reclaim the cost of the generation and delivery facilities to satisfy peak demand. Small customers do not precipitate a notable demand factor, but big customers do.

The result: if you have a demand meter, and you have large peak demands but low total consumption, you will pay notably more for your power than just a linear rate.

Because of the current levels involved, almost all split meter systems are demand meters.

We will cover demand factor and ways to reduce it in a future column.

After the meter, next in the electrical flow stream at the end of the service typically is the main disconnect. We are definitely back in NEC country now. The disconnect may be a switch with fuses, or a separate circuit breaker, or the main in a breaker panel. But its selection, installation and location are outlined carefully by the NEC. We will look here in a future installment.

Looking ahead

Next time, will take a little diversion to rotary converters that generate three-phase power from a single-phase source. We also will use this as an excuse to discuss that age-old question, "Why three-

phase power, anyway?" Then we will touch on NEC details concerning grounding, switchgear, generators, surge protection, wiring devices, lighting, emergency lighting, HVAC, raceways and much more.

■ ■ ■

Charles S. Fitch, W2IPI, is a registered professional consultant engineer, a member of the AFCCE, a senior member of the SBE, lifetime CPBE, licensed electrical contractor, station owner and former director of engineering of WTIC-TV in Hartford, Conn., and WSHH-TV in Marlborough, Mass.

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Atypical Tower Wiring

► STEEL, continued from page 11 and, more important, because testing showed definite shorts to ground, the horizontal run was pulled out and completely rewired with new wire. Subsequent testing showed all clear, so the crew again left, thinking all was well. Once again, fate pulled a quick one, and the shorts were back.

At this point, the head offices of the original crew decided that the only realistic solution was to rewire the entire tower with all-new (and costly) wire. Picture 1,100 feet, with eight #4 conductors, four #10s and seven #14 wires. The owner did agree to running two fewer #4s, and that

did seem to help, but we were still faced with 17 wires.

Admittedly it was a ponderous bundle of wire to pull in inch-and-a-half rigid conduit, but the count fell within NEC standards. This was probably one of our first failings. We should all have instinctively recognized that the NEC probably wasn't thinking about vertically pulling a hundred feet of wire at a bite, as is typical in tower wiring.

Hindsight

In retrospect, we should have opted for the next larger conduit. It might have made the endeavor less subject to failure.

With a larger conduit and subsequent junction box "softener" (the ring threaded inside a cast aluminum J-box to protect the wire as it is fed into the conduit) it might have been possible to feed the unwieldy wire bundles into the conduit more easily.

Another lesson we learned was to check each and every 10-foot stick of conduit visually before it goes up the tower. I strongly suspect that some of our shorts were caused by a "spur" of galvanizing on the inner wall of the conduit which pierced to outer insulation of the wire.

During the galvanizing process, after the steel has been acid dipped, if any little bit of debris ends up on the steel, prior to it being hot dipped in the zinc bath, it frequently results in a sharp burr or spur under the zinc coating. Climbers of fresh

towers are all too familiar with them, for they hurt when jabbed into the palm of the hand.

Ah, hindsight. It would have been so simple to sight down each stick prior to taking it up the tower. As it was, we tried using an inspection mirror in one J-box and a flashlight in another, but parallax makes it just about impossible to discern any detail on the conduit walls. We even discussed using a tiny TV camera, but this quickly was discounted as time-consuming and a bit impractical.

Another technique we employed was to test each run individually prior to any connections being made. We took jugs of water up the tower and poured a gallon down each run of conduit, while individually testing each conductor for a short to ground. While we were testing, we should also have been checking for "open" as well as for "shorted."

As it was, we made and sealed all of the connections before discovering one open wire. Fortunately, it was one of the smaller gauge conductors, so it only took a couple of hours to check the wire nuts in six junction boxes.

The next lesson was not to use the "figure eight" bolts typically installed in the back of large junction boxes, which normally are used to support the wire. During the rewiring process it was decided to use a kellum grip (Chinese finger) to support the bundle of wire in order to give us more working room in the box.

Remember, we are talking about 17 conductors. By the time you encapsulate a #4 split bolt with sufficient rubber tape and then good 3M electrical tape, the termination is about the size of a golf ball. All in all, it was still a wad of wires to stuff into each box. By the way, we were using the largest cast junction box on the market, lest you think us guilty of skimping on the boxes.

Another important lesson was to tape the mess out of the bundles after making each one up on the ground. (My editor urges me to explain that "tape the mess out of" is a country-ism, something like "tape the heck out of.") The original bundled runs had been taped about every foot or two, not nearly often enough. We even considered spiral-wrapping each bundle, but ended up with tape about every two to four inches.

I would estimate that maybe a day's labor for the entire six- or eight-man original crew would have prevented two return trips and probably 10 crew days of testing and rework. The taping of the bundles would have been the only really time-consuming item; the kellums are cheap and readily available; sighting down the sticks of conduit could have happened any time they were handled or moved. Testing while building also would have taken very little once a procedure had been established.

In the end, we hauled the old wire to a salvage yard, and the tragedy really came home. The wire heaped about a foot above the rails of a standard eight-foot pickup bed, and definitely squatted the Ford 250. It weighed in a tad more than 1,900 pounds and unstripped yielded less than \$250.

I can't find the picture of the loaded truck at the moment. Once I find it, I plan to post it on a bulletin board near my desk to remind me of all the lessons I learned by the experience.

All of us involved still have our fingers crossed.

Happy New Year!

When Digital Is In, What Goes Out?

Randy Stine

As more air studios are equipped with audio management systems, the question of what to do with the displaced studio equipment pops up.

Do you clean up the transmitter shed and hold a garage sale? Do you donate stuff to a museum as a history exhibit?

With reel-to-reel decks and cart machines on the way out, a chief engineer must decide what to keep and what to dispose of in the rebuilding process.

Cart machines, in particular, are endangered. "I've seen enough cart machines on the floor of engineers' offices the last year to fill several swimming pools," said Ed Trombley, field engineer for Munn and Associates, an engineering consulting firm.

Trombley travels the country and sees a variety of stations and studios. "Everyone seems to be going for the nice, clean studio look. Sometimes you don't see anything but the VDT, keyboard and a small mixer. And a mic, of course."

Once you've gone digital, what should you keep as backup in the studio?

"In most of our markets we'll leave a couple of CD players in the studio for backup," said Terry Baun, corporate vice president of engineering for Cumulus Broadcasting. "And usually we'll replace the commercial-grade players with consumer-grade stuff, knowing that they won't get much use."

Baun said some main studio gear usually will find its way to production. "Often times, we can practically build a new production studio with the tape decks, mixer boards and CD players we tear out of the on-air studio," he said.

Learning ways to recycle equipment is important.

"It's important not to waste anything," Baun said. "Being a part of a major group means we can usually find uses for everything. We may ship a console from Green Bay to Battle Creek to use at one of our stations there."

Baun agrees cart machines are history. "No use for them anymore. You might just as well donate them to a local school."

That's exactly what chief engineer Bob Hawkins plans to do when he rebuilds the studios at Emmis owned WENS(FM) and WNAP-FM in Indianapolis this fall.

"In fact, we'll throw in an old console and tape deck too," Hawkins said.

A local high school has been in the process of collecting used equipment to build a radio studio.

"We are going with AudioVault in our new studios," said Hawkins, referring to the Broadcast Electronics audio system. Plans call for back-up CD players, a cassette deck and a 360 Systems Short/cut for phone calls. "Other than a mic, that should be it for studio equipment."

The WENS on-air tape decks are headed for a new production room at the station. Even so, Hawkins said, usefulness of the decks could be short-lived thanks to the prevalence of digital audio delivery systems. "With more and more commercial dubs being sent via DCI and DGS, that old Otari or Revox could become obsolete."

What are radio stations buying when it comes to stand-alone studio playback equipment? "The market for CD,

Entercom Broadcasting stations, like many others, leave several backup CD players in the main studio. Marty Hadfield, director of engineering for Entercom, said he often can find uses for just about everything that's left over.

"If we have the space we'll put together a little mini-production studio, or a dubbing studio as we call them, with the equipment. With cart machines, we trade them in, use for parts or donate them," he said. Sometimes, Hadfield said, a radio station can work out a deal to trade some equipment when buying new digital equipment.

"I think it's becoming less of a practice, simply because I think there is quite a glut of used studio equipment out there with so many stations going digital."

A sizable market

What is the market for used studio equipment like? The Broadcast Division of Harris Corp. has a sizable chunk. Jim Woods, vice president of radio broadcasting for Harris, said the company's used equipment program has grown steadily over several years.

"It's a reasonable market to be in. With stations going to digital storage and retrievable systems, they are looking at ways to move some of this extra equipment around," Woods said.

Harris will routinely buy used cart machines for \$50 and re-sell them for \$100 to \$200. The demand from smaller stations for such equipment remains strong, Woods said. With parts becoming harder to find, for cart machines in particular, some stations look to used equipment strictly for parts.

"Finding parts and the people to fix 'em is getting harder to do," Woods said.

You can totally streamline your on-air studio. Or, you can do as most Chancellor Media stations have done, and keep one of almost everything in your studios.

"Computers have one tiny problem: they crash at the most inopportune times," said Jeff Littlejohn, Chancellor director of engineering. Most Chancellor stations still play music off CD.

Littlejohn said it helps him sleep better at night knowing that if the system goes down at 2 a.m., his stations will hardly miss a beat.

"You need these layers of redundancy to protect yourself. Your programming is too valuable to leave to chance," he said.

The digital revolution has created orphan equipment — and demand for used gear.

MiniDisc and DAT players is still strong," said Dave Howland, vice president for sales and marketing at Audio Broadcast Group.

Despite the declining popularity of cart machines, ABG still sells some. Howland said. Anything with read-write capabilities is still useful in studio settings, especially production rooms.

"Many stations still use DAT for commercial backup if they don't have room on their main hard drive," he said.

Sales of single-play CD players actually are up at Broadcast Supply Worldwide. BSW Sales Representative Tom Roalkvan said most radio stations are good at salvaging equipment.

"Sure, you have everything on hard drive, but you still need input sources. Someday you may not need a reel-to-reel deck, but for now you still do."

MiniDisc players are popular. "Some stations are using them as a replacement for cart machines," Roalkvan said.

When completing a studio overhaul,

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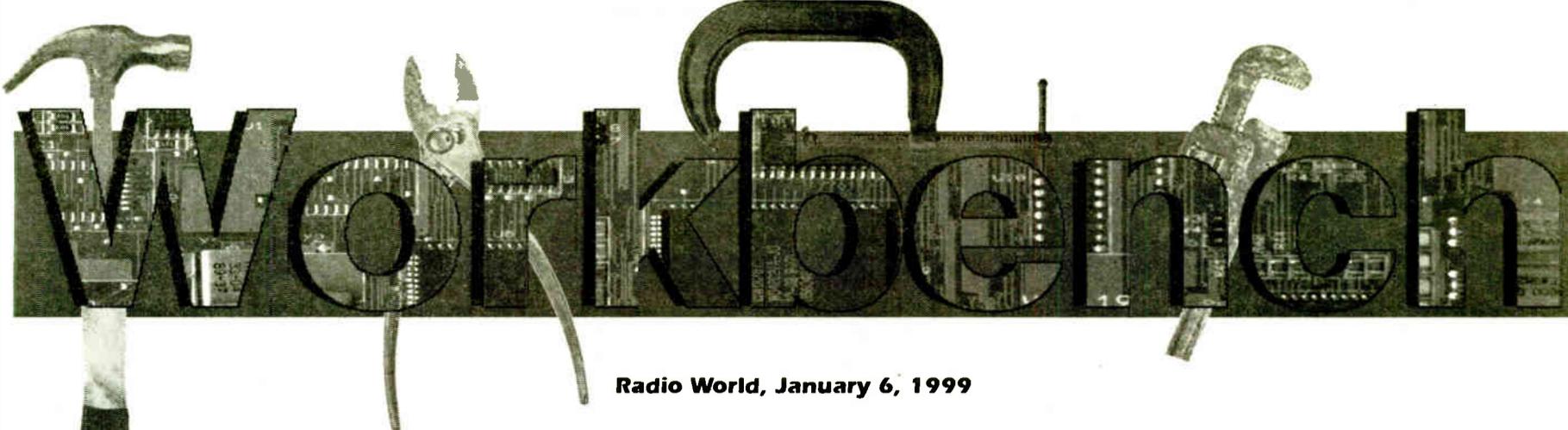


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Radio World, January 6, 1999

Make Life Easier — Label It!

John Bisset

Let's face it — we can't do everything. Remember that elusive reward called a vacation? How about that regional SBE show you need to attend, just to keep your skills sharp?

The best engineers have designed redundancy into their facilities, so backup systems exist to support the main systems. Even if you don't have the budget for a backup plan, there are things you can do to help others diagnose problems in your absence.

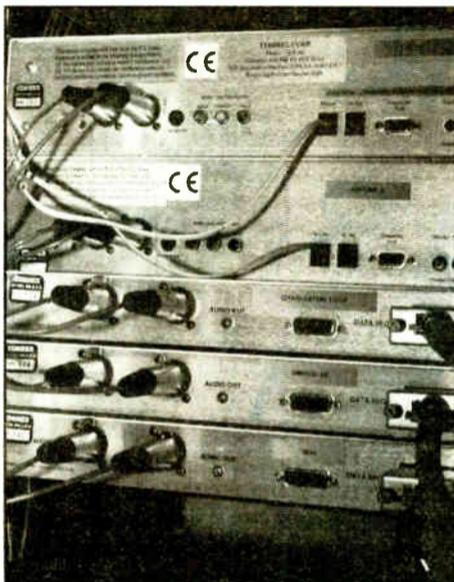
First and foremost is labeling everything clearly. I remember being called in to troubleshoot a phone system that was not working. The chief was out of town. Curiously, the PD said the system worked fine during the mid-day request show. What went wrong?

The afternoon drive jock went on vacation, and the fill-in had never done phones on his shift. There was one switch that he failed to throw. The chief had prepared a step-by-step process of using the phone system. No one bothered to read it! Nor did the talent read the label for the PHONE ON switch. So much for trying to make systems foolproof.

Careful labeling and instructions about how something is to be used made it easier for me, or any other engineer, to find the problem.

Mark Bohnett, chief at WOLC(FM) in Princess Anne, Md., used this strategy when

it came to his DAs. Each receiver output runs into its own section of amplification. The four audio outputs are identified on Avery labels, which Mark printed on the computer. It's easy to adjust feeds to different studios, and easy to follow the signal flow, using the labels as guides.



Label the back of equipment to help yourself and others.

When changes are made, new labels can be printed. Attention to "little" things like this makes troubleshooting a breeze, and you'll never turn the wrong pot, mess up stereo balance, or change the feed to

another studio, causing you a call-back to correct your mistake. A side benefit is that the labeling looks good, which makes you look good in the eyes of your manager.

Thanks, Mark, for sharing your ideas with *Workbench* readers!

Labeling equipment doesn't just mean the front, either. Ralph Messer, of West Virginia Radio's network of stations in Morgantown, recently completed a studio and rack room overhaul. After placing everything in the rack, the Brother P-Touch labeler got a workout.

Each piece of equipment was labeled for easy identification. Proper identification of rack equipment helps when you have several codecs going to different locations; you can trim troubleshooting time if you have to use non-engineers to

check something in the back of the rack while you're on the phone.

An intern can print up all the labels, and you can affix them to ensure they go on the proper equipment. This labeling effort pays off if you have several satellite receivers. Trying to keep track of which coax lines go to which receivers can be simplified by labeling everything.

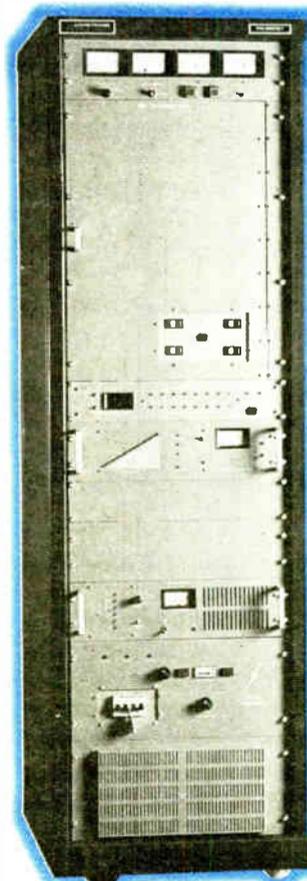
I remember a few years ago an engineer called me in to help realign a dish. He didn't realize, however, that he was realigning the wrong dish — none of the cables were labeled, so he thought he had the right one!

■■■

John Bisset has worked as a chief engineer and contract engineer for more than 20 years. He is a district sales manager for Harris Corp. He can be reached 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 at jbisset@harris.com

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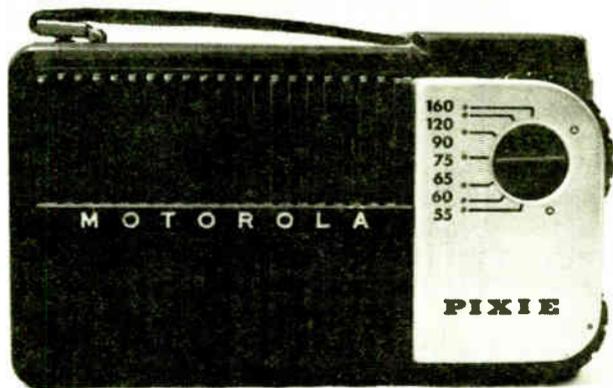
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You Must Remember This



The first transistor radio was mass produced in 1954 by the American company Regency. In 1955, Sony produced its first model, the TR55, which was not exported. But by then, there were other American manufacturers producing solid-state models.

the 4-by-6 inch cabinet. *This is one in a series of photographs featuring classic and less well-known radios. The pictures and descriptions are by collector Bill*



Consumer Reports didn't rate the new transistor sets favorably, possibly explaining why the Motorola Pixie, using tubes, sold fairly well in 1956.

The chassis of the 45P1 used one miniature and three subminiature tubes powered by a 1-1/2 volt "A" and a 45 volt "B" battery. The back opened on its hinges as a camera would for access to

Overbeck, president of the Delaware Valley Historic Radio Club, who has made every effort to ensure accuracy. To contact him, send a self-addressed, stamped envelope to P.O. Box 847, Havertown, PA 19083.

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BOTTOM LINE

CPs: Time To Use 'em Or Lose 'em?

Frank Montero

A few years back, I wrote a piece about the FCC's specific rules regarding the financing and sale of construction permits.

The article described the FCC rules which then stated that a permit for an unbuilt station could not be sold for more than the legitimate and documented "out-of-pocket" expenses incurred in obtaining the permit.

Well, it's time to throw that one out. In a bomb shell of a press release that came out in mid-November of 1998, the FCC said it would release a report and order that would, among other changes, allow the for-profit sale of unbuilt construction permits. It made the announcement in connection with its Non-Technical Broadcast Regulatory Streamlining proceeding.

The response in the industry was positive. Many people believed that the restriction was responsible for delays in getting such permits built and running as operational stations.

The reason: many permit holders, lacking the resources to build stations or facing obstacles to construction, were reluctant to sell them to broadcasters who could get them running quickly because they were prohibited from realizing a profit on their investment.

The hope was that the new profitability of these permits would create a new market for them, boost their value and get them in the hands of those who could build the stations quickly.

Still, as anyone who has worked

See BOTTOM LINE, page 23 ▶

Sitter Protests NBA Lockout

Bob Rusk

An employee of KEX(AM) in Portland, Ore., took up residence on a billboard, promising to stay there until the NBA lockout was settled or the 1998-99 professional basketball season was canceled.

Marty Anderson, 25, who works as a promotion coordinator in the Jacor station's marketing department, moved onto the billboard on Nov. 3.

"The idea to do this was mine," said Anderson, who spoke with RW via cell phone. "I'm doing this from a fan perspective, and not as a radio publicity stunt. I'm trying to make a statement to the NBA that the fans just want to see basketball."

'Save our season'

KEX placed a banner on the billboard that proclaimed "Save Our Season." Anderson's motto was clearly visible to passing motorists and pedestrians on Powell Boulevard, a thoroughfare that leads to downtown Portland.

"Since I got up here, everybody's been

honking, waving and screaming," said Anderson. "There is definitely support for the cause."

They also monitored him online. A live camera was installed and provided images to Web visitors at www.1190kex.com

As of Dec. 16, Anderson was still there.

Assistance offered

Advertisers also offered support, supplying whatever Anderson needed to make his stay as comfortable as possible, said KEX marketing director Rich Connor.

