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Radio World®

RDS Roll Call: 617 Stations
See pages 12-13.

Vol 20, No 15 | **Radio's Best Read Newspaper** | **July 24, 1996**

No Muscle to Protect AM

by Lynn Meadows

WASHINGTON After years of writing and rewriting the AM rules, after expanded band 1 and 2, after much effort and intent and good will, the nation's pioneer band is facing a new crisis.

It seems the rule that is intended to prevent cellular, paging and other Part 22 licensees from distorting AM patterns when they erect their towers does not apply to the new PCS (Personal Communication Services) licensees that have Part 24 licenses.

As it stands, the Federal Communications Commission has two problems. First, it has no rule to enforce if a PCS tower disrupts an AM pattern. Second, the rule that does exist to protect AM patterns from cellular and other Public Mobile Service towers is vague and ineffective.

That rule, "Disturbance of AM Broadcast Station Antenna Patterns" (22.371), says Public Mobile Service licensees who construct or modify towers in the immediate vicinity of an AM broadcast station are responsible for measures necessary to correct any disturbance of the AM station antenna pattern.

Within range

"Immediate vicinity" is defined as within 1 kilometer (0.6 miles) of a non-directional AM station and 3 kilometers (1.9 miles) of a directional AM station. If the new tower will stand within those distances, the builder must notify the AM licensee.

The rule states that "measurements must be made to determine whether the construction or modification affected the AM station antenna pattern," but does not specify who will pay for those measurements.

The FCC rule further states that it is the responsibility of the Public Mobile Service licensee to install and maintain any detuning apparatus necessary to restore proper performance of the AM station array.

A spokesman in the wireless bureau admitted that rule 22.371 "hasn't been 100 percent successful."

Whether through ignorance or negligence on the part of the newcomers, many AM stations have not found out about new cellular or PCS towers until those have disturbed their patterns.

Failing to notify an AM station before constructing a tower close by can result in a forfeiture. However, as B.C. Jay Jackson Jr., engineering advisor to the Chief of the Commercial Wireless Division, explained, "We can fine people all we want, but it doesn't fix the technical problems."

Proper installation

Technically, following the proper steps, new towers do not need to be troublesome at all. Ron Nott of Nott Ltd., manufacturer of detuning equipment, explained what steps the cellular and PCS companies should follow.

After notifying the station, Nott said the new PCS or cellular station should do a proof of performance — preferably partial or full. Over time, an AM station may

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Ships and Satellites: A Remote from the Sea

by Marvin Collins

LOS ANGELES It was April, 1996, when KOST(FM), Los Angeles, morning show producer Julie Asebez asked if there was a way the KOST morning show, featuring Kim Amidon and Mark Wallengren, could originate live from a cruise ship while en route from Los Angeles to Ensenada, Mexico. I told Julie to go for it.

A year before this, we had discovered the Lynxx Mobile Earth Station satellite system made by California Microwave. The Oklahoma City bombing had pointed out the need for a system whereby program-quality audio could be sent to the KFI(AM), Los Angeles, studio on very short notice. The Lynxx was the answer.

The Lynxx uses Inmarsat-B service, a digital technology service that permits the delivery of bidirectional high speed data — in this case, high-quality digital audio — from almost anywhere in the world.

In 1995, a capital expenditure request was made. The funds became available in early 1996, and we took delivery of the Lynxx in March.

Planning stages

Of course, now that I had told Julie to go for it, I began to wonder what I had

continued on page 30 ▶

NAB Addresses Antitrust Questions

by Angela Novak

WASHINGTON Are antitrust violations the natural result of radio ownership deregulation granted by the Telecommunications Act?

The National Association of Broadcasters says no.

With Department of Justice investigations taking place in various cities regarding radio ownership and the concentration of advertising revenues, the NAB is trying to educate the DOJ about the radio industry and its place in the overall advertising market.

The Telecommunications Act of 1996 lifted the FCC restrictions on the number of radio stations one party may own. The Justice Department has jurisdiction to determine whether a merger will yeild anti-competitive results. For example, a problem exists if one advertiser must go to one party for 75 percent of the desired coverage.

The NAB sent the Justice Department a paper titled "Comments of the National Association of Broadcasters on the Advertising Product Market" that states

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NEWSWATCH

Arbitron Adds Two to Fall Roster

NEW YORK The Tallahassee, Fla., and Wilmington, N.C., radio markets have been added to the Arbitron Fall roster of survey markets, bringing the number of new markets being measures in the Fall to 35.

Arbitron will add the Fall Survey to Wilmington in 1996, and to Tallahassee in 1997.

Based on 262 markets surveyed by Arbitron in the spring, Tallahassee ranked 167 and Wilmington ranked 182. Stations in those cities have the opportunity to sign up for the additional survey at introductory rates.

Family Radio Service Approved

FORT WORTH, Texas A RadioShack petition to establish a new unlicensed two-way voice radio service known as the Family Radio Service was approved by the FCC. The petition was filed with the FCC by RadioShack in July 1994.

The Family Radio Service is a license-free, two-way, short range (1–2 miles line of sight) voice radio service. FRS will allow individuals and families to maintain close contact without incurring the fees of other mobile radio services

FRS uses lightweight, palm-size .05 W transceivers with short antennas. The radios operate in the UHF frequency. Cost of the products that will operate on the FRS is expected to range from $100 to $200.

RadioShack expects to introduce its first FRS radio this fall, with a full range of FRS products to be available in early 1997.

Radio Data Group Offers Internet Development Services

FAIRFAX, Va. Radio Data Group Inc., the technology venture of EZ Communications Inc., announced that it will offer comprehensive Internet development services exclusively for radio and TV stations.

RDG has developed a cost-effective proprietary software product called AdNext that permits radio and TV stations to rotate banner advertisements on websites and control all billing, invoicing and management functions. Additional RDG products permit the easy integration of radio and TV station operations with the website.

Axcess Selects SpaceCom Systems

TULSA, Okla. Axcess Global Systems of Metairie, La., selected SpaceCom Systems and its FM Cubed satellite technology to provide the backbone for the paging carrier's new network of alphanumeric paging and information services.

The network will use RBDS FM subcarrier signals, which could eventually allow

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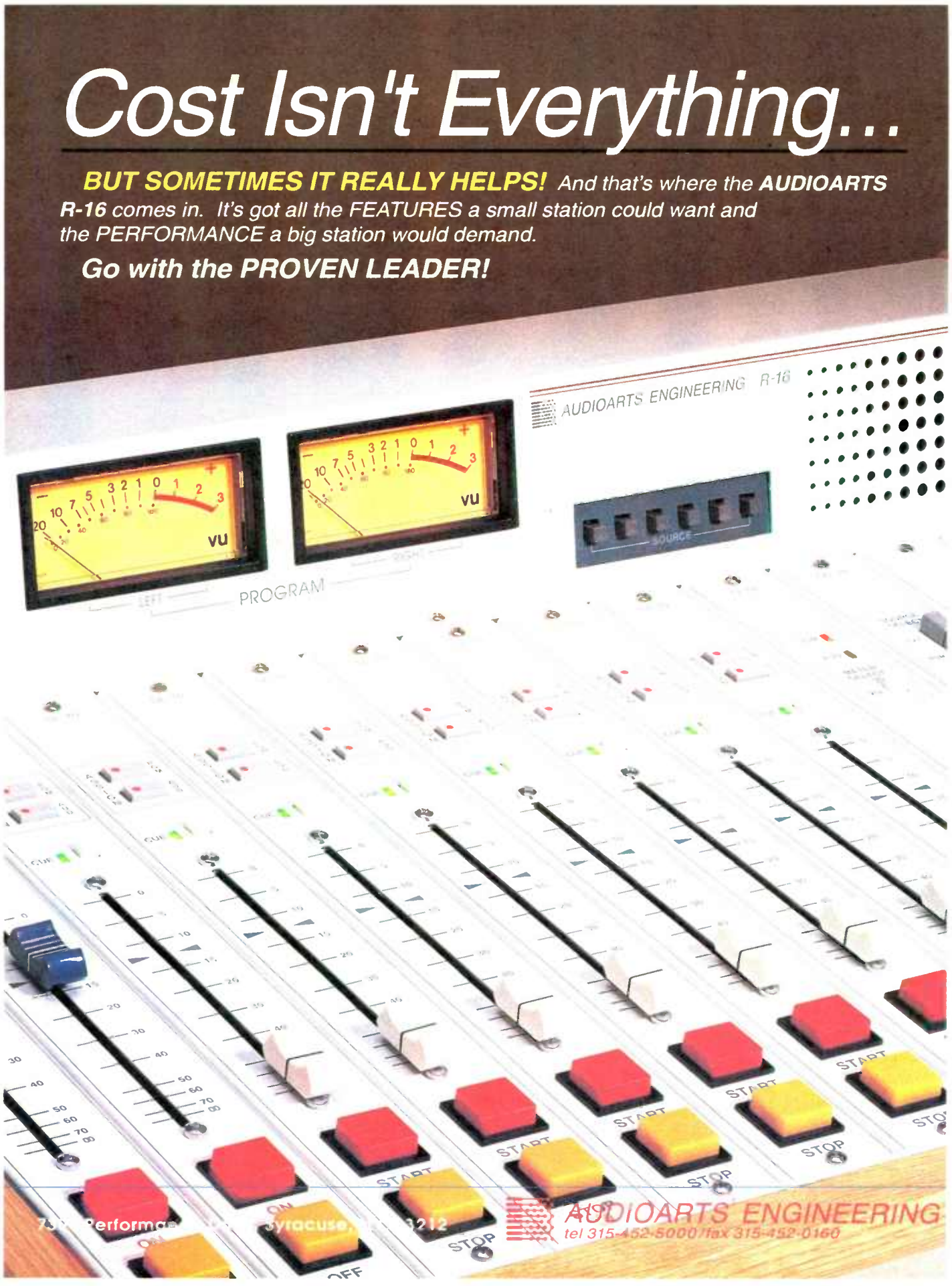

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NEWSWATCH

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customers to use their pagers anywhere in the world to retrieve messages and receive information.

The RBDS service will deliver regular alpha-numeric messages, as well as eight other information services, including news, weather, sports, stock reports and leisure services.

Investment Firm Buys Commodore Media

CHANTILLY, Va. The investment firm of Hicks, Muse, Tate & Furst Inc., headed by chairman and CEO Thomas O. Hicks, signed a definitive agreement to acquire Commodore Media Inc. in a deal valued at approximately $200 million. Commodore Media, one of the largest privately owned radio companies, owns and operates or LMAs 33 radio broadcasting stations in seven markets, with a dominating share of the estimated radio advertising revenues in the Huntington, W.Va. (74.5 percent) and Stamford, Conn. (92 percent) markets.

This is the first step for Hicks, Muse in the formation of Capstar Broadcasting Partners, a radio group that will be comprised of up to $1 billion of mid-markets radio stations.

Commodore Media will maintain its corporate identity as a subsidiary to Capstar and will continue to operate under current management.

Groups to Swap Radio Stations

DALLAS Chancellor Broadcasting Co. and SFX Broadcasting Inc. signed an asset exchange agreement to swap radio stations in Jacksonville, Fla., and Long Island, N.Y.

Chancellor will swap radio stations WAPE-FM, Jacksonville and WFYV-FM, Atlantic Beach, plus $11 million in exchange for SFX Broadcasting's WBAB-FM, Babylon; WBLI-FM Patchogue; WGBB(AM), Freeport; and WHFM-FM Southhampton. Pending FCC approval, the transaction is expected to close in early 1997.

VOA Adds Two Language Services

WASHINGTON The Voice of America will broadcast in Tigrigna and Oromiffa — its 49th and 50th languages — to listeners in Ethiopia and Eritrea. Although Amharic is the official language of Ethiopia, Tigrigna and Oromiffa are also widely spoken in the region. Tigrigna is one of the working languages of the now independent nation of Eritrea, and Oromiffa is spoken by the largest ethnic group in Ethiopia.

The broadcasts will feature regional, world and U.S. news; correspondent reports; and associated features stories. A recent BBC survey of 1,480 adults in Ethiopia found that 20 percent listen regularly to VOA Amharic. By adding Tigrigna and Oromiffa, VOA hopes to expand its listening audience in the region.

Ownership Hot Issue at MMTC

by Lynn Meadows

WASHINGTON Jesse Jackson Sr. spoke to an attentive crowd at the Minority Media and Telecommunications Council third annual luncheon last month urging them to fight for fairness in media ownership.

Jackson, president of the National Rainbow Coalition, started his speech by having the lawyers, trade representatives and media owners in attendance stand, join hands and pray for deceased Commerce Secretary Ron Brown to whom the MMTC had dedicated the luncheon.

Changing directions like a river, Jackson encouraged his audience to protest the tide of "more and more economic monopoly."

"This is a period of great retreat from many tenets of democracy that we hold dear," Jackson began. "While those that are locked out are fighting for affirmative action, those already in are fighting for inheritance provisions."

He used the tax breaks once offered to owners who sold their radio or television stations to minorities as an example of how the "monopolists, indeed the greedy, have used their power to deregulate justice, to deregulate opportunity."

Jackson then veered off into a discussion of the recent Supreme Court decision which makes drawing congressional districts along race lines illegal. He did return to the topic at hand, however.

"We need minority ownership so we can have interpreters of what's going down," said Jackson. He said the monopoly-controlled broadcast outlets would not provide the same interpretation of that decision as a minority-owned station would.

"There must be some more access to a diversity of information of the airwaves," he told the crowd.

Jackson argued against "color blindness" in today's society. He said people were using color blindness to "avoid responsibility for being fair and being just."

He criticized the FCC for "fighting for the right not to have equal employment and equal access." That charge comes in light of the FCC decision to revisit and streamline EEO requirements for small businesses.

A paper provided by the Rainbow Coalition at the luncheon criticizes the FCC for those streamlining proposals calling them a "profound breach of faith with minorities and women" and "a totally unjustified retreat from its commitment to diversity."

The Coalition further states that the FCC proposal to exempt small stations or small market stations from EEO compliance was presented "without a shred of evidence that EEO compliance imposes undue 'burdens' on these stations."

Touching on the subject of a recent string of fires set at black churches, the master speaker said "The issue is not the white sheets burning churches, its the blue suits and the black robes who have the power to make decisions restricting opportunities."

Jackson highlighted injustice in the criminal justice systems.

"Eighty-four percent of all rural arrests are white. Seventy-five percent of all urban arrests are white. Fifty-five percent of all men in jail are black. Now what's wrong with that picture?" he asked the audience.

Five grams of crack cocaine puts a user behind bars for five years, Jackson said. "Five hundred grams of powder, you get probation.

"Those who don't fight that injustice don't have the moral authority they need to fight for their share of radio and TV stations," he said. "It's all one problem. It's the same struggle. We cannot save radio stations if we cannot save children."

Minorities own approximately 3 percent of broadcasting stations.

He focused on how whites had been able to build monopolies and exclude other races by virtue of their head start in broadcasting and experience.

According to the Rainbow Coalition paper provided, the FCC did not license its first radio station to people of color until 1949. In 1973, there were 10,000 broadcasting stations on the air and minorities owned 10 radio stations and one television station.

Today, the Rainbow Coalition reports minorities own approximately 3 percent of broadcasting stations. Those they do own constitute less than half of 1 percent of broadcast industry asset value.

To bolster minority ownership, it was decided that station owners selling to a minority buyer would get tax breaks. Jackson called this the most conservative action believable. That option is now gone.

"We should have went to jail over that," said Jackson. "There should have been a couple hundred people in FCC meetings holding them up over that issue."

"You're not going to get the stations just because you're qualified," he said. "You're not going to get them just because you desire them. It comes through struggle."

"We must fight now the growth of monopoly in this industry," he said. "Fewer and fewer people are controlling more and more information and power."

He challenged the audience at the MMTC luncheon to move beyond analysis and begin to fight for fairness in media.

"America has not seen you put 500 people around the FCC office. It's not seen 100 people of this class go to jail. Someone will ask 'Why are they going to jail? What's that about ... Why are they protesting monopoly sales of TV and radio? What's that about?'"

When they ask, we can answer them, he told the crowd.

"That's the way of mass communication, mass communicators."

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World Radio History

Good News for RW; AM Not So Hot

WASHINGTON Lots of news to tell you about this time out. Chris Nicholson, who has been doing a tremendous job with the *Buyers Guide* section of the paper is moving up to become an associate editor for **Pro Audio Review** and John Gatski.

You can still reach him at the same number, but *Buyers Guide* duties will now be handled Chris Joaquim. She too spent some time working as an intern at WCXR(FM) here in town, although she comes to **RW** from one of the national associations where she was writing up products for catalogs and direct mailing pieces. Anyway, feel free to give her a call at (703) 998-7600.

★★★

My really big news though, is that Paul McLane of Bradley Broadcast Sales will be joining **RW** next week as Managing Editor.

Many of you may know Paul from his days at Radio Systems, or from his most recent stint at Bradley Broadcast Sales. On the station side, many of you may know Paul from his days on the air in Delaware, where he majored in journalism and manned the microphones as news anchor and reporter at a couple of area radio stations.

We are all very excited that Paul is coming on board. His journalism education and experience will help us to continue striving for that balanced, fair and honest coverage you've come to know and appreciate in today's **RW**, and his experience on the manufacturing/distribution side will help us shore up the technical, equipment and product coverage throughout the rest of the newspaper.

I think that Paul's combination of experience and knowledge perfectly complements Al Peterson's technical/production/hands-on radio station experience (plus that great sense of humor) as well as Lynn Meadows' hard-hitting journalism. Add to that our resources like Alan Haber, Frank Beacham, James Careless, Lee Harris, Dee McVicker and more than 40 correspondents worldwide ... well, you see where I'm going with this.

We are all at your service so feel free to drop us an e-mail at 741-3.2435@compuserve.com or call at (703)998-7600; fax (editorial only) at (703) 820-3245.

★★★

Ever feel like you want to climb up on that high horse again? I tell you, the more I cover the Federal Communications Commission, the more I feel like I'm beating my head against a brick wall. As our front page story indicates, the FCC rule intended to prevent cellular, paging and other Part 22 licensees from distorting AM patterns when erecting towers does not apply to the new PCS licensees (Part 24 licenses).

Not only that, but the rules that are on the books for Part 22 licenses are vague and ineffective. Hello again?

This is classic FCC. It took a decade to hash out the dramatic overhaul of the AM band. Some broadcasters were sacrificed for the greater good. That bane of every AM existence, interference, was tackled head on with technical improvements, migration to the expanded band and consolidation of the existing band.

The migration to the expanded band has been an exercise in patience — and for awhile, futility — for every AM operator hoping for a friendlier environment through which to radiate an AM signal.

And here we are, the AM band is back at square one.

FCC Chairman Reed Hundt loves to have his picture taken as he forks over these ultra-large checks representing the money the PCS auctions netted Uncle Sam. Yet, at what cost? And where is the picture of Chairman Hundt signing into regulation an incomplete ruling that will allow these cash-flushed PCS licensees to wreak havoc on our AM operators with impunity? I really am tired of beating up on the FCC but at some point, maybe the FCC executives and staff will wake up and try to see the whole picture, not just the picture with the most money in it.

Give the AM band a chance, will you? How can radio hold out for an intelligent and well-grounded digital audio radio solution, from a regulatory standpoint, if the FCC is going to allow half-baked regulations to govern the emergence of new technologies?

If the FCC does not endeavor to continue protecting the AM band, not even the most astounding DAB system yet to be imagined will save it from being killed off by interfering PCS, paging, mobile cellular, etc., services.

Come on FCC, stop making me pick on you.

Peter Maer (center), White House correspondent for Westwood One's NBC Radio-Mutual News, received the Merriman Smith Broadcast Award for his coverage of President Clinton's attendance at the funeral of Israeli Prime Minister Rabin. The award, sponsored by the White House Correspondents Association, for outstanding reporting under deadline pressure, was presented to Maer by President Clinton (l) and Vice President Al Gore (r).

Maer received the Merriam Smith Broadcast Award in 1992 for his coverage of former President Bush's sudden illness at a state dinner in Tokyo and also has been the recipient of several other broadcast journalism awards including the Overseas Press Club Award.

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World Radio History

READERS FORUM

If you have comments for Radio World, call us at 800-336-3045 or send a letter to Readers Forum (Radio World, P.O. Box 1214, Falls Church, VA 22041 or e-mail 74103.2435@compuserve.com or MCI Mailbox #302-7776). All letters received become the property of Radio World, to be used at our discretion and as space permits.

Radio faces

Dear **RW**,

It was with some disbelief and a little amusement that I read the article about "Please send photo" (**RW**, May 29). I too am a production director with a "deformed eye," although I don't claim to be reasonably well known!

I've been doing radio for 20 years now, and I will admit that when I first started, I was very shy about my irreparable "lazy eye." However, I'm at the point where I really don't care if a potential employer is turned off by it or not, and here are the valuable lessons I learned:

(1) Hardly anyone in the listening public cares. Really. I feel the potential employers who think that only beautiful people can represent them well are being overly sensitive about it.

I have yet to do a public appearance where people have looked at me and ran away shrieking. My station doesn't seem to feel that I represent them badly just because I don't look altogether perfect. You must remember that the beautiful people of the world are vastly outnumbered by the "average" and the "ugly." We see all kinds of people in all our walks in life, and there is no real good reason to make broadcasting unrepresentative of the world at large. I feel as long as I groom myself well, dress neatly and keep a positive, outgoing attitude, an employer really has no right to demand more as far as appearance is concerned.

(2) I have an answer to those who have dared to suggest in the past that I have some type of corrective plastic surgery to be considered acceptable for employment: Suppose I were to put myself through this rather painful procedure and spend six weeks on my back waiting to heal, and the chances of it turning out well are not overwhelming. Please tell me why working for you would make all of that worthwhile!

Finally, I have a great track record of employment. Yes, I'm human and I've made mistakes along the way, but I'm talented, responsible and have much to offer. If the only reason you don't want me to work for you is that you're somehow repulsed by my looks, or you fear someone else might be, then, quite frankly, I don't consider you worth working for. Sorry to be so blunt about it, but like I said earlier, I'm at the point in my life where I can safely say "Here I am ... take it or leave it."

It infuriates me that, in an industry that should be expecting much more of itself, people who are not "perfect" because of blemish or handicap are considered unworthy of employment, but are considered among the appropriate targets for advertisers who want their money.

Didn't mean to start a war here, but I just thought some who participated in that discussion should hear the other side of the story.

Ken Clark
WSAU(AM)
Wausau, WI

Radio tradition

Dear **RW**,

I was pleased to see the article on Kate Smith's famous rendition of "God Bless America" by Irving Berlin (**RW**, June 26).

Since starting the "Music, Memories and More" format four years ago, WLLH(AM) Lowell/Lawrence, Mass., (yes the station where Ed McMahon started his career) has played this song at 11:56 a.m., up to the noon news. On the few days that someone forgot to play it, they were soon reminded when the phones lit up with calls from angry listeners.

At least in the Merrimack Valley, the song has become a daily lunch-time patriotic tradition.

Gary Francis
Gary Francis Productions
Chelmsford, MA

Standard product

Dear **RW**,

I was interested to read W.C. Alexander's article, "Conquer Electrical Noise Problems" (**RW**, June 26). In it he suggests that a ground strap for a car can be (laboriously) produced by stripping apart a piece of RG-8.

Did you know that ground strap exists as a standard product? Belden part numbers 8660-8663 and 8668-8669 are flat ground strap in various widths.

If Mr. Alexander wants the equivalent to a braid on an RG-8 (say, Belden 8214), the braid on that is listed in that catalogue as having 1.1 ohm per 1,000 feet. There is a chart in the Belden Master Catalogue on page 358 that lists 10 AWG wire as having a resistance of 1.08 ohm per 1,000 feet (close enough for our example), so we need 10 AWG ground strap.

Belden 8669 flat ground strap is equivalent to "8.9 AWG," just a bit bigger, and is available on a 50-foot roll. You don't have to buy a huge roll. Hope this is a help to your readers.

Stephen H. Lampen
Technology Development Manager
Belden Wire & Cable
Richmond, IN

Different perspective

Dear **RW**,

A recent piece, "The Annual RF for Radio Ritual," by Thomas R. McGinley, reported on various technical presentations that were made at the NAB Engineering Conference. Among those presentations reviewed was a paper that purported to provide a definitive comparison between folded unipole and series fed antennas. The reviewer appeared to draw the conclusion that folded unipoles were of limited use as AM broadcast antennas.

Permit me to set this matter in a different perspective.

While one can appreciate the effort and intent of the authors in conducting their study on a folded unipole configuration, it must be recognized that this was an extremely limited study, conducted by individuals who have limited experience with folded unipole antennas.

On the other hand, a variety of individuals, from John Mullaney's pioneering folded unipole studies in the '60s to Dick Adler's extensive Naval Post-Graduate School NEC modeling efforts, have established a large base of information on folded unipole-type antennas. Indeed, our company, LBA Technology Inc., which is the largest provider of folded unipole-type antennas in the world, has generated extensive experience and related performance data on folded unipole AM antennas. In fact, there are clear and considerable advantages in a number of areas for folded unipoles as AM broadcast antennas.

It is notable that LBA Technology was not contacted by the study group and asked for its input in the design of the tests or their interpretation, in spite of the considerable knowledge that it has on the matter. This was unfortunate as well, as, in their inexperience, the study group used a tuning mode for their folded unipole that was improper with respect to best bandwidth conditions.

Leaving aside arguments of bandwidth and efficiency, the folded unipole antenna is truly a remarkable configuration for AM broadcasting in its ability to permit a tower to operate in the grounded mode, as well as to permit the selection of most effective operating impedances. In spite of the reviewer's disparagement of folded unipole for lightning protection, it does, in fact, provide a far greater measure of lightning protection than does a series fed tower alone. A large part of the LBA Technology antennas are in the tropics where lightning is a great problem, and their effectiveness has been well demonstrated in that environment.

While the LBA Technology Tunipole folded unipole antenna system is far advanced from the basic configuration tested in the NAB '96 report, nevertheless, hundreds of installations worldwide have demonstrated the reliability and effectiveness of the folded unipole concept in AM broadcasting. A more balanced and rigorous investigation should be exercised in order to set the record straight.

Lawrence Behr
President
LBA Technologies Inc.
Greenville, NC

Here We Go, Again

The news that the Federal Communications Commission rule intended to prevent cellular, paging and other Part 22 licensees from distorting AM patterns when erecting towers does not apply to the new Personal Communications Service licensees (Part 24 licenses) is disturbing.

Five years ago the FCC enacted a dramatic overhaul of the AM band toward the end of cleaning up interference on the AM dial. The result was a three-pronged attack on interference incorporating technical improvements, migration to the expanded band and consolidation of the existing band. Revised calculations and rules meant that for the greater good, many stations subsequently had to accept a power cutback at some point and yet others were to make the move to the expanded band (a process just now beginning).

Yet after all this effort and labor, we now find out that the nation's pioneer band is back at square one.

As it stands, the FCC has two problems. First, it has no rule to enforce if a PCS tower disrupts an AM pattern. Second, the rule that does exist to protect AM patterns from cellular and other Public Mobile Service towers is vague and ineffective.

Couple all this with an FCC bent on downsizing its staff and closing many of its field offices, and AM broadcasters are faced with the real possibility that PCS operators will wreak havoc on AM signals with impunity.

We understand that a cash-strapped government agency welcomes the infusion of millions of dollars that PCS auctions are bringing in — but disrupting such an established service as the AM broadcast band to do so is short-sighted.

Claims of serving the public by making the best in modern technical service available to them is a laudable aim, but in the long run, the public it claims to serve will not have much of a choice between interference-riddled services if the FCC does not protect these services from each other.

— **RW**

Radio World

Vol. 20, No. 15 July 24, 1996

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Radio World (ISSN: 0274-8541) is published bi-weekly by IMAS Publishing (USA), Inc., 5827 Columbia Pike, Suite 310 Falls Church, VA 22041. Phone: (703) 998-7600. Fax: (703) 998-2966. Periodicals postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Giselle Hirtenfeld, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966 Copyright 1996 by Industrial Marketing Advisory Services (USA), Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of Radio World
August 7, 1996

World Radio History

High School Station Looks for Frequency

by Alan Haber

Part II of III

WASHINGTON In the "real world" of professional radio, every day is fraught with competitive and economic pressure. Every day is an education for everyone who calls radio home. Every day is another page in the lesson plan of life.

Serious students

Thanks to radio activity at approximately 229 high schools across the United States, students serious about the medium are learning the ropes early on. For them, the experience is a hands-on entré to a possible position at a professional station.

The students working at WKR — Wildkit Radio — in Evanston, Ill., are serious about radio. The station kicked off its six-week inaugural run this spring and will return at the beginning of the coming school year.

Two hours of programming was recorded and played back the following day on one of Evanston Township High School's two cable channels, which are carried by Continental Cablevision in Evanston.

This was not the first radio-oriented activity at Evanston Township High School. In the early 1960s, according to WKR faculty advisor Roger Badesch, "faculty members and students tried to get a radio station started." The idea was to provide the students with an outlet for expression like the school newspaper.