A home improvement center provided the lumber for the "mini-condo" that Anderson built on the catwalk at the base of the billboard. A sporting goods retailer pitched in with camping supplies; an appliance store supplied a 19-inch television; and a furniture store gave a La-Z-Boy recliner.



Marty Anderson hooks attention while he has a ball at his billboard temporary residence.

It wasn't easy getting most of those things to Anderson. The recliner, for example, was pulled up to the billboard — which sits about 50 feet above the ground — with a rope.

"It was a pretty strong rope and it took three guys to pull the chair up here," said Anderson. It wasn't nearly as difficult getting a radio to him.

Adventure RV Center loaned KEX a 31-foot Winnebago. It was parked in a lot below the billboard and was used by KEX employees who brought meals to Anderson and stayed close by to offer assistance.

Climbing home

Not to be outdone, the Portland Fire Bureau brought a hook and ladder unit to the billboard and a crew climbed along the catwalk to install a smoke detector inside Anderson's little house.

See KEX, page 22 ▶

Focus on Syndication

See Page 24

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Here, There and Everywhere

Alan Haber

As I write this, it's just about time to unwrap presents, but as you're reading this you have already done the unwrapping thing, and those various-sized, altogether pesky green needles are effectively (but not absolutely — look under your couch) gone.

Here in the metro Washington, D.C., area, it's been hard getting into the holiday spirit. Must be the weather. After all, it's been unseasonably warm, with record-high temperatures being set, zippo frost and nary a hint of sleigh bells or ho-ho.

I mean, it's like 75 degrees today — how can you realistically immerse yourself in the magical spirit that's usually evident this time of year when all you can think about is getting a tan?

I'm not trying to be the Weather Channel — I'm trying to make a *point* here!

Dumb by nature

Whatever the weather is where you are, you can pretty much bet the ranch that the weather is different in other regions. Yet, we all share some common ground. Distance may separate us, but it also brings us closer together. And you have technology to thank for that.

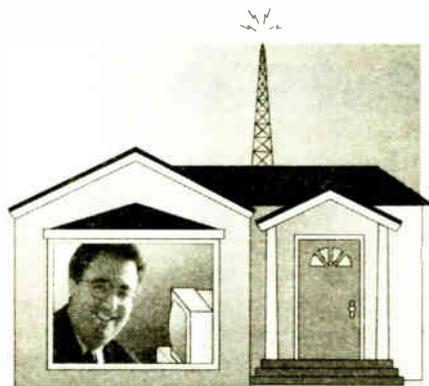
This holiday season, a kazillion computers will find their way into homes and a kazillion mommies and daddies will have spent a kazillion late nights trying to get the damned things to work. If they'd only read the manuals ... but I digress.

Computers are dumb by nature, or at least until they're given instructions they can follow and turn into something magical ... like connecting you to some far-away radio station.

It's still amazing to me that you can be in the United States and listen to a station in North Adelaide, South Australia. I'm listening right now to 107.9 Alta Mira, an

adult-alternative outlet. It sounds just about crystal-clear.

I might as well *be* in North Adelaide. When I'm listening to a station on the Net, I'm a local listener, even though I'm physically *here*. And where is here? It's



CYBER HOUSE

anywhere you want it to be. You need not be there to enjoy it; you need only have the means to get it ... and a computer gives you those means.

Listen from home

Webcasting allows a station in North Adelaide to enter your home just as easily as one in Singapore (the not-your-typical-oldies station, Gold 90.5 FM) or one in Powell/Cody, Wyo., where it's going to be around 30 degrees today, or so the announcer says!

But whether they're wearing parkas in Powell/Cody doesn't matter when it comes to my listening to one of the area's radio stations on the Net, just as it doesn't matter if at lunch I'll be wearing shorts and basking in the noonday sun, stretched out on a chaise lounge with a cool beverage at my side.

The fact that I can listen to the station is

all that's important, and with the advent of streaming media technology, I can.

Think about it like this: If you're an Internet shopper, you know you can buy just about anything that exists with a couple of mouse clicks and a credit card.

And you don't have to be buying those extra-wiggly woggles from a store that's physically less than 20 miles from your home. It's just as easy to order those woggles from a shop in the U.K. or a department store in North Adelaide, South Australia.

And don't ask me what a woggle is. All I know is they don't wobble when they walk.

Okay, group hug time, now. If your station is still undecided about Webcasting, remember that there are all those potential listeners out there — folks with wallets stuffed with cash they can spend on your advertisers' products, wherever those advertisers happen to be.

Split your commercial streams. Split your programming streams. Be creative. Target every single listener who is listening to your Webcasts. Leave no cyberstone unturned.

Remember that wherever you are, you're never closer to there than here.

■ ■ ■

Alan Haber can be reached via e-mail at zoogang@earthlink.net

KEX Sitter Protests Lockout

► KEX, continued from page 21

"This smoke detector has a 10-year-life battery. It is our hope that the lockout is settled before this battery is worn out!" said Neil Heesacker, the bureau's public information officer.

Anderson spent his nights in the 8-foot-long, 4-foot-high house sleeping on an inflatable mattress and kept warm with a space heater. He spends many of his days, some of which were wet and windy, out on the catwalk, waving to people below.

Since I got up here, everybody's been honking, waving and screaming.

— Marty Anderson

Anderson said he was determined not to leave his perch for *any* reason. A portable toilet was installed for Anderson on the rafters on the back of the billboard.

Visitors — including his wife — had to climb an aluminum ladder, walk across the roof of a one-story building, then climb another ladder to the billboard. KEX personality Mark Mason did his show from the billboard one afternoon. To mark the occasion, he played the 1982 Joe Cocker-Jennifer Warnes duet "Up Where We Belong."

At the approach of the holidays, KEX invited listeners to drop off decorations that could be used to adorn the billboard. The person who gave the best decoration each day received a free turkey.

KEX, which consistently places in the top 10 in the Portland Arbitron ratings, is the flagship station of the NBA's Portland Trail Blazers. Under terms of the NBA lockout, the Blazers were not permitted to comment on Anderson's Save Our Season campaign.

Anderson, whose sit-in was featured on the local TV news, hoped NBA Commissioner David Stern would hear about the billboard. "That would be absolutely awesome!" Anderson said.

If the lockout isn't settled or the season isn't canceled anytime soon, Anderson said he was prepared to spend the entire winter on the billboard — all the while relishing in his new-found fame.

"How often can somebody say that they actually lived on a billboard?" he said. "I'm having a lot of fun with this."

BUSINESS DIGEST

Ginsburg Invests in DG Systems

Former Chancellor Media Corp. President and CEO Scott Ginsburg has invested \$11 million in DG Systems and will be the new board chairman and CEO of the digital network services provider. DG's chairman, Richard Harris, will become vice chairman of the board; Henry Donaldson will continue as president and director and assume new responsibility as COO.

As chairman and CEO, Ginsburg is responsible for strategic direction, consolidation strategy and financial relationships.

Ginsburg sees opportunities to improve DG's electronic transaction network.

"There are over 10 million transactions annually for the distribution of national and regional broadcast spot advertising, another 10 million for local spot advertising, and untold additional transactions to support the processes of placing media buys, tracking results and billing and collecting for services provided," he said. "Through the Internet, as well as DG Systems' satellite and terrestrial network facilities, we will provide a wide array of value-added services to process this enormous flow of transactions."

— Leslie Stimson

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FCC's ABCs of CPs

► **BOTTOM LINE**, continued from page 21 in this business for a while knows, press releases are not all they appear to be. Broadcasters were not ready to rejoice until they could read the fine print of the FCC's streamlining decision.

However, when broadcasters started reviewing the details of the revision, they discovered both good news and bad news for construction permit holders.

In its streamlining order, the FCC has eliminated its prohibition on the for-profit sale of unbuilt construction permits.

This rule revision applies to all outstanding commercial station construction permits as well as commercial permits that will be issued pursuant to the auction process.

The revision also applies to noncommercial construction permits granted prior to the release of the streamlining order.

However, the FCC has deferred deciding on whether to lift the prohibition on future noncommercial permits in proceedings where there is more than one applicant.

Where there is a single applicant that gets the noncommercial permit by default, the revision applies and you can sell the permit at a profit.

Extensions

The FCC has extended all construction permits to three years. However — and here's the start of the bad news — there will be no extensions in the traditional sense.

Instead, the three-year period will be "tolled" by the filing of appeals of an FCC action related to the permit, by appeals of zoning orders (the initial zoning processing will not toll the three years), and by acts of God (e.g., floods and hurricanes), but only for a period not to exceed six months. No other excuses will be accepted. At the end of three years, the permit will automatically expire.

The rule placing a strict term on all permits measures the three years not from the release of the streamlining order or the most recent extension date, but from the grant date of the permit.

For those holding older CPs, especially those which have already been extended beyond three years, this may be a big problem.

If you have had problems with locating a site or construction of a site which traditionally would have justified an extension, the ruling apparently prevents any further extension unless you can show that the permit is within the three-year construction period from the grant of the CP, taking into account any tolling factors.

Therefore, if you have extensions pending or are close to the end of the life of the CP, and are already beyond the three-year period from the initial grant, you must apparently either finish construction by the effective date of the FCC order (60 days from federal register publication) or the permit will be canceled.

Broadcasters out there who may have permits that they acquired under the old rules, but that are more than three years old, will lose those permits if the stations are not built by the effective date of the order.

The practical result of the rule change is that it makes CPs "hot potatoes."

In the past, if you could not build the station because of a zoning or technical difficulty, this would be a legitimate cause for requesting an extension of the permit. Now, if you encounter these problems, the permit may be in serious jeopardy.

Barry Umansky, NAB deputy general

counsel, said, "For decades, broadcasters have been hampered by intransigent local zoning officials who have held up approval for tower construction and modification."

In some instances, zoning officials have been accused of abusing this authority by favoring one broadcaster over another or by forcing broadcasters to change their programming in order to get zoning or permitting approval by the local land-use officials.

Umansky worries that the new FCC construction permit term rules, which do not grant permit holders time allowances for delays in gaining local zoning approval for tower construction, will give local authorities a "federal sword of Damocles to hang over broadcasters and

empower these officials to essentially 'wait out' broadcasters and broadcast facilities that they don't like."

"The NAB has, for years, been urging the FCC to enact rules imposing time limits and other constraints under which zoning decisions would be reached.

"Such an action would restore predictability and fairness to the process."

Market value

The NAB, according to Umansky, intends to seek reconsideration of the zoning approval aspect of the construction permit term rule of the streamlining order.

From a business standpoint, at first blush, it was believed that the new rule revisions would have a positive effect on the market value of construction permits because they could now be sold freely to the highest bidder.

However, although you can now sell the permit for a profit under the new rule, the perishability of the permit could effectively depress its value on the open market.

Thus, for such permits, getting your out-of-pocket expenses back may now actually be wishful thinking, even without the price cap.

It is fully expected that petitions for reconsideration of this, and other aspects of the order will be filed by the NAB and affected broadcasters, especially by those who stand to lose their permits under the revised rules.

Still, unless such filings stay the effective date of the order, there will be many sweaty palms out there, to say nothing of extremely busy engineers and equipment vendors who will be rushing to fill client and customer requests to get their unbuilt permits up as quickly as possible.

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The New Kids on the Block: AMFM

Peter King

Veteran programmers remember what it was like to receive demos from dozens of programming services, but a new breed has emerged. Call them the Super Programmers.

Station groups that are producing programs for large numbers of their own stations and competitors are creating huge "opportunities" for advertisers and revenue streams to pad the bottom line.



One such company offers a case study in how broadcaster owners are pursuing programming strategies.

AMFM Radio Networks is the newborn syndication arm of Chancellor Media Corp. It announced its arrival last March by signing up radio legend Casey Kasem, who has been counting down the hits from coast to coast for nearly 30 years.

Kasem's sudden jump from Westwood One was an immediate warning shot for competitors that AMFM was serious about becoming a major player.

The company's own literature plays up its strengths, boasting a stable of highly

rated, company-owned FMs in top markets, covering CHR, AC, rock, alternative and smooth jazz.

The company said there are about 1,000 AMFM affiliates for all programming services, about a third of which are Chancellor and Capstar stations (the company is expected to finalize the acquisition of Capstar in early 1999).

Chancellor Senior Vice President David Kantor said AMFM started with a \$2 million investment and has succeeded beyond his best predictions, reaching its 1998 goals by the end of the third quarter.

Kantor said it will do better than \$60 million in revenue, with cash flow of more than \$20 million.

He is bullish on the network business, saying that for August, September and October, 1998, business was up more than 20 percent.

"It's hot, it's great," said Kantor. "The last five months in a row, June to October, every single month has broken a new record."

Kantor said many TV and cable advertisers are spending more on radio because listening habits have changed. For example, more women are working and listening to radio instead of watching daytime television.

"With consolidation and the additions to our audience, the top 25 markets, radio is an effective medium for major advertisers," he said.

Kantor said radio also is getting plenty of business from the "dot-coms" that have sprouted up in the past year or so.

Companies like Amazon.com and

Priceline.com are using radio because many consumers are listening and working on their computers simultaneously.

Instinctively, computer users call up their Web sites when they hear a radio spot. "People aren't watching TV and using the Internet, they're listening to the radio," he said.

No pressure plans

AMFM's strategy seems simple enough — acquire and develop marquee brands, stress quality to advertisers and programmers and get the shows cleared in the top markets.

This is easier said than could be done in the "good old days." Now, companies like AMFM have a head start that their ancestors could only dream of: a strong base of company-owned stations in Los Angeles, New York, San Francisco and other major markets.



These stations allow AMFM to get its shows on the air quickly and demonstrate their viability so they can be pitched effectively in other markets.

Yet Kantor said his local programmers are *not* pressured to use AMFM product.

He said that its stations are given the first crack at shows like "American Top 40" and "Rockline," and will air them "only if they're right for that station."

Still, another company executive said decisions on certain programs, are "no-brainers" for many programmers who jumped at the opportunity to have Casey Kasem.

Litigation rules

AMFM and Westwood One recently settled litigation over Kasem's jump to the fledgling network.

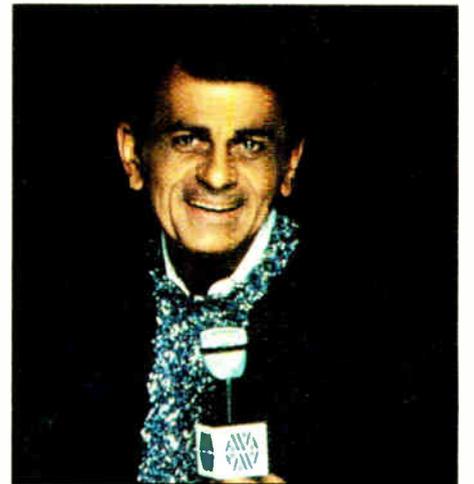
Both companies agreed not to pursue further action, but Kantor said neither AMFM nor Kasem did anything wrong in the transaction.

He said the move was great for AMFM, and Kasem is on the air in 17 of the top 20 metro areas on Chancellor stations. Kantor said he was on in only three of those markets in his final days at Westwood.

One reason for the settlement is that many Chancellor stations run Westwood One programming, although Kantor discourages them from running a competing show instead of one of his own.

"Our attitude is probably similar to ABC's, CBS's and Jacor's. If you have a competitive product, say our Casey vs. ABC's Rick Dees, our stations are going to support Casey. They may run Dees in addition to, but not instead of, Casey."

He said there are many non-competi-



Casey Kasem

tive situations; for example, the Dave Koz show is run by several competitors because there are so few smooth jazz programs in syndication.

AMFM doesn't have news or talk services, so Chancellor stations go outside the company to Westwood One/CBS, ABC or Jacor for hourly newscasts, Rush Limbaugh, Howard Stern, Don Imus or Dr. Laura.

Kantor said the big four own quality shows that their competitors will run on their stations because they fulfill a need.

"If you're looking at countdown shows or any other situation where there are choices," he said, "our stations will support our own show first. That only makes sense."

Kantor said there's a certain amount of pressure on his stations to air AMFM products, to keep revenue within the family.

However, he said, "the show has to fit with the station." Some companies, such as ABC and Westwood, are broad-based in their programming approaches, covering the gamut from news-talk to music.

Specialty programs

Others are concentrating on specific areas for now. AMFM's specialty is weekend music programming.

Its stable includes "AT40" and several CHR/AC offshoots, including a daily five- to seven-minute version featuring the stories behind the hits: "Hollywood Hamilton's Rhythm Countdown" featuring the WKTU(FM) personality; for CHR/rhythmic stations, "Rockline," a live call-in show featuring top rock acts



on Monday nights, and a second, more mainstream/classic-heritage rock version on Wednesdays set to begin Jan. 6: "Modern Rock Live," a Sunday night alternative version of "Rockline;" RuPaul Radio, a weekly "dance music extravaganza with simply divine features," for CHR and urban stations; "The Guitar Show with Kevin Bacon" and "The Dave Koz Radio Show" with smooth jazz artists and features.

AM/FM also syndicates "The Bob See SERVICES, page 26 ►

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NEWS ANALYSIS

Syndication Choices Are Vast

Dain Schult

Syndicated programming today is a critical part of radio's programming choices, competing for airtime and creating tough choices for program directors.

Network programs are readily available in a variety of formats. Some stations use them around the clock; others use them sparingly in certain dayparts or for specific short-form programming.

While it seems like it has been around a long time, such programming really came of age through the 1980s. Now, on the precipice of a new millennium, the programming arena changes so quickly you have to keep a scorecard to catch up.

Satellite Music Network morphed into ABC Radio Networks and the name game began in earnest. Group owners have learned the value of either creating their own satellite networks or gobbling up other companies that are already producing satellite network programming.

Automation wars

The economics of radio force owners in smaller markets to seek to pare costs.

A full staff in a small-market setting doesn't cost what a major-market air staff would run, but the expense is real and perhaps harder to justify in smaller markets.

The first stab at "cost containment/cost reduction" was automation. The big, bulky cart carousels and tape decks of earlier systems took up more space than a mainframe computer and could easily end up being more expensive than keeping your station live.

Everyone from that era has at least one war story about the time when the automation system hung up and (fill in the blank with your own anecdote here).

The march of technology continued. While automation systems improved, they were rarely a match for a well-pro-

could provide the small-market station owner with major-market air talent that the owner could never afford otherwise.

Better talent, a wider, deeper music library, non-stop programming that wouldn't go on vacation or fail to show up for a shift, the pitch went on. And it worked, because the satellite networks work.

So what's your pleasure? There's just about any and everything you could imagine out there in the spectrum of available programming.

Just like in automobiles and television networks, there used to be just the "big three." These days there are all kinds of networks and providers.

From cash and carry to barter to actually having the supplier compensate you for network commercials, you can find what you want from any of the major networks.

They can provide full-time programming, weekend packages, weekend stand-alones, and short-form elements.

All are big enough to do more than just one country format or one AC format, so you can get some specialization.

Just like the major auto makers, these networks are aggressive in holding on to their loyal customers while looking to

pick up affiliates from other networks. The challenge for many syndicators remains true market-specific, customized breaks and real time checks. In so many markets, it's still like listening to the "Today Show" — time is always "ten minutes after the hour" — but what hour? Covering four or more time zones caus-

es that challenge. Furthermore, while those jocks may be superior to the talent available in your market, they usually can't customize breaks because of the number and nature of the stations they serve.

Jocks can record some custom liners

See CHOICES, page 26 ▶



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grammed live station. Still, the search went on for a way to run more than one station with the same staff of announcers.

The march of time that was aiding the refinement of automation systems also set the stage for the onslaught of satellite programming. Some of the earliest attempts at long-distance simulcast programming revolved around utilizing STL links strung together to connect stations.

While this system worked, it was expensive because of the hardware and utility costs. Weather could affect the signal at times, too.

But we have to keep in mind that the 1970s and '80s were, in some ways, simpler — more FCC paperwork, but fewer stations owned by "big" groups because of the ownership restrictions.

But with each upward change in the number of stations that could be owned by one licensee, the greater the demand for some kind of centralized programming.

Major air talent

Which came first? Satellite programming or a shrinking air talent pool? One of the most enduring parts of the sales pitch for satellite programming has been that the satellite network syndicator

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Radio Programs a Buyer's Market

► CHOICES continued from page 25

that can be fit in to give more of a live, local feel but they can't do your weather forecasts or breaking local news stories.

They can take requests but you'll have to use their WATS line numbers so your local listeners will be "merged" with listeners across the country. Ditto on contests.

If you have someone who does your weather and local news that blends well with the network talent, that's probably all you need or want.

The cost of implementing such programming from a technical point is low. In most cases, the syndicator will provide the hardware needed to get started at cost or even at no cost at all to you.

Suppliers are becoming more responsive to the demands for local orientation. "Radio One," for example, is the Volkswagen Bug, circa early 1960s, to the big guys. It stands out because it is different. It offers just three formats: alternative rock, country and AC. But it provides customized breaks specifically for your station. You have to provide spe-

before walking down this street.

What looks good on paper may prove harder to accomplish than you might imagine when Mr. Murphy arrives to hook everything up for you.

There are a number of ways to go about setting up your own network.

You have to choose between prerecorded breaks or real-time live breaks. You can take the approach chosen by Capstar/GulfStar with its Star System, using WANs with ISDN connections. Jacor is using National Supervisory Network equipment and satellite linkage to create a hub-and-spoke system, which it is testing with some of its smaller market properties.

Jacor also has acquired a number of syndicators to protect its interests in certain programming.

Besides the major players and customized approaches, a number of other syndicators and networks are springing up.

Cox is involved with Music Choice and Digital Cable Radio. Jefferson-Pilot has expanded into syndication besides sports.

At the same time, larger group owners

task of making that selection.

Want news/talk shows, for example? All political positions are represented. You can



go from left to right to everything in the middle. With the advent of Internet "radio" shows, you can even plug into a variety of colorful and interesting talk shows that originate on the Internet.

The beautiful part of these trends: this is a buyer's market.

With so many services available and

so many syndicators chasing what is really a shrinking market, you are in a position to bargain more and to get more from any service you choose.

Perplexing choices

Like the kid on a sugar rush inside the candy store, your choices are mind-boggling.

It comes down to some simple questions: What are you looking to accomplish? Do you want to get creative and offer something modified and special?

If paring expenses is the answer, syndicated

satellite programming from an established syndicator is your best bet.

If you want to create something distinct, you are a prime candidate for considering creation of your own network.

■ ■ ■

Dain Schult is a regular contributor. RW welcomes other points of view.

If you want customized breaks, real time and time checks, you also could create your own network.

cific updated station information as you go along, but it seems to work.

If you want customized breaks, real time and time checks, you also could create your own network, if you own enough stations it can make sense.

A number of larger groups are working on their own networks and have implemented formats and programs. Consider your tolerance to pain and suffering and the level of your investors' patience

are buying up networks and syndicators to protect their interests in certain talk shows or other forms of long- and short-form programming.

Many of these networks are offshoots of groups developing programming for their own stations and then deciding to market that programming to other stations in the same geographic area or across the country.

There are so many choices a station can easily become overwhelmed with the

Programming Raises New Revenue for Radio

► SERVICES, continued from page 24

and Tom Show," its only daily long-form programming (Monday through Friday, morning drive) on the air on rock stations in almost 70 markets.

Radio at the races

AMFM, though, is making noises about expanding beyond the music frontier.



In a radical departure from its entertainment-/music-based programming, the network recently acquired radio rights for the Kentucky Derby, the first leg of thoroughbred racing's Triple Crown.

Does this mean long-time sports programmers like Westwood One/CBS and ABC/ESPN should start looking over their shoulders?

Kantor said he has little interest in long-season sports with heavy daily commitments — for instance, he calls baseball and basketball "too expensive" — but might be interested in more single-day event programming, such as the Derby.

"It's our first programming geared toward the AM dial," said Kantor. "We have some all-sports stations and they expressed a major interest in us pursuing major events such as the Derby."

Future talent

Is talk programming on the way? "I think if the right talent with the right deal exists, we would certainly pursue it. Clearly, though, compared to our competitors, the amount of AM programming we have in our stable just doesn't compare to theirs at this time. I'm not going to take on

a show like Rush's, it just doesn't make sense."

Kantor said he is looking at talent from within the company for possible future development.

The bottom line? It comes down to advertising and revenue. According to AMFM Marketing Vice President Martin Raab, network radio has been up more than 20 percent in revenues through the last quarter of 1998. He said, "This shows a number of major brands are finding radio the best way to get their message out in an efficient way."

"It's not just programming. Our work, in a network sense, can also bring some dollars and attention to the local (radio) marketplace as we

Network radio has been up more than 20 percent in revenues through the last quarter of 1998.

get some of these blue-chip advertisers in bigger ways than ever before."

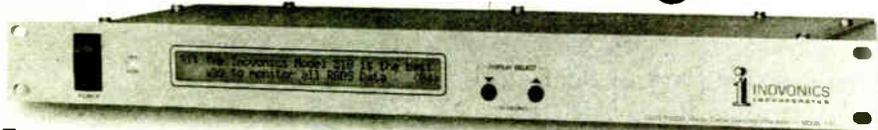
David Kantor said AMFM is getting a piece of almost every network radio buy: AT&T, NBC, Priceline.com, Red Lobster, Sears, Hershey, Amazon.com.

Why? "We've clearly delivered everything we said we would, and I think the advertisers are feeling very comfortable."

■ ■ ■

Peter King is a regular contributor to RW. Reach him via e-mail at Pkingnews@aol.com

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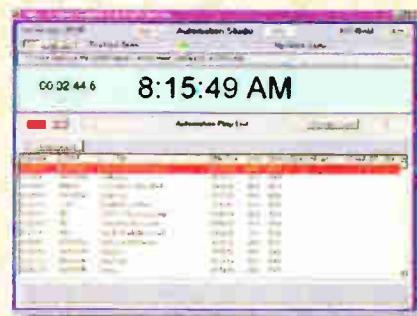
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Radio Syndication's Rich Menu

A radio programmer setting out to choose the right syndicated program to fit a format has many, many choices. *RW* invited the industry's leading program suppliers to provide information for a brief overview. This list is the result. It is, of course, only a starting point for your research.

Suppliers that did not reply in time can send press material to the address on page 5, attention *GM Journal Editor*, for possible publication later.

ABC Radio Networks

ABC Radio Networks offers syndicated radio vehicles delivering music, business news, talk, information programming and

entertainment. It claims to hold more top-ranked syndicated music programs that any in the radio industry. Talent such as Paul Harvey, Rick Dees and Tom Joyner call this network home, along with programs like "Radio Disney," "Fabulous Sports Babe" and "ESPN."

The latest contribution to programming from ABC is "Radio Disney." Radio Disney's weekly audience of children, age 6-11, surpassed 1 million listeners in December, according to Statistical Research Inc.



The Fabulous Sports Babe

In the news department, "ABC NewsWire" delivers 24-hour online news and information. "ABC Data" is a print-only service that delivers news, sports, music and entertainment information on multiple audio channels. ABC news services include sound-bites, USA Today radio script service, special events and commentary.

"ABC Satellite Music Network" offers 11 full-service, 24-hour music formats delivered live via satellite. Formats can be customized. Music formats include adult contemporary, contemporary country, traditional country, MOR, adult contemporary, young adult contemporary, urban adult contemporary, urban oldies, current rock and classic rock.

For information, contact ABC Radio Networks at (212) 456-1777 or circle Reader Service 4.

All Star Radio

All Star Radio offers several programs through its "Daily Comedy Exclusive Online" formats. All shows are available on a barter basis.

The "Stevens & Grdnic's Daily Comedy Exclusive Online" program is delivered daily via e-mail. The message, approximately 20 pages of fresh material, is complete with headline jokes, programming and contest ideas and phone topics. A daily exchange of ideas shared by more than 350 morning shows is exclusive to each market. A bi-weekly version is available for delivery on CD, featuring comedy bits, song parodies, commercial spoofs and contests among many other comedic ideas.

Fans of classic Looney Tunes cartoons will find something in "Mel Blanc's Blankity Blanc," a CD loaded with 500 comedy bits and drop-ins, from the "Golden Throat" of multiple cartoon voices, including Bugs Bunny, Daffy Duck and Porky Pig.

The company also offers "The Polka Monster," a CD full of polka readings of several hit songs.

For information on All Star Radio, contact Merrill Barr at (818) 766-6447, e-mail merrill@allstarradio.com or circle Reader Service 56.

AMFM Radio Networks

Chancellor Media Corp. bills AMFM Radio Networks as "A New Network for a New Millennium."

The network's affiliate base comprises, but is not limited to, Chancellor and Capstar station groups. The network estimates a combined total of more than 60 million weekly listeners.

AM/FM pursues a brand strategy and

claims dominant positions in contemporary, rock and smooth jazz formats. The network's strengths, according to research organization Radar 57, are in dominant positions among adult women and youth demos.

Prominent among its offerings is



"American Top 40 with Casey Kasem." The popular radio talent and his top hit countdown are available in CHR, AC, Hot AC and Feature formats, in lengths from three to four hours on weekends and five to seven minutes on weekdays.

"Rockline" is interactive radio hosted by Bob Coburn, featuring artists live, unrehearsed and unedited. The show includes interviews, live musical events and in-studio performances. The feature airs Monday and Wednesday nights 11:30 p.m. ET. "The Dave Koz Radio Show" is aimed at smooth jazz and adult contemporary radio listeners. It also combines audience interaction with music and entertainment interviews. Other offerings from the AM/FM stable include "Modern Rock Live," "Hollywood Hamilton's Rhythm Countdown," "RuPaul Radio," "Reelin' in the Years," "Guitar Show with Kevin Bacon," "Live from the Pit" and "The Bob and Tom Show."

For information call (972) 239-6220 or circle Reader Service 160.

Associated Press

AP Network News provides news, sports, features and business coverage plus actuality feeds. Among the many programs available are "AP Network News" on the hour, a five-minute newscast at the top of the hour, every hour every day. "AP Network News" on the half hour is delivered at the bottom of the hour in two-minute reports on major stories. Live special reports and closed-circuit feeds feature actualities, voicers, natural sound, wraps and on-scene reports for use in local newscasts.

"Hotline" monitors breaking news on a separate channel, allowing stations to stay with programming or switch to "Hotline" for news coverage.

AP Network Sports provides two-minute shows that air 20 times daily on weekdays, more often on weekends. "The Entertainment Report" is the inside story on the stars and the business of entertainment. Other entertainment offerings include "Eye on TV," "Flashback," "The Hollywood Report," "Film Clips" and "Today in Entertainment History."

"AP BusinessMinute" is a 59-second daily analysis of a major business story. "AP Business Update" features stock, corporate, economic news and other investment coverage. Business reports, available in 59-second daily feeds, include focuses on consumer items and agriculture news. Lifestyle features range from health and home improvements to nostalgia and high tech. Public affairs features include "Week in Review," a summary of the week's important news developments, airing four minutes weekly; "Special Assignment," covering major news stories in depth, 24 minutes weekly; and "Newsweek on Air."

For information, contact Associated Press at (800) 821-4747 or circle Reader Service 186.



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► MENU, continued from page 30

BlueSky Radio

BlueSky Radio is a radio program syndicator that specializes in short-form programs or vignettes that can be customized for commercial corporate sponsorships. The customization allows sponsors to target a specific demographic.



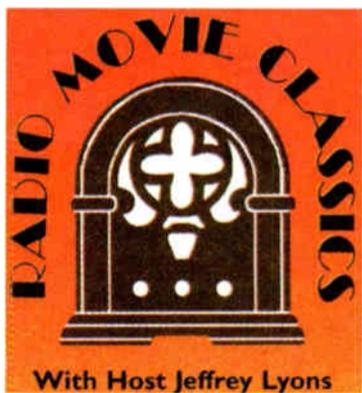
The network's strategy involves placing short-form programs within long-form features. "BlueSky Radio Info-tainment" features are short-form informative entertainment features, placed within the inventory of long-form programming.

Among the daily vignettes offered are "The Pet Care Minute," "The Pharmacist Minute," "The Jockey Sport Brief" (sponsored by Jockey underwear), "The Good Health Minute," sponsored by Tylenol, and "Smart Tip of the Day," a tip a day from Entrepreneur Magazine Editor in Chief Rieva Lesonsky. Also available, "Classical Stars" is a monthly one-hour program containing music and conversation with a classical artist.

For information, contact Mark Gura at (310) 230-4074, visit the network's Web site at www.blueskyradio.com or circle Reader Service 212.

Dick Brescia Associates

Dick Brescia Associates offers a variety of programming, from two-minute daily vignettes to 60-minute formats and radio shows for weekend broadcasts. Among the newest: "Watch," nostalgia radio hosted by Jeffrey Lyons, features favorite Hollywood stars and movies in a weekly hour program.



"Radio Super Heroes," hosted by Kris Erik Stevens, is a weekly, 30-minute program that brings radio super heroes out of the comic strips and onto the airwaves. "When Radio Was" is in its eighth year of syndication, and is carried on 300 American stations. The 54-minute nostalgia radio show airs weekdays.

"Leonard Maltin's Video Views" is a two-minute daily, distributed on CD format, aired weekdays with familiar voice of the man seen on "Entertainment Tonight." Maltin reviews current and classic home videos.

"This is Bob Harris" is a two-minute weekday program distributed on CD. Host Bob Harris is an award-winning humorist and commentator for KNX in Los Angeles and the recipient of the 1998 Associated Press Award for Best Radio Feature. Harris is popular among young adults and has appeared in publications such as Mother

Jones, The Funny Times and National Lampoon.

For information on DBA programming, contact David West at (201) 385-6566, e-mail to dbasyndicators@prodigy.net, visit its Web site at <http://ICTX.com/DBA> or circle Reader Service 8.

ESPN Radio

ESPN airs a variety of weekday and weekend sports programming and provides interviews and tie-ins with special events. The sports network recently aired three games of the Bowl Championship Series: the Rose Bowl, the Orange Bowl and the Fiesta Bowl.

The sports network airs exclusive NBA and Major League Baseball game coverage. The network is home to "The Fabulous Sports Babe," "ESPN SportsBeat With Brent Musberger" and "The Tony Kornheiser Show."

Among the famous names in programming available on the network are "ESPN Radio presents: GameNight," "The NFL on ESPN Radio" and "College GameDay on ESPN Radio." "ESPN Radio Network" is a subsidiary of ABC Radio Networks.

For additional information, call (972) 776-4644 or circle Reader Service 34.



Far West Communications

Far West Communications offers several formats for syndicated programming, all available on its Masterdisc custom CD service. Cuts are taken from the Far West library, which boasts more than 6,000 record company production masters.



Custom CDs with 15 cuts or less can be delivered within three working days at the price of \$6 per cut, including the price of the CD. Radio edit versions of certain tracks are available.

Among the formats offered by the company include "Modern MOR," a niche format for the 1990s designed to contemporize the traditional MOR/nostalgia format. MOR album and single tracks from the late '50s through today are the focus of this format, excluding AC crossover and nostalgia acts of the previous decades. With an average of 1,150 cuts, "Modern MOR" is available on custom CD as well as analog tape, DAT and live assist or automation systems.

The "Gold Plus" format is, according to the company, the longest running oldies format around, practicing the "play the hits" concept. The energetic, non-metal format concentrates on four categories of oldies spanning from the '50s through the '70s. Certain years are more heavily drawn from depending on the market.

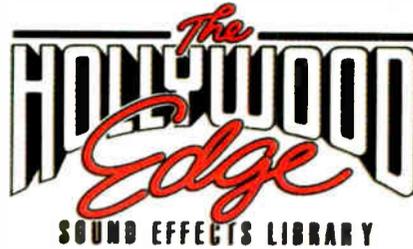
For information on Far West Communications, contact Paul Ward at (818) 248-2400; fax (818) 248-2596; e-mail farwestinc@aol.com or circle Reader Service 66.

The Hollywood Edge

The Hollywood Edge offers program directors choices for background music from their various sound libraries.

"T.H.E. Hollywood Edge Music Library" is a buyout library, no license fees or reporting required. Most of the content is created by musicians. "The Historical Series" is a six-CD library with sound takes from

Hollywood Edge's parent company, Soundelux, an Academy Award-winning sound company. Many of the cuts are from the film "Braveheart."



"Animation Collection" is a five-CD set of new digital stereo cartoon sound effects like slide whistles and bouncing twangs. "3DSFX," is described as an eclectic, six-CD collection of sound effects of modern and vintage steam trains, nautical vessels, atmospheres and crowds.

"Jurassic Dinosaurs and Other Fantastic Creatures" is a 99-track CD with 600 effects on one disc. "Sounds of Speed" is an effects package featuring Indy Car racing, dragsters and hydroplanes. The company offers many other libraries.

For more information, call (800) 292-3755, visit the Web site at www.hollywoodedge.com or circle Reader Service 92.

Jarvis Productions

Jarvis Productions produces "The Judy Jarvis Show," a five-hour live mix of calls commentary and interviews. The show discusses a range of topics from raising children, sexual harassment and drugs to sports and celebrities. Recent guests include

Ralph Nader, Col. David Hackworth and Arianna Huffington.

Jarvis has been a national radio host since 1993 and is a frequent guest on national and cable television news networks as well as a frequent contributor to op-ed pages throughout the country. She believes that the show's appeals lies in her independent approach to issues and her mixture of conservative and liberal views. "People respond to that," said Jarvis. "People don't want to hear just pat political points of view."



Judy Jarvis

Carried by more than 50 stations, the broadcasts from 10 a.m. to 3 p.m. (ET).

For information on The Judy Jarvis Show, contact Deborah Shillo at (860) 242-7276, e-mail to jjshow@nem.net, visit the Web site at www.judyjarvisshow.com or circle Reader Service 118.

See MENU, page 32 ►

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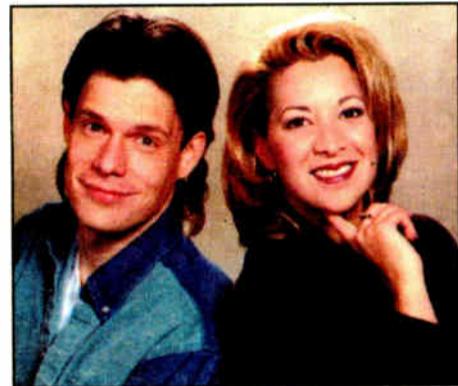
► MENU, continued from page 31

Jones Radio Network

The Jones Radio Network combines satellite-delivered programming with a full-service consulting and programming division.

Built on foundations established by Drake-Chenault, the Jones Radio Network delivers 24-hour programming for all formats. "Z Spanish" offers lively, danceable tunes with nationally renowned Spanish language talent. "Music of Your Life" features Gary Owens and Wink Martindale playing adult standards. Jones also offers several different country formats, sports programming and oldies.

Syndicated feature programming includes overnight personality/music shows, entertainment reports and one-minute outdoor life segments.



Marty McFly and Dallas Turner

Consulting services include aircheck critiques, music calls, promotional planning and image voicing. Jones consultants work with a station's management team to fine-tune the air product.

For information, contact Tom Watson at (303) 784-8770 or circle Reader Service 144.

MJI Broadcasting

MJI Broadcasting produces and broadcasts some 30 radio programs and services, and claims more than 15 million listeners on 2,000 stations. It syndicates daily music and entertainment, radio news services, short-form features, comedy prep, long-form programs, specials, special-event broadcasts and Internet programming for station Web sites.

Available in a variety of formats, MJI's daily fax and satellite service delivers news

with a focus on the artists, entertainment, and music. For radio stations on the Web, MJI Interactive offers daily news Web content delivery services.

Delivered on CD, MJI offers "Classic Cuts," a short-form service featuring popular names in classic rock revealing stories behind the music. "Country Quiz" is a daily trivia quiz show with turnkey prizeing and



promotions. "Ask the Stars" features 10 country artists answering fan questions each week. Also: "Oldies Countdown," "Brunch with Roberta Flack" and "Laugh Tracks."

"StarLine" is a monthly live, call-in show hosted by popular names in country music and broadcast from Nashville, with live interviews followed by fan questions.

MJI Special Events programming include the annual Country Music Association Awards and other specials and concert events. Satellite tours enable radio stations to feature live "local" interviews with big-name stars on a regular basis.

For information, contact MJI at (212) 896-5200, visit Web site www.MJI.com or circle Reader Service 222

NBG Radio Network

New services and programming from NBG Radio Network include REspec (Ready



Engineered Speculative), a customized collection of radio commercial donuts and production elements for more successful spec sales; and "Time Out for Trivia," a two-minute feature hosted by Harry Hamm of

KMOX(AM) in St. Louis.

Other programs offered by NBG include a new one-hour, syndicated effort called "Rock Around the World," which features original interviews and performances; and a second Nina Blackwood offering, "Absolutely 80s Spotlight," a five-minute vignette that focuses on the music and artists of the 1980s.