Interest is so strong in WKR — more than 40 students worked on the shows broadcast this spring — that the goal now is to procure a frequency and graduate the station to the major leagues.

On the Air at Wildkit Radio

"This is the first time that students, faculty, administration, parents and alumni have pooled together all of their resources to try to get a frequency," said Badesch. A local 1 kW, 24-hour FM signal, owned by a church that shares time with a high school in the northern suburbs, is available, although it can not be identified while negotiations are under way.

Behind this effort, said Badesch, is "strong evidence that the local cable supplier may be changing hands and that the school could lose both of its cable channels or maybe one of them."

Not being served

He also said that the school may privatize out its television production facilities.

Badesch said the feeling is that "the city of Evanston and the students of the high school are not being served by the present stations licensed to the city."

Through an over-the-air signal, Badesch said WKR would be serving the high school community directly and addressing issues of concern to the community, the students and the parents in the area.

The effort to get an over-the-air signal — funding for which comes from alumni donations — began about a year and a half ago.

"One of the parents of one of the students called to inquire about the possibility of his son working on a radio station at the high school," said Badesch. When the parent discovered there was no radio station at the school, "he made contact with some of the administrators and discussed the possibility of getting a radio club or a radio station started."

Through contributions, the station was able to secure about $70,000 worth of broadcast equipment and supplies from local fine arts station WFMT(FM) and an

continued on page 16 ▶

Funding Options Reviewed for CPB

by D.C. Culbertson

WASHINGTON When Republicans took control of Congress in 1994, zeroing out all funding for public broadcasting — indeed, eliminating the Corporation for Public Broadcasting entirely — appeared high on their agenda.

Recently, however, Republicans introduced a bill in the House and a discussion draft bill in the Senate providing for authorization of public broadcasting funds.

Jack Fields, R-Texas, introduced the House bill, known as the "CPB/PBS Self-Sufficiency Act," in February. Senator Larry Pressler, R-S.D., presented the discussion draft in May. A recent article published by the conservative Heritage Foundation described the Pressler draft as "bold."

Before he left the Senate to pursue his race for the presidency, Bob Dole planned to introduce a bill that, among other things, set up a yearly allotment of $4 billion for a public broadcasting trust fund. Dole's recent retirement and the short amount of time left to introduce any new legislation in the current Senate make it doubtful that any action will be taken on the bill.

In their fundamental points, the House and Senate bills are similar. Both provide for an annual reauthorization for CPB of $250 million through the year 2000 and provide ways of expanding and enhancing underwriting.

Both propose the creation of a trust fund to support public broadcasting which would eliminate the need for the approval of funds by the government every year.

The House bill says the money for this fund will come from the conversion and sale of vacant public television spectrum to the commercial sphere with a minimum funding level of $1 billion. The Senate bill does not specify the source or level of funding.

In both bills, the proposed fund would provide for the creation of a commission to study the current state of public broadcasting. The commission would look at ways the CPB could leverage their resources better. An example would be studying whether it makes sense to have multiple public stations in the same market.

The Fields' bill does not provide any information on the makeup or objective of the commission. Pressler's bill specifies that the commission be made up of two Senators, appointed respectively by the Majority and Minority Leader, two Representatives, appointed by the Speaker of the House and the Minority Leader and eight individuals appointed by the President.

These eight would be selected based on relevant experience rather than political affiliation like the current CPB board. In addition, the Secretary of Commerce, the Chairman of the FCC and the CPB President would serve as ex-officio members with no voting privileges.

At present, the state of both bills is in doubt. Fields' bill is presently being reworked and his press secretary declined to give any details of its present status.

"We're talking to everybody ... We're hopeful we're going to get an agreement," he said.

Pressler's bill is in an even more nebulous state. At the end of June, it had not even been assigned a number.

The Senator's press secretary simply said, "It's too early to say."

The CPB has been guaranteed funding — albeit declining — through fiscal year 1998. The FY 1996 appropriation is $275 million; in FY 1997, it is $260 million and in FY 1998, it is set at $250 million.

The House Appropriations Committee just approved a $250 million appropriation for 1999. That figure still has to work its way through the full House and Senate, a potentially perilous journey.

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NAB Still Favors IBOC

WASHINGTON The National Association of Broadcasters held its first Radio Board meeting of the year that included newly elected members in June.

Both new and seasoned members unanimously reaffirmed the NAB Radio Board resolution adopted in January supporting an in-band, on-channel (IBOC) digital audio broadcasting solution.

"This Board wishes to express its gratitude for the excellent work done by the DAB Task Force and to emphasize its continued strong support for the completion of IBOC development, with the aim of its expeditious adoption and deployment in this country."

Bernie Strom of USA Digital Radio told the board that her company will establish a board of advisers composed of broadcasters and receiver manufacturers and will need "vocal and consistent support from the broadcasting community for our efforts" as development continues.

USADR withdrew from the DAB testing process in May citing an inability to reach an agreement on test procedures with the Electronic Industries Association.

David Maxson of WCRB(FM) and David Murotake of Sanders Corp., a Lockheed/Martin Company, presented information on the FMDigital system which provides the technical basis for an on-carrier digital IBOC DAB for FM using existing subcarrier space (**RW**, April 3).

Updates on radio technologies like the Emergency Alert Service, upcoming DAB field tests in San Francisco and data broadcasting were also provided.

On the nontechnical side, the Radio Board instructed the NAB staff to suggest a revised fee schedule for 1997 to the FCC. The proposed schedule would base fees on a combination of station classification and size of its audience within its Grade B signal area. The fees are currently based on a station's classification regardless of market size.

The Board also adopted a revised dues rate structure which adds new revenue/dues categories for stations and groups whose annual revenue exceeds $5 million.

The old rate card topped off at dues of $700 a month for stations with an annual revenue of $5 million or above. The new categories range from $5 million to a new top category of $200 million and above. There is no change in any of the already-existing rate categories.

The Radio Board re-elected Dick Ferguson as chairman and Howard Anderson as vice chairman.

NAB staff briefed members on legislative and regulatory issues including campaign reform legislation, performance rights, Forest Service/Bureau of Land Management tower fees, beer and wine advertising, tax reform for small businesses, satellite DARS and the Justice Department and radio ownership expansion.

World Radio History

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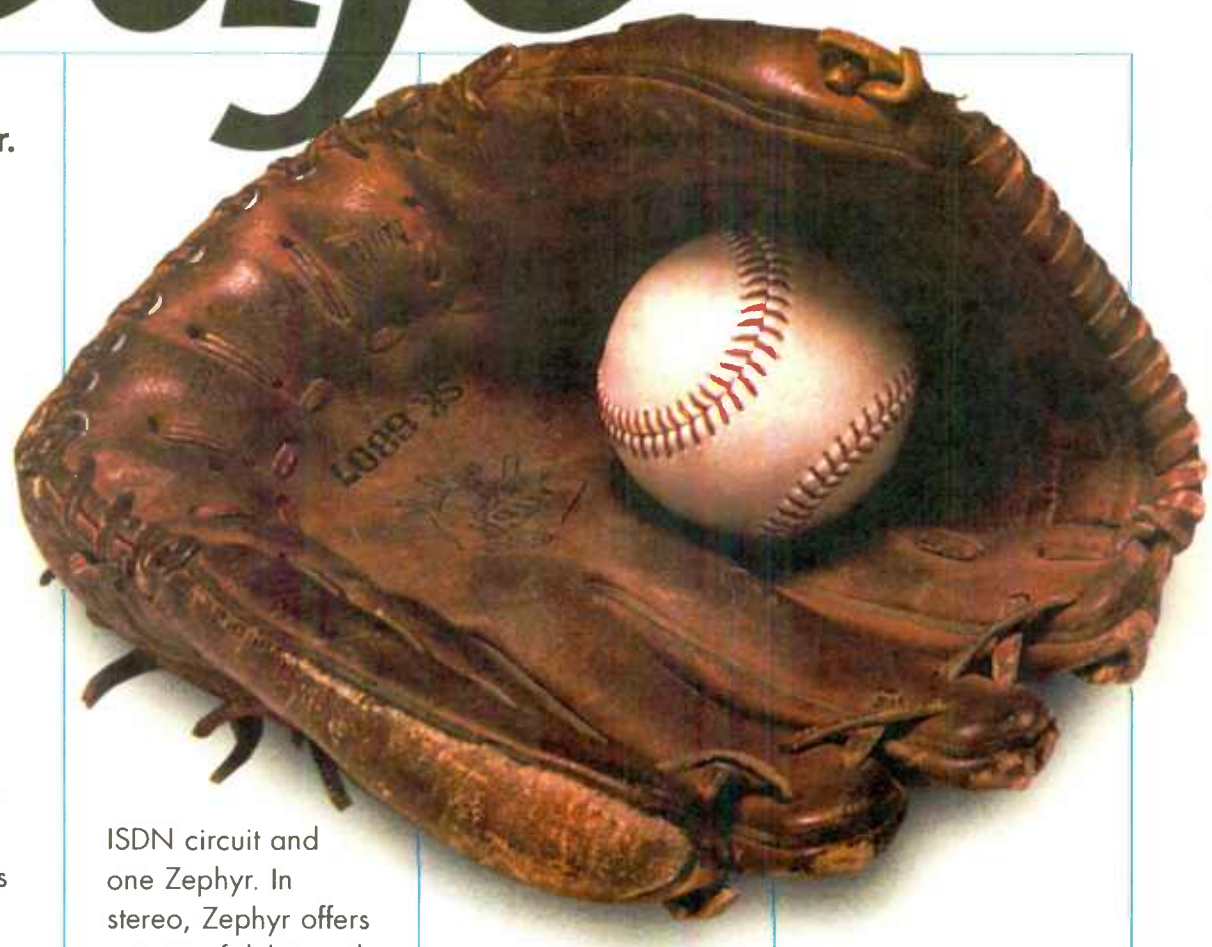

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World Radio History

Vessel to Broadcast Message of Peace

Former Radio Pirate Says He Will Play by the Rules When Broadcasting from the High Seas

by Alan Haber

KIOWA, Kan. A new offshore shortwave and mediumwave broadcast vessel is set to sail and transmit from international waters by the end of summer.

Dubbed the Electra, in honor of Guglielmo Marconi's floating laboratory, the Electra, it is the brainchild of broadcaster Scott Becker and broadcaster and former radio pirate Allan Weiner.

The Electra, now being outfitted in high-tech style with "more digital equipment than old military equipment," according to Becker, will provide "a free radio voice that can travel to those in need."

The ship is "very seaworthy," said Weiner. "It's a good ship. It's agile, nimble and able to get in and get out, and, you know, it's just what a floating radio station should be."

With no permanent home as of this writing — Becker said he is looking at France — the ship's plans are not yet firm. Final negotiations with a number of international organizations and concerns who will be partners in the Electra's mission have not yet been completed.

Weiner, the ship's chief engineer, is the former pirate radio broadcaster behind Radio New York International (RNI). Outfitted with AM, FM and shortwave transmitters, RNI broadcast about four miles off the coast of Long Island, N.Y., in 1987.

Good morning, Electra

In 1996, however, things could not be more different. The Electra's mission is to bring listeners old-time radio shows and programs dealing with environmental issues affecting the oceans and peoples of the world.

Becker and Weiner, operating under the company name Lightwave Mission Broadcasting, are determined that the Electra will be a complete success.

Weiner's last two floating radio ships — the Sarah, from which RNI emanated, and the M.V. Fury, — ended in woe.

The Sarah was seized by the Federal Communications Commission and the Coast Guard, and Weiner was arrested for alleged violation of international law. The charge was later dropped.

The M.V. Fury, one of whose four transmitters was slated to be used by Brother R. Stair's Overcomer Ministry of Walterboro, S.C., was raided by the FCC for alleged illegal transmissions.

The Sarah's fate effectively signaled the coming of the Electra; the ship was sold in 1992 to MGM studios and blown up in the 1994 movie "Blown Away," which starred Jeff Bridges and Tommy Lee Jones.

Purchased just prior to the big explosion, the Fury, a converted North Seas fishing boat, saw its career end in January 1994, when the FCC raided the ship and confiscated its broadcasting gear.

These are memories made long ago. The memories of the government calling on Weiner's ventures with the Sarah and M.V. Fury are strong, but Becker is not letting them get in the way of the Electra's purpose.

"I am not going to let the United States government squish me like an ant when they work for me to begin with," he said. The Fury, he noted, was boarded illegally. "We were not doing anything wrong."

As Weiner told RW in October 1994, the FCC stated that there were illegal transmissions coming from the ship.

Weiner, for his part, does not understand why the FCC has had problems with his radio ship ventures.

"You have to realize any offshore radio activity that's been done, connected with the United States, I've usually been involved with," he said. "The government is the one that chooses to get hysterical over it."

He said that everything possible is being done to adhere to the FCC's rules and regulations.

"The only thing I can figure is that whenever they see the words 'offshore radio,' and then they see the (name) 'Allan H. Weiner,' they take it as a direct challenge to their authority — to their reasons to exist."

Free form

Becker, a former radio and television pirate who has been friends with Weiner for years, had parted ways with Weiner after the Fury episode. Becker's pairing with Weiner seems to have been written on the high seas.

Allen Weiner displays gear below the deck of the Electra.

"I think the mutual camaraderie that comes along with being a pirate radio broadcaster is, if you really want to be a pirate broadcaster, you hook yourself up with the biggest one, and that's how I got involved with Allan," he said, laughing.

The Electra is well on its way to fulfilling Becker and Weiner's goals.

The only electromagnetic radiation coming off that boat will be from the incandescent lights.

—Allan Weiner

Although the sources of programming are not yet defined, Becker is negotiating with several organizations and concerns around the world for this purpose.

The ship is in "real good shape ... almost like a mini-submarine," said Becker.

"We want the general public to know exactly where we're going on this one," said Becker, putting a collective stake in the hearts of any naysayers. The Electra is "not going to be a bunch of radical, crazy kids up there playing rock 'n' roll music. We're a free-form radio broadcaster. I don't want us to sound like a pirate, because we're not a pirate radio station."

An interactive site on the World Wide Web is planned, and Becker has been sending press releases to the FCC, as well as to the media. The commission has not contacted him regarding the new ship's venture, and he does not plan on hearing from anyone there.

The Electra will be in international waters, he said, and will not be flying an American flag.

Becker said an independent laboratory will be retained to monitor the ship and report any RF emissions coming off of it. This, he said, is "the way we're going to get around the FCC this time."

Weiner said that while the Electra is being outfitted, he is "not even going to allow a microwave oven" on the ship.

"The only electromagnetic radiation coming off that boat will be from the incandescent lights," said Weiner.

The plan is for the Electra to broadcast to international target areas not yet determined, but outside of the United States. Becker did concede that signals can get into the United States from the ship's omnidirectional antenna as a result of atmospheric conditions.

Meaningless without support

The Electra soon will be sailing on its way to international waters. The ship is being outfitted with equipment. Work on the vessel is 90 percent completed. None of the work will mean anything without support, and Becker looks forward to plenty of it.

Becker created the Offshore Society for supporters. Through the society, people can show their support for the Electra by buying T-shirts, bags and prepaid telephone cards adorned with pictures of the Electra studio and the ship itself.

Members will receive membership cards and be able to keep up with the ship's activities through the World Wide Web site.

When the Electra is ready, both the media and the public will be able to walk through it. When the ship is in port, Becker said society members will be "welcome with open arms."

He said the bottom line for the Electra venture is to bring environmental issues and "peace, love and understanding about the oceans and the peoples around the world" to listeners. Both Becker and Weiner are excited about the future of the ship.

"I think it's fantastic," said Weiner. "I think it's wonderful for the world."

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World Radio History

Show Highlights Talkers, ISDN

by Alan R. Peterson

WASHINGTON The town famous for talk was the perfect setting for the annual convention of the National Association of Radio Talk Show Hosts (NARTSH). The gathering of hosts — big names as well as local legends — took place June 20-23 at the Omni Shoreham Hotel in Washington.

Talk Radio '96 featured panel discussions, exhibitors, special luncheons and several award ceremonies. Especially notable were a number of live broadcasts from the hotel digitally transmitted via ISDN equipment provided by Comrex.

Well-known names

Many familiar faces and voices attended as participants and guest speakers. Among the more star-studded sessions was the White House Luncheon in the hotel Regency Ballroom where key speakers included Gene Burns, Dick Cavett and George Stephanopoulos.

ISDN technology was used exclusively for live broadcasts.

Notable talk radio personalities in attendance included Bruce Williams, Jim Bohannon, Alan Colmes, G. Gordon Liddy, Mary Matalin and Oliver North, among many others.

The event culminated with the Freedom of Speech Awards and Dinner. NARTSH president Blanquita Cullum and Michael Harrison of Talkers Magazine were on hand to present the award to Alan Derschowitz, Michael Eisner and Bob Grant.

Talk show host Victoria Jones broadcasting live.

Technology

ISDN technology was used exclusively for all live broadcasts originating from the Omni Shoreham Hotel.

All hosts used identical equipment for consistent sound and fail-safe redundancy; if one host's link failed, an exact replacement was located and connected to continue the broadcast.

Equipment used from Comrex included the Codec Buddy source mixer, coupled to the ISDN Nexus codec. Six such configurations were in use with a seventh standing by as backup.

Carl Abrams of the Talk America network and the broadcast chief engineer, was very pleased with the performance of the Nexus and the Codec Buddy.

"I tested everything myself," he said. "It went up very quickly. We were here setting up last night, and by 2 a.m., it all worked."

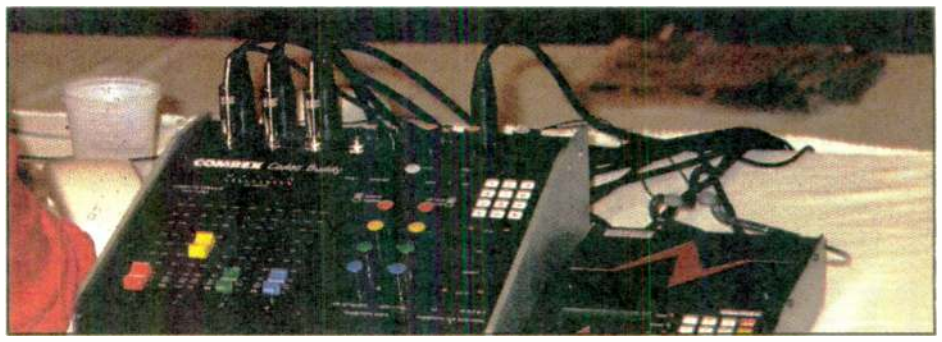
Abrams described the short delay of the Nexus as a plus for the talk performers.

"The delay is almost nonexistent on foldback. There is almost no time lag between the caller's voice and the host, so it sounds natural."

All microphones were ATM61HE units from Audio-Technica, which also provided headsets for all hosts participating in the live broadcasts.

Talk shows originating from Talk Radio '96 were as local as Upton Bell broadcasting to WTAG(AM), Worcester, Mass., and as distant as Joan Boyd of BBC Belfast, and Penhendrik Stenstroem of Norway R4.

Domestic network broadcasts included Talk America, United Stations, Salem Radio Network, Radio America, Jarvis Productions and Cullum Communications.



The Codec Buddy from Comrex was coupled to a Nexus Codec for each NARTSH broadcast.

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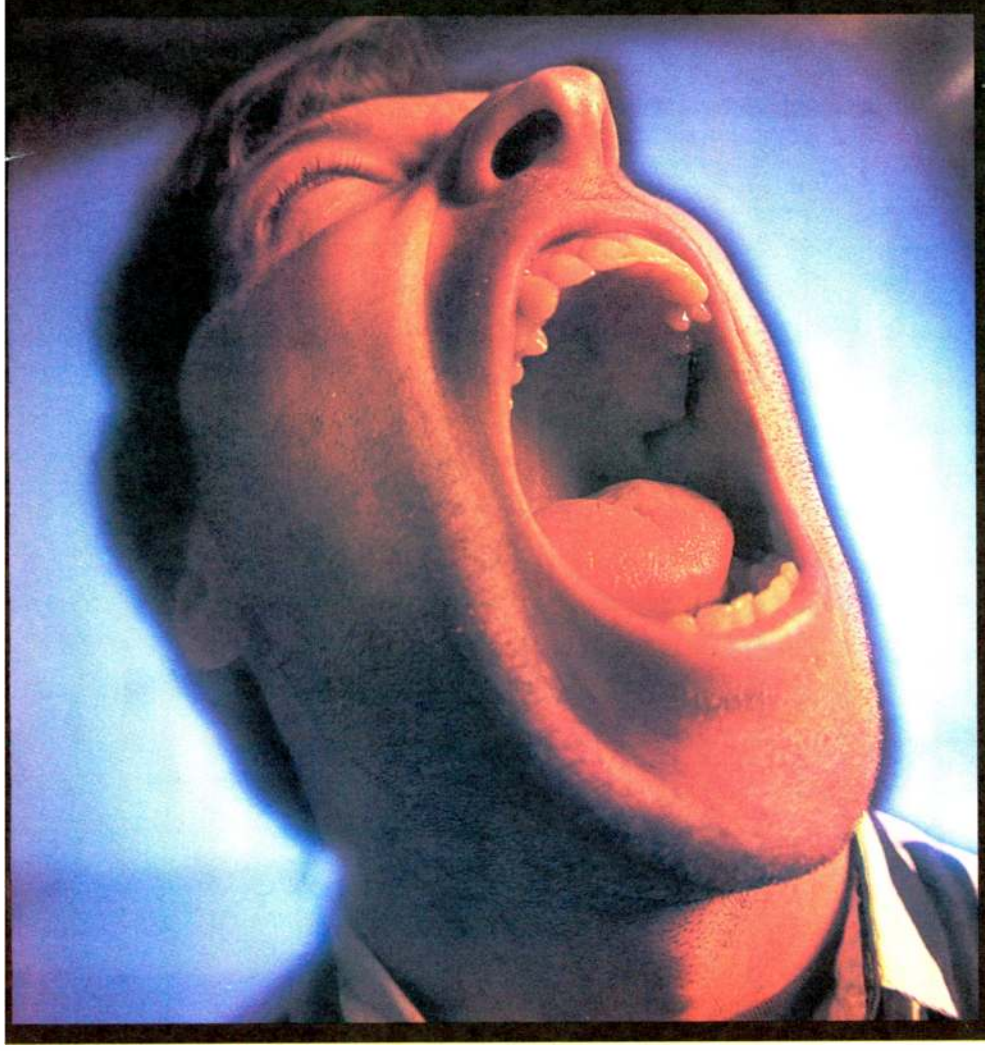

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World Radio History

Saving Electricity and Money

Engineers Need to Make Budget-savvy Decisions On a Daily Basis; Expert Contractors Share Insights

by Bob Rusk

BALTIMORE With tighter budgets and smaller staffs, engineers from Maine to California are looking for ways to help their stations save money.

In the first installment of this two-part story, Dwight Weller, chairman of Chapter 46 of the Society of Broadcast Engineers (SBE), talked about several creative ways to lower expenses.

The second installment will feature revenue-saving tips from national SBE President Terrence Baun.

Subcarriers

In addition to money-making ventures like leasing empty tower space and renting out the 67 kHz and 92 kHz subcarriers, Weller discussed ways he managed to save stations money, including things as simple as lowering the electric bill.

As director of engineering for the WLG Legends Radio Network, Weller eliminated all of the lights on the three towers for WWLG(AM), Baltimore.

"When I looked over the station license, I discovered they were below the height (requirement). You don't have to light anything under 200 feet," he said.

In 1989, Weller, who also heads Weller Audio-Visual Engineering, which specializes in remote equipment rental and station maintenance, studied the four-tower, in-line directional AM array of WCBM(AM) on 680 kHz. All four 365-foot towers were lighted.

"Aesthetically, it looks pretty," he said, "but it equates to dollars and cents."

Weller applied to the Federal Aviation Administration for relief of the lighting requirement and was granted an attachment to WCBM's license that only required lighting on towers two and four.

"That saved 50 percent of the maintenance and lighting costs — amounting to hundreds of dollars a year," he explained.

Although some might say that is not a lot of money, Weller said "If you're a small-town AM station, I think you'd focus on anything that could save you a couple hundred dollars."

In many cases, it costs a radio station money to follow the FCC rules. That is changing with deregulation.

WWLG originates programming and sends it to WASA(AM) in Havre de Grace, Md. — about 40 miles north of Baltimore. The station kept meter readers there when the FCC required an operator on duty.

"When that rule went away in October 1995, so did they," said Weller. "Cost savings are much greater now. Just having people in the building is a negative cost factor because climate-control for humans costs more than what an older tube-type 5 kW transmitter requires, not to mention the cost of trash removal and the telephone bill to occupy idle man-hours."

He said that meter readers sitting around to comply with the old FCC rule tended to fidget with transmitter tuning and other technical areas. That meant more on-site visits than Weller has to do now.

Dwight Weller

Weller estimated that the station spent about $1,500 to make the station remote controlled while still complying with the EBS requirements so they could control WASA from Baltimore.

"The payroll we recovered by eliminating the operator on duty paid for the remote-control equipment in less than two weeks."

Shrinking staffs mean that it is essential to develop relationships with engineers at other stations, which can prove vital in an emergency.

"If I blow a tube, it's not uncommon for me to get one from a station across town rather than paying a lot of money to have something shipped in overnight," said Weller. "Know who has what equipment. Share your secrets with everybody."

Know who has what equipment. Share your secrets with everybody.

—Dwight Weller
Weller Audio-Visual Engineering

Leave equipment on

Some station employees may resist the idea, but leaving equipment turned on 24-hours-a-day will significantly extend its life.

"It'll cost you a little more in electricity," acknowledged Weller, "but the equipment will last 10-times longer. Even if you're a daytimer, leave the equipment on when you're not at the station. The surge when you turn it on is what blows things up. Your maintenance factor will go down dramatically if you leave equipment on."

One of the biggest monthly expenses most radio stations have is the phone bill. The engineer can make several suggestions that will help lower it.

"If you're doing a remote that happens just twice a year, use your in-house lines," said Weller. "Don't spend extra money having lines put in that you won't frequently use.

But if you do spend the money, use those lines for multiple purposes. At WWLG, we have a switch-over matrix that uses part of our business lines at night for our sports talk show, rather than maintaining a separate bank of phone numbers."

Much of Weller's work for WWLG is done on the phone from the office in his home. Instead of incurring the expense of billing long-distance calls back to the station or using a calling card, he had an off-premises extension installed. It costs just $20 a month and shows up on the station's bill.

Turn up the heat

When Weller worked at WLIF(FM) in Baltimore, the transmitter provided so much heat for the studios and offices that the oil furnace was not needed.

"We had a trade with a local oil company," he recalled. "A deliveryman came out to fill the tank. When it needed just three gallons, he was irritated and thought we had switched the trade without telling him."

Weller said the station had not used the furnace at all that winter even though temperatures in Baltimore were in the teens and 20s for several weeks.

"It got so hot in the station that we had to open the windows," he said.

Using the transmitter as a heater, however, can be tricky.

"You have to neutralize the exhaust-air pressure before you suck it into the air return of the building furnace, and humidity must be added to the air going to areas occupied by people," explained Weller. "You must have the neutralizing chamber before sending the air to your furnace so that nothing can go wrong with your transmitter's cooling that could put you off the air."

This works equally well with AM transmitters. A 50,000 W setup "probably gives off enough heat to keep an entire schoolhouse warm," said Weller. "Even if you can't pull the heat off the top of the transmitter, you can blow a fan at a moderate speed across the cabinet. You'd be surprised by how much that will warm up a room."

Even when the transmitter is not located in the same building as the studios and offices, its heat can still keep the engineer's quarters warm.

"It'll be nice and cozy when you go in," said Weller. "You won't need any supplemental heat; but if you depend on that to heat the site and the station gets blown off the air in the winter, it's going to be a cold night."

He stressed that for every cubic foot of air sucked out of the transmitter room, stations must have adequate intake to the transmitter to replace it.

Weller, who will occasionally double as an announcer when duty calls, stressed that in addition to helping stations save money, engineers should also think about saving their own jobs.

"You can wear a bunch of different hats and justify your existence," he said. "You'll be more likely to stay around in a full-time capacity rather than being replaced by a part-timer or contract engineer."

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Modulation Sciences
RDS Diagnostix

Decoder Equipment

Advanced Digital Systems
Audio Broadcast Group
Belar Electronics Labs Inc.
Harris Allied
Inovonics
RDS Diagnostix
Rhode & Schwarz Inc.

Data/Information Services/Paging/GPS

Circuit Research Labs
Coupon Radio
DCI
Axcess Global Communications Corp.
Nokia Paging Inc.
Specialized Comm.
Terrapin

EAS RDS Equipment

Sage Alerting

RDS Automation Equipment/Software

Audio Broadcast Group
Milestone Technologies

Consumer Receivers

Advanced Digital Systems
Audio Broadcast Group
Axcess Global Communications Corp.
Delco Electronics
Denon Electronics
Grundig
Harris Allied
Onkyo
Pioneer

Data Recievers

Advanced Digital Systems
Aztec S.A.
Harris Allied
Modulation Sciences

Advanced Digital Systems
13909 Bettencourt Street
Cerritos, CA 90703
Contact: Mike McCoy
800-888-5244
RDS receivers for the PC, Data receivers, RDS decoder chipset, RDS, RBDS paging receivers, EAS receivers
Reader Service 209

AEV
Via Saviolo, 1/E
I-40017 Le Budrie
Di S.G.Persiceto - BO
Italy
Encoder equipment

Audio Broadcast Group
2342 S. Division Ave
Grand Rapids, MI 49507
Distributors of a wide range of RDS products including encoders, decoders and related hardware and software.