For information on NBG Radio Network, contact the Affiliate Relations office at (800) 572-4624 or circle Reader Service 15.

One-On-One Sports

One-On-One Sports is a live, 24-hour sports talk radio network with 402 affiliates and four owned and operated stations, in New York, Chicago, Boston and Los Angeles. Executives with the sports network say it is the nation's largest of its kind, reach-



ing more than 15 million listeners weekly.

The new "McCarver One on One" airs live from New York's Mickey Mantle Restaurant. Hosted by Tim McCarver, the show debuted Dec. 12. The sports network also will broadcast live from special sports events like the NFL draft. In early December the network began airing University of Massachusetts basketball games.

Hosts featured on One-On-One Sports include morning drive host Damon "The Dog" Perry, afternoon host Peter Brown and evening host Papa Joe Chavelier.

For information, contact Carolyn Phillips at (847) 509-1661, visit the network's Web site at www.1on1sports.com or circle Reader Service 67.

Premiere Radio Networks

Premiere Radio Networks, acquired by Jacor in 1997, calls itself the third largest radio network in the United States, with \$130 million in annual billing. It provides services in producing, creating and distributing programs in the fields of comedy, prep material, entertainment, music-related radio programs and services. Premiere says it represents and produces more than 70 programs and services distributed to more than 9,000 affiliates. Jacor also owns the Radio-Active Media, Multiverse and Chancellor Broadcasting programming properties.



Premiere talent includes Dr. Laura Schlessinger, Rush Limbaugh, Dean Edell and Art Bell. One of the network's latest additions, "The Group Room," airs live conversations with doctors, professionals and survivors of living with cancer.

Premiere offers daily fax services with format-specific music news, interviews and phone polls. "Premiere Prep Online" is an interactive show prep bulletin board service free to Premiere and Olympia affiliates via the Premiere Web site.

Premiere offers jingles, continuous music tracking, music libraries and other services.

For information, call (818) 377-5300, visit the Web site at www.premrad.com or circle Reader Service 119.

Radio Shows

Radio Shows Ltd. delivers long- and short-form syndicated radio programming. The

company also offers a la carte services for outside show producers, including market clearances, advertising sales and state-of-the-art billing and affidavit services.

Among the latest offerings from Radio Shows is "The Dr. Toni Grant Program," a three-hour call-in radio program in which



Comedian Howie Mandel and Dr. Toni Grant

psychologist Grant provides clinical and common-sense solutions while maintaining the entertainment value of radio.

"The Dr. Toni Grant Program" airs 3 to 6 p.m. (ET) weekdays, with a refeed 6 to 9 a.m. and 9 a.m. to noon. It is offered on a barter basis.

For more information, contact Radio Shows at (800) 988-4341, visit the Web site at www.drtoni.com or circle Reader Service 99.

Radio Voyager Network

A new, global syndicated radio network, Radio Voyager Network, was launched in September 1998 by Finger Lakes Productions International. RVN is a globally syndicated network broadcasting around the clock, seven days a week, airing live in



Europe and the United States simultaneously.

RVN studios, located in Washington, D.C., target listeners 18-34. RVN is an English-language commercial radio network that provides 24-hour music, entertainment and "solution-oriented" environmental and lifestyle features. The network combines modern adult contemporary music with international news and hourly features that cover today's pressing issues.

Popular U.S. and international disc jockeys from VOA Europe are showcased regularly on RVN.

Radio Voyager Network features 60-second "bursts of information," aired four times per hour on issues relating to health, race relations, new technologies, the environment and more.

Some examples: "Animal Instincts," sponsored by Ralston Purina, is a 60-second spot featuring interviews with leaders in the fields of veterinary research and animal behavior.

Presented by the Theresa and H. John Heinz III Foundation, "The EnvironMinute" offers tips, hints and suggestions on how listeners can be more effective in their conservation efforts. It is co-produced with the Environmental Health Center of the National Safety Council.

"The Ocean Report," hosted by author and environmentalist Peter Benchley, addresses pollution issues and offers suggestions on how to preserve natural resources. "NatureWatch" is presented in partnership with the Bronx Zoo-based Wildlife Conservation Society. The program features experts in science and nature and educates audiences on a wide range of environmental issues.

See MENU, page 34 ►

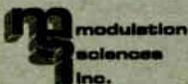
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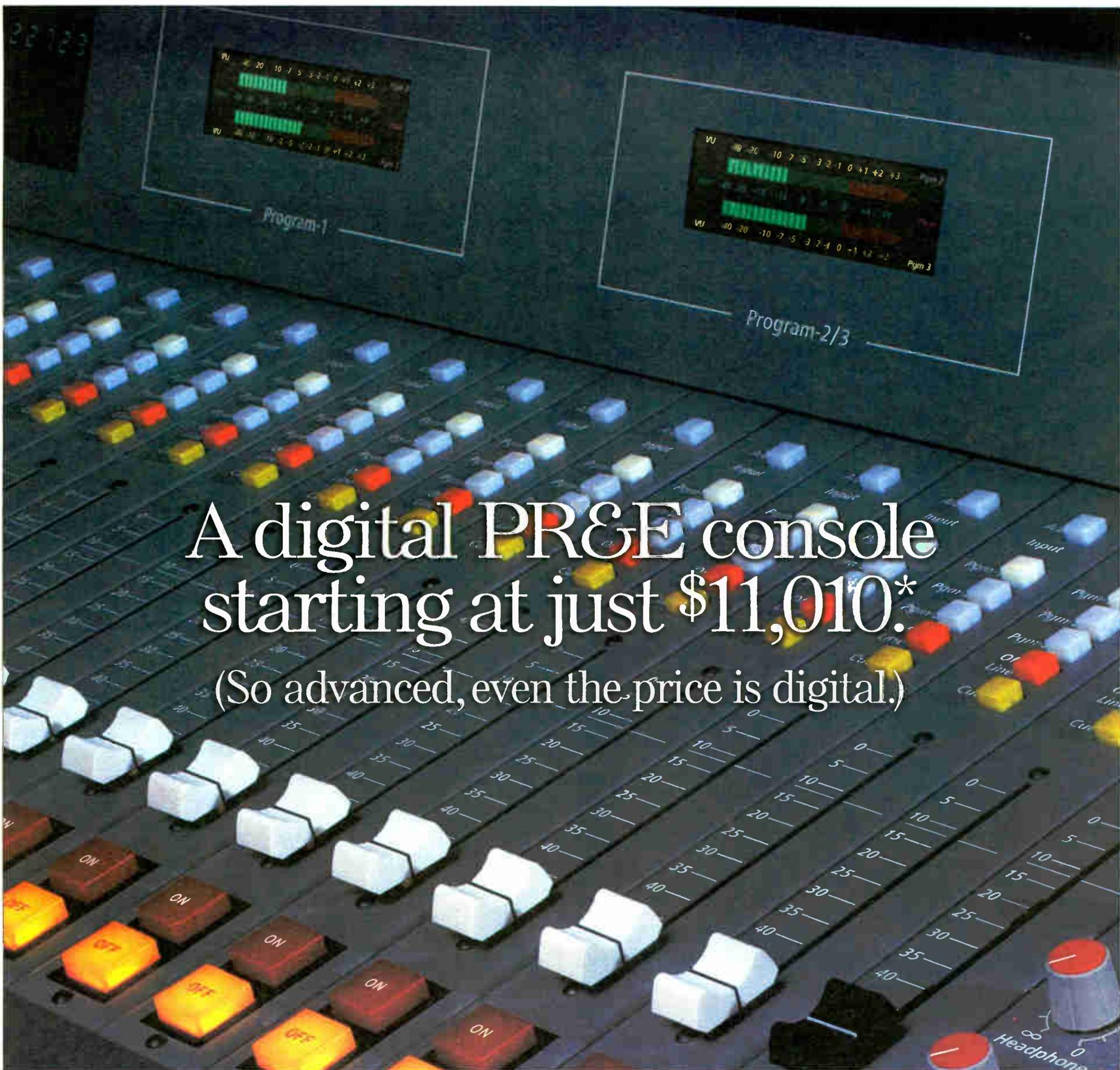
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World Radio History

► MENU, continued from page 32

For information on Radio Voyager Network, contact Greg Hartz at (607) 275-9400, visit Web site www.radiovoyager.com or circle Reader Service 182.

SW Networks

SW Networks, an interactive service network formed by Sony Software and Warner Music Group, offers several formats of syndicated programming.

Several company feature live artists through SW Satellite Interviews, conducted in the Los Angeles and New York SW facilities and sent live to the station's studio.



"Alternative Rock Network" comes with a daily preparation log of 12-15 pages: News of the Day, Entertainment News, Road Trip (tour information) and TV Party of a sample. The daily entertainment audio feed features three to five alternative rock artist soundbites, along with three or four soundbites from entertainment celebrities.

A 20-25 page daily preparation log comes with the "News/Talk Network" program. The

Talking Points section includes five or six topical stories with provocative questions to get the phones ringing. Other sections include News Briefs, Offbeat Briefs and Tabloid News. This format features the Guest Booking Service, a twice-daily roundup of compelling stories with contact names and phone numbers of relevant guests and spokespeople. Special bulletins are provided for major news.

For information on SW Networks, contact the company at (212) 833-5400; fax (212) 833-4994 or circle Reader Service 100.

Talk Productions

Talk Productions offers "The Underground Shopper," a program available on CD in two-minute vignettes for airing Monday through Friday. According to the company, it is the only shopping show with a national focus available to local stations with local retailers.

Airing from the company's flagship station in Dallas, host Sue Goldstein shares shopping tips and answers questions from listeners around the country on smart shopping and value hunting. The program, available on CD,



cassette and satellite, is tailored in different ways for the following formats: talk, AC, country, easy listening and adult standards.

Beginning in March, a weekend program

will be available on Satellite C5. Scheduled for live Saturday morning broadcasts, the three-hour program will feature the same ideas presented in the daily format. The program will run from 9 a.m. until noon, with repeats available for Sunday mornings.

The program will be structured to run in any of the following ways: Three hours live, which features two hours of live call-in and one hour of the host bring magazine-style reporting; a three-hour replay on Sunday; and "Magazine Hour," which can be aired at any time and delivered via satellite or CD.

For information on Talk Productions, contact Angelo Celidonio at (972) 245-3325, x122; fax (972) 245-1155 or circle Reader Service 139

Talk America Radio Networks

Talk America Radio Networks offers syndicated talk shows 24 hours a day, seven



days a week. The network offers shows that focus on a particular group or issue, as well as broad coverage of popular news and cultural events. It covers news, business, health, liberal and conservative political views, metaphysics, sports, computers and the information age, senior citizens and entrepreneurs among other issues.

"Discover Wall Street," with Morton Downey Jr., "PC TALK with Lloyd Kruckerberg and John Dowling" and "The Edge of Reality" with Ken Dashow are among its offerings.

For information, call (781) 828-4546, visit the Web site at www.talkamerica.com or circle Reader Service 209.

Talk Radio Network

Talk Radio Network, credited as the parent company that developed Art Bell, became a syndication independent recently when Premiere/Jacor sold the network back to Talk Radio Network.

Executive Vice President Bob Just said the network has developed a seven-day/24-hour schedule and plans to focus on live product offerings.

Programming features a variety of talk radio shows:

"America's Wake Up Call with Alan Keyes" airs weekdays 9 to 12 noon (ET). The conservative talk host is a former



Reagan administration official and author of two books; he holds a doctorate in government affairs from Harvard University.

"Auto Talk" airs Saturday for two hours, 11 a.m. to 1 p.m. (ET). David, the mechanic, offers solutions and diagnostic advice to automotive dilemmas, while Alan, a former car dealer and auto-body repair shop owner, computes the value of cars and trucks.

"World Wide Web Radio Show" is hosted by Mike Walter, founder and CEO of Tuneup.com, one of the initial subscription-based online services. The show is aired on Saturday, 3 to 5 p.m. (ET). Other features include "Conquering Negative Emotions with Roy Masters," "Cruisin' America," "NetTalk Live Daily" and "Your Personal Health."

For information, contact Tim Austin at (541) 664-8827 or circle Reader Service 103.

TM Century

A variety of programs are available from TM Century for assistance in differing formats.

Designed for Latino broadcasters, "MA\$!" is a new business development program. The market-exclusive program delivers three fresh, international-flavored commercial jingle concepts to a radio station's sales staff each month, for a minimum of 36 campaigns each year.

"The Country House Band" is promoted by the company as live station-image tracks with an attitude. The promo beds are designed around eight themes and are mixed more than 600 ways, according to the needs of the station. Examples include high-energy steel guitar to relaxing piano tracks, designed to bolster the recognition of a morning show by listeners.

The "MegaMusic" program features 1,500 original tracks of music on 103 CDs. A CD-ROM audio catalog, "Playback," is included to save time searching for a track and audition cuts in the library. The color-coded program is divided into six styles of music: AC Mellow, AC Medium, AC Up, Rock/CHR, Country and Specialty, for international and holiday themes.

For information on TM Century, contact Corky Brown at (972) 406-6869, fax (972) 406-6890, e-mail tmci@tmcentury.com or circle Reader Service 200.

United Stations Radio Networks

United Stations Radio Networks encompasses a comedy network, talk radio network and entertainment networks. Born in 1994 with the acquisition of DB Communications, United Stations Radio Networks was founded in part by Dick Clark. The network long-form, short-form and information content.



Among the comedy programs available are "Comedy Central," "Conan O'Brien on the Radio" and "Apollo Comedy Minute." Music programs include formats in country, ACM, ACMR, jazz, CHR, classic rock and rock. "The Country Comedy Jamboree," "Rock, Roll, Remember" and "US Music Survey" are a few of its music offerings.

United Stations is the national ad sales representative for Talk America Radio Networks, including programs "The Edge of Reality with Ken Dashow" and "The Barry Farber Show." Special short-form programming like "Awakenings with Maya Angelou," are available for a variety of formats.

For information, call (212) 869-1111, visit Web site www.usrn.com or circle Reader Service 112.

For information on Talk America, call (781) 828-4546 or circle Reader Service 60.

UPI Broadcast

Offering newscasts, features and a morning news and interview program, UPI Broadcast also provides ready-to-read scripts for newscasts, sportscasts and business reports.

UPI Net-1 features four-minute newscasts on the hour and one-minute headlines on the half-hour, 24 hours a day, seven days a week, plus hourly business and sports reports.

UPI Net-2 offers live special event coverage

See MENU, page 35 ►

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► MENU, continued from page 34 and "The UPI Morning News," a turnkey news, interview and feature program dual-anchored with easy cut-away options.

Also available are once-a-day, five-days-a-week half-hour feeds of religious sound bites and commentary; the weekend magazines "American Montage" and "While We're on the Subject;" sport scores and commentary and hourly coverage of major financial exchanges, indexes, markets and international companies.

UPI Features are topical, informative and entertaining news items including "Entertainment Today," behind-the-scenes news; "Science/Health," health, medicine and technology;



"Religion," daily stories and analysis; "Music," news and reviews; "Of Human Interest," stories about the famous, infamous and fascinating; "Today's Consumer," fare wars, product recalls and new product roll-outs; "Living Today," the latest in fashion and trends; "Watercooler Stories," funny stories from around the nation; "Jock Strip," the top five list; "Gizmo-rama," the latest software and consumer products; "Blast From the Past," this day in history, and "Horoscopes," astrological highs and lows.

For information contact Kami Arnot at (202) 898-8254, e-mail to sales@upi.com, visit Web site www.upi.com or circle Reader Service 231.

USA Radio Network

USA Radio Network serves more than 1,300 affiliates as well as Armed Forces Radio Network. It offers headline news, every day, delivered to stations at the top of the hour. News updates are delivered continuously at the bottom of the hour and full coverage of special events is available.

A spectrum of sports news and events is offered, including "Sports Trivia," "NFL This Week," and "College Basketball This Week."

Content features daily long-format programs like "Eye on the Middle East," "Christian Interest News" and, recently added, "The John and Ken Show," a national talk show from California-based Fisher Entertainment.

For information on USA Radio Network, call (972) 484-3900 or circle Reader Service 214.

Virtual Radio Programming

Virtual Radio Programming provides turnkey radio programming service that includes major-market talent, imaging and



Virtual Radio

customized music scheduling.

Virtual Radio Programming positions itself as different from satellite-delivered programming, in that it is locally focused and delivered via wide area network, ISDN, portable hard drive or compact disc.

Commercial inventory remains intact; VRP does not interfere with spot load, so individual stations determine commercial capacity and stopset locations in the hour. Eleven individuals on the VRP creative team write, create, and produce custom, non-boilerplate imaging for VRP stations.

The cost of the service depends upon market size and the amount of programming and dayparts to be covered.

For information, contact Virtual Radio Programming at (206) 441-0434; visit the Web site at www.vrp.net or circle Reader Service 94.

The Wall Street Journal Radio Network

The Wall Street Journal Radio Network delivers three syndicated programs.

"The Wall Street Journal Report" is a service of hourly two-minute reports, broadcast weekdays around the clock. It covers business, economic and financial market reports from newsmakers, analysts and Wall Street Journal reporters. The program is carried on more than 100 stations.



"Dow Jones Money Report" is delivered in a news-you-can-use format, as hourly one-minute updates of economic news and lifestyle trends. The reports are available weekdays 5:45 a.m. to 9:15 p.m. and air on Saturdays 6 a.m. to 3 p.m. (ET). "Work & Family" is a live, two-hour call-in radio program aired on Saturday mornings at 10 a.m. Hos Jan Wilson orchestrates a broadcast that tackles modern, real-life pressures of work and family, like dealing with a tough boss, finding day care and office politics.

"Barron's on Investment" is a radio script service faxed or delivered via satellite each Friday. Three one-minute scripts feature investment related stories based on news in the upcoming issue of Barron's.

For "Work & Family," contact Nancy Abramson at (914) 244-0655.

For all WSJ programming, contact Anne Su at (212) 416-2384 or circle Reader Service 63.

WestStar TalkRadio Network

WestStar TalkRadio Network broadcasts the "Kim Komando Show." Radio's "Digital Goddess" explains computers and the Internet in everyday language. Known for

no-holds-barred advice, she fields callers and comments on developments in cyberspace and the computer industry. Komando also contributes a column to Radio World.

The show is carried by some 200 stations and is broadcast from 10 a.m. to 1 p.m. (ET) Saturday mornings.



Kim Komando

"The Kim Komando Computer Minute" is a 50-second editorial on topics ranging from online banking to wireless Internet access available weekdays, 6 a.m. to 7 p.m.

Komando is the computer editor for Popular Mechanics and has a weekly syndicated computer column for The Los Angeles Times. She has written two books.

For information about the "Kim Komando Show," contact Amy Wiitala at (602) 381-8200, e-mail to amyw@weststar.com, visit its Web site at www.komando.com or circle Reader Service 51.

Westwood One

The Westwood One umbrella encompasses some of the longest-running radio network news operations and hosts.

Westwood One syndicates hosts G. Gordon Liddy, Tom Leykis, Don Imus, Jim Bohannon, Don and Mike and others. News operations include CBS Radio News, Mutual News, CNNRadio News, CNBC Business Radio and the Shadow Broadcast Services roster of traffic, sports, news and weather delivery.



News program material includes "On The Air with John Tesh," a three-hour adult contemporary music program hosted by the co-host of "Entertainment Tonight." Seasonal segments and features are available year-round.

Two new networks, CNN Max and Source Max, were launched recently. Beginning this month, existing networks are being reconfigured into the CBS Network, NBC Network, NeXt Network and WONE Network.

For information on Westwood One, call (310) 840-4323 in Los Angeles or circle Reader Service 78.

— Syndication listings compiled by Laurie Cebula, Al Peterson, Brian Galante and Karen Robb from material provided by the companies.

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Bob's credentials for capturing the attention of young adults is impressive:

- Nominated five times as Lecturer of the Year by Campus Activity Today... Bob has appeared on stage at over 250 college campuses.

- Widely published newspaper and magazine columnist including Mother Jones On Line, The Funny Times, Z and National Lampoon.

Want more? - Bob is a five-time Jeopardy champion, author of "Cramming 101" and has received accolades like these: "wickedly observant" - (Chicago Tribune), "One of the most talented political comics performing today" - (Cleveland Plain Dealer)

For More Information Contact
David West at:
Dick Brescia Associates
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Haworth, NJ 07641
Phone: 201-385-6566
Fax: 201-385-6449
E-Mail: dbasyndicators@prodigy.net

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2	3	4	5	6	7	8
9	10	11	12			

February

S	M	T	W	Th	F	S
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	1			

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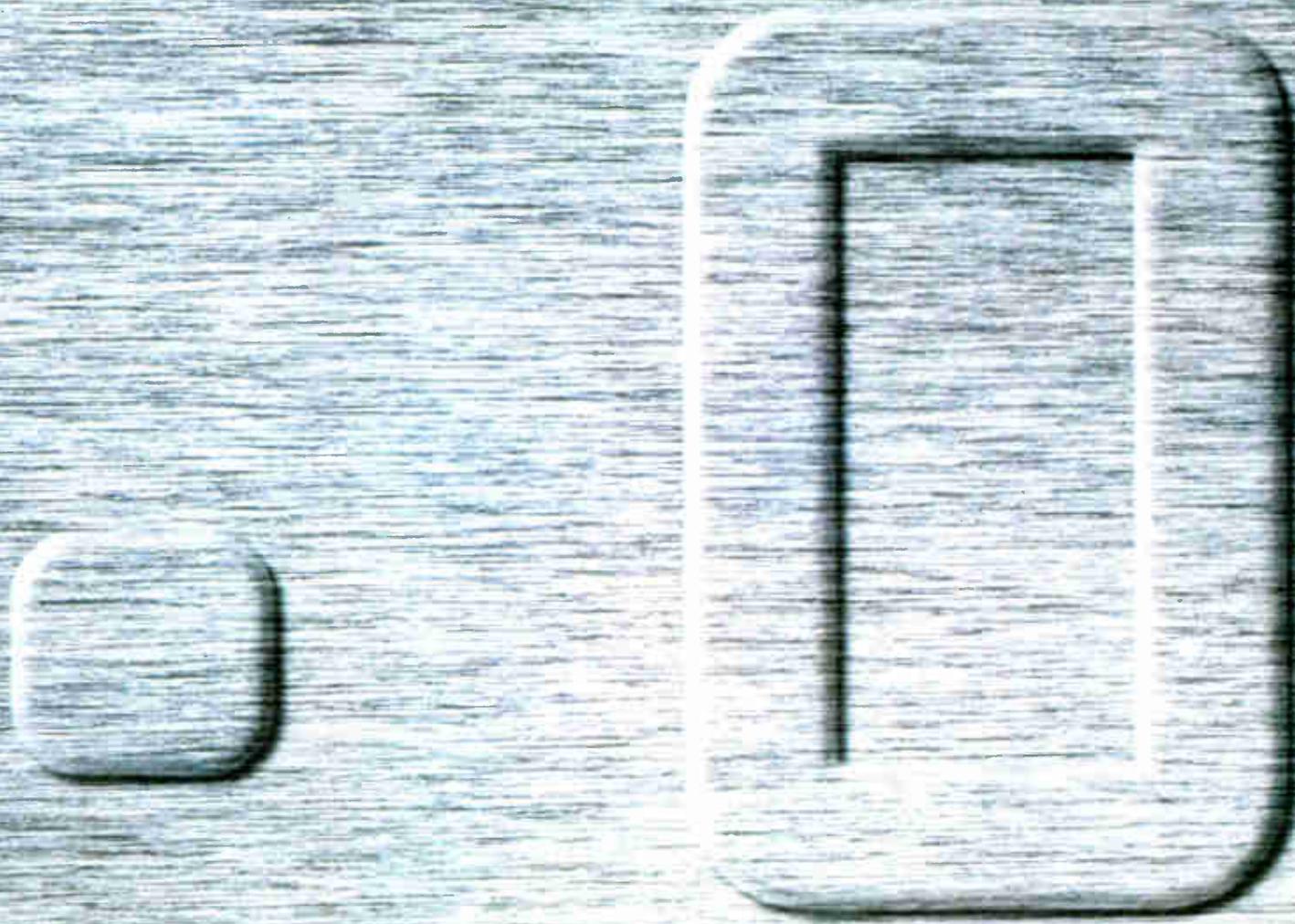
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ROBERT LEEMBRUGGEN, KTWV, Los Angeles

"Orban's new Version 3.0 provides a full, dynamic sound that other processors cannot compete with. The superior output and unique remote access feature makes it the best product of its kind."

ANDI GALL, Mondocom GmbH, Germany

"After auditioning several processors, I decided to go with the Optimod 8200. It sounded so good out of the box that I didn't have to play with it much at all. The remote control software is awesome!"

MICHAEL KERNAN, WCSX/WRIF/WXDG, Detroit

Radio Execs Skip Streaming Event

Bill Mann

The recent Streaming Media '98 conference at the Grand Hyatt in San Francisco was a sellout. More than 600 key industry people gathered to discuss and learn the latest in Internet radio and TV.

Missing, however, were radio broadcast executives.

There certainly were plenty of enthusiastic Webcasters. Their presence wasn't surprising. Among those in the crowded event were start-ups out to grab a piece of the radio pie using the Internet.

Many of these are "radio" in name only; they own no licensed broadcast facilities, but position themselves as radio stations on the Net. Others are actual radio stations that also stream their content.

The show was sponsored by Internet-related firms like InterVu, Compaq and encoding.com, among others. Broadcasting's conspicuous absence might have been due in part to the timing of the conference shortly after The NAB Radio Show, at which some of the same speakers appeared.

Others interpreted the absence of radio managers as a sign of complacency.

Jan Anderson, an executive of Minneapolis-based Net Radio, which provides customized music to workplace desktop PCs, noted the absence of broadcast radio.

"TV didn't have a clue, and now cable's killing them," he said. "Radio is so caught up in mergers and consolidation they're not paying attention to all the exciting stuff that's going on in Netcasting right now. Arbitron released a study showing that Internet usage decreases broadcast radio listening 15 percent. If nothing else, that should concern them."

Net advantage

In addition to organizations like RealNetworks and broadcast.com, other companies specializing in Webcasting were present.

Robert J. Smith Jr., vice president for public affairs of the International Webcasting Association, took a more sanguine view of radio broadcasters' absence.

"We're still trying to figure out the business model for radio on the Internet. No one's come through with that yet, and many radio execs want to know what the advantages are in Netcasting," he said.

"At this point, radio broadcasters need to get beyond 'Can we do it physically?' because we know they can. But they also want to know what kind of a return are they getting on their Netcasts, since most of them have been doing it for one or two years now."

Smith said those radio managers want to know how they can market their existing streamed content, and whether to put more resources into it in the future.

Peggy Miles, president of IWA and Intervox Communications, said, "Ease of use is still a big issue in Netcasting, and it's getting easier." Miles co-authored the book "Internet Age Broadcaster," published by NAB.

With some 1,700 broadcast radio stations worldwide streaming audio on the Internet, Miles said, "This convention

really could have used more broadcast radio presence. There's a lot going on technologically and also in marketing and advertising on Net radio. Broadcast stations should be doing a lot more with their Web sites."

Suppliers at the convention sought to position their products as the right tools for Internet radio marketing success.

Among the more interesting products, Miles said, was the new Stats 2.1 content-management software from Lariat Software, which provides statistical analysis and reporting for streamed media.

"It lets you know what's working on your radio station's Web site. It gives you charts and graphs about what's being used, as well as data and trends about where listeners go after they leave your site," she said. "Accountability software like this is a real help to managers."

The Seattle-based Lariat also demonstrated a media management software package called Station Manager. It allows better management of streamed audio and video files, aiding the production of commercially sponsored online broadcasts, a growing phenomenon.

Miles noted Arbitron research showing that one out of five radio listeners now listens to Internet radio in some form. She said Steamquest's new portable, wireless Net radio device will allow listeners to tune in to their hometown stations from anywhere in the world.

Bandwidth bedevils

Bandwidth, of course, is a major issue in streaming. But choppy reception and dropouts continue to bedevil audio feeds. Some high-tech suppliers at the convention mean to do something about it with a unique approach — by simply bypassing most of the Internet.

Los Angeles-based iBeam Broadcasting is set to launch its own satellite network in the first quarter of the

year, to deliver quality audio to larger audiences by eliminating bandwidth constraints.

Engineering tests are wrapping up. "We're setting up dishes at ISPs around the country now," said James Rea, iBeam's vice president of media services.

"We'll have our own network of remote servers at the ISPs to take downloads from satellite feeds, and we'll be able to deliver at least 100,000 on-demand multicast streams instead of the



Lariat Software Package

20,000 or so now available by bypassing the Net. Each stream will also allow embedded advertisements," he said.

Umang Gupta, chairman of Keynote Systems in San Mateo, Calif., said, "The performance limitations of the Internet are usually the result of backbone and infrastructure delays. A satellite system can effectively bypass these delays, resulting in dramatic improvements in end-user performance."

Delivering audio

"Broadcasters need large audiences," Rea said, "and this is the way to do it. It's the first step toward creating a real broadcasting media on the Web. This will be the perfect delivery system for a big rock concert, for example," he said.

Of the absence of radio broadcasters at the convention, Rea said, "Don't worry, they'll be here next year."

Other companies made notable announcements at the conference.

AT&T introduced a product called A to B Mail. Miles said it allows a station to

e-mail multimedia promotions.

"You can have a jpeg (photo) of one of your air personalities e-mailed to a listener who has been to your Web site, and have him or her read a short message about an upcoming station promotion."

Seattle-based Activate announced it had been named by Radio Data Group as RDG's exclusive provider of broadcast signal streaming over the Internet. RDG Webmaster is an Internet development service of MJI Broadcasting.

The deal also establishes a dedicated streaming network for affiliated stations. RDG Chief Executive Officer Michael Rau said, "Activate's package allows radio stations to seamlessly integrate audio streaming with their sites on a custom basis and cost-effectively.

"Radio stations need a custom-tailored streaming service provided from a radio perspective and an alternative to Broadcast.com," Rau said.

Vstream showed its comprehensive Demand system, which allows stations to archive programming, manage bandwidth usage and allow controlled, measurable distribution of content to controlled audiences. It also provides user profiling.

Net-only radio

Microsoft and Sonic Foundry announced the beta release of a new content-creation tool for Windows media technology.

The authoring tool, Windows On-Demand Producer, delivers production and encoding features for Internet content providers.

"It easily converts WAV and AVI files," Microsoft stated, "to the Advanced Streaming Format (ASF) for streaming to the Windows Media Player included in Windows 98."

Sonic Foundry said the process allows end users to play the content immediately, providing an improved listening experience.

"The addition of the Windows On-Demand Producer to the Windows Media Technology Platform will make it even easier for developers to create and deliver compelling content for their audience," said Todd Nielsen of Microsoft's developer-relations group.

Bill Mann is a regular contributor to Radio World.

Will Radio E-Commerce Pay?

Bill Mann

"Can I make money on the Internet?"

That question has been asked by business people for years. Most of the participants of the recent Streaming Media '98 conference, it seems, would answer "Yes."

Another question was on the minds of attendees: What's the future of Internet advertising and other e-commerce? They were upbeat on that, as well.

Web site revenues

Money is being made through the Internet, they say, and it is only a tiny percentage of what's to come. That was the message at one major session and pep talk on e-commerce.

As one example of the promising future of Internet radio, the first

Internet audio appliances have started appearing.

Audible Inc.'s pocket-sized Internet content player has arrived. It has been described variously as an Internet Walkman and the first Internet VCR because of its time-shifting capability.

This "program-your-own drive-time" device, the Audible Player, was called the breakthrough product of 1998 by Business Week, according to Audible founder Donald Katz, who spoke at two sessions.

And while broadcast radio may not yet be making much, if any, revenue through station Web sites, the potential is enormous, delegates were told — if they do it right.

Attendees also heard that if radio does not move aggressively into this emerging marketplace, it risks losing audience and potential advertisers.

The key is being savvy in doing business in new ways demanded by the new medium.

Embedded advertising, which is becoming easier to use and customize, is one way to market successfully, the speakers said.

At a session titled "Where's The Money Going to Come From — Advertising Streams?," panelists agreed that the use of "rich media" on a station Web site, instead of plain banner advertising, is critical.

"Rich media does far better for the advertiser than the average banner," said panelist Michael Tchong, editor of Netcasting newsletter Iconoclast.

This sentiment was echoed by Bill McCloskey, director of advertising development for InterVU Inc., which provides Internet advertising technical

See E-COMMERCE, page 39 ▶

► E-COMMERCE, continued from page 38 support to companies.

"You don't just see static banners at most successful, major sites," McCloskey said. "You have to do something to catch people's eye and increase click-through."

Rich media incorporates technologies like Java and Shockwave and provides animation, mini-movies, audio and other enhancements on Web page advertisements.

Major pages like cnn.com or MSNBC.com provide good examples of so-called "rich media." Russ Yanda is co-founder of the Rich Media Division of MatchLogic Inc. His company handles Web page advertising for 200 major corporate advertisers.

"Banners quickly become invisible," he said. "You have to step up ads on the Web." Yanda agreed with McCloskey that 30 percent of all personal computers can now handle rich media.

Asking for ads

"There's a new paradigm," Yanda said. "The Internet allows 'permission advertising.' People ask to see those ads. I've seen studies that show that Internet advertising reaches only about 1 percent of consumers.

"But it's precisely the 1 percent advertisers want: these are people who ask to see an ad and who will continue on and make a purchase decision."

Panelists said Internet advertising also gives advertisers tracking capability, something radio execs badly want, through increasingly common "accountability software."

Tchong cited a recent Wharton survey that found each 14 cents an advertiser spent on the Internet generated \$1 in sales. "Hard data like this is finally coming in."

Another survey showed 68 percent of Internet marketers didn't believe they can get results on the Internet. But Tchong was unfazed.

"That's an obstacle, but rich media will make it work for them."

Radio may be competing with the personal computers for ad money, attendees heard. "The business will change dramatically in the next five years," said Tchong, who surprised many in the audience with this prediction: "In the next four to five years, big advertisers like Coke and Pepsi will be paying for virtually all desktop software."

The reason? "They know how valuable that desktop advertising space is," said Tchong.

Katz, who spoke at two sessions, announced at the convention that his Audible, Inc has finalized a deal to provide downloadable, three-times-daily reports from The Wall Street Journal.

Katz' Walkman-sized Audible player costs \$200. The customer base of 5,000 players is now paying on average \$20 a month each for fresh content, some of it time-shifted radio programming like NPR's "Fresh Air." "All Things Considered" and "Car Talk." A second-generation player is coming.

Files of copyrighted audio content are compressed and downloaded from the Audible Web site on customer PCs.

The palm-sized Audible player breaks the computer's umbilical cord by allowing the user to listen in his or her car or at work, through headsets or a car's audio system.

"We're providing value for people's downtime," Katz said, "and we're finding that people are willing to pay for it

the same way dissatisfied TV viewers showed they were willing to pay for cable, then premium cable, now pay-per-view."

Premium programs

Time-shifting of radio programs is only part of Katz's e-commerce strategy. There are 16,000 hours of premium programming available from the New Jersey-based Internet start-up. The files are downloaded right onto the player.

"Much of the material had previously been available only in print, like the Harvard Business School magazine, management lectures and self-help materials," Katz said.

Audible also has a growing books-on-tape catalog that subscribers can download, with such titles as Stephen King's

new bestseller "Bag of Bones."

The cost of a book on tape at Audible is \$7, compared to the average of \$19, according to Katz, for a typical book on tape sold in the conventional manner.

At the e-commerce session, Katz said the spoken word is undergoing a renaissance. He mentioned the popularity of news/talk radio as an example. He said his business plan has been to position his company in the middle of a revenue continuum.

"At one end, you have broadcast radio," Katz said, "with billions in revenues. At the other end, you have audio books. And in the middle, you have \$150 billion in advertising that's not going into the spoken word but is perfect for it — newspapers, magazines, newsletters. That's where we want to be.

"Broadcasters will 'get it,'" Katz told the convention, "when they create proprietary programming. There are new revenue streams from programming original content on station sites that managers haven't even dreamed of yet."

The New York Times notes that "some of the smartest investors in the U.S., including Kleiner Perkins and Patricof and Company," are among the investors who ponied up \$18 million for Katz' start-up.

Ease of use remains the biggest obstacle for opening up the marketplace in Internet radio, panelists agreed, and that's what providers are trying to do now. Internet chips in car radios will pick up digital satellite systems, and other audio technologies are being introduced.

Get Better Jocks for Less Money

Increase profits by running your station more efficiently. Outside the highest billing hours, it doesn't make sense to pay announcers to sit around *waiting* to talk. A Scott uncompressed music on hard drive System can put all the songs, spots and prerecorded Voice Trax together smoothly with *nobody* in the air studio!

For years, Scott Studios' client stations have been successfully pre-recording *great* 4-hour shows in 15-20 minutes.

Now, thanks to Scott Studios' new *free* Voice Trax Via Internet (VTVI) software, free-lance announcers can record timely localized shows *from anywhere*. All they need is a good microphone, an Internet connection, any Windows computer, and Scott Studios' free VTVI software!

After the station's music has been scheduled, one touch of a button automatically e-mails the log and the latest live copy to the distant announcer. Scott's VTVI works seamlessly with all music schedulers and traffic/billing programs.

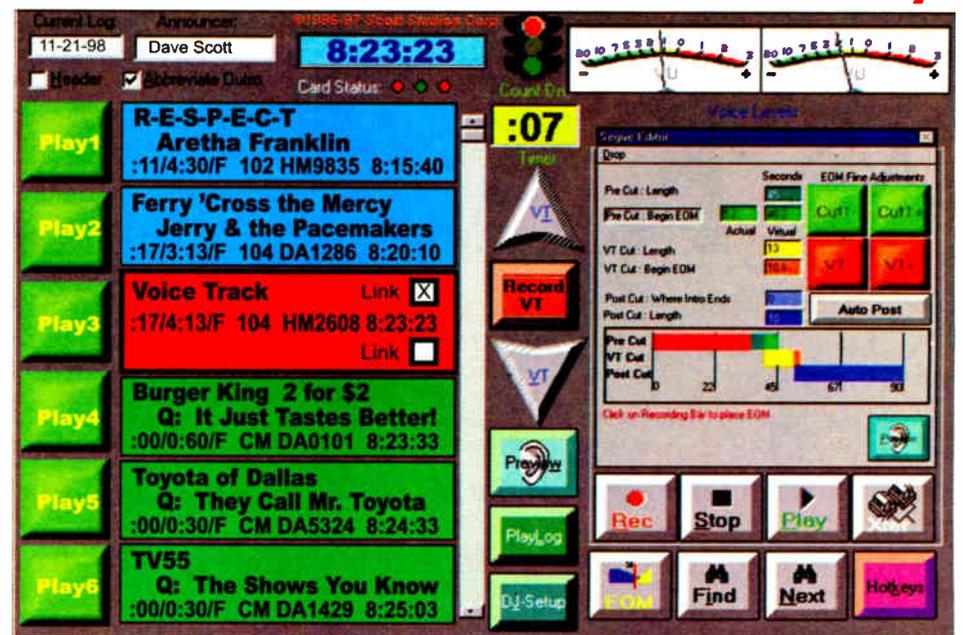
Scott's Voice Trax Via Internet software is *very* easy for your announcers to use. Scheduled live tags, trivia and copy display automatically on the right side of the screen. There's no fumbling with a copy book or even a mouse. When you're recording a song ending, simply press the space bar on the VTVI keyboard to start the next song or spot. Release the space bar after you stop talking. VTVI then moves ahead to the next place to talk.

All Voice Trax are recorded with the computer's ordinary sound card with impressive digital fidelity. Depending on your format, a microphone processor may be helpful to punch up the announcer's voice, but no console is needed.

If all the station's spots have been produced when the log is sent, Scott's Voice Trax software automatically computes and displays accurate time checks the announcer can include if desired in any Voice Trax.

After recording, any or all of the show can be reviewed and changed. Scott's VTVI Segue Editor even lets your jock fine-tune timing without any need to re-record any thing.

When done, a click on the VTVI Auto-Send button dials the Internet and moves the entire show to the distant Scott digital audio system automatically. Transfer speeds vary based on your Internet Service Provider, but with a dial-up phone line a shift can upload to the Internet in 40-50



Here's Scott's Voice Trax Via Internet (VTVI) software, shown with the optional Segue Editor. VTVI allows a distant announcer to pre-record a 4 hour show in about 15-20 minutes with nothing more than a Windows computer, an Internet connection and a good microphone.

minutes. With ISDN, transfer time can be 20-25 minutes.

Your announcer can be answering e-mail, writing copy, editing promos or doing a number of other things on the VTVI computer while your show is being transferred.