Axcess Global Communications Corp.
6620 Riverside Drive #200
Metairie, LA 70003
Robert L. Adams, President
Phone: 800-264-3777
RBDS paging systems and Panasonic RBDS paging receivers
Reader Service 149

Aztec
31 rue du Chemin de Fer
F-67200 Strasbourg
France
RDS data receivers and RDS/RBDS encoders for radio text, data transmission, paging

Belar Electronics Labs Inc.
PO Box 76
Devon, PA 19333
David Hirsch
610-687-5550
Makers of the only complete RDS/RBDS monitor that measures pilot/RDS phase
Reader Service 148

Broadcast Supply Worldwide
7012 27th Street West
Tacoma, WA 98406
Provides RDS Encoders and Decoders

Circuit Research Labs
2522 W. Geneva
Tempe, AZ 85282
Contact: Jack Otterson
602-438-0888
Professional RBDS/RDS encoder, RBDS in-house and full TNPP Paging Systems
Reader Service 68

Coupon Radio
10 Rockefeller Plaza
New York, NY 10020
Information services

DCI
10121 Miller Ave
Cupertino, CA 95014
Global positioning

Delco Electronics
1 Corporate Center MSCT-16A
Kokomo, IN 46904
RDS receivers available for vehicle installation

Denon Electronics
222 New Road
Parsippany, NJ 07054
Contact: John Casey
201-575-7810
RDS Tuners, Receivers, and car audio head units
Reader Service 67

Grundig
3520 Haven Ave. Unit L
Redwood City, CA 94063
Portable shortwave receivers with AM, FM, RDS

Harris Allied
3712 National Road West
Richmond, IN 47374
Carries encoders, decoders and receivers

Inovonics
1305 Fair Ave.
Santa Cruz, CA 95060
Contact: Anne Chaney
408-458-0552
Low cost RDS/RBDS Encoder; comprehensive Decoder/Reader
Reader Service 169

Io Research Pty. Ltd.
Level 1, 30 Kings Park Road
West Perth, WA 6005
AUSTRALIA
RDS equipment, signs, In Car Information System, etc.

Milestone Technologies
2221 Mariner Circle
Raleigh, NC 27603
Data Broadcasting file transfer software (SATX) compatible with RDS

Modulation Sciences
12A World's Fair Drive
Somerset, NJ 08873
Encoders, monitors, data receivers

Nokia Paging Inc.
12345 Starkey Road, Su
Largo, FL 34643
Contact: Markku Lento
813-532-4241
Paging specialists
Reader Service 7

Onkyo
200 Williams Drive
Ramsey, NJ 07446
RDS receivers and tuners

Pioneer
2265 East 220th Street
Long Beach, CA 90810
Receiver manufacturers

RDS Diagnostix
74 Hanover
Mountain Lakes, NJ 07046
Test/Decoder

RE America Inc.
31029 Center Ridge Road
Westlake, OH 44145
Contact: Cathy Huth
216-871-7617
Complete line of third generation RDS encoders for broadcast, data, GPS and paging applications.
Reader Service 108

Rohde & Schwarz Inc.
4425 Nicole Drive
Lanham, MD 20706
RDS/RBDS Encoders and Decoders

Sage Alerting
700 Canal Street
Stamford, CT
EAS Equipment with RDS

SCA Data Systems Inc.
2912 Colorado Ave., Suite 200
Santa Monica, CA 90404
Encoders

Specialized Comm.
1638 153rd St. SE
Bellevue, WA 98007
Contact: Allen Hartle
206-641-9043
Software provides artist, songtitle and miscellaneous data distribution
Reader Service 188

Terrapin
11958 Monarch Street
Garden Grove, CA 92641
IVHS Services/Differential GPS

VG Broadcast
Hayworthe Villa, Haywards Heath
West Sussex RH16 1DB
United Kingdom
Encoders for radio broadcasters

EIA Web site: www.eia.org/cema
NAB Publication: RDS Applications: Opportunities for Radio Broadcasters
(800) 368-5644

World Radio History

RDS ROLL CALL

TOTAL STATIONS = 617

Station	Freq.	City
ALABAMA		
WZYP-FM		Athens
WRJM-FM		Geneva
ARIZONA		
KZZZ-FM		Kingman
KBZR-FM		Phoenix
KEDJ-FM		Phoenix
KHOT-FM		Phoenix
KKFR-FM		Phoenix
KLVA-FM		Phoenix
KPHF-FM		Phoenix
KRIM-FM		Phoenix
KTWC-FM		Phoenix
KZZP-FM		Phoenix
KSLX-FM		Scottsdale
CALIFORNIA		
KSBR-FM		Anaheim
KALX-FM		Berkeley
KPFA-FM		Berkeley
KPFB-FM		Berkeley
KSIQ-FM		Brawley
KFMF-FM		Chico
KPPL-FM		Colusa
KVHS-FM		Concord
KOHL-FM		Fremont
KUFX-FM		Gilroy
KCRH-FM		Hayward
KFSG-FM		Los Angeles
KHQT-FM		Los Altos
KCRW-FM		Los Angeles
KKBT-FM		Los Angeles
KKGO-FM		Los Angeles
KKLA-FM		Los Angeles
KLSX-FM		Los Angeles
KPCC-FM		Los Angeles
KPFK-FM		Los Angeles
KPWR-FM		Los Angeles
KREA-FM		Los Angeles
KSCA-FM		Los Angeles
KTWV-FM		Los Angeles
KUSC-FM		Los Angeles
KATM-FM		Modesto
KHOP-FM		Modesto
KCSN-FM		Northridge
KPLM-FM		Palm Springs
KSHA-FM		Redding
KFOX-FM		Redondo Beach
KNPR-FM*		Ridgecrest
KRXQ-FM		Sacramento
KSFM-FM		Sacramento
KSDS=FM		San Diego
KPBS-FM		San Diego
KYXY-FM		San Diego
XTRA-FM		San Diego
KALX-FM		San Francisco
KDFC-FM		San Francisco
KECG-FM		San Francisco
KEAR-FM		San Francisco
KALW-FM		San Francisco
KFFG-FM		San Francisco
KFOG-FM		San Francisco
KFRC-FM		San Francisco
KKHI-FM		San Francisco
KKIQ-FM		San Francisco
KKSF-FM		San Francisco
KUSF-FM		San Francisco
KSJO-FM		San Jose
KCBX-FM		San Luis Obispo
KDB-FM		Santa Barbara
KUSP-FM		Santa Cruz
KSTN-FM		Stockton
COLORADO		
KBCO-FM		Boulder
KKFM-FM		Colorado Springs
KCDC-FM		Denver
KCFR-FM		Denver
KHIH-FM		Denver
KKHK-FM		Denver
KMJI-FM		Denver
KOSI-FM		Denver
KVOD-FM		Denver
KWBI-FM		Denver
KXKL-FM		Denver
KXPK-FM		Denver
CONNECTICUT		
WSHU-FM		Fairfield
WPKT-FM		Hartford
DELAWARE		
WSTW-FM		Wilmington
DISTRICT OF COLUMBIA		
WAMU-FM		Washington
WASH-FM		Washington
WAVA-FM		Washington
WEBR-FM		Washington
WETA-FM		Washington
WDCU-FM		Washington
WGAY-FM		Washington
WGTS-FM		Washington
WHUR-FM		Washington
WKYS-FM		Washington
WMMJ-FM		Washington
WPFW-FM		Washington
WRCY-FM		Washington
WWDC-FM		Washington
FLORIDA		
WAPN-FM		Daytona Beach
WNDB-FM		Daytona Beach
WSFP-FM		Ft. Myers
WUFT-FM		Gainesville
WAOA-FM		Melbourne
WAFG-FM		Miami
WAMR-FM		Miami
WLRN-FM		Miami
WLYF-FM		Miami
WRMF-FM		Miami
WRTO-FM		Miami
WTMI-FM		Miami
WDIZ-FM		Orlando
WEAZ-FM		Orlando
WHTO-FM		Orlando
WJRR-FM		Orlando
WLOQ-FM		Orlando
WMFE-FM		Orlando
WMMO-FM		Orlando
WOCL-FM		Orlando
WOMX-FM		Orlando
WPCV-FM		Orlando
WTLM-FM		Orlando
WWKA-FM		Orlando
WUCF-FM		Orlando
WOWW-FM		Pensacola
WFLZ-FM		Tampa
WFTI-FM		Tampa
WHPT-FM		Tampa
WLVU-FM		Tampa
WSJT-FM		Tampa
WUSA-FM		Tampa
GEORGIA		
WABE-FM		Atlanta
WCLK-FM		Atlanta
WGHR-FM		Atlanta
WKLS-FM		Atlanta
WMKJ-FM		Atlanta
WNNX-FM		Atlanta
WRFG-FM		Atlanta
WWEV-FM		Atlanta
WZGC-FM		Atlanta
WSTH-FM		Columbus
WDMG-FM		Douglas
WJTG-FM		Macon
WFAS-FM		Savannah
WSTR-FM		Smyrna
WRAF-FM		Toccoa Falls
WAFT-FM		Valdosta
IDAHO		
KCIX-FM		Boise
ILLINOIS		
KNJZ-FM		Alton
WRMS-FM		Beardstown
WCIL-FM		Carbondale
WCBH-FM		Casey
WLRW-FM		Champaign
WARG-FM		Chicago
WBEZ-FM		Chicago
WCCO-FM		Chicago
WFMT-FM		Chicago
WJCH-FM		Chicago
WJKL-FM		Chicago
WJMK-FM		Chicago
WKKD-FM		Chicago
WKQX-FM		Chicago
WLLI-FM		Chicago
WNIB-FM		Chicago
WNUR-FM		Chicago
WOJO-FM		Chicago
WRSE-FM		Chicago
WXRT-FM		Chicago
WLS-FM		Chicago
WNUA-FM		Chicago
WSSD-FM		Chicago
WZSR-FM		Chicago
WNIJ-FM		DeKalb
WEIT-FM		Decatur
WYDS-FM		Decatur
WZNX-FM		Decatur
WLLR-FM		East Moline
WAAG-FM		Galesburg
WWTE-FM		Lincoln
WGLO-FM		Pekin
WFYR-FM		Pekin
WSWT-FM		Peoria
WDBR-FM		Springfield
WPGU-FM*		Urbana
WGFA-FM		Watseka
INDIANA		
WYEZ-FM		Bremen
WSHW-FM		Frankfort
WXKE-FM		Ft. Wayne
WENS-FM		Indianapolis
WZPL-FM		Indianapolis
WITZ-FM		Jasper
WZWZ-FM		Kokomo
WWKI-FM		Kokomo
WEZV-FM		Lafayette
WGLM-FM		Lafayette
WMRI-FM		Marion
WITA-FM		Plymouth
WLEZ-FM		Terre Haute
IOWA		
KGRS-FM		Burlington
WMT-FM		Cedar Rapids
KMGO-FM		Centerville
KRVR-FM		Davenport
KMGS-FM		Des Moines
KRKQ-FM		Des Moines
KLYV-FM		Dubuque
KIAQ-FM		Ft. Dodge
KOEL-FM		Oelwein
KOLS-FM		Onawa
KJJC-FM		Osceola
KDCR-FM		Sioux Center
KUOO-FM		Spirit Lake
KAYL-FM		Storm Lake
KANSAS		
KYQQ-FM		Arkansas City
KLLS-FM		Augusta
KKCI-FM		Goodland
KFKF-FM		Kansas City
KFDI-FM		Wichita
KENTUCKY		
WMMT-FM		Whitesburg
LOUISIANA		
WGGZ-FM		Baton Rouge
KQXL-FM		Baton Rouge
KCIL-FM		Houma
WYCT-FM		Kentwood
KFXY-FM		Morgan City
WNOE-FM		New Orleans
KMJJ-FM		Shreveport
MASSACHUSETTS		
WBCS-FM		Boston
WBUR-FM		Boston
WERS-FM		Boston
WGAO-FM		Boston
WGBH-FM		Boston
WUMB-FM		Boston
WJMN-FM		Boston
WMJX-FM		Boston
WBOS-FM		Brookline
WFPB-FM		Falmouth
WBOQ-FM		Gloucester
WSSH-FM		Lowell
WATD-FM		Marshfield
WXKS-FM		Medford
WCRB-FM		Waltham
WAAF-FM		Worcester
WBPR-FM		Worcester
MARYLAND		
WFSI-FM		Annapolis
WHFS-FM		Annapolis
WEAA-FM		Baltimore
WERQ-FM		Baltimore
WGRX-FM		Baltimore
WIYY-FM		Baltimore
WOCT-FM		Baltimore
WPOC-FM		Baltimore
WWIN-FM		Baltimore
WWMX-FM		Baltimore
WXYV-FM		Baltimore
WWIN-FM		Glen Burnie
WETH-FM*		Hagerstown
MICHIGAN		
WIOG-FM		Bay City
WAHS-FM		Detroit
WDZR-FM/FM		Detroit
WFUM-FM		Detroit
WHFR-FM		Detroit
WHPR-FM		Detroit
WJLB-FM		Detroit
WJZZ-FM		Detroit
WKQI-FM		Detroit
WLLZ-FM		Detroit
WNIC-FM		Detroit
WOVI-FM		Detroit
WPHS-FM		Detroit
WSDP-FM		Detroit
WYCD-FM		Detroit
WQRS-FM		Detroit
WUOM-FM		Detroit
WVGR-FM		Detroit
WWMV-FM		Detroit
WDBM-FM		East Lansing
WKAR-FM		East Lansing
WGLQ-FM		Escanaba
WTAV-FM		Grand Rapids
WKLQ-FM		Holland
WKFR-FM		Kalamazoo
WRKR-FM		Portage
WBTH-FM		Port Huron
MINNESOTA		
KAUS-FM		Austin
KKBJ-FM		Bemidji
KDNW-FM		Duluth
KEEZ-FM		Mankato
KKCK-FM		Marshall
KBEM-FM		Minneapolis
KCFF-FM		Minneapolis
KDXL-FM		Minneapolis
KFAI-FM		Minneapolis
KMJZ-FM		Minneapolis
KMOJ-FM		Minneapolis
KNOW-FM		Minneapolis
KQQL-FM		Minneapolis
KREV-FM		Minneapolis
KSJN-FM		Minneapolis
KSTP-FM		Minneapolis
KTIS-FM		Minneapolis
WBOB-FM		Minneapolis
WREV-FM		Minneapolis
KNOW-FM		St. Paul
KSJN-FM		St. Paul
KSTP-FM		St. Paul
KDJS-FM		Willmar
MISSOURI		
KCWA-FM		Arnold
KFMZ-FM		Columbia
KGRC-FM		Hannibal
KYYS-FM		Kansas City
KEZK-FM		St. Louis
KFAV-FM		St. Louis
KGNV-FM		St. Louis
WCBW-FM		St. Louis
WKKX-FM		St. Louis
KIHT-FM		St. Louis
KLPW-FM		St. Louis
KNSX-FM		St. Louis
KPNT-FM		St. Louis
KSD-FM		St. Louis
KSHE-FM		St. Louis
KSLQ-FM		St. Louis
KWUR-FM		St. Louis
WKBQ-FM		St. Louis
KMJM-FM		St. Louis
KNUZ-FM		St. Louis
KXOX-FM		St. Louis
KYKY-FM		St. Louis
WFUN-FM		St. Louis
WIL-FM		St. Louis
WVRV-FM		St. Louis
KLTO-FM		Springfield
KTTS-FM		Springfield
MONTANA		
KCTR-FM		Billings
KKBR-FM		Billings
KATH-FM		Bozeman
KPXX-FM		Livingston
NEBRASKA		
KNFN-FM		Norfolk
KESY-FM		Omaha
WOW-FM		Omaha
NEVADA		
KNPR-FM*		Beatty
KNPR-FM*		Boulder City
KOMP-FM		Henderson
KNPR-FM*		Indian Springs
KLUC-FM*		Las Vegas
KFMS-FM		Las Vegas
KWNR-FM		Las Vegas
KEYV-FM		Las Vegas
KRRI-FM		Las Vegas
KOMP-FM		Las Vegas
KEDG-FM		Las Vegas
KFBH-FM		Las Vegas
KYRK-FM		Las Vegas
KKLZ-FM		Las Vegas
KNPR-FM		Las Vegas
KNPR-FM*		Laughlin
KEYV-FM*		Laughlin
KNPR-FM*		Moapa Valley
KNPR-FM*		Pahrump
KLNR-FM*		Panaca
KBUL-FM		Reno
KNEV-FM		Reno
KNPR-FM*		Scotty's Junction
KNPR-FM*		Searchlight
KTPH-FM*		Tonopah
NEW HAMPSHIRE		
WBHG-FM		Laconia
WLNH-FM		Laconia
NEW JERSEY		
WFPG-FM		Atlantic City
WKDN-FM		Camden
WZVU-FM		Long Branch
WBSS-FM		Millville
WMGQ-FM		New Brunswick
WBGO-FM		Newark
WFME-FM		Newark
WNNJ-FM		Newton
WPAT-FM		Patterson
WADB-FM		Point Pleasant
WPST-FM		Trenton
WPSC-FM		Wayne
NEW MEXICO		
KKOB-FM		Albuquerque
KKSS-FM		Santa Fe
NEW YORK		
WAMC-FM		Albany
WGY-FM		Albany
WZRO-FM		Albany
WSKG-FM		Elmira
WDRE-FM		Garden City
WKJY-FM		Hempstead
WFRS-FM		Long Island
WRHU-FM		Long Island
WSHR-FM		Long Island
WBAI-FM		New York
WDFH-FM		New York
WFME-FM		New York
WFUV-FM		New York
WHCR-FM		New York
WHTZ-FM		New York
WKWZ-FM		New York
WNEW-FM		New York
WNYC-FM		New York
WQXR-FM		New York
WRGX-FM		New York
WSKQ-FM		New York
WHUD-FM		Peekskill
WBEE-FM		Rochester
WMHT-FM		Schenectady
WSIA-FM		Staten Island
WMRW-FM		Westhampton
NORTH CAROLINA		
WKJA-FM		Belhaven
WMIT-FM		Black Mtn.
WUNC-FM		Chapel Hill
WSOC-FM		Charlotte
WXRA-FM		Eden
WKOO-FM		Jacksonville
WCXL-FM		Kill Devil Hills
WTQR-FM		Winston Salem
NORTH DAKOTA		
KSSS-FM 101.5 Bismarck		
KBTO-FM 101.9 Bottineau		
KDVL-FM		Devils Lake
KRRB-FM		Dickinson
KFNW-FM		Fargo
KNOX-FM		Grand Forks
KQDJ-FM		Jamestown
KNDK-FM		Langdon
KYYZ-FM		Williston
OHIO		
WOUB-FM		Athens
WKHR-FM		Bainbridge
WFCJ-FM		Cincinnati
WGRR-FM		Cincinnati
WGUC-FM		Cincinnati
WMMA-FM		Cincinnati
WMUB-FM		Cincinnati
WNKU-FM		Cincinnati
WOXY-FM		Cincinnati
WVAE-FM		Cincinnati
WVXU-FM		Cincinnati
WWNK-FM		Cincinnati
WBWC-FM		Cleveland
WCLV-FM		Cleveland
WCPN-FM		Cleveland
WCSB-FM		Cleveland
WDOK-FM		Cleveland
WGAR-FM		Cleveland
WENZ-FM		Cleveland
WKKY-FM		Cleveland
WKSU-FM		Cleveland
WLTF-FM		Cleveland
WMMS-FM		Cleveland
WNCX-FM		Cleveland
WNWV-FM		Cleveland
WNZN-FM		Cleveland
WOBC-FM		Cleveland
WQAL-FM		Cleveland
WUJC-FM		Cleveland
WZAK-FM		Cleveland
WZJM-FM		Cuyahoga Falls
WLVO-FM		Columbus
WDFM-FM		Defiance
WGLE-FM		Lima
WKRJ-FM*		Mt. Philadelphia
WGLE-FM		Toledo
WKKO-FM		Toledo
WGTE-FM		Toledo
WXKR-FM		Toledo
WKRW-FM*		Wooster
WKBN-FM		Youngstown
WHIZ-FM		Zanesville
WOUZ-FM		Zanesville
OKLAHOMA		
KSYE-FM		Frederick
KIRO-FM		Lawton
KTST-FM		Oklahoma City
KXXY-FM		Oklahoma City
WVDO-FM		Tulsa
OREGON		
KZEL-FM		Eugene
KYTE-FM		Newport
KOPB-FM		Portland
KKRZ-FM		Portland
KMCQ-FM		The Dalles
PENNSYLVANIA		
WRTI-FM*		Allentown/ Bethlehem
WFRA-FM		Franklin
WITF-FM		Harrisburg
WRVV-FM		Harrisburg
WIBF-FM		Jenkintown
WROZ-FM		Lancaster
WBEB-FM		Philadelphia
WBYO-FM		Philadelphia
WDAS-FM		Philadelphia
WFLN-FM		Philadelphia
WGLS-FM		Philadelphia
WIOQ-FM		Philadelphia
WKDN-FM		Philadelphia
WKXW-FM		Philadelphia
WHYY-FM		Philadelphia
WMGK-FM		Philadelphia
WMMR-FM		Philadelphia
WRTI-FM		Philadelphia
WPLY-FM		Philadelphia
WRDV-FM		Philadelphia
WSTW-FM		Philadelphia
WUSL-FM		Philadelphia
WXPN-FM		Philadelphia
WXTU-FM		Philadelphia
WWDB-FM		Philadelphia
WBZZ-FM		Pittsburgh
WDUQ-FM		Pittsburgh
WDVE-FM		Pittsburgh
WJPA-FM		Pittsburgh
WLTJ-FM		Pittsburgh
WORD-FM		Pittsburgh
WRRK-FM		Pittsburgh
WSIH-FM		Pittsburgh
WWSW-FM		Pittsburgh
WXDX-FM		Pittsburgh
WZPT-FM		Pittsburgh
WRTI-FM*		Reading
RHODE ISLAND		
WWBB		Providence
SOUTH CAROLINA		
WEPC-FM		Belton
WWDM-FM		Sumter
SOUTH DAKOTA		
KOLY-FM		Mobridge
KRRO-FM		Sioux Falls
KBWS-FM		Sisseton
TENNESSEE		
WSKZ-FM		Chattanooga
WQZQ-FM		Dickson
WYPL-FM		Memphis
WKXD-FM		Monterey
WMMU-FM		Nashville
WYCQ-FM		Shelbyville
TEXAS		
KEAN-FM		Abilene
KSNN-FM		Arlington
KNLE-FM		Austin
KAYD-FM		Beaumont
KQXY-FM		Beaumont
KYKR-FM		Beaumont
KTTX-FM		Brenham
KTEX-FM		Brownsville
KKYS-FM		Bryan
KORA-FM		Bryan
KTEX-FM		Bryan
KRTK-FM		Cleveland
KRTK-FM		Cleveland
KCBI-FM		Dallas
KDMX-FM		Dallas
KERA-FM		Dallas
KHCK-FM		Dallas
KJCR-FM		Dallas
KMRT-FM		Dallas
KVTT-FM		Dallas
KYNG-FM		Dallas
WRR-FM		Dallas
KNTU-FM		Denton
KBNA-FM		El Paso
KPLX-FM		Fort Worth
KEGL-FM		Fort Worth
KBXX-FM		Houston
KHMX-FM		Houston
KILT-FM		Houston
KJIC-FM		Houston
KLTO-FM		Houston
KMJQ-FM		Houston
KPFT-FM		Houston
KRBE-FM		Houston
KRTX-FM		Houston
KTBZ-FM		Houston
KUHF-FM		Houston
KJMZ-FM		Irving
KOOL-FM		Jacksonville
KMIA-FM		Jasper
KBDR-FM		Laredo
KYKX-FM		Longview
KFMX-FM		Lubbock
KKMY-FM		Orange
KFTG-FM		Residencia
KATX-FM		Perryton
KLTN-FM		Port Arthur
KHYS-FM		Port Arthur
KCRN-FM		San Angelo
KXTN-FM		San Antonio
KRTS-FM		Seabrook
WACO-FM		Waco
UTAH		
KSOS-FM		Ogden
KSOS-FM*		Salt Lake City
KSOS-FM*		Salt Lake City
KNSN-FM		Salt Lake City
KLZX-FM		Salt Lake City
KSOS-FM**		Utah County
VIRGINIA		
WLTY-FM*		Norfolk
WNVZ-FM		Norfolk
WESR-FM		Onley
WCDX-FM		Richmond
WKOC-FM		Virginia Beach
WASHINGTON		
KISM-FM		Bellingham
KXXO-FM		Olympia
KFAE-FM		Richland
KCMS-FM		Seattle
KGRG-FM		Seattle
KISW-FM		Seattle
KJR-FM		Seattle
KNHC-FM		Seattle
KMIH-FM		Seattle
KCIN-FM		Seattle
KUBE-FM		Seattle
KUOW-FM		Seattle
KYCW-FM		Seattle
KMPS-FM		Seattle
KMTT-FM		Seattle
KBTC-FM		Seattle
KZOK-FM		Seattle
KAEP-FM		Spokane
KDRK-FM		Spokane
KEZE-FM		Spokane
KUPS-FM		Seattle
KRPM-FM		Tacoma
KVTI-FM		Tacoma
WEST VIRGINIA		
WHCM-FM		Parkersburg
WKWK-FM		Wheeling
WISCONSIN		
WIZM-FM		LaCrosse
WERN-FM		Madison
WNWC-FM		Madison
WUWM-FM		Milwaukee
WMYX-FM		Milwaukee
WMSE-FM		Milwaukee

*translator

World Radio History

Is Seagrams Inviting Disaster?

by Frank Montero

WASHINGTON Sometimes business competitors have to be forced by rule or statute to do or not do something. Other times, industries agree to take collaborative action because it is in their collective interest.

Self-imposed quarantine

So it was with advertising liquor on radio and television. For nearly fifty years, hard liquor manufacturers observed a "gentleman's agreement" to avoid advertising their products on the airwaves.

So effective was the industry's self-imposed ban that many assumed that airing hard liquor ads — like airing cigarette ads — was illegal. But as many recently discovered when Seagrams decided to run spots for its Crown Royal whiskey on a Texas television station, it is not.

Liquor companies began the ban after Prohibition in an effort to calm the concerns of prohibitionists following enactment of the 21st Amendment.

Over the years, the self-imposed quarantine effectively cut the cost of advertising because every liquor manufacturer knew his competitors were doing the same. If one company broke the truce, it was argued that the flood gates would open.

The voluntary ban sheltered the liquor industry from the public outcry faced by cigarette and other tobacco companies that advertised on radio and television in the 1960s and 1970s. Like nerve gas or nuclear weapons, advertising on the airwaves was one weapon no one wanted to use for fear of the backlash.

With this self-imposed prohibition, there was never any perceived need for law makers to take action. Consequently, the liquor companies did not have to suffer through the bad publicity and loss of good will that the tobacco industry faced.

Unlike tobacco, there is surprisingly little federal regulation of alcohol ads on the airwaves. Years ago, advertising distilled spirits was not allowed under the National Association of Broadcasters Code of Self-Regulation. That Code was subsequently challenged by the Justice Department and then eliminated.

Currently, although many states regulate alcohol advertising, the only federal regulation is an obscure ATF regulation that prohibits advertisers from listing the alcohol content of beer.

In contrast, many remember tobacco advertisements slowly being pulled off the air beginning with the Marlboro man and lasting until cigarette ads were completely banned. Ads for little cigars and chewing tobacco ("just a pinch between your cheek and gum") were finally banned in 1986.

Shock and condemnation

The alcohol industry's Pax Romana may be coming to an end with the Seagrams spots. Although the Seagrams ads have attracted considerable attention, hard liquor ads have appeared on radio and television in the past, most notably on Spanish language stations in the United States and Puerto Rico, where they raised little attention.

In contrast, many have responded to Seagrams ads with shock and condemnation. Seagrams and some broadcasters point out that beer and wine have enjoyed a relatively free reign in advertising over the airwaves.

In fact, while liquor advertisers have kept each other at bay, they watched their share of the overall alcoholic beverage market erode in comparison to beer and wine sales.

With the running of the Seagrams ads, all eyes are on other liquor manufacturers to see if they also break ranks and begin running television and eventually radio advertisements. Thus far, Seagrams' competitors appear to be staying the course to see what the fallout will be.

One immediate reaction was the introduction of a bill into Congress by Representative Joe Kennedy (D-Mass.) that, if enacted, would ban hard liquor ads from the airwaves.

Moreover, the Crown Royal spots could fuel the ongoing debate about whether certain beer ads, most notably "Spuds Mackenzie" and the very popular Budweiser frogs, which critics claim are aimed at young audiences, should be banned or regulated.