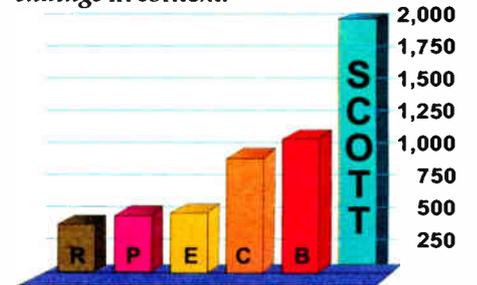
Scott Studios VTVI also includes our exclusive Voice/Music Synchronizer. When any Voice Trax mentions song titles or artists, your jock turns on the link so the Trax plays only with the correct song. No operator attention is needed at the station for Voice Trax to play seamlessly. If the announcer forgets to record something, or songs or spots get changed at the last minute the Scott Voice/Music Synchronizer automatically substitutes generic Voice Trax for each day and hour for each announcer.

Nothing could be easier or less expensive, yet still sound so good as good talent with Scott's VTVI! Of course, the free Voice Trax Via Internet does require Internet connections on both ends, a \$29 per month FTP transfer site, and the Scott NT System plus a \$2,500 Scott Remote Recording Router back at the station.

We also offer a \$500 VTVI Deluxe that lets the announcer download telescoped song intros and endings from the Internet, then fine-tune timing of talk-ups and backells in the context of the music and spots with little or no need for re-recording. With the VTVI Deluxe, a telescoped aircheck can be previewed with the beginnings and

ends of the songs and spots.

Or, the \$1,000 Super Deluxe VTVI lets your distant announcers record *while listening to song and spot intros and endings* in context!



It's a fact: More U.S. stations use Scott Studios than *any* other major digital audio system. 1,950 radio stations have 4,300 Scott digital work-stations, including *major* groups like CBS, Chancellor, Disney/ABC, Clear Channel, Emmis, Citadel and many more. In the US' top 10 markets, 45 stations and 5 networks use 155 of our digital workstations

Call Scott Studios to see how the Voice Trax Via Internet digital system can greatly improve *your* bottom line.

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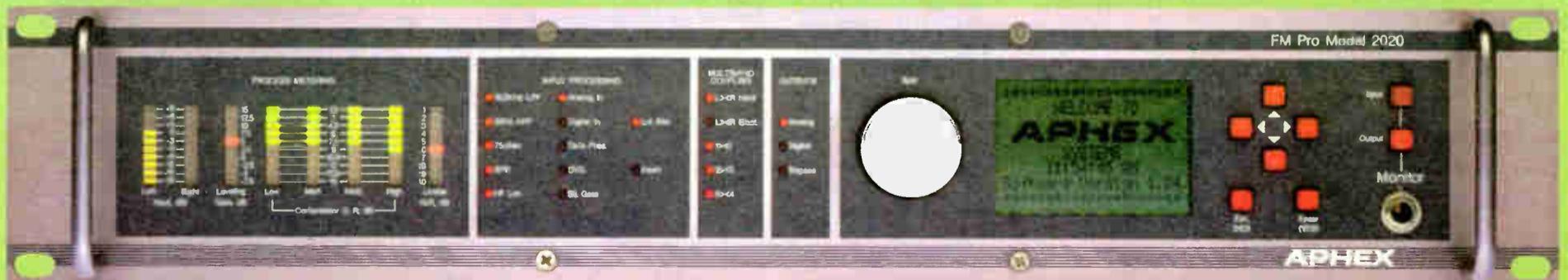
The hype for digital audio has been deafening. While digital offers advantages for storage and control, it has severe limitations for dynamics processing. Indeed, Cutting Edge® claims their Omnia unit sounds almost as good as analog.

The Aphex 2020 FM Pro offers the purity of an all analog signal path with the power of digital control. Through its use of 11 patented circuits, the 2020

achieves the greatest possible loudness while retaining musicality and naturalness.

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World Radio History

Studio Sessions



We try
the
MR-1
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Radio World

Resource for Radio Production and Recording

January 6, 1999

Groove Addicts: A Look Inside

Alan R. Peterson

We take for granted all of those blasts, zaps, textures and ambiance beds we use to make our radio production sound brilliant. Most of the time, our concern for these elements begins and ends in the time it takes to open and close a CD case. But these elements naturally have to come from somewhere.

One such source is Who Did That Music? and Groove Addicts in Los Angeles. The company produces jingles and imaging for radio stations, as well as some of the most in-your-face production elements available.

In the course of a day, the producers and engineers at Who Did That Music? and Groove Addicts sample, nudge, tweak and reprocess all kinds of audio to make stations sound light years ahead of the competition. Sometimes they use conventional methods and recording tricks, but most often they will process an effect into something brand new via ProTools or the latest sound manipulation software.

Studio Sessions spoke with owner

and Creative Director Dain Blair and Sound Designer Robert Nelson. An aggressive new collection of imagers and promos created by Groove Addicts for BBC Radio One set the tone for the interview. The collections blends hip-



Robert Nelson at a ProTools workstation, ready to morph more sounds.

hop loops and distorted rock beds with samples from Spike Jones and movies, along with heavily manipulated recordings of actual sound effects.

RW: You are both musicians. Do you get the same satisfaction out of hearing a six-second jingle on the radio as you would hearing one of your songs?

Nelson: Yes. Even if you put a 10-second bed together, it is quite a bit of work right

One producer on that project, came in and told us, "The first rule is, there are no rules."

RW: Let's talk about the technology that went into the assembly.

Nelson: A great deal of processing was done with ProTools plug-ins. We have quite an array of those here, mostly effects used for guitar or other instruments in non-traditional ways — using them in vocals, let's say. The more bizarre, the better. We're using a lot of digital distortion on vocals, all in ProTools.

There are a series of plug-ins geared more toward the sound design field. I really like using spatial effects, flanging and saturation effects. A lot is done with plug-ins, but there is also a lot done in editing: dividing up words into syllables and dropping in a repetitious effect.

When you do that, it tends to have a little musicality behind it. It takes on its own identity.

RW: Is anybody there using a PC-based audio editor?

Blair: What's a PC? (loud laugh from both)

RW: What about the drum loops and hip-hop tracks? Did you create those, did they come from sample collections or another source?

Nelson: They come from almost anywhere. Some that seem like drum patterns are not; they could be other instruments tweaked and EQ'd to bring out percussive characteristics. I would say 75 to 80 percent of those loops were taken and re-edited into new patterns, followed

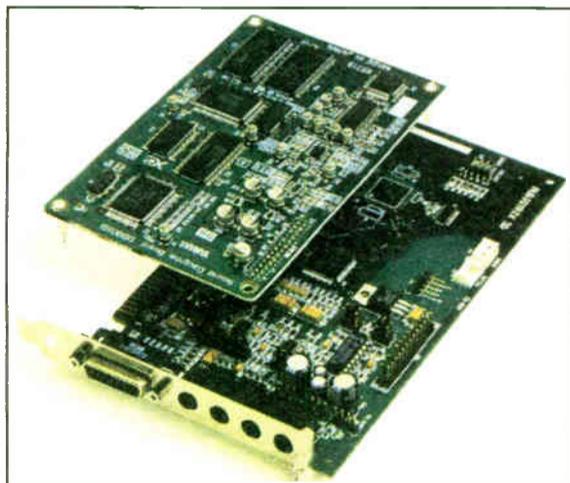
See GROOVE, page 47 ▶

PRODUCT REVIEW

Audiotrix Has a Few Tricks Up Its Sleeve

Read G. Burgan

From the moment I opened the box, I found the Audiotrix 3D-XG soundcard from Mediatrix inviting. More



Audiotrix 3D-XG soundcard, with Yamaha digital synthesizer along for the ride.

than a two-channel audio soundcard, the 3D-XG contains a full-fledged Yamaha synthesizer.

In addition to the card itself, the package comes with a pair of unpow-

ered speakers, a MIDI in/out adapter cable and a CD with several audio/MIDI software programs that not only demonstrate the card's many features, but actually put it to work without waiting for you to purchase additional third-party software.

Up and running

The 3D-XG uses a standard ISA slot, and both the soundcard and the supplied drivers install easily. I had it up and running in short order under Windows 95 on a Pentium 166 with 64 MB RAM. The soundcard supports sampling rates from 11 to 44.1 kHz at 8- and 16-bit depth.

The Mediatrix 3D-XG card features stereo line input and output, a microphone input and an amplified output capable of driving small computer speakers. All connections are made with eighth-inch mini-plugs.

Unlike similar computer soundcards

See 3D, page 43 ▶

there. It's in a much more concentrated form, obviously.

Blair: Every project brings a new set of challenges, and you get positive results in the fact the stuff goes on the air almost immediately.

RW: The BBC imaging is as in-your-face as a collection could get. Is it possible to put just about anything on tape these days and a station will love it?

Blair: (laughs). We had a good client, Eddie Temple-Morris, the BBC Radio

RDS/RBDS "Mini-Encoder"

With this simple, "dirt cheap" encoder, your station can begin transmitting

the more important radio-data IDs, service flags and text messages.

Use any PC to quickly and easily enter your station's call letters or "street name," format identifier, translator frequencies and scrolling ads or promos. Menu-driven software transfers this information to the encoder's own non-volatile memory.

This nifty little encoder installs in minutes, locks to any stereo generator and works in to any FM transmitter.

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Circle (105) On Reader Service Card

Music and Voice on One Card

► 3D, continued from page 41

that force you to buy a separate optional MIDI cable, the 3D-XG comes with a MIDI in/out cable that allows the connection of a keyboard or synthesizer module as well as a joystick.

It also has an internal DSP, allowing the card to produce reverb and chorus without taxing your machine's CPU.

Checking it out

The Audiatrix claims a signal-to-noise ratio greater than 85 dB using the A/D converters, and my measurement of -82 dB was close to their published spec. The 3 dB difference can easily be accounted for noise generated by adjacent computer cards in my computer — a common problem with internal sound cards.

I found the audio quality to be crisp and clean. I used the card for both recording and playback using Sound Forge 4.0, and the resulting sound was comparable to the results obtained with more expensive cards.

But the jewel is the Yamaha wavetable synthesizer, with its XG MIDI technology and 4 MB of voice ROM. The synthesizer has 676 voices, 21 drum kits and supports 32-note polyphony and 16-part multi-timbrality.

Whether you are a fledgling jingle producer, a serious musician or a production rat just wanting to "plink" around, the built-in synthesizer of the 3D-XG will provide plenty of inspiration for creating all kinds of sounds.

I found the sounds rich and realistic, with a multitude of useful patches including acoustic piano, English horn, Hammond organ and various string ensembles, to name just a few.

I found the sounds rich and realistic, with a multitude of useful patches.

Using the EEdit95 feature, complete control over all parameters of the internal synthesizer is available, allowing the creation of virtually any sound you would like.

I was able to connect both an external keyboard and synth module to the 3D-XG using the supplied MIDI

adapter cables. Using the supplied software, my keyboard provided data to the soundcard, and the card controlled the external synth.

Audiatrix includes several software utilities for use with the card, including an elaborate mixing configuration that includes volume, reverb and chorus settings and even bass and treble. It also has its own player and recorder. The player can be configured to play through a list of files to provide uninterrupted MIDI music.

The recorder and player offers full duplex capabilities, allowing you to play one file while recording to provide true sound-on-sound multitrack capabilities.

Several bonus software programs are provided in the accompanying CD package, including Cakewalk Express LE, Cool Edit Pro LE and Hotztrax.

Cakewalk Express is a budget version of the well-known MIDI sequencer product line. It certainly could certainly be used to score and edit legitimate production music or commercial ditties to accompany spots and multimedia presentations.

Hotztrax provides various sound patterns to which you can input your own melody using the computer keyboard. It includes a drum, bass and keyboard track. Even someone with no particular musical background could quickly develop a music bed to accompany a piece of production.

Cool!

Cool Edit Pro LE is the "lite" version of Cool Edit Pro from Syntrium Software. It has enough tools to do basic digital audio recording, playback and editing, but is too light for serious work.

If you need to record news actualities or a simple spot, you would probably find Cool Edit LE adequate. But for more than that, you will want either the full version or another standalone digital audio software product.

The Audiatrix 3D-XG represents an excellent value in a consumer soundcard, and a nice alternative to "blaster compatible" components. It provides functions of a digital audio card and adds a high-quality onboard digital synthesizer to satisfy

The Right Way to Choose a Soundcard

Increasingly, the distinctions between a consumer and a professional sound card are blurred. Amid the many claims and features of today's sound cards, how can you pick the right one?

Look first at the input/output jacks. Most consumer cards use eighth-inch stereo mini-jacks. The consumer cards usually offer a wider variety of input and output choices, including microphone and speaker/headphone jacks. To accommodate this much hardware, they are pretty much forced to use this size of jack.

Because of the very small size, these are not as reliable as other jacks, and can create intermittent contacts and other problems. A professional-grade soundcard will generally have only one set of line inputs and outputs, using more reliable RCA phono or even balanced XLR type jacks.

A professional card usually will have provisions for digital input and output. It may not be on the card itself,

Too Much? Go 'Pro'

Suppose all you need is a simple, clean audio I/O to your computer without the elaborate synthesizer. If the Mediatrix 3D-XG is a little too much for you, the company also has the AudioTrix Pro — a \$99 stereo soundcard with minimal synthesis capability and a signal-to-noise ratio exceeding 90 dB.

General MIDI voices are included on the card and 4-operator FM synthesis is available for gaming, but the real story is in the 16-bit full duplex stereo sampling D/A converter, with better than 90 dB dynamic range. The card boasts extremely low THD with ratings less than .001 percent.

The Audiatrix Pro is assembled with double-sided surface mount assembly techniques and a four-layer board. Internal noise generated by the PC is minimized.

Cross-platform drivers are available for DOS, Windows, OS/2, Windows NT, NeXTStep and UNIX offshoots such as Linux. Details on the Mediatrix Pro are also available at the company Web site.

— Alan R. Peterson

one's musical creativity.

Depending on machine and preferred operating system, the Mediatrix Audiatrix 3D-XG includes drivers for Windows 3.1x, 95, NT, OS/2 Warp and Unix.

The card carries a retail price of \$295 and a street price of about \$269. Mail order distributor Tracer Technologies (www.tracertek.com) stocks the card for \$229.

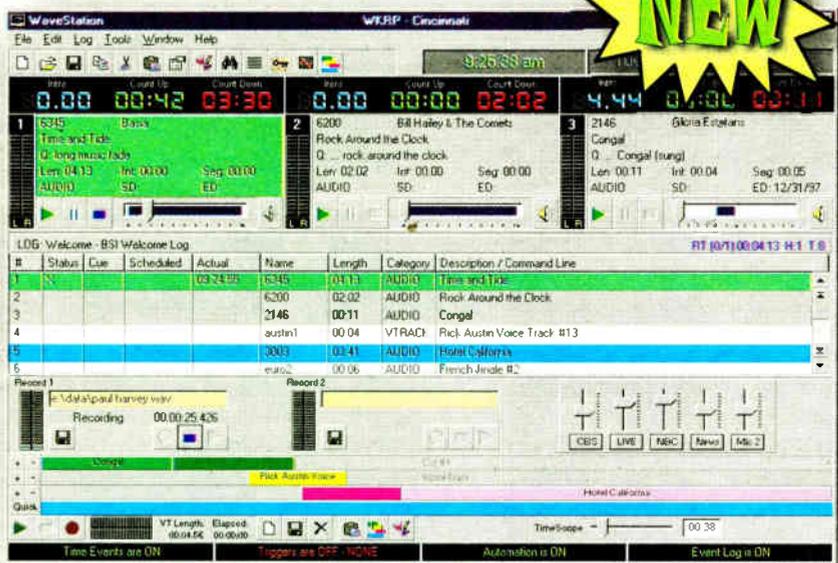
Mediatrix Peripherals is at 4229 Garlock Street, Sherbrooke, Quebec, Canada J1L 2C8.

For information, contact Mediatrix Peripherals at (819) 829-8749, via the Internet at www.mediatrix.com or circle Reader Service 27.

Read Burgan is a free-lance writer and a former public radio station manager who can be reached at (906) 296-0652 or through e-mail at rgb@up.net

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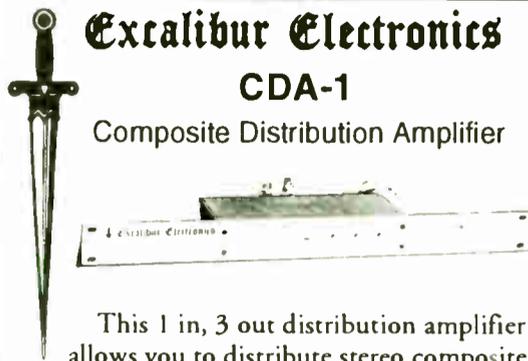
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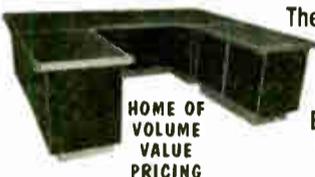
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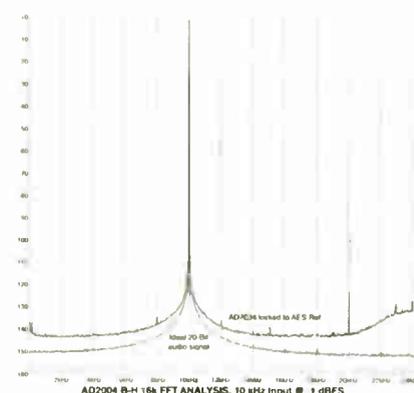


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READER SERVICE NO. 47

Election Night Tests Facilities

Rich Rarey

In the past, midterm election-night news coverage at National Public Radio traditionally had been modest. It was conducted entirely on the network news floor, with reporters filing by ISDN and telephone to Studio 2A. Program hosts from "All Things Considered" conducted the broadcast.

This past Election Day, news division management believed the race for Congressional seats would be close, and the outcomes would influence future hearings, impeachment proceedings and the business of the country in general. Accordingly, the plans for support were

bigger, and required the large NPR Studio 4A to house the editorial, support and on-air staff.

On the evening of Nov. 3, 1998, the 1,700-square-foot studio was home to rows of tables and chairs for hosts, editors, reporters, runners and analysts — 24 in all.

The grand setup

Each member of the support staff was equipped with a Pentium computer connected to the NPR data network. Two B&K 4000 series mics hung from the double-height ceiling to capture the buzz and activity of this work area in stereo.

In a back corner of the studio, sur-

rounded on two sides by 10-foot-high blocks of thick acoustic foam, sat hosts Robert Siegel and Linda Wertheimer. To their left, three mic positions were set for



reporters and analysts to stop by to report and analyze the voting process live to air.

Each host used a Neumann U87 microphone. The guests had Sennheiser MKH40 mics. All monitoring was done

by headphones. Two foamboard vote-tally panels were propped on opposite sides of the room, the final results hand-marked on the panels by production assistants linked together by ClearCom headsets.

Margaret Low-Smith, the election night producer, said the best reason for putting the crucial staff together was communication.

"I tried to make the system as tight as possible so no one would have to run around to get information," she said. "Everybody was there to work, not just to make ambiance. I also wanted the program to *move*; we were packing six things into 12-minute segments and I wanted to convey the sense that a *lot* of things were happening around America."

History lesson

Her preparation included reviewing tapes of coverage from years past.

"When I listened back to the old tapes, I heard the hosts would talk to the reporters, where the rooms were filled with energy. When we went back to just hosts, the energy was lost. The thought was to put the newsroom up there, in studio 4A."

See ELECTION, page 45 ▶

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Picking A Card

▶ CHOOSE, continued from page 43 eliminates this problem by putting the output level so high that any troublesome noise generated by adjacent cards is reduced to less than -100 dB, rendering it essentially inaudible.

In addition, many older professional audio consoles tend to load down unbalanced lines and effectively reduce the output level. A consumer-level audio card with a -10 dB output may lose even more under those conditions.

A professional soundcard usually also will have duplex capabilities, enabling you to record while listening to the playback of another WAV file at the same time. This provides true multitrack and sound-on-sound recording ability.

A professional soundcard should also support the maximum sampling rate, which at the present moment is 48 kHz. While 44.1 is certainly adequate for most applications, there are those moments when you want to extend the frequency response to a maximum of 22 kHz. In the future, expect the maximum sampling rate to climb even higher as new standards are embraced for DVD CD audio.

As you shop for a soundcard, consider whether you will be using it professionally or personally. For personal use, the extra bells and whistles of a consumer card may offset some of its weaknesses in other areas.

And as still more cards are developed, look for the distinction between consumer and professional audio cards to blur even more.

— Read G. Burgan

► ELECTION, continued from page 44

Even though the main journalist software at NPR is mainframe-based and thus requires only a dumb terminal, the HP Vectra computers served a useful purpose, said senior editor Pam Fessler.

"We viewed the newswires — AP, UPI, Reuters — primarily, but editors and reporters could simultaneously write scripts," she said. "We also had an updating chart available to all computers on the network, to display the races that NPR had called, and at what time the race was called."

Fessler said that the newscast unit, which was located two floors away, used this charting extensively to keep track of the races.

Web browsing had a place in the information mix as well. "Internet sites, such as each state's secretary of state's office were checked for results, as well as other broadcast organizations' sites," said Fessler. "Even without the Internet, there was so much information coming in, the best way to organize and communicate that knowledge to the right people was by using computers."

Studio 4A audio, but without the overhead mics. Because the phoners originated from Studio 2A, the respective mix-minus bus already included the other phone feeds. This way, field reporters could hear other reporters on the other phone feeds. It was an easy matter to bring the new Studio 4A mix minus into the Studio 2A PR&E console.

The technical setup from microphone to satellite was simple and straightforward. Studio 4A produced the voices, and Studio 2A produced the reporters on phone and coordinated other housekeeping, such as funding credits.

The audio went from Studio 2A to the rooftop uplink, and to NPR member stations from there.

Further behind the scenes

Where things became complex and subtle were setting the different mix-minuses, IFB, and monitoring circuits to let all on-air participants hear exactly the audio source they needed.

A Prospect ten-channel portable intercom was installed in Studio 4A.

wires from one room to another, and any reasonable signal from DC control to SMPTE time code can be put on the pairs for any convenient purpose. All eight tie lines from NPR Master Control were cross-connected between the two Control

delivering four channels of WAND audio directly to the patch bay. These channels carried speeches from the winners and losers and other incidental audio, frequently with short notice.

The BTS ports for the most part were

left free so that urgent, time-sensitive audio could be quickly dialed up and put on the air. In the rehearsal, we found several bad patch cords, but we did not find them quickly — there were up to four patch bays in some of the routings.

Broadcasts such as these make for a pleasurable challenge, for there are many ways to configure a good control room, but very

few ways remain once the requirements and limitations of your programming are met.

Until next month, I remain,
Your obd't eng'r

Rich Rarey is managing editor of EUonline, the NPR on-line engineering journal. Drop an e-mail describing your own complex broadcasts to rrarey@npr.org



NPR hosts Siegel and Wertheimer work the mics.

Photos by Alan R. Peterson

Rooms, meaning that a signal on "Studio 4A Tie 8" was immediately available on "Studio 2A Tie 8."

Write it down

One of Greenhouse's jobs was to carefully document the signal direction and source, and keep that document close by in case of trouble.

Additionally, tie lines from NPR Record Central were routed to Studio 2A.



On the other side of the glass, Control Room 4A buzzes with activity.

NPR, along with other major print and broadcast organizations subscribed to the Voter News Service for running tallies.

Behind the board

Mark Greenhouse, technical director for "All Things Considered," designed the on-air layout to be a comfortable working space for the seven hours of occupation.

He reviewed block diagrams of past in-house complex broadcasts, and worked out the fine details of implementing the interconnection of the two broadcast studios, Studio 4A and the downstream Studio 2A, two floors away.

Studio 2A had four phoner units to receive phoned-in reports from the field. It was decided Studio 2A would originate the phoners, and send a full mix backfeed to Studio 4A. Studio 4A, in turn, would send a mix-minus of everything out of the console.

In a dress rehearsal two days before the broadcast, the devil within the details emerged. As reporters called in to simulate on-air reportage, it became apparent that the two B&K overhead ambiance mics in the big studio were triggering the gating on the Telos Systems phone units. Releasing the gated override on the phone boxes was worse, with audible bleedthrough and digital artifacts on the host's voices returning through the phoner.

After a brief discussion, Greenhouse used one of the 48-track outputs on the SSL console in Studio 4A and routed it to Studio 2A. This source contained all

In the control room, director Bob Boilen could push a button to talk to either or both hosts, all guests, transmit instructions to the floor manager by way of a Lectrosomics wireless mic transmitter and receiver, or he could squawk to Studio 2A and be heard through a self-powered speaker. A similar speaker in the control room



Studio 4A becomes a newsroom.

allowed the Studio 2A director to squawk back to Studio 4A.

In all our diagrams, drawing these circuits took the most thought and ink. It took a melange of products, from RTS, ClearCom, Prospect, Lectrosomics and Fostex to make the entire IFB package work effectively.

Even though all NPR Washington facilities have four BTS switcher ports, making available hundreds of sources, there is no better value to a facility than to have a generous number of properly wired tie lines between rooms.

A tie line is simply a pair of copper

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PRODUCT REVIEW

Handheld MiniRator Rated Highly

Bob Shotwell

To an audio or broadcast engineer, an audio oscillator is as basic a tool as a good knife is to a chef.

As knives come in all varieties — ranging from fine imported cutlery all the way to the as-seen-on-TV Ginsu — audio oscillators likewise run the gamut. Somewhere between the legendary Potomac Instruments AG-51 and the ubiquitous telco “chirper,” both in price and utility, is the MiniRator MR-1 from Neutrik USA.

If you need a capable, precise and inexpensive (\$150) audio oscillator which can be at home in a tool box or a bench, then this bad boy is the one for you.

The MR-1 is a lightweight contender in size only, about the size of a classic HP calculator and weighing only 6 ounces, AA batteries included. And those two batteries will keep going for better than 20 hours, a lot longer than the typical engineer’s stamina.

There are no protruding connectors. At the top is a recessed RCA jack and at the bottom a male XLR swings out from the battery compartment when needed.

The control count is small. A combination Mode/On/Off button plus Up and Down buttons are all that you need to navigate the menu. The menu itself is displayed on a two-line, 32-character, LCD display measuring approximately 2.5 by 3/4 inches.

The MiniRator menu provides an

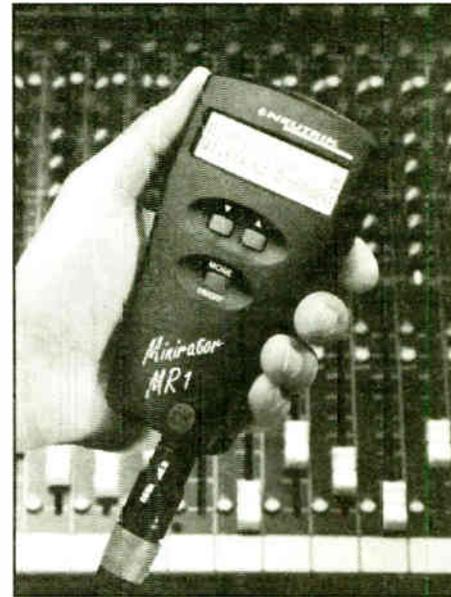
ample range of choices, including sine wave from 20 Hz to 20 kHz in 31 steps; square wave from 20 Hz to 5 kHz in 25 steps; Pink or White noise; a sine wave sweep in seven speeds ranging from 0.05 to 5.0 seconds per step; output levels from -78 to +4 dBv in 41 steps and finally a handy “polarity” test.

The polarity test selection places a 20 Hz positive pulse, which ramps down to zero, on XLR pin 2 or the center RCA pin. This could be quite useful when using an oscilloscope to trace phase reversals.

Needless to say, this is not your father’s Heathkit IG-72.

As audio oscillators go, the MR-1 has quite respectable specifications.

See MINI, page 49 ▶



The Neutrik MiniRator MR-1 features three-button operation and balanced output.

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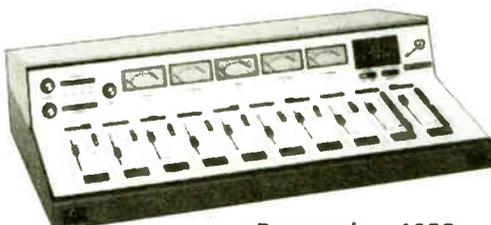
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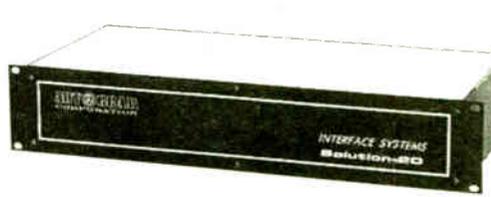
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READER SERVICE NO. 45

Grooving With Addicts

► GROOVE, continued from page 41 up by several layers of effects.

I don't want to take a sample from a CD and have anyone tell where it came from. I take a little more pride in being more creative than that. My objective is to make a sample into something new and impossible to tell where it came from.

RW: Is there a "favorite" device of choice in the community right now for this process?

Nelson: There are a number of boxes by E-Mu like the Orbit and the Planet Phatt that are quite trendy and hip. But then again, the last thing I want to do is grab a sound out of a box and have someone go, "Oh, I know where he got that."

Blair: We once brought in a rhythm section and spent four hours just having them do outrageous things. We brought in two guitar players and had them sit there and play every wild effect they could think of. Then we took all that stuff and used that as elements as well.

RW: Walk us through a typical approach of creating an element or effect.

Nelson: When I start out with a sound, I like to sample it in mono, so I can end up creating my own stereo effects.

I will either time-stretch or compress it to add extra character; rarely is my sample the correct length I want it to be when I begin.

What helps make a sound interesting is

them a lot. I do a lot with tones, like 1 kHz and 10 kHz. When you do a lot of filtering on some of those, it gets pretty amazing.

In the machine

Nelson recently began using a new audio product called Metasynth, from Arboretum Systems and U&I Software.

This is a standalone sound design software package for the Power Mac that translates pictures on the computer screen into AIFF and WAV files.

By manipulating the hues, colors and shapes seen on the monitor, the user instructs the program to modify the characteristics of the existing audio file or to synthesize something entirely new.

Nelson also spends time with ReBirth from Propellerhead Software, a software emulation of early '80s drum machines and bassline synthesizers. The sound created by the program is a staple of retro-electronic dance music.

RW: What do you do when a client asks, "I want something that sounds like (improvised silly sound effects and mouth sounds)"? How do you handle that?

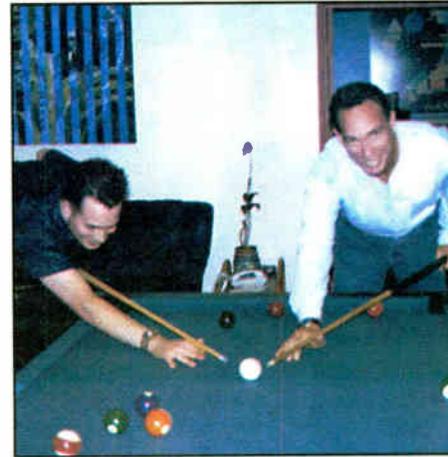
Nelson: It depends on the client. Some are used to dealing in musical terms, while others aren't at all. It's a matter of trial and error.

Blair: Sometimes we're on the same page, other times we're in different books completely. With Radio One, we just sat there and watched Eddie listen to 20 cuts

bites are such a minor lift, and its being used for the station's on-air promotion.

We did a jingle for Capital Radio in London, which was a rip of Queen's "We Will Rock You." The drum pattern was set up differently, but was still loud and boomy.

Within three or four days, Capital Radio got a call from Queen's manage-



Robert Nelson and Dain Blair of Groove Addicts, cueing up.

ment, label and publishing company demanding a synch license if they were to continue using it. The music wasn't the same, but it was too obvious a template where it came from.

Here in the U.S., I don't think that would ever be a point with a record company or group, because they don't want to take a station to task when they also need them to play the records. Secondly, record companies here realize stuff like that does help sales.

We do a "bag-alike," rather than a

sound-alike. It captures the overall feel and sound, but musically is a completely different piece. We stay legally clear this way.

RW: What are radio stations asking for right now from creative companies such as Groove Addicts?

Blair: Workpart packages are important. They seem to have an insatiable appetite for things like our MindBenders package.

They want jingles and elements that sound like the music they play, so it sounds like seamless playing. They are looking for the edge. What I hate is to go from Alanis Morissette to Third Eye Blind with the Johnny Mann Singers in between.

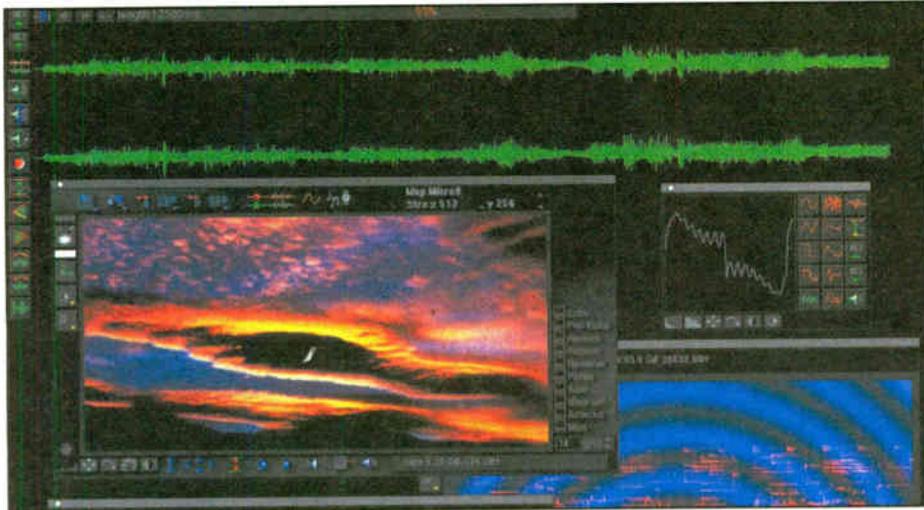
We just like challenges. Everything we do is all about new challenges. That's what makes it interesting to come in every day.

RW: Finally, on the station level, what can be done to improve creativity, to pull out the stops and experiment with sound as you do?

Nelson: Avoid the obvious and conventional ways of treating and effecting things. The more abstract you can be, the better. A lot of plug-ins have preset settings, like "Guitar Reverb." Just steer clear of that for use on a guitar.



For information on Who Did That Music? and Groove Addicts, contact the company in California at (310) 442-1444. Information on ProTools is available from Digidesign in California at (650) 842-7900. Arboretum Systems has a Web site at www.arboretum.com



Arboretum Systems Metasynth: Painting Sound Pictures

to normalize or over-normalize it. When you normalize, you are bringing up the maximum peak of that sound to 0 dB. When you over-normalize it to 200 percent, you digitally clip the top and distort it. Then you reduce the level to one-half. This brings it back to the original level, but the "digital" characteristics remain.

I will also double a sound with an octave for more strength, put a resonator on it and add some sub-tone. Then I throw it last through a doppler or auto-panner to give it some quasi-stereo spatial characteristics. I try not to do this to the point where it becomes repetitive.

When I come up with something, I try to mix and match the effect with the plug-ins. If you don't have enough at your disposal, it gets old quick.

RW: Do you have any favorite source sounds? Nature, machinery, motors?

Blair: For me, it's bathroom sounds (both laugh).

Nelson: A lot of animal sounds are real interesting, especially when you pitch

we had done. We went back, and one by one he told what he liked and what he didn't like about each one. The next round, he liked everything but one.

RW: What about vocal talent?

Blair: That came from Radio One. They went all over the U.K with a portable DAT, getting the punters (British equivalent of "average Joe") to shout, laugh, scream "BBC."

Here in L.A., we brought in a Shakespearean actor who was really, really bent. All we did was roll the machine and let him go. He was sick and demented and made up outrageous things and phrases along the way, which we cut up and used.

RW: What about clearances for using movie bites? Does radio tend to look the other way on those?

Blair: The BBC looked into some of the more famous movie "lifts" and got clearances for the U.K. Over there, it's a lot more of an issue that is watched. Here, movie

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Mini-Oscillator 'Respectable'

► MINI, continued from page 46

At any frequency or output level, the distortion was well below our ability to measure. Neutrik claims 0.025 percent, which I can believe. Frequency response is claimed to be ± 0.5 dB. The response was ruler-flat with the exception of a 0.5 dB rise at 20 Hz and a 0.75 dB drop at 20 kHz. Slightly off the mark, perhaps, but still very good and more than useful.

The Neutrik spec-sheet claims a balanced XLR and unbalanced RCA output. In fact, these two outputs are both electrically balanced. The XLR Pins 2 and 3 are a balanced feed, referenced at one-half voltage to the common Pin 1.

Meanwhile the RCA center pin is electrically identical to XLR Pin 2, and the RCA shield electrically at Pin 3. This arrangement, however, works perfectly well. As a battery-operated unit with a plastic case, it is unlikely ever to have chassis ground conflicts.

Further, shorting either XLR Pin 2 or 3 to the common Pin 1 caused only a 6 dB output loss with no evidence of distortion.

Speaking of that plastic case, I had the opportunity to use this unit at our FM site. We are running 2.5 kW into a two-bay full-wave spaced antenna only about 80 feet above ground. There was no evidence of RFI under these conditions. I am impressed and only wish the telephone at the site was as accommodating.

Do you hear the ringing?

The only disappointment was in the square waves. There is some overshoot and ringing which will limit the usefulness of this function. Specifically, there are 3 to 4 cycles of 16 kHz leading-edge ripple and an overshoot of about 6 percent.

Although this is not terrible for a unit of this price and size, a user will have to allow for this when making square-wave tests. Still, this is a Caddy at a Kia price and it may be unfair to compare it to a Jaguar such as the PI generator.

If I were designing a successor, say a Neutrik MR-2, what would I like to see added or changed? Only two things come

to mind. The first is a wall-wart option.

Although battery life is very good,

would be nice. There are a few empty

voids inside the case sufficient to permit

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being able to plug it in and leave it on to sweep an RPU line from the transmitter

mounting a power plug, if you were so daring.

The second change would be to have menu changes remain in memory. Presently there is one default power-up mode. It would be nice if the unit would power up in the same mode as when last used. I can hear my Dad saying, "Will you leave things the way you found them!"

These two trivialities aside, Neutrik has provided the engineer who has everything one more must-have item: the handheld MiniRator MR-1.

■ ■ ■

For information, contact Neutrik USA in New Jersey at (732) 901-9488 or circle Reader Service 3.

Bob Shorwell is both SBE and NARTE certified. A broadcast engineer for more than 20 years, he now co-owns and operates WPVQ(FM), Deerfield, Mass. Reach him at bob@wpvq.com

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Circle (230) On Reader Service Card

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Want to Sell

Musak Sampler, \$25; Cook Sampler, \$20. J Morinelli, 610-715-1720 or 610-789-1968.

Sony BCT-20G Betacam video cassettes, field tapes used once, over 500 avail, \$1ea +shpg. G Kloarcik, 314-533-0320.

TELEPHONE EQUIPMENT

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Marcom Rood stereo gen 203, BO. J Nelly, 208-743-1551.

Potomac Instruments FIM-71 FM/TV field strength meter, just calibrated, \$7000. K O'Malley, 757-446-1329.

Racal Dana 9303 power meter, 0-2 GHz, new in original box, \$475. N Macrae, 702-386-2844.

Want to Buy

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TUBES

Want to Sell

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EMI 100th anniversary promo CD. J Morinelli, 610-715-1720 or 610-789-1968.

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CD Players	Monitors	Stereo Generators	Positions Wanted
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1-9 col inch (per inch)	1x	6x	13x	26x
10-19 col inch (per inch)	\$79	77	75	72
Distributor Directory	\$75	72	70	67
Professional Card	\$121	118	115	110
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3CX15,000H3	4CX3500A	6AS7G	SV572-160
3CX20,000A7	4CX5000A	6BM8	SV6550C
3CW20,000A1	4CX5000R	6D22S	SV6L6GC
3CW20,000A7	4CX7500A	6L6GC (See SV6L6GC)	SV811-3
3CX300A1	3CW20,000H3	6N1P	SV811-3A
3CX400A7	3CW20,000H7	811A	SV811-10
3CX2500A3	3CW30,000H3	812A	SV811-10A
3CX2500F3	4CX250B	833A	TH5-4
3CX2500H3	4CX250BC	8161R	TH5-6
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3CX3000F7	4CX250R	EF86	TH6-3A
3CX4500F3	4CX350A	EL34	YC130/9019
3CX6000A7/YU148	4CX350AC	EL509	SK300A
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Want to Buy

Technics SL-1200MK-2 TT's in gd or better cond. J Burdick, 414-308-4333.

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McMartin BF-5K FM xmtr w/exciter BFM-8000, perfect cond, \$8000. T Hamilton, 870-367-6854.

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Fax: 314-664-9427

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Collins 300G AM xmtr, tuned to any frequency. S Bailey, 615-451-2131.