Not coincidentally, Kennedy has also introduced legislation that would significantly restrict the types of beer and wine ads that can be aired. Some claim that the particular Crown Royal spot in question, which features two dogs with a school graduation theme and identifies the dog holding the Crown Royal bottle as the "valedictorian," is clearly aimed at a young student audience.

The broadcasting industry has generally opposed legislation that would prohibit the advertisement of hard liquor on the airwaves, although most would prefer to maintain the status quo under the voluntary ban, especially if it keeps safe the legality of beer and wine advertisements and the millions of dollars of advertising revenues that go with them.

NAB President Eddie Fritts has stated, "We oppose any advertising ban on any legally produced product" and that the proposed legislation is "unnecessary."

In addition, many point out that even if other liquor companies follow suit and begin producing television or radio spots, there is no guaranty that the stations or the networks will run them. Most major television networks have stated that they will not air hard liquor spots either on their network programming or on their owned and operated stations.

However, one thing is clear: The ads will stoke the controversy. They could also lead the liquor industry into a public relations quagmire like the one that consumed tobacco companies — a quagmire that alcohol manufacturers had carefully avoided for so many years.

Frank Montero is a communications attorney and partner with the Washington law firm Fisher Wayland Cooper Leader and Zaragoza, L.L.P. Contact the firm at (202) 775-5662 or e-mail fmontero@fwclz.com

No Rule to Guard AM

▶ continued from page 1

have drifted out of compliance without realizing it. If so, it should be brought back into compliance.

Once the tower is erected, a test should be done to determine how much the AM pattern was distorted. If necessary, a detuning system should be designed and put on the new tower.

Finally, another set of measurements should be taken and sent to the FCC.

John Furr of John Furr & Associates Inc., a communications consulting company that represents broadcasting, cellular and PCS companies, called the before and after measurements an "insurance policy" for cellular operators against future demands to pay for repairs.

Likewise, explained Jackson, an AM station may want to know they were fully compliant before the new tower went up. Nott said that skipping the first measurement is troublesome because without it, it is hard for the person detuning the new tower to know for certain where the problem is.

Without prior measurements, the new tower owner will be considered responsible even when AM pattern disruption is not necessarily his or her fault.

Solving the situation

Most everyone agreed that educating cellular and PCS engineers about the rules and regulations could reduce the last-minute calls for emergency detuning.

Still, without a rule covering new PCS towers, PCS engineers using 22.371 are basically complying voluntarily — something Jackson said he appreciates.

Staff in the Mass Media Bureau and Commercial Wireless Branch are working together to find a solution. Jackson agreed that the best solution might be a rewrite of rule 22.371 to make it less vague and expand it to apply to the new PCS towers.

While the onus is on the wireless companies, it is clear radio stations need to be watchful of their own backyards.

WFGW in Black Mountain, N.C., has first-hand experience with a backyard tower. A cellular company's consulting engineer notified the station it would be putting up a tower and making the necessary measurements.

A month later, the tower was up, said Chief Engineer Tim Neese, but no preconstruction measurements had been taken. The company then took nominal measurements and said the new tower never affected the WFGW's patterns.

Neese said the FCC assured WFGW that the cellular company would not get a license until they did a proof. That was in the late summer of 1995.

Although Neese does not know if the company has a license now, he does know they have not done a proof because nobody has contacted him to make the necessary arrangements to do so.

Neese had two suggestions for other AM stations. First, as soon as a station knows that there will be a tower built, it should contact its legal counsel and go on record with the FCC indicating that it is aware of the new tower and expects the tower's owners to follow the regulations.

Second, said Neese, follow the whole construction process through and keep a paper trail with yourself, the commission and the company building the tower.

If it is too late and the tower is already up, AM owners have two responsibilities. First, Bill Ball of the AM Branch recommended sending a letter of complaint to the chief of the Wireless Bureau. The Bureau will then tell the PCS or cellular company to correct the problem.

Second, regardless of who is at fault, the AM branch will not tolerate interference. As Ball explained, when a station's pattern is distorted, it is not just an isolated problem. It is a question of interfering with other stations — especially when it comes to directional antennas.

The station should check with the Mass Media Bureau to make sure it may operate with a slightly altered pattern. Otherwise, the station may have to reduce power or make other temporary arrangements until the matter can be resolved.

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Circle (213) On Reader Service Card

World Radio History

CAN YOUR RADIO AUTOMATION PLAY 6 CUTS AT THE SAME TIME?

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Data Analysis:

Identified: TS35 Digital Studio
Mains: Radio Automation LIVE - AUTOMATED - Sat Automation
Technology: Hard Disk Recording - PC compatible Hard Disk Play Back
Record Channels: 12 stereo independent simultaneous (24 mono)
Powered by: D6 digital audio board - linear and compressed
Compatibility: All digital audio formats - linear and compressed

Inputs/Outputs: Digital AES-EBU + Analog
Hard Disk Editing: 2 ÷ 12 tracks - all functions
Multi Auto Recording of external inputs: Affirmative
Long Time Recording: Affirmative - on additional DAT drive
External Sources capability: Multi CD - DAT - MD - MIKE - TEL - SAT - etc.
Configuration: Networking or Stand Alone
Advanced Functions: Time Announce - Multi Voice Track - Auto Programs
Advanced Functions: Pop up texts - News - Integrated Cart Replacement
Advanced Functions: Multi Dj "Instant play" overlayed jingle machine
Advanced Functions: Music + Traffic + Program scheduler incl. - Many Others
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World Radio History

NAB Briefs Justice

▶ continued from page 1

that the trend in radio station consolidation authorized by the new legislation should not raise antitrust concerns.

The paper provides advertising revenue figures and an extensive explanation of media competition for advertising dollars. The NAB also explains the economic factors that have led to the consolidation taking place in various markets and the reasons the consolidation will benefit the radio industry.

According to the NAB, "the substantial constraints that even powerful broadcasters would face because of competition should be recognized." The NAB notes that the more than 10,000 radio stations in the United States account for only 7 percent of national media advertising revenues, while TV accounts for over 20 percent and newspapers control approximately 23 percent.

"In selling its advertising slots, a radio station competes in a product market that includes other radio stations and a host of other media," the paper states. This competition between radio and other media is explained in detail through examples of RAB sales tactics.

The paper outlines ways in which radio sales staffs use comparative materials to "divert advertising dollars from other media to radio (and prevent the substitution of other media for radio) and increase radio's current share of the 'advertising pie.' "

"The very fact that the radio industry sponsors an organization like RAB and devotes significant resources to competing against other media indicates the intensity of this intermedia competition," the paper states.

The NAB also contends that there are no advertisers beholden to radio, nor is there a category of advertisers who have reason to maintain radio advertising in the face of rate increases.

In its discussion about competition within the radio industry itself, the NAB points out that because stations can and do switch formats in search of larger audiences, intense competition prevails.

Data is provided that shows how top stations in specific markets failed to retain the top slots over the years. The NAB states that this data is an "indication of the vulnerability of even the largest radio broadcasters to competition from innovative competitors."

The paper states that this vulnerability to loss of position is one of the factors that will prevent the exercise of market power by a station or group of stations. Another factor cited is the fact that radio sells a "perishing" product: air time, which cannot be stored and sold at a later time.

The NAB states that the fragmentation that exists in the radio industry today is a legacy of the historical FCC regulations. With the relaxation of ownership rules for the radio industry there is a move toward a "more effective allocation of industry assets. The improved operation of the industry will result from both operating and management efficiencies that will reduce the costs faced by broadcasters, and by improving the mix and quality of product offerings available to listeners and advertisers."

The Legend Continues.

The Old Standard.

Our M267 Mixer is more than the best selling mixer of the last ten years. It's the most versatile, the most durable, and the best performing. You trust it in your rack – you trust it on the road. And while production environments have changed, your mixer remained the same. Until now.

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Our new M367 Portable Mixer gives you all the reliability and durability of the M267, plus a list of new features and improvements. We made it over 25 dB quieter with a low noise circuit — ideal for digital formats. We added two more mic line inputs, bringing the total to six. We added peak LEDs. And we gave it 12 and 48-volt phantom power for your condenser mics.

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THE SOUND OF THE PROFESSIONALS...WORLDWIDE. SHURE®

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High School Fights for Air Time

▶ continued from page 6

alumnus of the school who has owned stations in Michigan.

The station now has a production mixer used as its broadcast board, three cart machines, two compact disc players, two reel-to-reel tape recorders, a turntable, microphones and a dual cassette recorder. The two compact disc players and dual-cassette recorder were provided by the school.

The students working at WKR are finding out about the process necessary to get an on-air frequency.

"Evanston's always had a very strong radio and TV curriculum," said Badesch, noting that the high school offers radio classes. "For this coming school year, they have just revamped the curriculum and brought in a new teacher, new text books and new direction."

Real-world training ground

The school's radio classes cover technique, production and the running of radio stations, among other things. Three one-semester courses will be offered, after which students can get their radio fix by signing up for independent study and internship programs.

Badesch said the school board has been "extremely supportive" and "very enthusiastic" about WKR. The board is "very excited about the fact that we've been able to get so much equipment donated and that the students have taken such a strong, active role in the station," he said.

Badesch said that the students "understand what needs to be done. They understand to what professional level they must do their jobs. This is not just a bunch of kids getting together and putting on a show."

Badesch will move this fall to another school west of Chicago but will still be involved with WKR through the alumni association. For him, the students at the station are tomorrow's radio professionals.

"I think this is going to be a tremendous real world training ground for the students," he said.

□□□

*Part Three, in the next issue of **RW**, will focus on WYCS, Yorktown, Va., and bring the high school radio experience home.*

World Radio History

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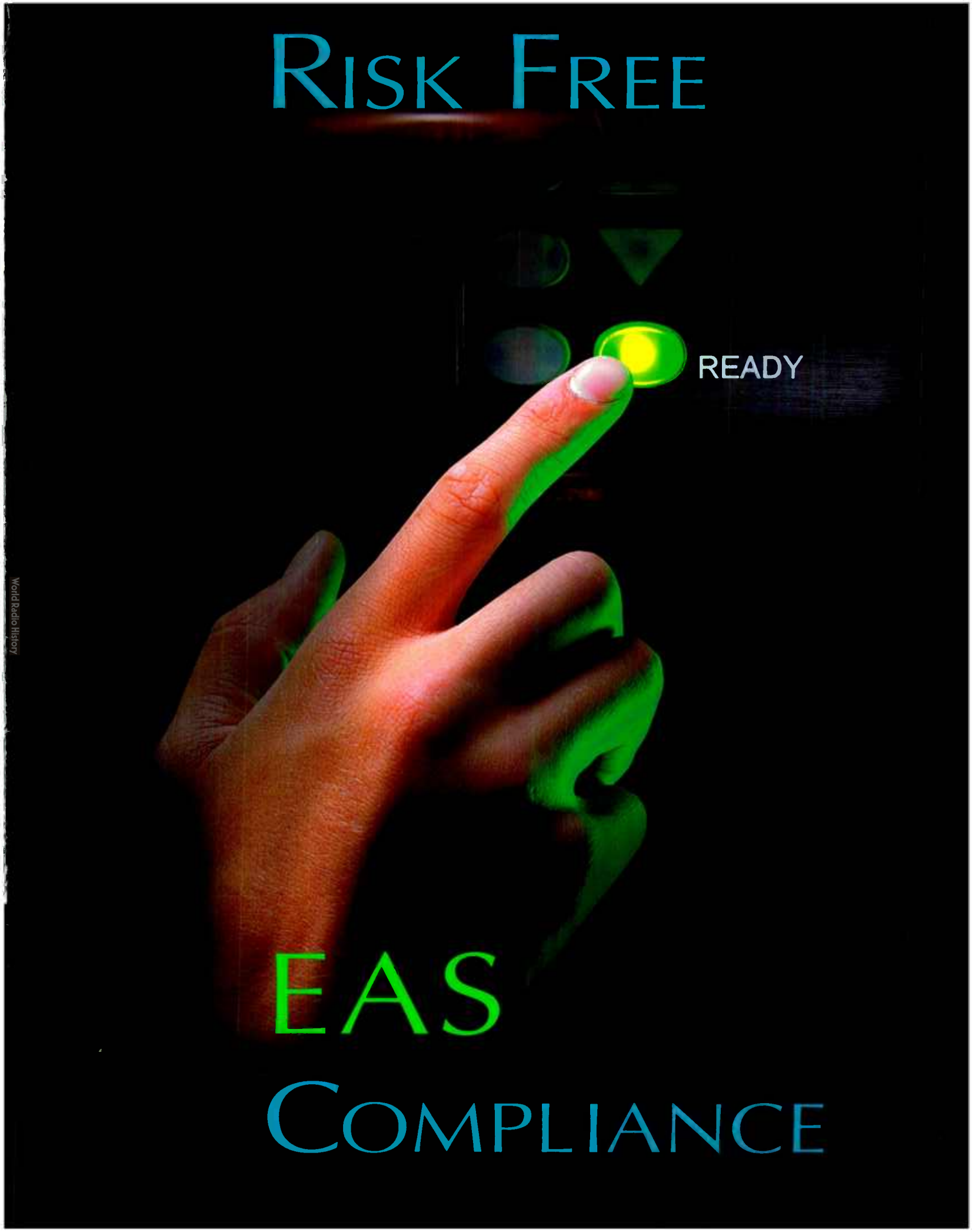

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Paul Black
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COLLABORATION WITH TOP INDUSTRY PROFESSIONALS

The outstanding flexibility of TFT's EAS 911 design is the result of extensive input from some of the industry's most respected professionals. Throughout the R & D process, TFT solicited advice from industry leaders to develop a system that would meet the various needs of broadcasters, cable operators, regulators, emergency information providers and more. All design features and operations including front panel push-buttons and rear panel connections were thoroughly researched, tested and revised after FCC sponsored field tests. Bottom line... the EAS 911 is a "real-world" product designed by frontline professionals just like you.

World Radio History

Studio Sessions

Equipment and Applications for Radio Production and Recording

Stop Humming and Start Recording
See Page 19

High-tech Radio by Storyk

by Alan R. Peterson

INTERLOCHEN, Mich. A recently completed radio studio complex here is attracting attention for its high-quality design and construction, done by one of the most notable names in the recording industry.

The new $1.35 million, state-of-the-art facility at Interlochen Public Radio (IPR) features acoustic design and layout conceived by the Walters-Storyk Design Group of Highland, N.Y.; award-winning architects of world-class recording studios.

IPR is associated with the Interlochen Center for the Arts, the educational institution for dance, drama, music and the visual arts. The station is an affiliate of National Public Radio and Public Radio International.

World-class team

The team of John Storyk and Beth Walters is widely known for designing high-end recording studios in the United States and beyond.

Storyk's first studio design assignment was Electric Lady in New York for musician Jimi Hendrix in 1968. After designing some 600 studios around the world since then, the team took on the Interlochen project.

"We chose Walters-Storyk to collaborate with us on the entire new complex because John Storyk seemed to be the architect most capable of designing a station with the critical acoustic support functions we required," explained IPR director Thomas Paulson. The collaboration included local Interlochen architect Terry Clark.

A Walters-Storyk studio is a blend of form and function. Storyk tackles acoustics and architecture while Walters seamlessly incorporates interior design.

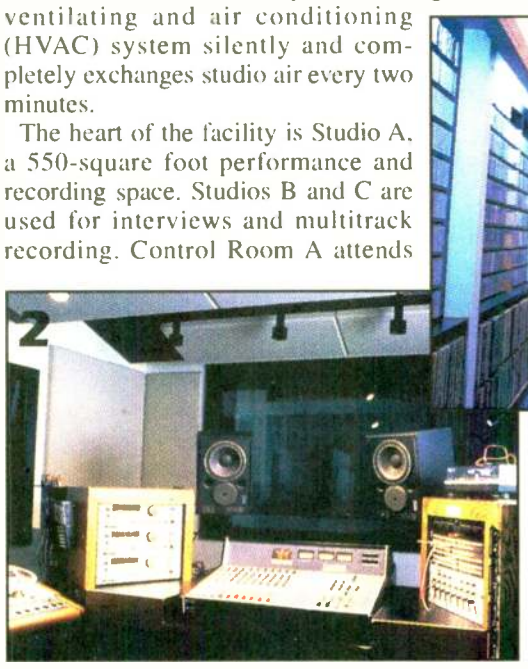
Studio A

Overview

The radio complex is located in a cutting-edge 9,800 square foot facility. A full 7,600 square feet is completely new; with five studios and control rooms, library, cassette production area and eight new offices.

Separate concrete slab floors and triple-wall construction provide isolation and sonic quality comparable to the finest pro audio studios in the country. The heating, ventilating and air conditioning (HVAC) system silently and completely exchanges studio air every two minutes.

The heart of the facility is Studio A, a 550-square foot performance and recording space. Studios B and C are used for interviews and multitrack recording. Control Room A attends the 24-track digital recording system.



Control Room C, left, and the Tape Library, above.

Ceiling height soars to 20 feet in Studio A to accommodate HVAC ducting and acoustic treatment. And, as shown in Picture 1, to afford plenty of mic room over the lid of the grand piano as well.

The real story behind the studio's acoustic environment is hidden under the floors, inside the walls and up near the ceiling.

Storyk designed all three studios to stand on "floating" floors. In addition to the separately poured concrete floors, the wooden surface shown in Picture 1 is built atop four inches of foam material.

Double- and triple-wall construction is also floated. The use of several layers of wall material further deadens the space and minimizes sound transmission.

A Helmholz resonator — a device not often seen in radio studios — tames bass response while adding a pleasing aesthetic quality to the space. The IPR complex uses wooden resonators made of maple. These are taken as ornamental sculpture at first, but serve a legitimate acoustical purpose (see accompanying article).

Note the studio placement in Figure 1. By building studios away from each other (unlike in most radio installations), the possibility of leakage is eliminated.

The IPR control rooms and production studios are built with a slight conical flare to the walls. Splaying the walls slightly outward avoids parallel surfaces in the room, breaking up resonances caused by axial modal reflections.

In creating studio space, Storyk will step off the dimensions of a room, then will use his own Computerized Acoustic Ray Trace software to calculate the way a room will behave acoustically.

This allows Storyk to plug in different room dimensions and types of acoustic treatments at will. A virtual room can be

continued on page 20 ▶

PRODUCT EVALUATION

Sophisticated DP/4+

by Jeremy Savage

HARTFORD, Conn. A couple of months ago, KISS 95.7 installed an Ensoniq DP/4 processor in our production studio to check it out.

My goal was to watch personnel use it and see how much they would do in a month's time. Up until this point we had been using a standard Eventide H3000B — sent back to the company for refurbishing — and an inexpensive multi-effect unit.

The DP/4 has four separate processors that can be configured for four separate channels or ganged together to chain effects. We chose the latter at KISS-FM.

Installation was a breeze so I threw in the rack, left the manual in the production studio, turned the jocks loose on it and watched what happened.

Big fun

We felt a number of the effects lent themselves more to music production and recording than to a radio voiceover. But that did not stop us from having fun with the DP/4+.

After only a day, our production director, Bryan Apple, was able to configure a myriad of effects using the unit. Some of them were completely unique.

He found the unit was able to create a wide range of unique flanging effects. Using these, he brewed up an effect he called "Heavy Metal," which made source audio sound very metallic. The effect was so different, everybody around the station wondered where it had come from.

For Bryan, the most impressive variety of effects were the ultra-clean reverbs. The equipment we had in house couldn't touch the DP/4+ reverb quality.

Ensoniq DP/4+

The ability to process four individual channels through one unit is a fantastic feature. Had time allowed, we would have wired it into our console in that manner and used it to its fullest potential.

Ultimately though, most effects were more easily dialed in via the Eventide presets. Blending effects can be quite a timely process and radio production people are always under severe time constraints.

Other personnel (DJs on the run) used the device only as a reverb. When it came to wetting down voice tracks, this unit was superior to anything we have ever had. The reverb was smooth and clean.

Because of its sophisticated nature, most DJs never really delved into this box too deeply. I believe if I had stripped every effects box out of the studio and left only the DP/4, everyone would have used the unit more completely.

We did have one small problem with the installation of the DP/4+. It filled the rack space above our 99B cartridge recorder quite nicely (yes we still use carts). But the close quarters created a very unusual side effect.

A field generated by the DP/4 power supply or some RF spray from the clock circuit affected the 99B cart machine's ability to recue. It was a maddening problem, because every time we would pull the 99B forward for cue adjustment, the problem would go away.

The difficulty could have been easily solved by moving the unit a short distance away from the cart machine. But it was still a very strange interaction.

The Ensoniq DP/4 is a sophisticated processing device that can generate an incredible array of effects. Its strong point was its fabulous set of reverb settings. It has the ability to chain effects or be used as four individual processors in a multitrack environment.

Creative production people who have the time and the talent to tweak the sounds they want will appreciate this device.

□□□

Jeremy Savage is vice president of operations for WKSS-FM, Hartford, Conn. His email address is kissclub@kiss957.com

World Radio History

The First Name In Digital, The First Family In MiniDisc

MD Cart Series Recorders/Players *The DN-995R/990R recorders and DN-981F player offer all the advantages of MD without the conventional tape cart problems of wow and flutter or drop-outs and tape stretching. These full-function units provide audio and computer interface as well as a multitude of options, including synchronization. Optional "Hot Start" switchbox adds instant playback of any 10 tracks (DN-981F).*

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DN-1100R MD Recorder *The DN-1100R MD recorder offers 74 minutes of stereo recording time with a 44.1 kHz sampling rate, 16-bit linear (A/D converter) quantization and ATRAC compression. The unit also features 10 independent "Hot Start" buttons to which any 10 tracks from a total of 255 can be assigned. This feature is ideal for sound effects libraries, sound bytes and announcements.*

DN-80R Portable MD Recorder *The DN-80R is the most advanced ENG recorder on the market, allowing up to 148 minutes recording time in mono and 74 minutes in stereo, per disc. The portable unit provides news gathering personnel and reporters who are on-the-move with shock-proof recording and playback capabilities from a 40 second memory buffer. Further time-saving production features include field editing on a single disc. A standard 23dx video camera battery provides maximum power for a full 148 minutes.*

DN-045R MD Replicator *The DN-045R MD replicator performs exact digital-to-digital dubs, up to 3.5 times faster than realtime without the cascade of ATRAC compression. The included Windows™ software also allows fool-proof editing during replication.*

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Circle (54) On Reader Service Card

World Radio History

LINE OUT

Sinking Hum for Quiet Recordings

by Bruce Bartlett
with Jenny Bartlett

ELKHART, Ind. Welcome back to our hum clinic. So far we've talked about ground loops; how they cause hum and how to prevent them.

Another way to reduce hum is to connect your audio gear securely to ground. To do this, you need to know about the power ground or safety ground.

In a modern AC outlet are three holes. The U-shaped hole is the safety ground or power ground. This terminal connects by a long wire to the power company's earth ground, which can be a copper rod driven in the earth, a skyscraper's underground steel structure or a cold-water pipe.

Three lines

The power cord in most audio gear has three wires: hot, neutral, and ground. The round ground pin is tied to the equipment chassis. When you plug the power cord into

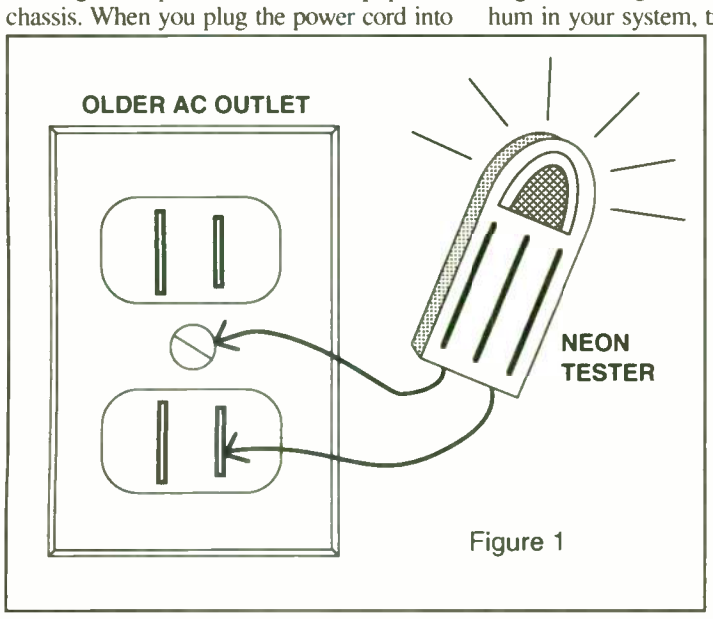


Figure 1

an AC outlet, the ground pin connects the chassis to the safety ground.

Why is this done? The safety ground provides a sink for hum currents induced in the chassis. Another reason is safety.

If a short circuit accidentally occurs between the chassis and a hot power line, the chassis current will flow to the safety ground rather than through someone touching the chassis, preventing shocks.

Suppose you are doing a remote in a building with older wiring that lacks a third-wire safety ground. For safety, and to reduce possible hum or RFI, you may need to install a safety ground.

Find the AC outlet where you want to plug in your mixer. The outlet has a metal screw that holds the cover plate to the wall outlet. That screw might make a good safety ground.

Scrape the paint off the screw. To see whether the screw is grounded, connect a neon tester between the screw and each outlet socket as in Figure 1. If the tester glows in either of the sockets, the screw is grounded.

If so, plug your mixer power cord into a ground-lift adapter, and trap the adapter metal ground tab under the outlet screw. There is your safety ground.

If the outlet screw is not grounded, you cannot use it as a safety ground. Similarly, if someone clipped the wire off the adapter, it is basically useless.

Instead, you will have to connect to the ground bus in the building circuit-breaker box.

Caution: If you are unfamiliar with electrical wiring practices, hire an electrician.

Make sure you know what you are doing before you work inside the circuit-breaker box. Check your local electrical code before doing any AC power wiring.

Inside the breaker box near the bottom is a heavy copper plate called the ground bus bar. All the building ground wires (bare or green) connect to it. The ground bus bar is already tied to earth ground, via a cold water pipe or a copper rod in the earth.

You want to connect your mixer chassis to the ground bus bar. First locate your mixer ground terminal, or a screw which connects to the chassis.

Run a heavy insulated wire from the mixer chassis to the ground bus bar. You have established a safety ground for your mixer. Be sure that the gauge of the ground wire meets code; No. 4 gauge should be thick enough in most instances.

An audio component other than the mixer might have a ground terminal. If you hear hum in your system, try connecting this terminal to the safety ground by a separate wire.

Cable hum

Future columns will cover more on safety grounds. Now let us turn our attention to audio cables. They can pick up hum from oscillating fields radiated from power lines in the walls. How does this occur?

One type of hum pickup by cables is due to electrostatic interference. Power lines act as one plate of a capacitor, while the conductors in audio cables act as the other plate. An oscillating electrostatic field is set up between these two plates, causing hum to be transmitted (coupled) from the power lines to the cable conductors. An electrostatic field couples best at high frequencies, and so is heard as a buzz made up of 60 Hz and its harmonics.

To prevent buzzes caused by electrostatic fields, we use shielded cable. The shield surrounds the conductors and keeps out hum fields. The greater the shield coverage, the better it rejects hum. Foil shielding has the most coverage, so it is the best choice for permanent wiring.

Shields must be connected to ground to be effective. This way, the ground provides a drain path for shield charges caused by electrostatic fields. If you connect a metal chassis to ground, the chassis becomes an effective shield against electrostatic hum fields.

Hum pickup in cables is also caused by magnetic interference. Power lines and transformers act like electromagnets. They radiate magnetic lines of force that oscillate at 60 Hz and its harmonics.

These lines of force cut the conductors in audio cables and make the conductors generate a hum signal. Magnetic fields couple best at low frequencies, creating a low tone at 60 Hz.

Because both electrostatic and electromagnetic fields generate interference, how do you tell which is which?

A magnetic hum field is directional and is detected by rotating the device picking up the hum. If the hum level varies, the hum is magnetically induced.

To reject magnetic hum pickup in a cable, use twisted-pair cable. If the pair is twisted, the conductors occupy the same point in space on the average, so they are exposed to the same amount of magnetic hum field. The conductors generate equal and opposite hum voltages at the balanced input, where the hum cancels out.

A chassis can shield against magnetic hum fields if it is made of a magnetically permeable material — steel or mμ metal. The chassis need not be grounded unless you also want to use it for electrostatic shielding.

Power transformers in audio equipment radiate magnetic hum fields. So install your equipment at least several inches from the large transformers in power amplifiers.

Avoid using fluorescent lights in the studio because they produce strong magnetic hum fields. If fluorescent lights cannot be removed, be sure the lighting fixtures are grounded, and replace faulty ballasts.

Inside each fixture, install a noise filter available from electronics supply houses.

When using incandescent lighting, avoid dimmers that use silicon controlled rectifiers (SCRs). They inject "hash" and buzzes on the AC line. Instead, use multiway incandescent bulbs to vary the studio lighting levels.

Power cables and extension cords radiate hum fields that audio cables can pick up. So separate these two types of cables by at least one foot as shown in Figure 2. If they must cross, do so at right angles and space them vertically; this reduces the coupling between cables.

Are you doing a remote from a theater or church? In these venues, stage lighting circuits can cause buzzes. It helps to install AC isolation transformers or line filters. Keep lighting cables well away from audio cables. Again, if these cables must cross, cross them at right angles and separate them vertically.

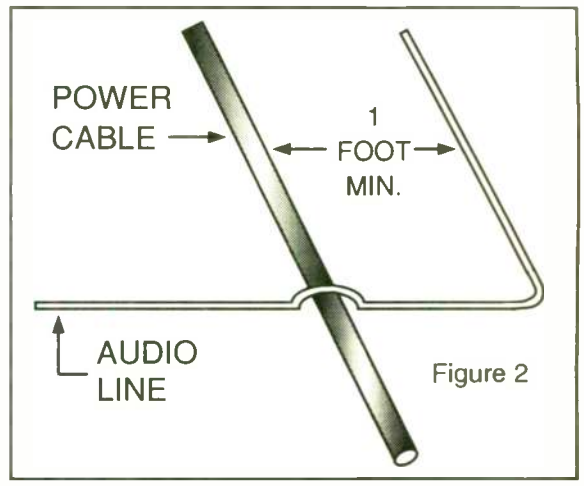
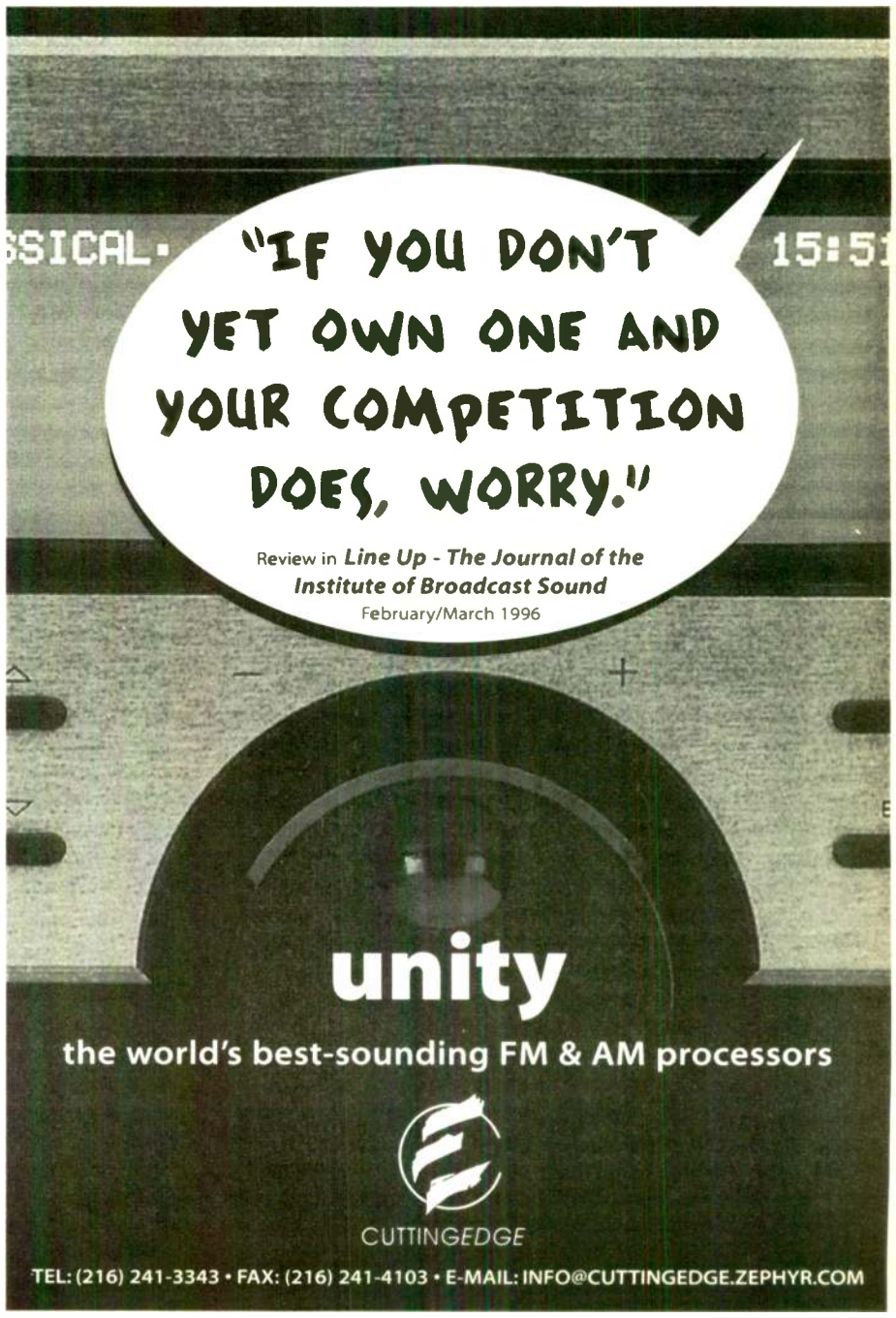


Figure 2

More on hum prevention next time.

□□□

Bruce Bartlett is a mic engineer, writer and recording engineer, and the author of "Practical Recording Techniques" published by Howard Sams. Jenny Bartlett is a technical writer. Bruce can be reached at (219) 294-8388.



Circle (74) On Reader Service Card

World Radio History

Interlochen Complex

▶ continued from page 17

completely designed, tested and tuned in the computer before a single stud is nailed up.

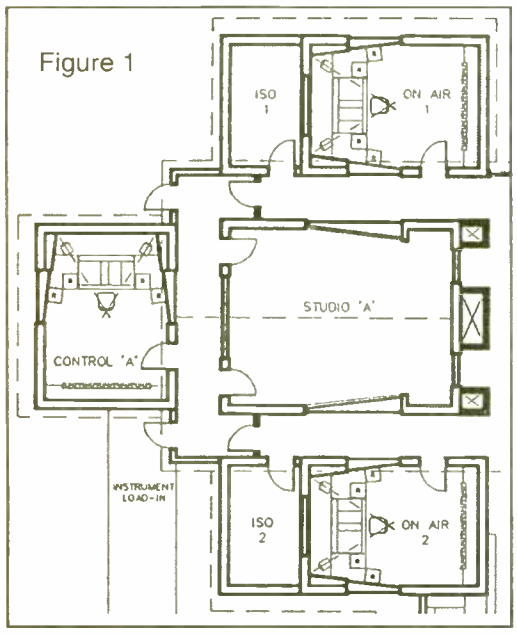
Another helpful reference used by Storyk in defining a room's rudimentary acoustic nature is called the Room Mode Ratio Diagram, designed 40 years ago by acoustician R.H. Bolt.

The diagram is used to determine ideal proportions of an acoustic space for smooth low frequency response. Storyk uses the diagram to confirm his own extensive calculations regarding a proposed studio's acoustics.

While a room can be isolated from external noise, the greatest offender of all can be the HVAC system. Storyk's studios use low-velocity HVAC systems with wide ductwork to minimize the amount of high-frequency "rushing" noise coming from vents.

John Storyk

Figure 1



Low-frequency vibration is subdued by locating air conditioner motors and compressors away from the studios, mounting the machinery on springs.

Silencers and baffles are used along the duct run to diminish midrange noise. Air moves through the Interlochen facility very quietly.

Connectivity to the sealed studios is accomplished by hundreds of cables and fiber optic lines. Mic lines from Studios A, B and C enter the Control Room A nerve center and the fiber optic cable allows Interlochen to import audio from a number of performance locations on campus and beyond.

Unobstructed views between studios and control rooms allow for visual interaction between performer and engineer, as shown in the view from Control Room C, in Picture 2.

Picture 3 shows off the IPR tape and record library. The high ceiling is a carryover from the huge Studio A just down the hall. The library stores 10,000 recordings and features six workstations.

Paulson's primary goals for IPR were established even before Walters-Storyk was engaged for the project. He said, "We wanted to provide one 24-hour public radio broadcast service and prepare for a second. We plan to produce programs for national distribution and wanted the capability to produce compact discs in a multitrack setting. We also intended to lease out space for revenue."

Paulson seems particularly satisfied with the entire facility. "An executive from PBS Radio in Chicago toured our new recording and broadcast complex recently," he explained. "He commented that only five or six radio stations of this quality exist in the United States.

"I believe it," he said.

Calling Dr. Helmholz

Wall panels and foam wedges tame rooms by absorption and diffusion, but a Helmholz resonator alters acoustics by resonance. The device is used to control an abundance of bassiness in a studio.

A Helmholz resonator — named for 19th-century physicist Hermann Ludwig Ferdinand Von Helmholz — is an enclosed chamber coupled to the outside air by a small aperture. Put simply, a carefully designed empty box with a hole in it.

When a resonator tuned to 80 Hz is introduced into a room with an exaggerated peak at that frequency, all the 80 Hz energy in the room gets used up in an attempt to make it resonate. This causes a drop in intensity of that particularly offending frequency.

The desired higher frequencies simply reflect off the device and remain part of the room's character. It seems too simple a process to work, but it does.

Despite this simplicity, complex calculations are behind the design of a single resonator. Factors such as the radius of the aperture, air density, volume of the enclosure and thickness of the boundary at the aperture all come together in the design.

Storyk and Walters use mahogany or maple wood in their slat-style resonators. This gives them predictable results and a pleasing visual accent as well.

Slat resonators lack round apertures in their design, so the calculations become even more complex. However, the functionality remains the same.

Refer to "On the Sensations of Tone" by Helmholz, "Music, Physics and Engineering" by Harry F. Olson (both Dover Publications), or "How to Build a Small Budget Recording Studio from Scratch" by F. Alton Everest (Tab Books) for details and calculations on designing Helmholz resonators.

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World Radio History

Lap-tracking for $500? Not Yet

by Alan R. Peterson

WASHINGTON Much like Val Davis and Bruce Bartlett admitted in the July 10 **RW**, I, too, like to raid the Internet for inexpensive — if not free — audio software.

Plenty of demo programs are waiting to be put to work cutting tracks, like Goldwave, Cool Edit, SAW and a couple of others. The ones I like I have registered.

"You know," you ask yourself, "why should our station drop a pile of money on a multitrack workstation? I can search the Web for a free program that will solve all our problems."

Not quite. As you will discover, there is more to making a PC-based DAW do its thing than some budget software.

Laptop tracking

Tempting, isn't it? "I can buy a used 386 laptop for less than $400, get a $110 PCMCIA soundcard, pull down some cheap software and have an instant 8-track recording studio."

Cool, huh? For about $500, you could make obsolete a commercially available DAW that would start around six grand.

Well, life is never fair, and your money will be spent in vain. Let me explain why.

There is a reason the 386 PC is no longer hugely popular. This former champ now slogs along at a torpid 40 MHz and spends a lot of time and calculative capacity just redrawing Windows.

Due to the available technology of the day, the 386 was fixed to run a limited-capacity hard disk. By fiddling with the BIOS setup, you might get your little laptop to take on larger drives, but why would you want to?

Do not count on the laptop's original 215MB drive inside. One minute of 44.1 kHz mono audio data is right around 5.3MB long, which means 40 minutes worth of uncompressed audio.

For two-track work, this is not bad. But spread it out across eight tracks and that works out to five minutes per track. Less, figuring on disk space for DOS, Windows and your audio software.

Let's play cards

"Okay, I'll bite the bullet and get a used 486 laptop," you might be considering. "It's more expensive, but will have more power."

Absolutely. Now consider your sound card.

Know why that PCMCIA card costs only $110? Record something with it and listen to all that hiss. Climb above the noise floor and welcome to Clip City. If you want decent sound, you are going to need a better card.

Ever wonder why boxes like the Digital Generations System receiver and others sound so clear? The Antex sound card inside probably starts around $800. Cards built by Digigram run into the thousands!

Game-compatible cards are fine playing back quality 16-bit sounds. But record a few sounds into your machine on that same card and hear the real difference.

"Forget the laptop," you offer. "I'll just upgrade an old desktop machine with a Pentium or 586-compatible motherboard. Those are being advertised everywhere."

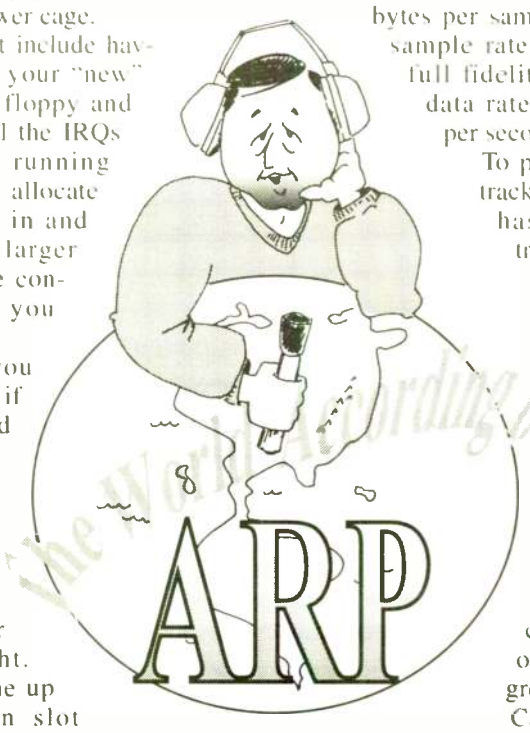
Good idea. While you are at it, swap your power supply.

Your old PC probably has 5VDC rails. Those new motherboards take only 3.5VDC.

You can either tack in a dozen resistors and regulators, or pay another $65 for a properly rated power cage.

Oh, that doesn't include having to configure your "new" machine for the floppy and CD drives, set all the IRQs and addresses, running MEMMAKER to allocate RAM, dropping in and formatting that larger drive, buying the controller card if you want SCSI....

Incidentally, you did check to see if the board would mount properly inside the case, didn't you? Those power and ribbon connectors are always shorter than you thought. And trying to line up those expansion slot sockets with the backplane, well, you know.



Slipped disk

"Fine! I'll spring for a ready-made lower-end Pentium. Now can I do my multitracking?"

Wrestling with a homemade multitrack is like mining iron oxide to make your own tape.

Almost. Take a look at the seek-and-transfer rate of your hard drive. Can it handle all those tracks? The disk drive places an immovable limit on track playback.

Some audio programs record unlimited tracks but only play back a handful. Grab your calculator and see why.

Sixteen-bit audio requires two bytes per sample. You desire a sample rate of 44.1 kHz for full fidelity. That means a data rate of 88,200 bytes per second per track.

To play back all eight tracks, your hard drive has to seek and transfer a minimum of 88,200 x 8 bytes, or 705.6 KB every second.

You can cut the sample rate but not all programs let you do 32 kHz. Many drop right to 22 kHz, meaning your frequency response tops out at 10 kHz. Not great.

Can your hard drive go that fast? Find out with a utility called Norton Sysinfo, which evaluates your drive and CPU speed. The faster the drive, the faster the data transfer.

This assumes your machine has nothing else to do but take data off the drive. Are you creating mix decisions in real time or mousing an automated mix? Would you like to see waveforms? These functions all divert bits of brainpower away from your task.

Unless you specifically dedicate your computer for audio only, it will continue normal housekeeping; looking to see what the modem is up to, if the mouse was moved, the keyboard touched, the game port twiddled with.

Good luck if you are also running MIDI sequencing software. Everything will swipe clock cycles from your CPU.

When these little slices of time add up, the result is glitchy audio. Your precious tracks drop down to two, maybe four useable channels. Remember, these are mono channels. If you are thinking stereo, halve everything.

All right. Say you have abandoned the budget laptop multitrack idea. You took two or three grand and purchased a system to do the eight channels you want. You drop in the shareware program and fire the machine up.

You don't hear a thing and can't understand why.

Now at last you see the best reason a package from the big boys beats a "free" system any day of the week.

When something goes wrong, you want to pick up the phone and scream at somebody.

A manual would be nice, no? So would a base of users to help you through problems they may have already encountered.

Compatibility with more than one brand of sound card would be pleasant as well. Use the freebieware and get nothing. Pay the man and get it all.

Big money is riding on fast and efficient radio production, which is why my vote goes to commercially made DAW software and products first. Wrestling with a homemade multitrack is like mining iron oxide to make your own tape. Who needs that?

Those shareware recorders are powerful and popularly priced. I own and use them myself at home, and I think they are great for simple projects not requiring the big multitrack DAW.

Just don't bet the station's bottom line on them.

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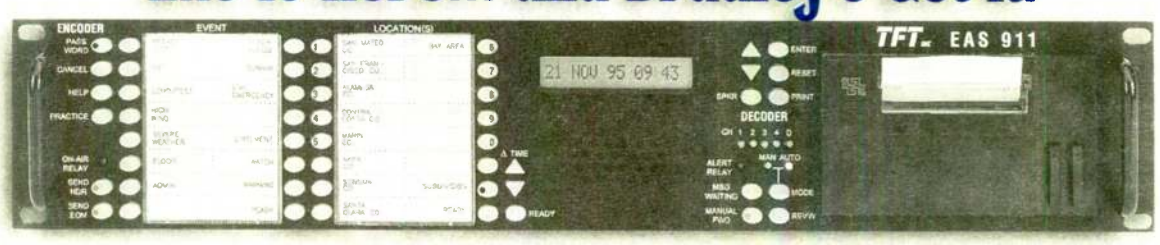

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World Radio History

PRODUCERS FILE

Senny, Go Get Your Shotgun ... Mic

by Ty Ford

BALTIMORE The idea for this review started over two years ago during a conversation with Chris Clausen, a friend in Boston who does great voiceover work.

Because we both have Orban DSE-7000 workstations, our periodic conversations cover the latest upgrades and then wander off into other gear.

During one of those conversations, Chris mentioned that, after hearing that legendary voiceover talent Ernie ("The Love Boat") Anderson always uses a Sennheiser MKH 416 P48 shotgun ($1,350), he got two: one for his studio and one he takes with him for outside session work.

Try before you buy

This was not a deaf decision. Chris tried them before putting down the money. His reasons for liking the MKH 416 are that it has a built-in presence boost that usually requires no further EQ and that it has a nice proximity effect when worked at close range.

That led me to Sennheiser's Joe Ciaudelli, who suggested that I also try the newer MKH 60 P48 ($1,495) shotgun.

The MKH prefix, stands for *M*icrophone, *K*ondenser, *H*igh-frequency. Both mics are transformerless, super cardioid/lobe short shotguns. According to Ciaudelli, instead of using FET transistor circuits to generate output, the signals in both mics modulate a radio frequency oscillator at 8 MHz.

This results in a very low output impedance and that renders the mics highly immune to humidity.

The Sennheiser MKH 416 P48 Shotgun

Whereas the older MKH 416 uses a single, charged fixed-backplate and single membrane, the diaphragm of the MKH 60 is positioned between two charged plates.

The Sennheiser theory is that the more constant impedance resulting from the dual plate design results in lower intermodulation (IM) distortion in the upper midrange.

The MKH 60 capsule diaphragm is tensioned for the flattest frequency response with a natural resonance of about 1 kHz. Electronic circuits are used to balance the response by lifting the highs or lows accordingly.

With as much as they have in common you might expect that the two mics sound alike. They don't.

The 40 Hz — 20 kHz figures for the MKH 416 and 50 Hz — 20 kHz for the MKH 60 only tell part of the story. At distances of six inches or greater, the MKH 60 shows about 3 dB more gain than the MKH 416.

While not overly pronounced, the MKH 416 does have a greater low-frequency response and a more noticeable proximity effect which more than makes up for the 3 dB level difference when worked closer than four inches.

The MKH 416 has slightly more self-noise than the MKH 60, but it also has a more open top end than the MKH 60 flat position.

The MKH 416 has no EQ adjustments, but it is not flat either. Bass roll-off starts at 100 Hz and is down 4 dB by 50 Hz.

There is a gentle rise that starts at 1 kHz that reaches a +4 dB plateau from 4 to 10 kHz. Top end response fades slightly, but is still +2 dB at 20 kHz.

That +4 dB plateau puts a nice edge on most voices, and the proximity effect when worked closely, provides a nice warm bottom. That is probably why Sennheiser added a high-frequency lift switch to the MKH 60.

The result is a high-frequency lift that is somewhat similar to the upper midrange curve of the MKH 416: +2 dB at 4 kHz, +5 dB at 10 kHz +4 dB at 20 kHz. The MKH 60 also has a low-cut filter of 5 dB at 100 Hz.

With the HF lift in, the MKH 60 and MKH 416 sound similar, with the 60 sounding slightly brighter and more present. Sibilance could be a problem here unless you can get enough distance to allow the air to diffuse some of the high frequencies. At a distance of a foot or more, the MKH 60 shows its power; it's louder, making the source sound closer to the mic.

Without the lift in, the flatter MKH 60 curve sounds midrangey by comparison and, in all cases, it does not have the low-end response of the MKH 416. Both mics have extremely tight patterns. Get more than about 12 to 15 degrees off-axis and, with a good set of cans, you can hear the high frequencies roll off.

I found the roll of the MKH 416 slightly more pronounced, perhaps due to its sensitivity to higher frequencies than the MKH 60.

If you are trying to flatter the human voice and are recording at close range, the MKH 416, even with its higher noise, gets my vote.

On the other hand, if you are doing location recording of dialogue or wild sound at a distance for digital audio postproduction where a shotgun is indicated, the lower noise of the MKH 60 makes it the logical choice.

As a generalization — and you know I hate them — I would guess that digital recording advocates would favor the MKH 60, while their analog counterparts would prefer the MKH 416.

Application notes

The positioning of any shotgun is critical to its success. Sticking a shotgun on a camera-mount and aiming horizontally it at the person speaking only works if there is nothing behind him/her.

By "nothing," I mean no walls, no super highway, no windows, no reflective surfaces. If there is anything behind them to reflect the sound, you can actually end up with worse audio than if you stuck an omni lavalier on their lapel.

The early reflections picked up by the lav are likely to be far less objectionable than sound that has bounced around the room for a few hundred milliseconds before coming off the back wall and into the shotgun.

If you have a highly reflective floor, do not position the mic above the source pointing down or you will get too much floor reflection.

If you have a hard ceiling or an active HVAC system, do not mic from beneath or you end up with all of that noise as part of your recording. If you are doing audio for video or film, and the floor is out of the shot, toss a blanket or some other sound absorptive material on the floor to reduce the reflections.

Do not position the mic above the source pointing down or you will get too much floor reflection.

So, if you're committed to using a shotgun, remember to take into account what's behind the source and position the mic accordingly.

That probably means getting a boom, a boom operator, an extra set of headphones and a cabling system that includes mic lines and returns so the boom operator can hear the mic.

If you are providing audio for video or film, and you do not have a mechanical boom, add in a few bucks for a few sizes of apple crates for the boom operator to stand on so he or she can get the boom well above the sources and out of the shot.

□□□

Ty Ford's "Advanced Audio Production Techniques" can be found at http://www.bh.com/fp/24080082.htm

His V/O demo is available as AIFF, WAV and RealAudio files. Visit ftp.jagunet.com/pub/users/tford

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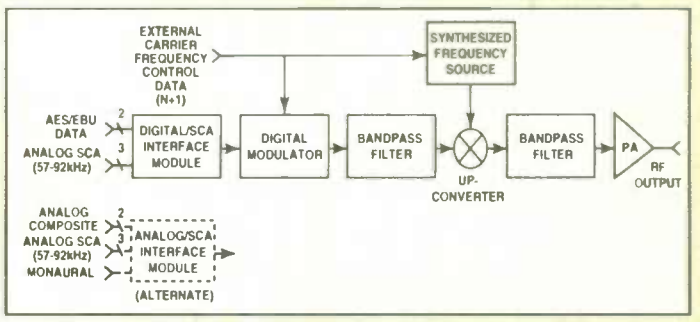
Besides the DIGIT™, Harris has a wide range of "Clearly Digital™" products for all your broadcast needs whether AM, FM, or TV. For more information, contact Harris.



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PRODUCT GUIDE

Companies with new product announcements for Studio Sessions Product Guide should send them to:
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Tannoy Nearfield Monitors

Tannoy has released the System 600 and System 800 nearfield monitors. Both lines are suited to nearfield applications in recording and project studios and in broadcast.

Both the 600 and 800 series have +90 dB sensitivity and power handling to 150W. The phase coherent Dual Concentric drive units are combined with a new cabinet design for a clear throw over the console. Bass definition has been improved in both models as well.

Tannoy System 800 Monitor

The System 600 has 52 Hz - 20 kHz response, while the System 800 boasts 47 Hz - 20 kHz response.

For information, contact Tannoy/TGI North America at (519) 745-1158 or circle ***Reader Service 31.***

New Eventide Processor

Eventide has introduced the DSP4000B Production Ultra-Harmonizer effects processor. The new device is based around the original DSP4000 processor, but features software and programs designed specifically for radio, television and postproduction. Sound designer Jay Rose created a number of programs, including the simulation of a pilot speaking from a cockpit and a youngster at a fast-food drive-thru window.

Soft keys, a data wheel and six-line LCD display highlight the front panel. A slot for PCMCIA flashcard RAM memory is also included. The processor features balanced XLR and unbalanced quarter-inch analog inputs, .005 percent distortion figures with 22 kHz response, MIDI and PA422 serial data remote control. Options include a digital AES/EBU and SPDIF I/O interface and an internal sampler board.

For information, contact Eventide at (201) 641-1200 or circle ***Reader Service 11.***

Tascam MiniDisc Recorder

Two new MiniDisc Products were recently released by Tascam: the MD801R recorder/player and the MD801P play-only deck. The MD801R recorder has a cosmetic, ergonomic design based on the familiar Tascam DA-30 DAT recorder.

This familiarity includes a large jog wheel for locating and editing audio with 1/86-second precision. Moving, inserting and combining audio is possible in the MD format, making the MD801R suitable for editing dialog, creating dance mixes and other tasks.

Tascam MiniDisc MD801R Recorder/Player

Both MD decks feature a Link capability to cascade several players when long format program playback is required. Analog and digital I/O is included, as is computer control via an RS-232C interface.

Options include a 10-track instant playback feature and data entry via ASCII keyboard.

For information, contact Tascam at (213) 726-0303 or circle ***Reader Service 71.***

PAiA Electronics Catalog

The 1996 PAiA Electronics catalog is available from the Edmond, Okla.-based company. The company sells audio kits for studio and personal use. Products include compressors, parametric EQ and spring reverb kits for studio applications and a line of vacuum tube preamplifiers.

Of interest to the radio production professional, PAiA features an eight-band vocoder, an MS stereo microphone kit, a Moog-like analog synthesizer and a Theremin; a tone generator operated by moving one's hands around a pair of antennas, used to effect in the Beach Boys' "Good Vibrations."

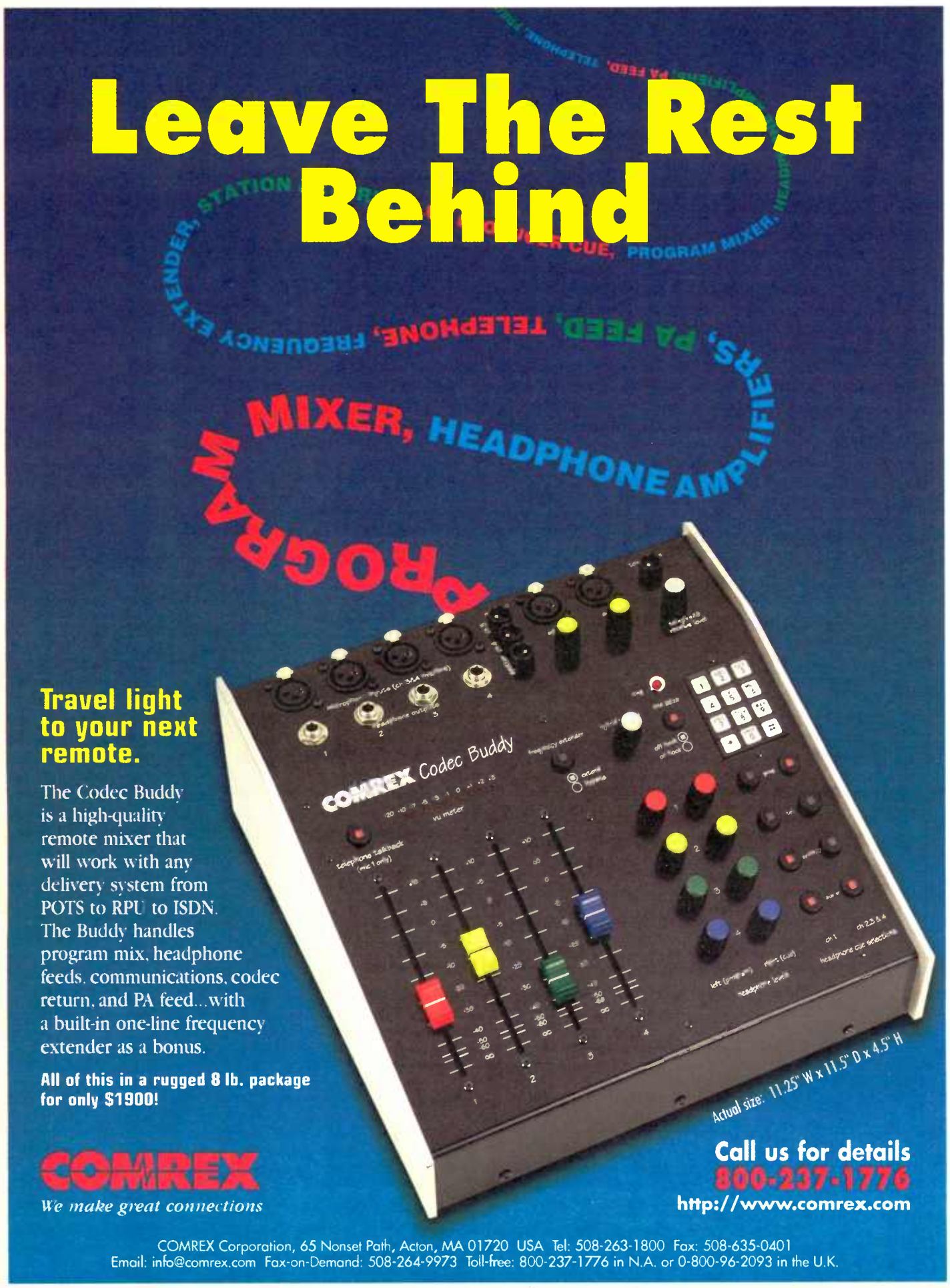
For information, contact PAiA at (405) 340-6300, on the Internet at www.paia.com or circle ***Reader Service 51.***

E-mu Interface

The ADAT Sync Option Card is now available for the E-mu Systems Darwin hard disk recorder. The card has two ADAT-compatible nine-pin connectors which allow synchronization of up to 16 Darwin units, or one or more Darwins to interface with any ADAT-compatible tape machine or control device. The card makes a Darwin "look" like an ADAT product.