RCA BTA-1R2 xmtr tube type oscillator printed circuit board. M Sandidge, 423-323-0640.

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Gates BC-250GY 250W AM, circa 1960, gd cond, \$800; **RCA BTA-5U 5 kW AM** on 810 kHz, excel cond, \$4000; **Harris BC-5H 10 kW AM**, on 1090 kHz, gd cond, \$9000; **Harris MW-5A 5 kW AM**, on 1290 kHz, gd cond, \$9000; **RCA BTF 20E1 20 kW FM**, gd cond, no exciter, \$10,000. T Toenjes, 785-437-6549.

Harris 25000W FM, tuned to 94.5, exciter MX15, great cond, BO. C Lyford, 415-257-0779 ext 57 or 415-457-5565, email: clyford@marincatholic.org.

Harris/Gates BC-250GY xmtr, will operate at 250 or 500 W, tuned to 1560 kHz, clean & in gd cond, \$2000. S Bailey, 615-451-2131.

Nautel AMPFET ND1, 1996 1 kW AM on 1570 kHz, avail 1/99, mint cond, BO. R Miller, 808-572-5534.

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N18
January 6, 1999 Issue
Use Until April 6, 1999

<p>① Type of Firm (check one)</p> <p><input type="checkbox"/> D. Combo AM/FM stations</p> <p><input type="checkbox"/> A. Commercial AM station</p> <p><input type="checkbox"/> B. Commercial FM station</p> <p><input type="checkbox"/> C. Educational AM/FM station</p> <p><input type="checkbox"/> E. Network/group owner</p> <p><input type="checkbox"/> F. Recording Studio</p> <p><input type="checkbox"/> K. Syndicators/Radio Station Service Providers</p> <p><input type="checkbox"/> G. Audio For Video (TV Station/Teleprod Facility)</p> <p><input type="checkbox"/> H. Consultant/Ind Engineer</p> <p><input type="checkbox"/> I. Mfg. Distributor, or Dealer</p> <p><input type="checkbox"/> J. Other _____</p> <p>② Job Function (check one)</p> <p><input type="checkbox"/> A. Owner/President</p> <p><input type="checkbox"/> B. General Management</p> <p><input type="checkbox"/> C. Engineering</p> <p><input type="checkbox"/> G. Sales</p> <p><input type="checkbox"/> H. Programming/News</p> <p><input type="checkbox"/> J. Promotion</p> <p><input type="checkbox"/> F. Other _____</p> <p>③ Purchasing Authority</p> <p><input type="checkbox"/> A. Authorize/Make Final Decision</p> <p><input type="checkbox"/> B. Evaluate/Specify/Recommend</p> <p><input type="checkbox"/> C. No Purchasing Authority</p>	<p>④ Equipment/Services Purchases in the Next 12 Months (Check all that apply)</p> <p><input type="checkbox"/> A. Transmission, STL/RPU</p> <p><input type="checkbox"/> B. Antennas, Towers, Cable</p> <p><input type="checkbox"/> C. Audio Procession Delays</p> <p><input type="checkbox"/> D. Telco. Codecs, Remote, Field, Audio</p> <p><input type="checkbox"/> E. RDS/RBDS & Subcarrier Equipment</p> <p><input type="checkbox"/> F. Delivery Systems & Satellite Equipment</p> <p><input type="checkbox"/> G. Digital Editing & Production</p> <p><input type="checkbox"/> H. Live Assist, Automation</p> <p><input type="checkbox"/> J. Consoles, Mixers, Cabinetry</p> <p><input type="checkbox"/> K. Headphones</p> <p><input type="checkbox"/> L. Microphones</p> <p><input type="checkbox"/> M. Monitors/Speakers</p> <p><input type="checkbox"/> N. Studio Audio Sources & Switching</p> <p><input type="checkbox"/> O. Syndicated Programming</p> <p><input type="checkbox"/> P. Test, Monitoring & Remote Control</p>	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr><td>001</td><td>036</td><td>071</td><td>106</td><td>141</td><td>176</td><td>211</td></tr> <tr><td>002</td><td>037</td><td>072</td><td>107</td><td>142</td><td>177</td><td>212</td></tr> <tr><td>003</td><td>038</td><td>073</td><td>108</td><td>143</td><td>178</td><td>213</td></tr> <tr><td>004</td><td>039</td><td>074</td><td>109</td><td>144</td><td>179</td><td>214</td></tr> <tr><td>005</td><td>040</td><td>075</td><td>110</td><td>145</td><td>180</td><td>215</td></tr> <tr><td>006</td><td>041</td><td>076</td><td>111</td><td>146</td><td>181</td><td>216</td></tr> <tr><td>007</td><td>042</td><td>077</td><td>112</td><td>147</td><td>182</td><td>217</td></tr> <tr><td>008</td><td>043</td><td>078</td><td>113</td><td>148</td><td>183</td><td>218</td></tr> <tr><td>009</td><td>044</td><td>079</td><td>114</td><td>149</td><td>184</td><td>219</td></tr> <tr><td>010</td><td>045</td><td>080</td><td>115</td><td>150</td><td>185</td><td>220</td></tr> <tr><td>011</td><td>046</td><td>081</td><td>116</td><td>151</td><td>186</td><td>221</td></tr> <tr><td>012</td><td>047</td><td>082</td><td>117</td><td>152</td><td>187</td><td>222</td></tr> <tr><td>013</td><td>048</td><td>083</td><td>118</td><td>153</td><td>188</td><td>223</td></tr> <tr><td>014</td><td>049</td><td>084</td><td>119</td><td>154</td><td>189</td><td>224</td></tr> <tr><td>015</td><td>050</td><td>085</td><td>120</td><td>155</td><td>190</td><td>225</td></tr> <tr><td>016</td><td>051</td><td>086</td><td>121</td><td>156</td><td>191</td><td>226</td></tr> <tr><td>017</td><td>052</td><td>087</td><td>122</td><td>157</td><td>192</td><td>227</td></tr> <tr><td>018</td><td>053</td><td>088</td><td>123</td><td>158</td><td>193</td><td>228</td></tr> <tr><td>019</td><td>054</td><td>089</td><td>124</td><td>159</td><td>194</td><td>229</td></tr> <tr><td>020</td><td>055</td><td>090</td><td>125</td><td>160</td><td>195</td><td>230</td></tr> <tr><td>021</td><td>056</td><td>091</td><td>126</td><td>161</td><td>196</td><td>231</td></tr> <tr><td>022</td><td>057</td><td>092</td><td>127</td><td>162</td><td>197</td><td>232</td></tr> <tr><td>023</td><td>058</td><td>093</td><td>128</td><td>163</td><td>198</td><td>233</td></tr> <tr><td>024</td><td>059</td><td>094</td><td>129</td><td>164</td><td>199</td><td>234</td></tr> <tr><td>025</td><td>060</td><td>095</td><td>130</td><td>165</td><td>200</td><td>-</td></tr> <tr><td>026</td><td>061</td><td>096</td><td>131</td><td>166</td><td>201</td><td>-</td></tr> <tr><td>027</td><td>062</td><td>097</td><td>132</td><td>167</td><td>202</td><td>-</td></tr> <tr><td>028</td><td>063</td><td>098</td><td>133</td><td>168</td><td>203</td><td>-</td></tr> <tr><td>029</td><td>064</td><td>099</td><td>134</td><td>169</td><td>204</td><td>-</td></tr> <tr><td>030</td><td>065</td><td>100</td><td>135</td><td>170</td><td>205</td><td>-</td></tr> <tr><td>031</td><td>066</td><td>101</td><td>136</td><td>171</td><td>206</td><td>-</td></tr> <tr><td>032</td><td>067</td><td>102</td><td>137</td><td>172</td><td>207</td><td>-</td></tr> <tr><td>033</td><td>068</td><td>103</td><td>138</td><td>173</td><td>208</td><td>-</td></tr> <tr><td>034</td><td>069</td><td>104</td><td>139</td><td>174</td><td>209</td><td>-</td></tr> <tr><td>035</td><td>070</td><td>105</td><td>140</td><td>175</td><td>210</td><td>-</td></tr> </table> <p>⑤ Equipment Budget For Next 12 Months</p> <p><input type="checkbox"/> A. Less than \$25,000</p> <p><input type="checkbox"/> B. \$ 25,000 - 99,999</p> <p><input type="checkbox"/> C. \$100,000 - 249,999</p> <p><input type="checkbox"/> D. \$ 250,000 - 499,999</p> <p><input type="checkbox"/> E. Over \$500,000</p>	001	036	071	106	141	176	211	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	018	053	088	123	158	193	228	019	054	089	124	159	194	229	020	055	090	125	160	195	230	021	056	091	126	161	196	231	022	057	092	127	162	197	232	023	058	093	128	163	198	233	024	059	094	129	164	199	234	025	060	095	130	165	200	-	026	061	096	131	166	201	-	027	062	097	132	167	202	-	028	063	098	133	168	203	-	029	064	099	134	169	204	-	030	065	100	135	170	205	-	031	066	101	136	171	206	-	032	067	102	137	172	207	-	033	068	103	138	173	208	-	034	069	104	139	174	209	-	035	070	105	140	175	210	-
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For Immediate Response, Fax to: 703-820-3310

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Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

For the best deals on Celwave products, Andrew cable and Shively antennas.

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2.5 KW FM 1974	Harris FM 2.5H3	
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3 KW FM 1975	CSI FM300E	
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5 KW FM 1983	Harris FM 5K	
5 KW FM 1982	Continental 816R1	
5 KW FM 1967	Collins 830E	
5 KW FM 1967	Collins 830E	
10 KW FM 1962	RCA BTF 10D	
20 KW FM 1970	Harris FM 20H3	
25 KW FM 1981	Harris FM 25K	
25 KW FM 1981	Harris FM 25K	

2655 Philmont Ave #200, Huntingdon Valley, PA 19006

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EMPLOYMENT

HELP WANTED



DO YOU HAVE A FACE FOR RADIO?

How about the drive, and technical expertise needed for radio in the next century?

Prophet Systems, the leader in digital audio broadcast systems, may be the place for you. Opportunities for tech support, programmers, engineers and sales. Great salary and benefits.

Check out listings on the web: www.prophetsys.com or call (308)284-3007.



nuff said!!

Advertise!

Call your advertising representative
703-998-7600
for details & deadlines

Digital Audio Engineer: Klotz Digital America is offering to an Engineer experienced in audio mixing consoles &/or audio routers with a strong background in software applications and communication skills a position in customer support. Complete knowledge of PC computer applications required. Send resume to: Klotz Digital America, 5875 Peachtree Industrial Blvd, #340, Norcross GA 30092, or call 678-966-9900.

Tired of being on call 24 hours a day? Project Managers
Systems Designers
Installation Supervisors
Installation Technicians

RDA Systems, Inc., the leader in radio broadcast systems integration, is accepting resumes from seasoned radio technical professionals who will be given consideration to join our team in building advanced radio station systems coast-to-coast.

Please send cover letter and resumes to:
RDA Systems Human Resources
RDA Systems, Inc.
P.O. Box 7152
Chesterfield, MO 63006
Fax: 314-391-9655
ldearborn@rdasystems.com
www.rdasystems.com

ENGINEERING OPPORTUNITIES!

Triathlon Broadcasting is looking for experienced chief engineers with excellent digital skills and the desire to manage complex automated technical operations in aggressive duopoly environments. Successful applicants will have at least 5 yrs. radio engineering experience with at least 2 yrs. as a chief and good references. FAX resume to Dennis Ciapura 520-204-2221.



Don't Gamble with your Advertising Dollars!

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Call Simone at **703-998-7600 today!**

RF Field Technician

Perform pre- and post-construction measurements of AM broadcast antenna patterns, using a Field Intensity Meter. Adjust Detuning apparatus insalled on communications towers to minimize re-radiation AM of broadcast signal. Requires a basic understanding of radio frequencies and a flexible schedule. Fax resume to 703-558-0501 or email to: rachel@biby.com.

BIBY Engineering Services

Chief Engineer

Leighton Enterprises Incorporated is searching for a chief engineer. Candidate should have 5 years radio engineering experience and 2 years as chief. Must be computer literate and versed in AM and high power FM transmitters, digital audio, microwave, satellite systems, and familiar with modern studio equipment, FCC general class license and SBE certification preferred, LAN experience a plus. Great salary and benefits. 401K and ESOP. Resume

John Sowada,
Leighton Enterprises Inc,
P.O. Box 1458,
St. Cloud, MN 56302

POSITIONS WANTED

CE position wanted, exper w/computer, xmtrs, automation, DCS, UDS, digital studios. R King, 815-399-1829 after 6PM.

Listener & sponsor-preferred, live, local programming making comeback, exper, veteran talent avail for salary exceeding poverty level. Alex, 513-777-8423.

CE position wanted, exper w/computers, xmtrs, automation, DCS, UDS, digital studios. R King, 815-399-1829.

Hard working, friendly, outgoing CE seeks employment, FT, PT, contract work, NE, TV/FM/AM/cable station, exper CET & FCC licensed, avail immed. M Rakoff, 718-969-5224.

Advertise!

Call your advertising representative
for details & deadlines **703-998-7600**

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This listing is provided for the convenience of our readers.
Radio World assumes no liability for inaccuracy.

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U.S. Midwest: Sandra Harvey-Coleman	765-966-0669	Fax: 765-966-3289
Southwest Sales: Christopher Rucas	415-922-5595	Fax: 415-922-5597
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Europe, Africa, Middle East: Raffaella Calabrese	+39-2-7030-0310	Fax: +39-2-7030-0211
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Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review: send to the attention of the appropriate editor.

Engineering

CA
COMMAND AUDIO
Command Audio Corporation, located in Redwood City, is developing an exciting new wireless audio information and entertainment service. We have a dedicated team of experienced professionals ad are looking for a:

Technical Maintenance Engineer to assist in constructing and maintaining broadcast studios and production facilities. Duties include installation, maintenance, and repair of equipment including audio consoles, DAT, minidisk, and cassette recorders, as well as other tools of the broadcasting trade. This position will report to the Director of Operations in assisting editors, producers and the CAC staff with general maintenance of our production facilities.

We seek an individual with a minimum of 2 to 5 years experience in a broadcast environment who possesses knowledge of routine and preventive maintenance, intermediate electronics, audio cable installation, and basic construction skills. Some travel and schedule flexibility will be required.

Command Audio Corporation offers a comprehensive benefits package that includes a stock option program. For immediate consideration, write us at: 101 Redwood Shores Parkway, Suite 100, Redwood City, CA 94065, fax your resume to (650) 631-6155. Principals only, no phone calls please. EOE/mfh.

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name _____

Title _____

Company/Station _____

Address _____

City/State _____

Zip Code _____

Telephone _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

Are you currently a subscriber to Radio World? Yes No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

- D. Combination AM/FM station
- A. Commercial AM station
- B. Commercial FM station
- C. Educational FM station
- E. Network/group owner
- L. Consultant
- N. Delivery Service (Internet/Cable/Satellite)
- F. Recording Studio
- K. Syndicators/Station Providers
- M. Ind. Engineer
- G. Audio for Video/TV Station
- H. Consultant/ind engineer
- I. Mfg. distributor or dealer
- J. Other

II. Job Function

- A. Ownership
- B. General management
- C. Engineering
- J. Promotion
- H. Programming/production
- G. Sales
- E. News operations
- F. Other (specify)
- K. Production Mgt or Staff

WTS WTB Category: _____

Make: _____

Model: _____

Brief Description: _____

Price: _____

WTS WTB Category: _____

Make: _____

Model: _____

Brief Description: _____

Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by lister.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966



Sometimes
we have to
settle for
what we
need...

Wouldn't
you rather
Get what
you
WANT?

We've taken the very **best** technology, components and field engineering input to make this the **FINEST** console available.

The **A-6000** is engineered specifically for major market stations that demand a lot of function and need to lead with technical excellence. It's based on an open architecture mainframe that lets you change module locations with **no** restrictions, giving layout top priority and allowing easy reconfiguration as format needs change.

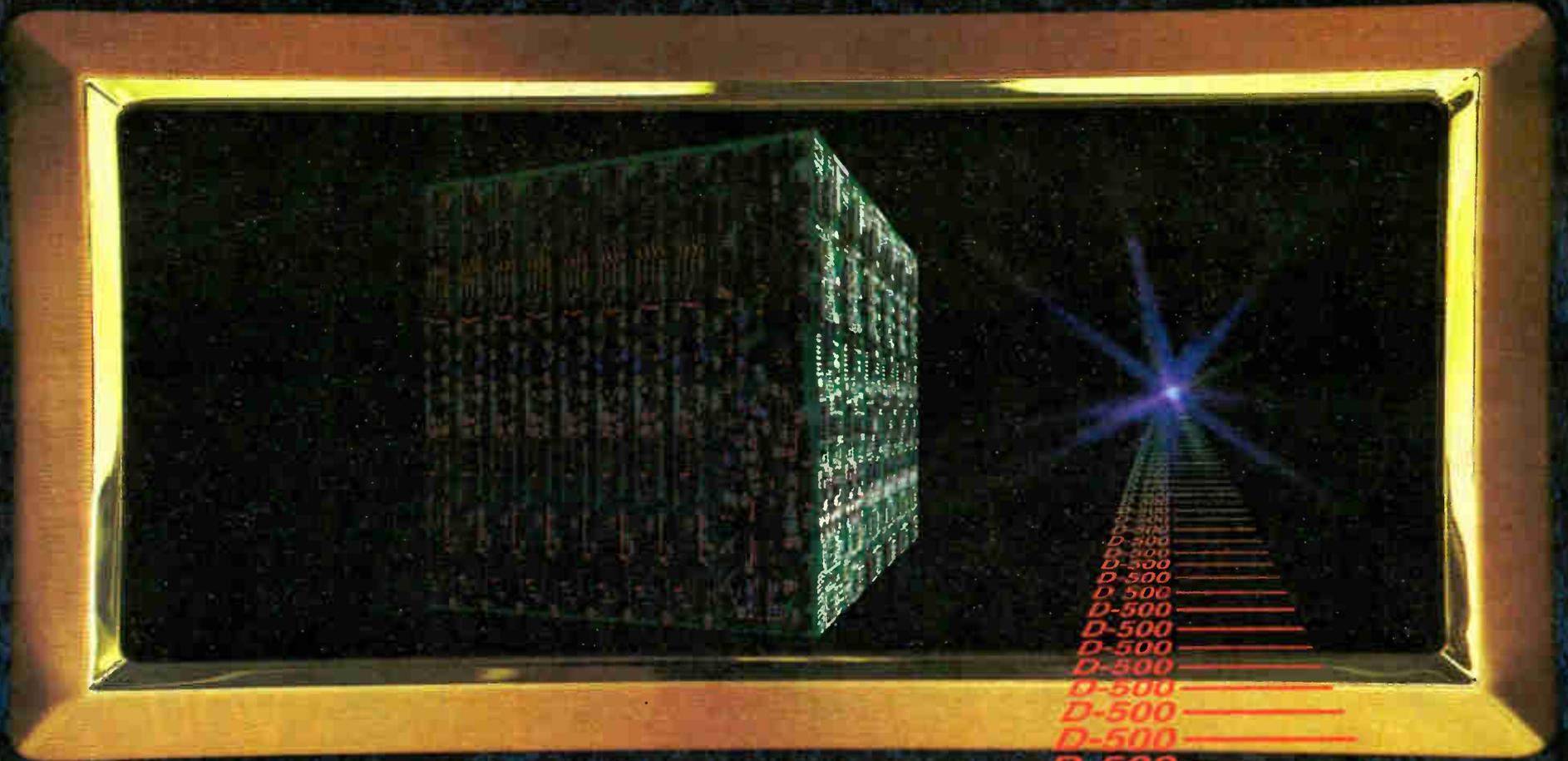
The **Wheatstone A-6000** has the appearance, features and power to excite the most demanding program and production staff; its engineering, performance and thoughtful design will help your personnel achieve broadcasting excellence.

 **Wheatstone**

252-638-7000

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DIGITAL is HERE



Resistance is FUTILE

It's just a matter of time—you're going digital anyway. Digital is cost effective, low maintenance and high performance. So why not go with a console that has it all worked out for you? The Wheatstone D-500 is the first digital console to bring you top-notch features and performance in a form totally familiar to your station. It's all set to plug in and go on-air handling both your digital *and* analog needs. **Make the DIGITAL move!**

D-500
D-500



The D-500 Digital Radio Console

tel 252-638-7000 / fax 252-637-1285 / sales@wheatstone.com

 Wheatstone Corporation

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World Radio History