The E-mu Darwin can now share complete compatibility with ADAT-type machines from Alesis, Fostex or Panasonic. When used with appropriate synchronizers, users can also sync to the Sony nine-pin protocol. Suggested price of the ADAT Sync Option Card is $349.

For information, contact E-mu at (408) 438-8612 or circle ***Reader Service 41.***



Circle (88) On Reader Service Card

World Radio History

Running Radio

Your Resource for Business, Programming & Sales

Put Your Signal On the Internet
See page 27.

New Book Celebrates Morning DJs

Alan Haber

ASHINGTON You would think it uld be nearly impossible to squeeze t over 70 years of morning personality tio into a book just over 200 pages ıg, yet that is exactly what author ilip A. Lieberman has attempted in adio's Morning Show Personalities: rly Hour Broadcasters and Deejays ım the 1920s to the 1990s" (McFarland Company Inc., 1996).

ffection for past

By and large, Lieberman, the senior anner in the City Planning and evelopment Department of Sarasota, a., has succeeded. This enjoyable book divided into five main sections: The st four cover, in detail, key morning dio personalities (broadcasting primari- on the east coast) working in distinct as; the fifth and largest section identi- es more than 1,000 other early risers in handy A–Z format.

It seems that Lieberman has less affec- t on for the current crop of morning per- sonalities than those who manned the nicrophones in the 1950s, '60s and '70s, r it is these merchants of the morning rwaves that dominate the book — lthough, of course, many of these per- onalities continued working in radio rough the '80s and are still working in e current decade.

"It should be obvious to any radio lis- ner over the age of 30 that the prevail- ıg style of morning DJs has been chang- ıg since the mid-1950s," Lieberman said ı the introduction to the book.

Noting that today's audience is "more pecialized in its demands," Lieberman aid that the "trend away from individual- y has been exacerbated by radio station ıkeovers and by conglomerate managers vho are more interested in the bottom ne than in providing a quality entertain- package."

b

Public demands

He also observed that, "Someone can hired to spin records or read news for a considerably lower salary than hat of a comedian like Gene Rayburn or musical scholar like Jonathan Schwartz. A return to quality programming will occur only when the public demands bet- er talent from its local stations and com- mercial sponsors, and supports those pro- grams by patronizing their advertisers."

Lieberman's stance should not dampen he book's effect on readers who feel that here is quality programming on morning radio; rather, it should encourage readers to think more seriously about what it is that makes morning radio great and effective, and it should encourage pro- grammers and listeners to seek out the best morning talent that money and good sense can buy.

The fun in a book such as this is in its "jogging" muscle: its ability to "jog" readers' memories of various morning radio personalities. In this, the book more than succeeds.

Readers who listened to and perhaps worked with the personalities covered by Lieberman will find themselves expand- ing on some of the information presented here; other readers will be sufficiently intrigued by what's on offer to look for more information elsewhere.

Many readers will wonder why certain morning radio personalities are not cov- ered in this book; perhaps dropping a note to the author will result in an expanded edition incorporating those missing in action.

Fuel for the fire

Lieberman has done a good job of pro- viding fuel for the fire for the next friend- ly get-together during which you and your friends in the radio biz will trade stories about radio's great morning per- sonalities. Lieberman's warm examina- tions of New York station WOR(AM)'s legendary Gambling dynasty; comedians Bob Elliott and Ray Goulding (better known as Bob and Ray), who held court at New York's WINS(AM) and WOR; and Arthur Godfrey, who resided on the airwaves of stations including WFBR(FM) in Baltimore and WCBS-AM-FM in New York, are particularly interesting.

Lieberman takes a look at some of the key morning personalities of radio's Top 40 era, including the late Wolfman Jack, who worked the wee hours at KCIJ(FM) in Shreveport, La., in the early 1960s. Lieberman said that Wolfman Jack "did accomplish his prime goal, an even more important goal than emulating the soul singers and DJs: to make people happy."

Lieberman also tackles the post-Top 40 era. Although this section opens with the one-two punch of Don Imus and Howard Stern —where the author interestingly suggested that Imus "could be labeled the original shock jock, although his routines are tame compared to Howard Stern and some of the other bizarre DJs of the 1990s — it also includes Dan Geiger, the co-host of "The All American Alarm Clock" show on Radio AAHS, the kids' radio network.

This is a nice touch that balances the inclusion of the decidedly non-kid-orient- ed Stern and Imus.

A couple of tidbits in the book may sur- prise readers: For example, Lieberman noted that Bob Keeshan, most famous for being television's much-loved "Captain Kangaroo," was a writer for Buffalo Bob Smith, who was working at WEAF (later WNBC) in New York.

Readers may also be surprised to find the book dedicated to Hugh Brannum, whose name will certainly be familiar to those who grew up watching the afore- mentioned "Captain Kangaroo." Brannum played Mr. Green Jeans on the show. However, although Lieberman says that Brannum "worked along with many of the greats in morning radio before there was television," he doesn't offer elaboration anywhere in the book. Perhaps he will in a future edition.

Quibbles

A couple of minor quibbles: Lieberman hardly ever identifies a station as being of the AM or FM variety and, at times, fails to include the city a station broadcasts from and the city or cities it broadcasts to.

On the much-appreciated side: The book's thorough index will come in handy for readers looking for quick infor- mation on specific personalities.

"Radio's Morning Show Personalities" is a good read for anyone interested in morning radio through the years.

The stories of the early risers who have toiled behind the sleepy microphones of radio stations in cities and towns of all sizes presented within the pages of this book are part of radio's considerable, rich history, and have helped to form the foundation of radio's soul.

PERSONNEL LEVEL

Personal Grooming Can Make a Big Difference

by Sue Jones

BURKE, Va. Simple things can make a difference in your career advancement or lack of advancement. You may look over the following items and say, "Hey, everyone knows to do this." I am willing to bet that you can probably think of someone who has missed one or two of these points and it influences the boss's perception.

If you see a weakness of your own, be forewarned and take the steps necessary to correct the problem.

Rumpled mess

Wear clean and neat clothing. Your station may have a relaxed dress code or no code at all. Certainly, sales staff must wear acceptable business dress because they are meeting the advertis- ers at their business offices. However, if you are not part of sales, you may not be required to wear standard business dress. If there is no dress code estab- lished, anything that is not indecent is acceptable.

Think about it. Even if you dress casu- ally, the clothing should be clean and pressed. Clothing does not have to be expensive to make you look good. Even expensive clothing can make you look like a rumpled mess if it is not cleaned and pressed. If you wear clothing that is soiled and looks like you slept in it, others may wonder if you take the same care with your work as you do your personal appearance.

If you are the engineer and your job sometimes requires you to crawl under furniture and equipment, you may think that you are going to get dirty and wrin- kled anyway, so why bother. You proba- bly would not want to meet a client who comes to the station in a dirty, wrinkled shirt and/or grease-stained pants. You see the other staff members and your boss daily. They all form an opinion about you and your work when they see you.

This is a no-brainer. You may not be able to control lightning that knocks the station off the air, but you can control the way your clothing looks. If you take the time to keep your clothes clean, pressed and in good repair, you will look more organized, instead of like someone who just rolled out of bed.

Some may argue that your work should be the only thing for which you are evaluated. You may be the brightest and most experienced engineer in your market. However, if your boss would be embarrassed to introduce you to a client, you have lost the potential for further advancement. There is a lot more to your job than just completing the assigned tasks.

Single guys

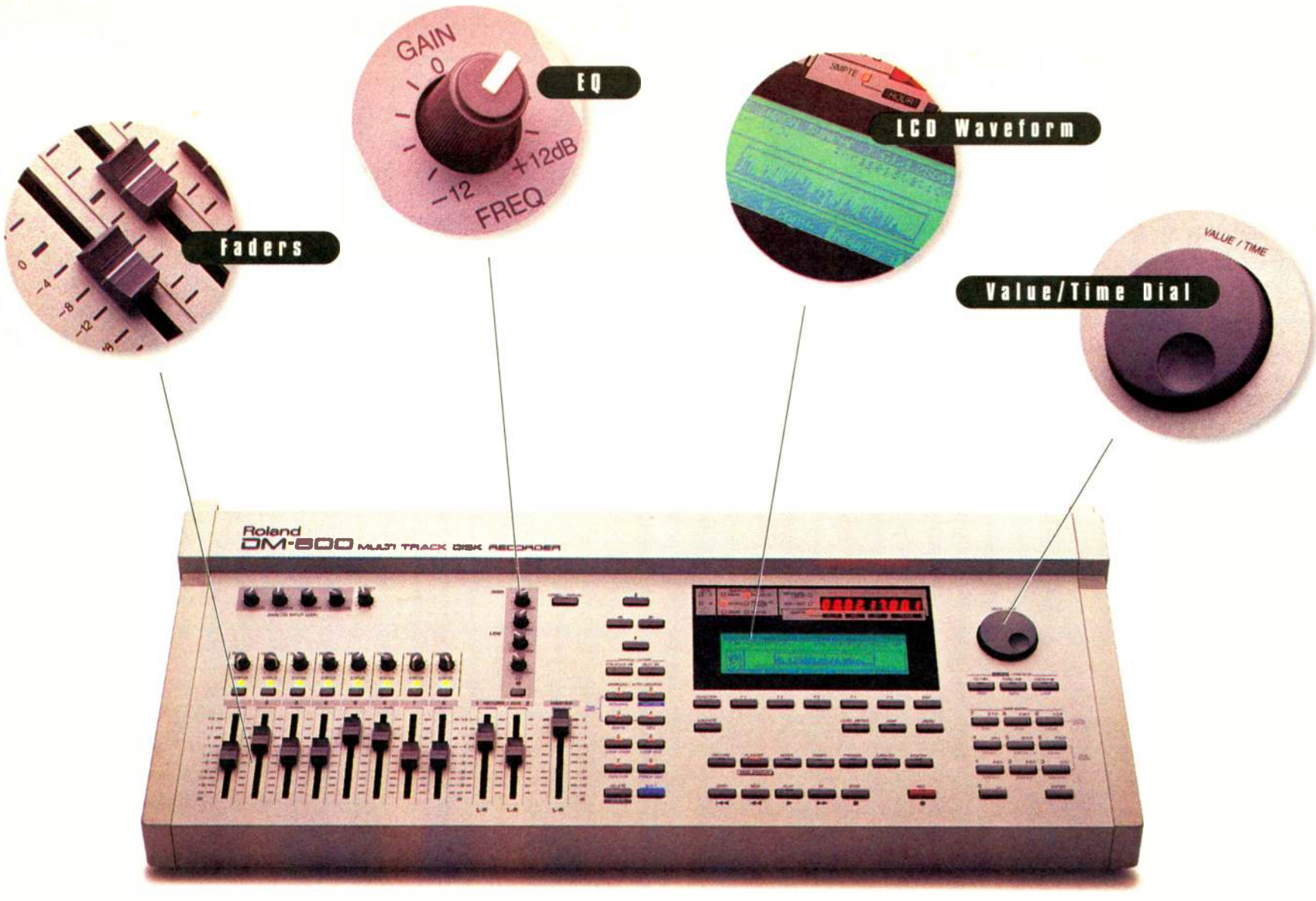
If you are a single guy and have never been trained in the fine art of laundry and ironing, the local dry cleaning shop will be happy to assist you. Many might argue that professional laundry and dry-cleaning is too expensive. There are 260 working days per year (52 weeks x 5 days/week). If you or your spouse does not want to do all of the laundry, laundry service for men's shirts costs approximately $1 per shirt, maybe a little more in expensive areas. That works out to an average of a dollar a day.

Is your career advancement worth a $1 a day to you? Pants and skirts are a little more expensive. The cleaning costs are worth it, if you do not do it yourself. Even in this age of synthetic fibers that supposedly do not wrinkle, ironing counts.

Washing and drying a pair of jeans or pants is not a complete job if you pull

continued on page 29 ▶

World Radio History



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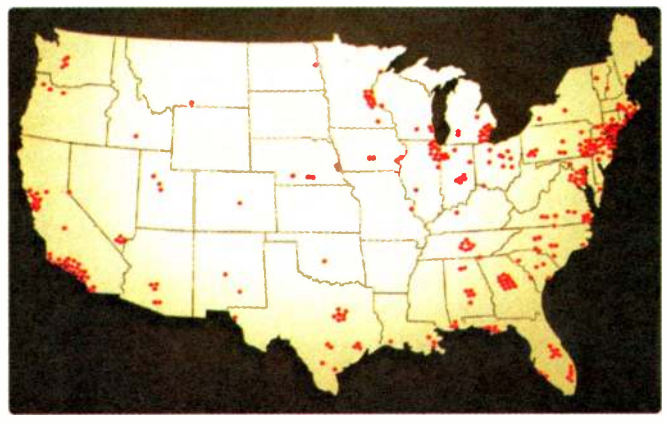

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World Radio History

Put Your Signal on the Internet

by James Careless

OTTAWA Recently I have received a lot of e-mail from radio broadcasters who want to put their stations onto the World Wide Web, but they are not quite sure how to do it. What they want most of all is information: sources where they can learn what they need to know, before they commit any cash to cybercasting.

Look on the Web

One of the best sources of information on this — if the not the best — is the World Wide Web itself. And the best site for finding it — at least the best I have found thus far — is the Real Radio site at http://www.radiotv.com/

What makes the Real Radio site so useful is that embedded within it are direct links to a number of stations that are broadcasting over the Internet. It also includes links to Progressive Networks and Xing Technology StreamWorks, the two big cybercasting data streaming formats. Other Internet audio products are available and are in development, but currently RealAudio from Progressive Networks and StreamWorks from Xing continue to dominate the market.

Anyone considering putting their station on the Web should explore both the RealAudio (http://www.realaudio.com/) and the StreamWorks (http://www.xingtech.com/) sites in depth before making a decision about which streaming software to buy and install. Each contains extensive details on the setup and capabilities of the two programs, including very useful FAQs (frequently asked questions) that can answer many concerns.

One caveat: There are differences between the RealAudio and StreamWorks formats, notably in the amount of data — and thus audio quality — each provides at different data rates.

However, to say one format is better than the other, judging from the opinions of broadcasters using them, is mostly a matter of personal taste. For that reason, it is essential for anyone evaluating these formats to take the time to download the free RealAudio and StreamWorks players. The players are distributed free to help spur interest in the technologies: it is akin to giving away free radios.

Then you can make up your own mind by browsing through both RealAudio- and StreamWorks-formatted stations on line.

Once you have looked at the RealAudio and StreamWorks sites, downloaded the players and searched the Web, the next step is to seek some outside advice.

E-mail people at the radio sites you have been visiting and ask them about the technology they use. They also can advise you about the steps they took to set up their system, what problems they have had and whether or not the whole project has been worthwhile.

For instance, Gord Watts is programming/marketing manager for news-talk station CFRA(AM) in Ottawa and vice president for marketing and sales for 3WB, which runs the Internet-only station Internet Business Radio.

When CFRA went on-line over a year ago, they chose to use StreamWorks.

"Our objective at the time was to simulcast the radio station over the Internet," Watts said. "(RealAudio) was not able to continuously stream a live signal at that point — it can now — while StreamWorks could." As far as the cost of going on-line, CFRA encountered two: a fixed cost and an ongoing cost.

"The fixed cost is the hardware and software you need to acquire. I think for the Xing Technology software, the cost was about US$10,000. The ongoing cost is the bandwidth you need to deliver the live stream to users."

Next came the issue of setup: What is really involved in getting a radio station on the Web?

"First, you need software to encode the analog or digital signal you are sending out to the streaming format," Watts said. "You need an encoder, a piece of software that runs on most conventional platforms. Then you need a server and a computer to run it on, and the server basically again is software. We made an arrangement with our Internet service provider (ISP) to work off of one of their server boxes."

CFRA chose to locate its site on the ISP's computer rather than buying one capable of handling the calls at the station. "We do not have the expertise in house to do that," said Watts, "and I think in a lot of cases that is the way most radio stations have gone.

"The technology problems we have encountered have been virtually nonexistent," he said.

How fast can you go?

Another issue to consider is modem speed: Should you configure your cyberstation so that it broadcasts at 14.4 kbaud — the most common consumer rate these days — or should you deliver better audio quality by providing only a 28.8-kbaud feed?

Faster speed means more data can be put through, which equals more bandwidth, and 28.8-kbaud modems are quite common these days. However, for listeners with slower modems, a 28.8-kbaud feed is unreadable.

"We have found that there was not a lot of use from 14.4 dial up, so we ramped up to 28.8 or better," he said. "We have moved up from 10.5 kbps of audio data to 16 kbps, which gives you very good reception on a 28.8 modem or better."

Finally, there is the question of who is listening and where.

"CFRA was on-line, and we had the Lowell Green phone-in show on-air. A fellow in South Africa was listening in and was frustrated because he could not access the program using the toll-free line, which can be used throughout North America, but not from South Africa." But Gord Watts and CFRA are not the only ones to sing the praises of broadcasting on the Web. OZ-FM (CHOZ-FM) in Saint John's, Newfoundland, for example, is also on the Web, using RealAudio to deliver its signal. The target audience for the station is expatriate Newfoundlanders. The bottom line is that if you are considering broadcasting on the Internet, check out the stations that are already on-line and the available technologies, and read, read, read. Then download the audio players, and listen, listen, listen. Finally, once you begin to formulate your plans, e-mail people at the stations you enjoy, and ask for advice and feedback.

It sounds rather straightforward, but it is the background work you need to do to make successful foray into the brave new world of cybercasting.

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James Careless is a free-lance writer and audio producer based in Ottawa, Ontario Contact him with via e-mail at careless@magi.com

One of the best ways to develop ideas about branching into a new area is to check out the competition. Several lists of radio stations that are on-line exist on the World Wide Web, and using a search engine like Alta Vista, Lycos or Yahoo will help you find even more.

The following stations all broadcast live to a global audience via the Internet using either RealAudio or StreamWorks.

RealAudio Stations

- KING-FM in Seattle: http://www.king.org/
- KLSU(FM) in Baton Rouge, La.: http://www.cyberview.net/klsu
- KOOL-FM in Las Vegas: http://www.vegasradio.com/kool.html
- KPLX(FM) in Dallas: http://www.kplx.com/
- National Public Radio: http://www.npr.org/
- OZ-FM in Saint John's, Newfoundland: http://www.ozfm.newcomm.net/
- Radio Tango in Oslo, Norway: http://www.sn.no/radiotango/
- Virgin Radio in London: http://www.virginradio.co.uk/home.html
- World Radio Network in London: http://www.wrn.org/
- WTEM(AM) in Rockville, Md.: http://www.wtem.com/

StreamWorks Stations

- Auburn Network in Auburn, Ala.: http://www.aunetwork.com/
- BR5 Personal R@dio in Munich, Germany: http://mats.gmd.de/BR5/
- CFRA(AM) in Ottawa: http://www.cfra.com/
- International Community Radio in Taipei, Taiwan: http://www.icrt.com.tw/
- Internet Business Radio in Ottawa: http://www.ibrlive.com/
- Kiss FM in Helsinki, Finland: http://www.kiss.fi/
- KPIG-FM in Watsonville, Calif.: http://www.kpig.com/welcome.htm
- WKSU(FM) in Kent, Ohio: http://www.wksu.kent.edu/
- WLIB(AM) 1190 in New York: http://www.internetwork.com/
- WXYC(FM) in Chapel Hill, N.C.: http://sunsite.unc.edu/wxyc/

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World Radio History

INTERNATIONAL UPDATE

Competition Heats Up on Irish Airwaves

As Listenership to Independent Stations in Ireland Continues to Rise, Stations Compete for Every Ear

by Maggi Taylor

DUBLIN, Ireland Competition for listeners on the Irish airwaves is getting hot.

In Dublin, site of the most fierce competition, rival music stations FM104 and Classic Hits 98FM have battled it out since they both began broadcasting almost seven years ago.

Now, for the first time ever, FM104 has more listeners than Classic Hits 98FM.

Winning back listeners

This marks a major turning point for FM104; persistence and a few gambles here and there have finally paid off. The largest gain for the station is winning back a lot of the younger listeners lost to Dublin's pirate stations during the past few years.

These pirate stations targeted 15- to 24-year-old listeners with indie and dance music not supported by the commercial stations.

FM104 Chief Executive Dermot Hanrahan attributes a lot of the gain to the addition of former-Atlantic 252 DJ Rick O'Shea. O'Shea hosts a 19:00 to 22:00 program that is a huge hit with the under-25 age group.

Hanrahan also attributes a lot of the current success to the appointment of Colm Hayes as program director last year.

He said Hayes' philosophy is to put fun back into radio and to give presenters more freedom.

Hayes is responsible for the successful FM104 breakfast show, which features three presenters that Hanrahan describes as "wacky and fun" and "totally spontaneous."

Meanwhile at Classic Hits 98FM, Group Program Director Jeff O'Brien admitted, "We have taken our eye off the ball," and that the station has lost some of its grip on the highly competitive Dublin radio scene.

FM104 and Classic Hits 98FM have battled it out since they began broadcasting.

"There is no doubt we have lost our way a bit. After six-and-a-half years I suppose this was likely to happen," O'Brien said.

"We will now fine-tune our music product. We were playing a lot of dance music which was putting off our target audience who are in the 25–40 age group. We will go back to basics and the classic hits formula."

O'Brien also noted that Classic Hits 98FM will implement some changes in its news production.

Must regain

The survey shows the biggest loss for the station is with 20- to 24-year-old listeners, a market it realizes it will have to regain. However Classic Hits 98FM remains popular with over-25-year-olds. As far as advertising revenue is concerned, the two stations have differing views.

Jeff O'Brien said the slip in listenership will not greatly affect advertising turnover. "Most of our advertising is targeted at the older group and the figures show the biggest slip is with the 15–19 year bracket."

However, FM104 plans to reap the benefits of its new-found status as the number one radio station in Dublin; the station has increased its advertising rates by 26 percent.

Steven Shanahan, media director with Quinn McDonnell Pattison, said the latest figures should not influence significantly the amount advertisers spend with each station.

A major result of FM104's new status was a proposed partnership with Richard Branson's London-based Virgin Radio, in which Virgin would take a 27-percent minority stake in the Irish station. In the end the station decided that a proposal to change the station name to Virgin 104FM made the deal unworkable.

"It would not be prudent for us to change the name of the station now that we are number one," said Hanrahan. "That would be suicidal given that we have changed our name twice since the launch of the station."

Virgin is said to be "extremely disappointed" by the decision, but is still anxious to get involved in the Dublin radio scene.

A spokeswoman said it makes sense for the company to move into Ireland mainly because Virgin has such a high profile in Dublin with the Virgin Megastore music store, a cinema complex and its airline.

At press time, Virgin was approaching other stations in the market about possible partnerships.

Independent radio on rise

Around the country, the latest survey figures show a continuing rise in listenership to the independent radio stations.

Nationwide, 53 percent of listeners tuned into the independent stations each weekday compared to 36 percent for the national broadcaster Radio Telefís Éireann (RTÉ) Radio 1 and 29 percent for the RTÉ-run 2FM.

For the same survey period last year, the independent sector had 50 percent, RTÉ Radio 1 drew 38 percent and 2FM had 28 percent.

The independent stations have clearly established themselves as the preferred option for the Irish listening public, with more than half of the country's listeners tuning into an independent station each weekday," said Michael O'Keeffe, chief executive of the Independent Radio and Television Commission (IRTC), which licenses the independent stations.

O'Keeffe added that the strength of the independent sector in the south was very much reflected in Cork. "Fifty-five percent of listeners in Cork tune to 96FM County Sound each weekday, which puts them ahead of all the other stations in the area."

Outside of Dublin, Cork has the most competitive radio market in Ireland.

On the regional breakdown O'Keeffe said independent stations hold 62 percent of the listenership in the south, 57 percent in the northwest, 52 percent in the midlands and 43 percent in Dublin.

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Maggi Taylor reports on the industry for Radio World from Ladysbridge, County Cork, Ireland.

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World Radio History

FEEDLINE

Learn the ABCs of AM Antennas

by W.C. Alexander

Part I

DALLAS Several people have approached me in recent years asking what texts or primers are available on AM antenna systems, both directional and nondirectional. Having looked around myself over the years, I know what a dearth of modern material there is.

A couple of these people in search of knowledge suggested that I put something together. I am no scholar and am nowhere near to being in the same league with the old masters, but it occurred to me that assembling a rather elementary text on AM antenna systems would be a good opportunity to brush up on some of the things I have forgotten, and share what I know with others who want to learn.

The purpose of any AM antenna is to radiate the power generated by the transmitter.

Nondirectional antennas radiate equally in all directions, providing the simplest way to get a signal out in an efficient manner. Directional antennas are used to concentrate signal in some directions (toward population centers, for instance) while suppressing signal in others (toward other stations which must be protected from interference).

The antenna system is the last point in a broadcast system where the broadcaster has any control over the signal. After that point, environmental factors, receiver characteristics and other factors have sway over what the listener hears. The amount of signal received at a given point is dependent on the amount of radiation toward that point from the antenna, the distance to the receiver, the conductivity of the earth between the transmit and receive locations, the character of the terrain between antennas and, sometimes, the ionospheric conditions. Atmospheric noise, natural and manmade, affects the signal-to-noise ratio at the receiver, but it does not affect the level of signal arriving from the transmit antenna.

AM antenna systems are vertically polarized. This is done for a number of reasons, including superior groundwave propagation and simplicity of antenna systems. The downside of vertical polarization is that most atmospheric noise is also vertically polarized. Still, vertical polarization is a better choice for AM broadcast than horizontal, and virtually all AM radiators are vertical. Not only are horizontal dipole antennas mechanically impractical, their radiation on the horizon is not nearly as good as that of a vertical radiator.

Earlier, we mentioned that several things influence the amount of signal received at a particular point from a given antenna system. The first of these was the amount of radiation toward the receiver. The amount of radiation toward a particular point is influenced by the transmitter power, system losses, antenna efficiency and antenna directivity. Transmitter power is self-explanatory. System losses come in several areas — resistive losses in conductors, ground system and tuning components, and transmission line losses.

Antenna efficiency is really defined in two ways: One has to do with the vertical radiation characteristics of the antenna, the other has to do with the radiation resistance. We'll look at both of these in more detail later. The efficiency of a nondirectional AM antenna is expressed in millivolts per meter at one kilometer (mV/m/km), and this figure is referred to

continued on page 53 ▶

Personal Grooming Matters

▶ continued from page 25

them out of the dryer with a zillion wrinkles. The time and effort that you took to get them clean is wasted if you wear them wrinkled. The look will be the same: unkempt and disorganized. Even in casual clothes, managers know the importance of being clean and pressed. If you doubt this, think of how you would respond to a boss and the confidence level you would have of a boss who always appeared neat and clean compared with one who always looked disheveled.

Organization is key

It may be helpful to organize yourself before you go to bed. Select the clothing that you plan to wear and put it in a readily available space. If the items are not clean or you discover that you do not have a matching shirt or blouse to go with your pants or skirt, you will have the time to launder the necessary item. This will be an impossible task if you discover the problem in the morning when you are hurrying to get out the door.

When you purchase clothing, think about the matching possibilities of the items you already own and the ones you are considering buying. A blouse that matches only one skirt in your wardrobe may be the latest fashion but will be very limiting. Buying clothing of colors and fabric that can be appealingly paired with other items in your closet will not only stretch your budget dollars but will make getting dressed in the morning less of a chore.

Image consultants advise that you should dress for the next job that you want. Assuming that you want to climb the organizational ladder, notice those who have achieved it and look as good as they do. The next time a higher level position is open, at least you will not automatically be ruled out because you do not dress in a manner that is suitable for the position.

Practice good basic personal hygiene. This is a basic requirement that is just as important as clean and neat clothing for all of the same reasons. It is easy to rationalize skipping one of the daily hygiene rituals because you are late getting started. If you think that skipping a step like shaving, brushing your teeth, washing your hair, or checking yourself in the mirror before you leave will save you time, you may be right. However, you will save only a few minutes, at best. The few minutes you saved will not make up for the negative perception that your boss and coworkers have of you when they see you.

Early bird

The best solution for this problem is to get to bed earlier or get up earlier. If you cannot do all of the routine basics and get to the station on time, complete the routine basics and get to the station a few minutes late. Being a few minutes late if you are part of the air staff is not an option. If you must be late, make up the time by taking a shorter lunch break, coffee break, or just stay later than you normally do to make up the time. If you skip a personal hygiene step to arrive on time or are late, vow to immediately correct your specific problem so that you do not appear at the station in a unkempt state or constantly late.

Check yourself in the mirror during the day to make sure that your hair is still neatly combed, to make sure that your clothes do not need adjusting, and your hands and nails are clean. Make any midday grooming corrections in the restroom, not in your work area.

Attention to personal grooming can make a difference in how you and your work is perceived by the boss and those who make decisions about your career path. Those who are seeking advancement take the steps to assure their personal image fits the next career step. I guarantee if you do not notice your image, someone else will.

□□□

Sue Jones is a principal in Bisset Communications, a communications management firm located in the Washington area. She can be reached at (703) 503-4999.

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World Radio History

Remote Broadcast Aboard Ship

▶ continued from page 1

gotten myself into. At the time I had very little experience with the Lynxx, other than a few brief test calls. Would it work on a moving ship at sea?

There is nothing like the thrill and terror of trying out a new piece of equipment in circumstances the designers had not considered. Before long, I began to have doubts about my "go for it" statement.

Julie excitedly told me that the broadcast from a cruise ship — the Sun Princess — was a go. Now my doubts really hit home.

A week later I had a meeting with Steven Spendlove and David Garbett of Princess Cruise Lines to discuss the technical aspects of the project. The more we discussed it, the more I thought it was a good idea and that it just might work.

We talked about an existing system on most Princess Cruise ships that can provide a 64 kB data path to shore. I was referred to Richard Hadsall of Maritime Telecommunications Network (MTN).

There was not sufficient time to have the ship outfitted for an additional 64 kB of data. The Princess Cruise ships are equipped with a 64 kB data stream, divided into eight 8 kB segments for eight simultaneous ship-to-shore telephone conversations.

For a second 64 kB to be added, a higher-power amplifier and other additional hardware had to be installed, requiring one month's advance lead time.

Dry run

In other words, I was now committed to a remote broadcast using our new Lynxx mobile earth station that had not been tested at sea. This meant a full dress rehearsal first without a cruise ship.

Because I did not have a ship at my disposal, I did the next best thing and set up a remote "broadcast" in my front yard. I was lucky: My neighbors were not home the day of the tests so there was no "What is that nutty neighbor doing now?" to endure.

It was necessary to estimate how much shipboard rolling and turning the system could tolerate. Based on this exercise, I felt it was possible to manually track the satellite in order to compensate for ship maneuvering.

Sometimes the high-speed data call would have digital dropouts or brief loss of sync. Usually, hanging up and calling again seemed to clear the problem.

During our meeting, Garbett had said, "I would not have thought such a plan as yours, using a nonautomatic tracking antenna, would work."

We needed calm seas and minimal ship rolling because I would not be able to compensate fast enough for elevation changes. Also, too much ship rolling might put me out of commission ... if you know what I mean.

So after setting up the remote equipment and attaching to the Lynxx, I spent some time panning the antenna around to get a feel for how wide the pattern was.

A high-speed data call was placed via the Lynxx to the KOST studios. When the Lynxx connected and the Comrex DXP codec made the familiar synchronization chirp, I could hear KOST emanating from the monitor speaker set up in my front yard.

This was a bidirectional path with 7.5 kHz of bandwidth in each direction via the Lynxx mobile earth station. A Comrex DXP codec was attached to the Lynxx via a V.35 cable supplied by Lynxx. Audio from a Mackie 1202 mixer was fed into the Comrex DXP for conversion to 56 kB data.

The resulting data entered the Lynxx via the V.35 cable for satellite transmission via Comsat. The Lynxx has a handset that permits dialing any telephone number in the public switched-telephone network.

A call was made to a Switched 56 number at the KOST studios. The call is automatically answered at the studio and the Comrex codecs at both ends sync up, establishing a bidirectional audio path. The satellite system used is the Inmarsat-B with satellite time, on demand, provided by Comsat.

When I called the studio from my home phone, the announcer reported the audio sounded excellent.

Costly

I should mention that this is an expensive system for remote broadcasting. The Lynxx mobile earth station and accessories, including a remote antenna mounting kit cost about $35,000. This does not include the cost of the Comrex codec nor the audio mixer, microphones, etc.

The cost for satellite time is expensive, too. A high speed data call, which is needed for broadcast quality, costs $17.95 per minute.

Comsat does offer some discounts for high volume users. Depending on the amount of time used, discounts can range from 10 to 27 percent. Discounts start after you have used your first $1,000 worth of time in a month. For our broadcast, it was either pay the price or reel out 200 miles of mic cable.

On board

The Sun Princess is the largest cruise ship in the world. It was built in Monfalcone, Italy, in 1995. It has an overall length of 856 feet and a breadth of 106 feet. Normal passenger capacity is 2,300 with a crew of 900.

The day we boarded, the ship had arrived earlier in the morning after a Caribbean trip via the Panama Canal. Ours was a promotional trip for travel agents as the ship made a two-day cruise from Los Angeles to Ensenada. After we returned to Los Angeles, the ship continued to Alaska, where it will spend the summer cruising between Vancouver and Alaska. In the fall, the Sun Princess will return to the Caribbean for a winter of cruising.

What a pleasure to view the beautiful four-story lobby with sumptuous marble staircases, sparkling brass railings, chandeliers and elegant glass elevators. The lobby was much like that of a five-star hotel.

We boarded the Sun Princess cruise ship in San Pedro, Calif., 11 a.m. Monday morning. Most passengers did not board until 2 p.m., but I needed the extra time to figure out how I was going to set up our shipboard remote broadcasting facility.

I was shown the location for our broadcast: the 14th deck in a protected area near the 24-hour Horizon Court buffet. Looked good to me.

As it turned out, it was not possible to operate the Lynxx satellite system at this location. There were too many obstructions and too many people would be gathered around this area.

The solution was found two decks above. On the 16th and top deck there is an area that is not open to the public, providing a relatively clear view in all directions. There were, however, two large domes for the ship's satellite communications, and a part of the ship's structure could get in the way. Still, it was the best I was going to do.

Communications Officer Tom Martel helped me install a two-pair cable from deck 16 to our deck 14 location. Because none of the ships elevators go that high, he helped haul the 70-pound Lynxx up to deck 16.

With my handy propane soldering iron I put the proper connectors on the ends of the cable. Next came a quick check of the Lynxx while the ship was tied to the dock. The satellite was just about where I guessed it would be.

I made a short high-speed data call to the studio and was pleased to hear KOST in the headphones plugged into the Comrex DXP for the test.

Ready to sail

After stowing the Lynxx away, I joined my wife for the view of San Pedro as we started our trip to Ensenada. All of us in the KOST group had dinner at the early seating. We had to get up early the next morning to be on the air from 6 to 10 a.m.

We attended the early show in the Atrium Lounge with an introduction by Gavin McLeod, the captain of television's "Love Boat." In fact, McLeod was one of the guests who stopped by for an interview at our shipboard studio.

After the show it was early to bed because 4 a.m. would come soon. After all the activity of the day I fell asleep quickly.

I awoke about 3:30 a.m., worried about the remote broadcast. So it was out of bed and off to deck 14 to set up our gear on two large tables that had been provided for our use.

Sometimes foresight pays off. I knew I was going to be disoriented in the dark at 4 or 5 a.m., and that it could be difficult to find the satellite in the dark with no references. In this instance, a Sony Pyxis GPS receiver was a big help.

While I was setting up, I put the receiver out on a table in the clear. It was not long before the GPS told me we were on a course of 163 degrees and going 13 miles per hour; about half-speed for the Sun Princess.

Shooting the bird

Knowing our heading made it easy to estimate the bearing of 255 to the Pacific Ocean Region satellite that I needed to find. The elevation would not change from my earlier tests so all I had to do was aim the Lynxx antenna.

Upon powering up and initializing the Lynxx, the LCD signal strength meter showed I had acquired the satellite. Fine-tuning my aim was quite simple after that.

Shortly before 6 a.m., I dialed the Switched 56 number at the KOST studio and we were ready to hit the air after the newscast.

continued on page 32 ▶

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World Radio History

Live Remote from Sun Princess

▶ continued from page 30

I should mention that calls via Inmarsat do not always go through on the first try. The phone number was in the Lynxx speed dialer so that I could easily redial the number. I had to try three or four times before the call would go through.

Sometimes the high-speed data call would have digital dropouts or brief loss of sync. Usually, hanging up and calling again seemed to clear the problem. It was a great feeling to know we were on the air with the Lynxx, along with a Comrex DXP codec providing a 7.5 kHz audio path for the KOST morning show with Mark and Kim.

And I was relieved to find that my "go for it" to Julie was now happening.

Loss of signal

It was about 7:30 a.m. when I came down the two decks to our broadcast location to check on how things were going, when the return signal from KOST suddenly disappeared. We had lost the satellite connection. Back up on the top deck I found the Lynxx and the Comrex were without power.

Someone had closed a large metal door on the power cable one deck down, causing a ground fault which tripped a breaker or blew a fuse somewhere on the ship. I had no idea where this fuse or breaker might be.

The communications officer sent for the ship electrician. While he was running down the problem I started searching for another source of power. In a nearby pantry, an American-style 120V receptacle was found behind some dishes.

A long extension cord was pulled down from the deck above and plugged into the pantry. The Lynxx was plugged in, powered up and redialed. We were connected with KOST again.

Our loss of connection was not too serious because all the music was being played at the studio. I had insisted that the studio board-op be qualified to go on the air in case we had gone down. Our weekend announcer/board op Lance Ballance was able to fill in nicely for us while I was scrambling to restore power and reconnect via the satellite.

What's up, dock?

The next test came as we docked in Ensenada. The ship did not simply pull in straight to the dock as I had hoped but instead made a 180-degree turn before docking. This kept me busy aiming the Lynxx antenna for a few minutes.

It is surprising how quickly a ship this large could turn, thanks to the side thrusters on the Sun Princess. As soon as we tied up at the dock, no more aiming was necessary. It was a routine remote broadcast from there on until 10 a.m.

After putting away the remote gear and stowing the Lynxx, my wife and I disembarked to downtown Ensenada. We enjoyed a couple of hours of shopping and picture-taking before returning to the ship.

Unlike San Pedro, Ensenada allowed for an unobstructed view of the ship. We were truly amazed by its size. By 2 p.m., everyone was back on board and we started the return trip to Los Angeles.

That evening we enjoyed another excellent meal with the traditional baked Alaska dessert, and another show in the 800-seat Princess Theater. Afterwards it was early to bed again.

This time I could feel a slight ocean-induced motion of the ship, but it was very minimal and nothing to get sick over. I was up again at 4 a.m.

After a quick breakfast at the buffet, I set up the mixer and mics, then consulted the Sony GPS receiver. We were now on a course of 348 degrees at 13 miles per hour. Knowing this, it was easy to estimate the bearing to the Pacific Ocean Region satellite. Again, signal acquisition was simple after powering up the Lynxx. I only had to make a slight adjustment to peak the signal.

Shortly before 6 a.m., I placed another high-speed data call via the Lynxx to the KOST studio Switched 56 number. We were connected and ready for another broadcast.

Coming home

We had been on the air with the morning show for about an hour when we started turning into Los Angeles Harbor. By watching the Sony GPS receiver display our course changes, it was easy to anticipate my moves in manually aiming the Lynxx antenna. It was also interesting to see our speed changes as we maneuvered to enter the harbor.

I had been told we would probably head straight to the dock and tie up. But when we passed by the dock, this was obviously not going to be the case.

Mark and Kim were warned we might have trouble maintaining the connection during the turnaround. After passing the dock we started our turn under the Vincent Thomas bridge that crossed the channel. At 255 degrees a hill blocked the signal and my "look angle" to the Pacific region satellite was only 12 degrees above the horizon.

Luckily, Mark and Kim were able to prerecord their 7:30 a.m. break, because the connection was lost when we turned under the bridge. The ship is so large, there was only about another 20 feet of clearance.

Once the turn was completed, we slowly cleared the bridge and the hill, so I redialed the Lynxx. It connected on the fourth try and we remained connected until the show ended at 10 a.m.

My worries were over. The Lynxx technology worked. Mark and Kim will always remember their live shipboard broadcast, and I will always have fond memories of my cruise with the Lynxx and the Sun Princess.

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Marvin Collins is chief engineer of KFI(AM), KOST(FM) and KACE(FM), Los Angeles. He can be reached at (213) 251-3149.

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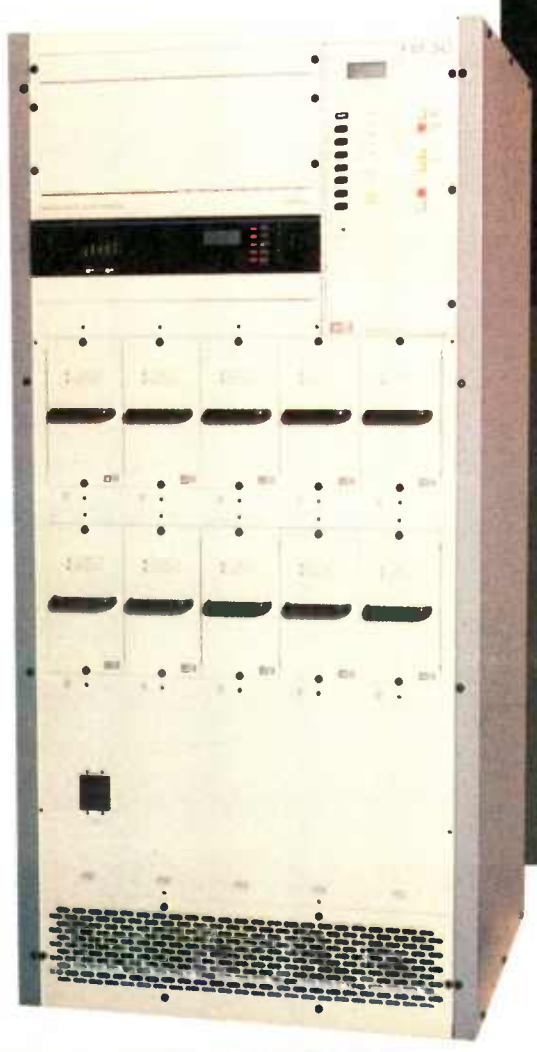

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Circle (115) On Reader Service Card

World Radio History

Jingle Still Works after 24 Years

by Alan R. Peterson

WASHINGTON Have you ever caught yourself unconsciously humming a commercial jingle? You were not even aware of it until you stopped to consider where you heard the melody, and were surprised to remember it was for shaving cream or a car.

A simple melody gets imprinted in the minds of consumers.

Even long-defunct products continue to live on in music. Many people 30-plus years of age have no difficulty humming the commercial melody for Winston cigarettes or Brylcreem hair lotion.

To that end, the jingle writer and advertiser have succeeded. A simple melody gets indelibly imprinted in the minds of consumers for all time — normally a happy, pleasant melody, very catchy, easy to hum and often impossible to get out of your head.

For example, ask anybody in the Philadelphia area to hum "that diner jingle," and off they go singing "Everybody who knows goes to Melrose" — a commercial jingle that dates back a couple of decades.

Banking on a jingle

Up and down the East Coast, a radio jingle that has proven successful for 24 years is for Savings Bank Life Insurance, or SBLI.

The original jingle took to the air during the 1972 Super Bowl with the following lyrics:

"With S-B-L-I, You're worth more alive ...'cause S-B-L-I leaves you more money for living." These lyrics have been ingrained in the minds of a full generation of prospective policy buyers.

The jingle was conceived and composed in a single afternoon by No Soap Productions of New York. According to president Dan Aron, "The way the tune stuck took me as much by surprise as anyone else. It's amazing to consider a jingle we created has lived to see its 24th anniversary with no end in sight."

Savings Bank Life Insurance makes insurance affordable and easily accessible. Consumers can buy a policy directly from a bank, so the overhead from an issuer's sales force is eliminated along with the pressure for the customer to buy up.

This low-key approach made unusual demands on the advertising. Visibility and memorability were the keys: if there was an insurance program that made good fiscal sense, people would want to look into it.

Casual complexities

Aron and the group created a casual ditty that could be hummed all day long.

"Life insurance is a complex issue," said Aron. "In devising the jingle, I wanted something that would make the listener want to say the name. The trick was to take four random letters — S,B,L and I — and turn them into the words of a song. By applying equal measures of skill and magic, that's exactly what we did."

The original jingle had a breezy pop sound. The current version is done in an easy swing feel with harmony reminiscent of Boyz II Men, but with the same melody line. A shining example of the "if it ain't broke, don't fix it" philosophy.

Since the jingle was first composed, a number of advertising agencies have come and gone on the SBLI account. All have continued to use the original SBLI jingle, although updated regularly to keep in step with changing musical styles.

The original agency, Lieberman-Harrison, has long since been supplanted by the current agency, Elser & Aucone, who saw the value of retaining the original SBLI jingle. If there were any questions that a jingle written during the Nixon administration would still be effective, the enormous success of the campaign answered them.

Valid leads

In 1995 alone, agency president Bill Aucone reported nearly 30,000 responses to an 800 number.

"Of those, 70 percent were valid leads and 70 percent of those had no previous relationship with a savings bank," said Aucone. "Response to our new TV/radio flight, which broke in mid-April, appears to be consistent with the previous year."

Additionally, overall direct response is up 8 percent from this time last year, premium income is up 7.5 percent and sales of new policies have increased 7.1 percent.

The long life of the SBLI jingle helped Elser and Aucone create a market- and cost-effective campaign. The operating budget for producing and airing the TV and radio spots, along with newspaper advertisements, is a small percentage of what is comparably spent by larger companies such as Met Life and Prudential.

"An enduring jingle can produce multiple benefits," said Aucone. "People remember catchy jingles, and if it lasts, it becomes part of the culture of everyone coming into contact with it. It has the same sort of elusive quality you find in songs that become standards."

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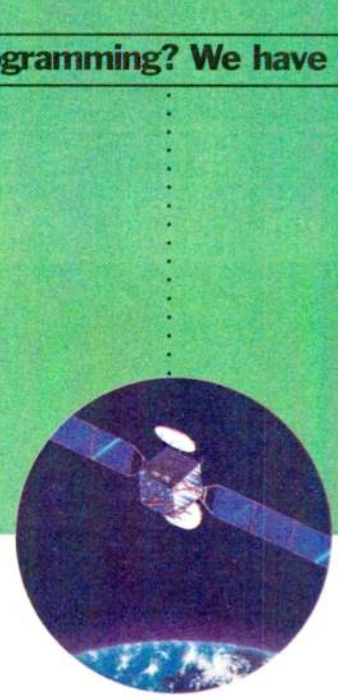

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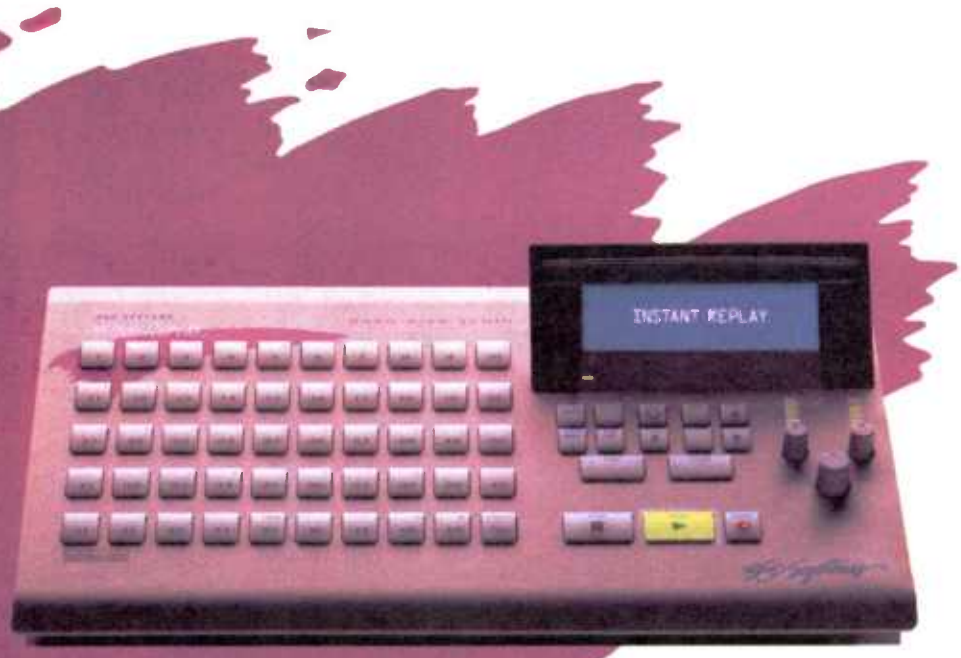

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World Radio History

KEYBOARD CONNECTION

Tracking Friends, Associates Using E-mail

by Barry Mishkind

TUCSON, Ariz. Have you ever had a letter returned stamped "addressee unknown?" In our transient society, where an average of 20 to 25 percent of the population moves each year, it can be difficult to keep your address book current.

Similarly, a large number of e-mail addresses change every year. At least the U.S. Postal Service can forward mail to individuals who fill out their form. On the other hand, people who change their e-mail addresses can prove to be difficult to contact, even if they are still at the same physical location.

This happens because most on-line services do not provide for e-mail forwarding. If you have ever wondered why some of your customers or friends do not send you e-mail any longer, or if your e-mail to them comes back with the dreaded "user unknown" message, let us consider some of the reasons why and suggestions on how to avoid e-mail hassles.

Your e-mail address can be the first truly permanent address you have.

The floating address

It is true after all: there is no "here" in cyberspace! Your e-mail address can be the first truly permanent address you have, following you everywhere. Or, it can become a problem. In fact, it is possible to accumulate so many e-mail addresses that no one can find you.

Perhaps you have used one of those diskettes from an on-line service inviting you to a free month's trial? If so, you likely sent some e-mail to someone to announce your new "location" on the Information Superhighway, an address of the form user@domain.name (pronounced as "user at domain dot name" — for me, it is barry@broadcast.net). When the recipient (R)eplies, your address is automatically attached to the message.

But, what happened at the end of the month? Did you continue with that Internet Service Provider (ISP)? Or did you try out another one? If the latter, you now have a new address, now@a.different.place. Meanwhile, your former provider completely deletes your former address. Hence, if one of your friends tries to send you e-mail at your original address, it comes back to him as "user unknown." Now, of course, if he knows where you are, he can call on the phone (yes, most computer folks still can use a phone!) and ask for your new e-mail address. However, if you have changed jobs, it might be harder to find you. Worse yet, if he only has your e-mail address, contact can be lost unless you happen to send a note to him from the new location.

A special case of this happens when someone subscribes to a mailing list, where each message goes to dozens (or hundreds) of others. If he or she changes addresses without notifying the mailing list, not only does he not get messages, but each message sent to him will "bounce" back to the moderator. For example, I get 10-20 "bounces" a day; and when school closes for the year, it can be 50 a day, for just one mailing list.

There are several ways to avoid this happening. First of all, if your ISP is a local provider, it may agree to insert a short file on its system forwarding your e-mail to you. Most of the national providers do not do this, citing difficulties in handling the volume of addresses. Sometimes getting a new address is almost unavoidable. It may be your ISP went out of business or a university account closed at the end of the semester. Perhaps you changed ISPs to get better service. Or you use several services on purpose — a local provider most of the time, and one of the national services when traveling, to get a local access number in different cities. I experienced each of these situations last year.

A permanent address

My solution was to get a permanent e-mail address. For a fee, companies like Broadcast.net will provide an address that can be forwarded anywhere.

Another solution is to carefully e-mail everyone who might have your address with the new one.

A good address book will help, and it is courteous to unsubscribe from mailing lists when you know your address will change.

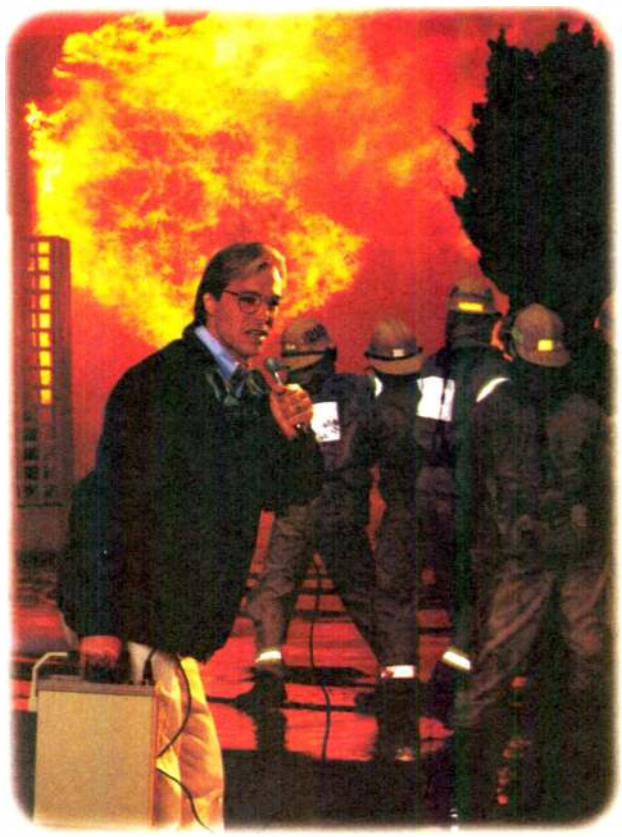
If you can't locate someone in the broadcast industry because his or her address has changed, several lists are available.

Finally, a suggestion about your .sig or "signature" line, which is put at the bottom of e-mail, sometimes automatically by your mailreader or manually: Instead of cute phrases or graphics, insert brief

continued on page 45 ▶

[quality]

the best sound



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SIGNAL-TO-NOISE

MiniDisc Gets Fresh Promotion

by Frank Beacham

NEW YORK The MiniDisc format has been languishing in obscurity for too long, and its manufacturers are now pulling out all the stops to revive the technology before it is too late.

Consumer side

On the consumer side, Carl Yankowski, president of Sony Electronics in the United States, was quoted in the New York Times recently as saying "we haven't found the right pricing and positioning to make this product work." His advertising staff is now busy testing new ways to promote the product and let potential customers know about the usefulness of MD as a recording technology rather than as simply a playback medium for commercial music releases.

Sony is also quietly lowering prices on MiniDisc hardware and media. A new portable player has hit the market at a $199 list price and 74-minute discs now have a list price of below $10. Some discount stores are reported to be selling blank MiniDiscs for as little as $6.99. MiniDisc recorders, however, are still pricey consumer electronics products when compared to the cassette-based devices they are designed to replace.

The future of MD in the consumer market is important to professional users of the format because there is so much crossover in products and technology. Lower prices on the consumer side will carry over to the pro side, the MiniDisc marketers tell us. However, the pro divisions at Sony and Denon are not counting on the consumer side and are both engaged in aggressive marketing and media campaigns for their own customers.

"Initially we looked at MiniDisc as a replacement for the NAB cart tape format," said Paul Foschino, marketing manager at Sony Pro Audio. "We were doing pretty well in getting them into radio, TV stations and production facilities."

Now, however, Sony Pro Audio is broadening its line of MiniDisc products and is looking for a larger base of users.

"We are now looking at sound reinforcement applications such as hotels, malls, restaurants and theme parks ... anywhere music needs to be played back on a regular basis or voices need to be recorded, looped and played back continuously," Foschino said.

The same message comes from John Casey, who markets pro MiniDisc products at Denon.

"At NAB we launched a new ad for our family of MD products. We are now targeting all pro users, anybody that's ever used tape for any recording medium," Casey said. "We know the product works, but it has been an awareness thing. Even our own product people didn't know the usefulness of MiniDisc. We had to educate people."

The initial results, said Casey, have been successful. "The feedback we're now getting is great and we've seen a tremendous increase in sales," he said. "Now we are going for the big push."

Recent coverage

Foschino said the recent coverage in RW of the ABC Radio use of the Sony MZ-B3 portable MiniDisc recorder "spurred a lot of excitement among the radio community for using it as a field recorder" and resulted in many calls to Sony from broadcasters.

"Initially we had decided not to carry the B3 (on the pro side)," said Foschino, "but that response forced us into carrying it. We crossed the piece over (from the consumer division) and started selling it."

Foschino said the ABC Radio tests demonstrated two important things needed to win over pro users: first, how MiniDisc can be used in real world recording applications and, second, that the sonic quality holds up under demanding, multigenerational professional use.

"There was always concern about the transmission technology," Foschino said. "It was an unknown factor. There was a wall of resistance. Now it has fallen."

In the near future, expect a new generation of pro MD cart machines from Sony. Among other new features, these units will have the ability to record and play mono audio. Add to that MiniDisc multitrackers for small audio production suites and project studios. Several companies have shown prototypes of multichannel mixers that incorporate MiniDisc data recorders. Sony will show its prototype this summer at the National Association of Music Merchandisers show.

Also coming soon are updated consumer MiniDisc recorders using version 4 of the ATRAC compression scheme. Current products incorporate version 3.5 of the software. This improved compression algorithm, coupled with features like internal 20-bit processing, have dramatically improved the sonic quality of the MiniDisc format over the last year.

"These new ATRAC schemes add a lot of credibility as what you can do with compression these days," said Foschino.

□□□

Frank Beacham is a New York City-based writer and producer. His address is 163 Amsterdam Ave., #361, New York, NY 10023. His e-mail address is: frank@beacham.com. Web site: http://www.beacham.com

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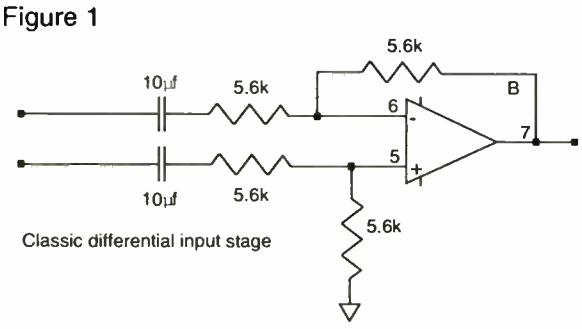
Keeping Balanced with Opamps

The Introduction of Opamp Circuitry Led to the Search for Electronic Equivalents to Transformers

by Jim Somich

BROADVIEW HEIGHTS, Ohio In the old days it was simple. If you had a transformer on an input or output, you were balanced. If the transformer had a grounded center tap, even better. But transformers can compromise audio performance, and, unfortunately, high-quality transformers are expensive and bulky.

Figure 1



Classic differential input stage

With the introduction of opamp circuitry, the search was on for electronic equivalents to transformers for both input and output applications.

Figure 1 shows a classic equal-value differential input amplifier. Because it is usually desirable to have an input impedance of over 10 k to affect a bridging termination, the input resistor values are often elevated. The noise of these stages is directly attributable to these high resistor values. Lower input resistor values will improve noise specs.

The DC blocking series capacitors have to be large in value to maintain an even input impedance at the lowest used frequencies and, being necessarily unpolarized, physically large and expensive. Beware of circuits that use polarized electrolytics here. The results are sonically inferior!

The circuit in Figure 1 suffers from a slight problem. As common and popular as it is, it only works properly under ideal circumstances, offering still some but not total isolation from ground under usual use. This is because the input impedance on the noninverting leg is permanently defined by the resistor values, while that on the inverting input leg is dynamic.

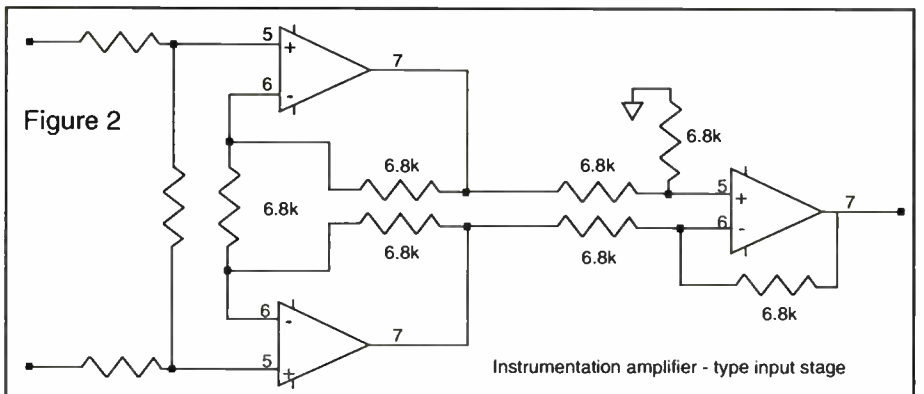
If the noninverting leg is stationary, the inverting leg sees the value of the input resistor, and the circuit behaves as a straight ground-referenced inverting amplifier. If the noninverting input is moving, however, the reference point for the inverting leg is changing, and the impedance it is seeing is changing, too. The negative input leg impedance is continually being variably bootstrapped by common-mode voltages and nondifferential sources.

Ideally, there must be no discernable difference in characteristics between the electronically balanced output circuit and a transformer.

It's possible to match the two input impedances of the input legs for differential signals as in Figure 1. It's also possible to match them for common-mode signals by altering the resistor values in one or the other leg — but not for both at the same time. In either case, the circuit falls apart if the signal source has a significant impedance.

The instrumentation amplifier presents a very high, nonground-referred differential termination and has the great advantage that gain may be easily invoked between the two input amps at no cost to the excellent common mode rejection. A typical instrumentation amplifier input stage is shown in Figure 2.

Figure 2

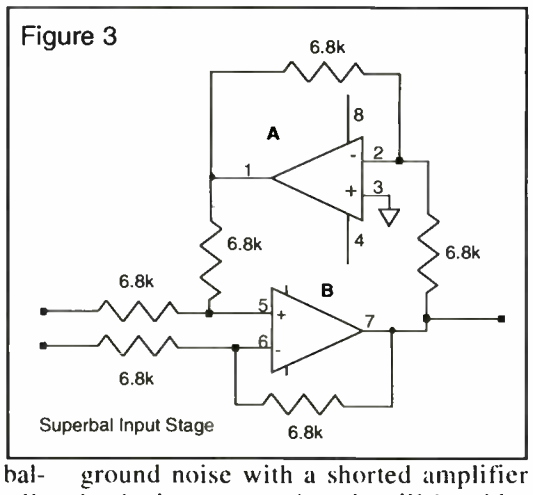


Instrumentation amplifier - type input stage

Adjust input resistors for required input impedance (3.3k for 10k input Z)

Figure 3 shows a unique input circuit called a superbal. This is a balanced differential virtual-earth amplifier, referred to ground solely by one opamp input and capable of quite astonishing common-mode rejection. Accepting any lopsided input signal, it delivers a differential output perfectly symmetrical to ground, making it a splendid input conditioning amplifier.

Figure 3



Superbal Input Stage

The simplest balanced outputs configuration is diagrammed in Figure 4. This is a pure, no-nonsense, inverter-derived differential feed. For many internal connections, and especially in differential balanced mixing systems, it works well. But, as regards to the outside world, forget it! Ideally, there must be no discernible difference in characteristics between the electronically balanced output circuit and a transformer (hopefully without the core-saturation and reactive problems of the latter).

Regardless of the common-mode potential, the differential output potential must not change. Also, the output should be insensitive to any imbalance in termination, even to the extent of shorting one leg or the other to ground. This is the floating test.

For example, the simple inverter circuit of Figure 4 fails the floating test because if one leg is shorted to common, the noverall output has to drop by one half (6 dB). (The question of what happens to ground noise with a shorted amplifier bucketing current into it will be sidestepped here.)

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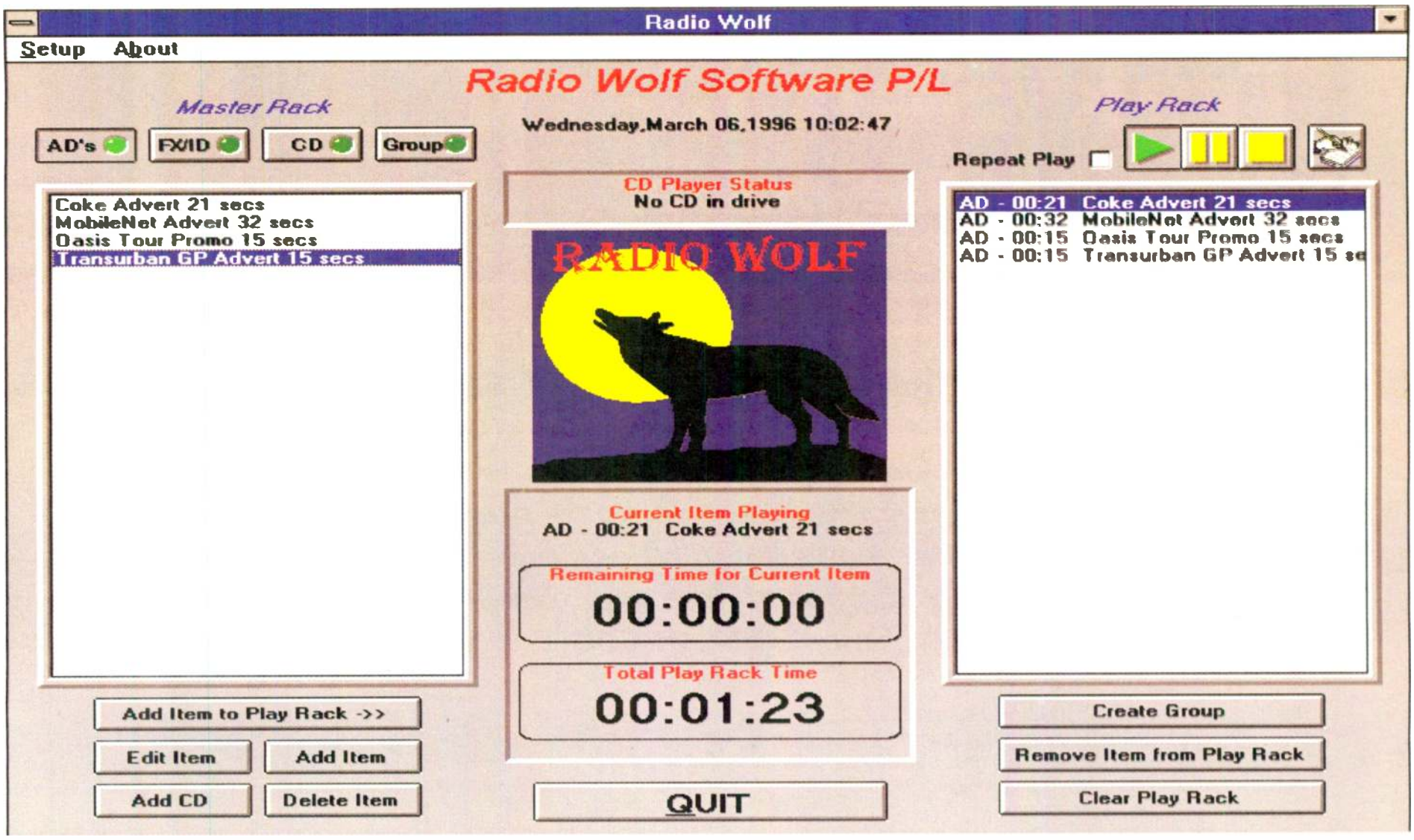

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Balancing with Opamps

▶ continued from page 38

Figure 4

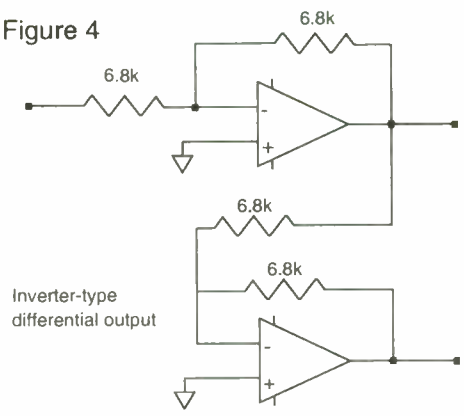
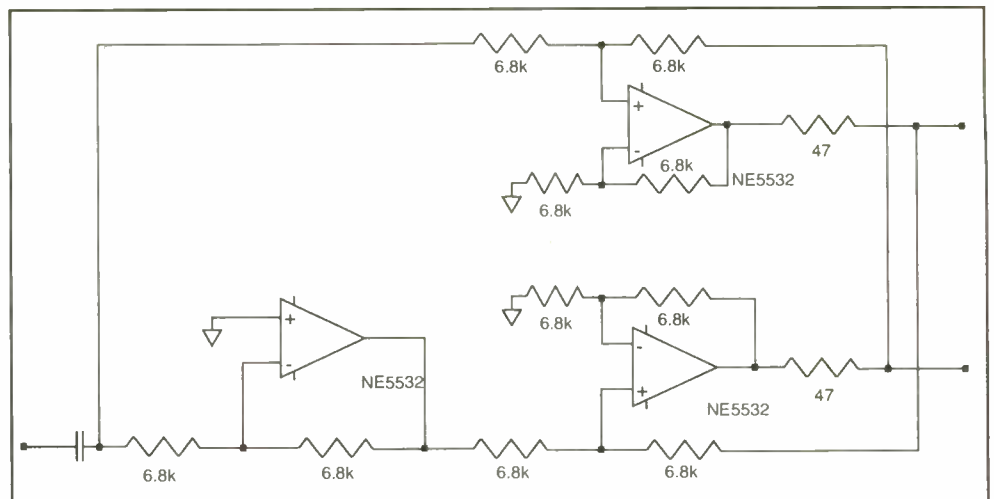


Figure 5 shows a circuit that more approximates a transformer output. It depends on cross coupled positive feedback between the two legs to compensate for termination imbalance.

A unity gain inverting stage provides out-of-phase drive for the two legs, each output leg of which is a -6 dB gain inverting amplifier with error sensing applied to its reference (positive) inputs.

Under normal operation, there is no error-sensing voltage; the two inverse outputs cancel at the midpoint of the equal sense resistors. The two amps invert merrily away, a differential voltage equal to the unbalanced input voltage appearing between their outputs. (Two -6 dB quantities make a zero gain.)



Cross-coupled differential output stage

Figure 5

Take the case of one output — say the upper one — being shorted to ground. An error potential of specific phase and level is derived on the error sense line such that positive feedback increases the gain of the unshorted amp by 6 dB. Simultaneously, the positive input of the shorted amp receives a signal equivalent to its negative input, canceling its amplification. Closing the shorted amp down prevents ground current problems; therefore, any measure of output termination imbalance is reasonably dealt with by this arrangement.

It is not that easy to simulate a high-quality transformer-coupled input or output stage.

As you can now see, it is not that easy to simulate a high-quality transformer-coupled input or output stage. Keep this in mind when you are building your own circuits or when evaluating a product that claims to be electronically balanced.

□□□

Jim Somich is a radio broadcast engineering consultant and president of MicroCon Systems Ltd., a manufacturer of broadcast equipment. He can be reached by e-mail at jimsomich@aol.com

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Move Up from Carts to Touchscreen Digital Audio

Play Anything...At A Touch

The best way to improve your radio station is to put all your spots, sounders and sweepers ***on-line*** and ***ready to play instantly*** from hard disk. Creative talent sounds better than ever with ***Scott Studios'*** new touchscreen digital audio system.

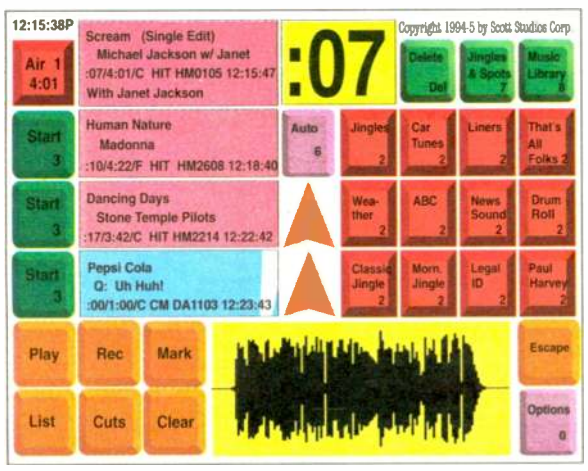
Here's how it works: Six buttons on the left of the large computer touchscreen play what's on your log. Scheduled spots, songs, promos, PSAs and live scripts come in automatically from your production studios, traffic, music and copy computers. Jocks can revise sweeps at a touch (with the arrows at mid-screen), or work with the full day's log and add or rearrange anything.

On the right, 17 "hot keys" start or fade ***un-scheduled*** jingles, sounders, effects, comedy or promos ***on the spur of the moment***. Your morning show will benefit from 26 sets of 17 user-defined instant audio "hot keys".

You can ***preview*** anything in a cue speaker at a touch. The Scott hard drive even lets you listen to endings ***while*** that song or spot is playing on the air!

And ***nothing*** beats the Scott System for easy levels. Touch the label on the screen, moving right to left to fade as desired. If you'd rather adjust levels on the console, channel numbers show clearly on each start button.

The Scott Studio System is your ***best*** way to make the move to digital audio and eliminate troublesome carts. The touchscreen plays whatever you want ***instantly***. All scheduled spots, jingles, promos, scripts and songs come in from your traffic, copy and music computers.



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Touch ***one*** button and you're recording phone calls to hard disk. Another button and you've got the world's easiest editor. When it's ready, one touch and your call's on the air. The phone recorder only adds $1,000 to the system.

The *Best* Digital Audio

When spots, promos, PSAs, or any other digital audio is recorded, they're immediately playable in ***all*** your Scott System air studios. Nobody wastes time carrying carts down the hall or redubbing spots for additional stations.

One question you ***don't*** have to worry about with the Scott System is "What if it breaks?" The Scott System comes complete with ***every*** spot and jingle stored ***redundantly*** on ***two*** hard disks. It's a snap to switch to the "hot standby" system! You get touchscreen convenience, digital quality, and backup redundancy for no more money than tape machines and commercial carts.

The World's Fastest Requests!

Touch either of the two buttons at the top right of the main screen to see our "Wall of Carts" with all your audio ***on-line!*** Touch the spot, sounder, jingle, promo, PSA or comedy you want and it plays ***instantly***. Or, you can put it anywhere you want in the day's schedule.

During play, all Scott screens include large digital timers that automatically count down intro times, and flash warnings 60-, 45-, and 30-seconds before the end. You also get clear countdowns the last 15 seconds of each event.

Instant Songs on Hard Disk

Scott Studios is radio's premier source of high quality music on hard drive. ***All your songs*** will be pre-dubbed ***free***.

Nothing could be faster than requests from the Scott System! You also get five "Wall of Carts" with music that plays at a touch! Songs are shown by title, artist, year, length or category.

The Full Day's Log

Scott Studios lets you see the whole day, and make any changes you want.

See It at WME Booth 935!

The Scott System ***leads the industry*** with major broadcasters like Capitol Cities/ABC, Group W, Shamrock, Alliance, Salem, Liberty, Saga, Liggett, Regent, Tichenor, Benchmark, Max, Atlantic, and Rawlco in Canada. Scott Systems are in Detroit, D.C., Dallas, Houston, Philadelphia, San Diego, Denver, San Antonio, Ft. Lauderdale, Cincinnati, Dayton, Lansing, Las Vegas, and smaller markets coast-to-coast from Bangor to Bakersfield.

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World Radio History

Selecting Your E-mail Address

► continued from page 35

information useful to others who may need to locate you. A good start would be your complete name, because many e-mail addresses are cryptic, to say the least.

NAB gathering of computer folk

At the NAB show this year, the 4th Annual Computer Users Luncheon was again sponsored by RW. The crowd that showed up enjoyed chatting about everything from specific programs to increasing the professional resources available on the Internet.

For those of you who didn't make it, just to make you a little jealous, we'll mention some of the neat door prizes arranged for attendees.

Topping the list were several broadcast industry oriented items: Dataworld, at (800) 368-5754, provided one of its large AM Station Pattern Books. Radiosoft's Peter Moncure, at (904) 426-2521, gave away a copy of his recently updated MapFM program. Communications Data Services, at (800) 441-0034, provided a full-color propagation map. Rules Service Company, at (301) 424-9402, and Pike & Fischer, at (301) 654-6262, provided a computer set of the FCC Rules and Regs. Microsoft Corporation, at (800) 228-6270, sent us copies of the MS Professional Office and Business Pak, and the 1996 copies of MS Bookshelf, MS Encarta, and MS Cinemania. DacEasy, at (800) DAC-EASY, sent a couple of copies of its DacEasy Accounting and Payroll 95. From Grollier, we had the latest Grollier Multimedia Encyclopedia, along with its intriguing new multimedia game SFPD Homicide. From Symamtec, at (408) 253-9600, we had copies of the new Norton Navigator for Windows 95, as well as Norton Anti-Virus, and Norton Utilities for both Windows 95 and NT.

Finally, S&S Software, at (800) 310-9078, contributed several copies of Dr. Solomon's Anti-Virus Toolkit, including support for macro viruses.

We wish to offer our sincere thanks to all these fine companies that helped make this year's lunch gathering a standout part of the NAB convention. If you planned on coming, and couldn't make it, please consider making it part of your plans for next time. We'd love to meet you!

□□□

Barry Mishkind can be reached at (520) 296-3797, or barry@broadcast.net via the Internet. His home page is at http://www.broadcast.net/~barry/

BE AudioVAULT Runs Olympic Attraction

by Alan R. Peterson

ATLANTA If you make it to the '96 Summer Olympics this year, a must-see stop for any broadcaster will be the Fountain of Rings at Centennial Olympic Park.

The fountain is presented by AT&T and consists of a computer-synchronized display of water jets, lights and fog in the shape of the interlocking five-ring symbol of the Olympic Games. Every day at 6 a.m., the display comes to life with a series of multilingual announcements, the music playlist for the day and then the show.

The Fountain of Rings is considered the largest stationary remote-controlled fountain automation system of its kind today. The big surprise: a stock Broadcast Electronics (BE) AudioVAULT is the "choreographer" of the fountain show.

Water music

The digital audio storage device — better known for commercial playback for radio — is being used as a combined music programming system and fountain controller for the $6 million attraction. In addition to playing selections like "Chariots of Fire," the Olympic Theme and selections from Yanni, the AudioVAULT communicates with the systems controlling the fountain.

The digital device is being used as a fountain controller.

Regulation of water flow, fog and light displays are under the AudioVAULT's command. Despite operating in a high EMF area strong enough to cause monitors to flicker, the AudioVAULT performs without a problem.

BE AudioVAULTs are already in use in other arenas. Bally's Casino in New Jersey uses one for audio playback, as do franchises in the Houston's restaurant chain.

The fountain provided some new obstacles, not the least of which was lots of water. "A major hurdle was the electromagnetic field produced by the solenoids controlling the water jets and lights," said Cole Harrison, systems engineer for Atlanta-based Commercial Audio Systems.

"A copper mesh was added around the control room to correct the EMF problem. However, this was needed by the other products, not the 'Vault'."

The AudioVAULT is kept in a concrete bunker at the end of a 40-foot shaft at the fountain site. The actual controls for the device are three-quarters of a mile away at the Georgia World Congress Center. A series of computers remotely control the display from this location.

"It's nothing you would not use in a standard radio station," said Tracy Peterson, digital marketing specialist for BE, noting the off-the-shelf status of the Olympic AudioVAULT.

Dave Buck, Southeast digital sales manager for BE, agrees. "This is the same software and system I would sell to a radio station although it can be described as a 'high-end basic system' with rackmount cabinet and a heavy-duty power supply. It was expanded to 30 ins and 16 out closures with two GPI cards."

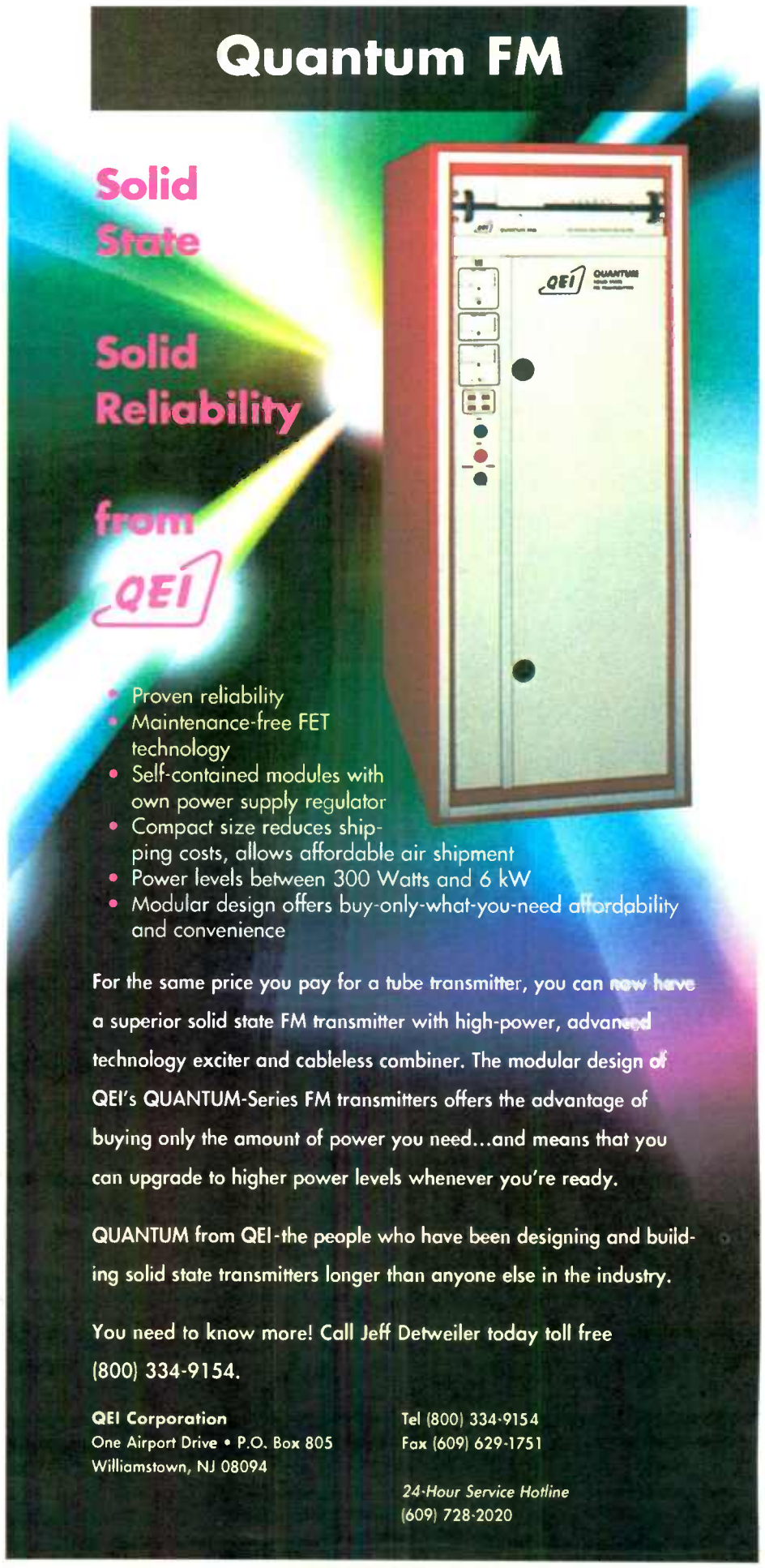
How it works

Buck explained how the computerized fountain works. The AudioVAULT's hard disc system is loaded with music appropriate to the occasion. The music is "striped" with SMPTE timecode, and a sequencing device tied to a Yamaha SPMTE distribution amplifier fires the water jets and lights. Technicians rehearse a light and water sequence, then write it to sync to SMPTE.

"PC Anywhere or Carbon Copy software is used to remotely control the fountain," said Buck. "If the Vice-President comes to visit, we can rewrite the playlist and move an appropriate piece of music into the queue."

Buck noted the applications for such a device are numerous. Computer-controlled attractions at amusement parks or larger venues can be run by such a device.

Plans are underway for grander uses for AudioVAULT SMPTE event-controlled systems, but Buck understands BE's prime responsibility and client base. "Radio is our core business," he said.



Circle (176) On Reader Service Card

World Radio History

WORKBENCH

Removing Loud Pops From Audio Output

by John Bisset

SPRINGFIELD, Va. We're fortunate to have good customer service technicians at a majority of broadcast manufacturers. When we've noted superlative service, we like to pass on the good words. Arlan Haggard (as close a relation to Merle as I am to Jacqueline!) at ITC (International Tapetronics Corporation) certainly fits in this category.

When it comes to ITC cart machines, Arlan is the guy you want. Recently, in discussing some stability problems with the Delta series cart machine, Arlan told me of a chip upgrade on the logic board for this machine.

Older machines may have a 74LS123 mounted on the board, ITC recommends replacing this chip with a 74HC123 to improve logic stability.

The workhorse 3D machines have their own set of quirks, usually noticed after years and years of service. Though these machines seem to run forever, a problem with dried out caps can cause cueing problems. For example, if a deck on your 3D won't recue, the typical response is to turn up the sensitivity a little bit. After a week, though, the deck will miss cues again. Sooner or later, you will run out of sensitivity pot. Change C-205, C-207 and C-210. If you can't find 5(F replacements, 4.7(F has worked fine for us.

We also came across an interesting audio effect — again, caused by bad caps. When a cart would recue, there would be a very loud pop in the audio output. Not a problem if the console channel mutes, but if the jock leaves the pot open, it's nasty.

There are actually two fixes for this problem. If you move the cue board to another deck and the pop follows, you need to replace C-27 on the cue board. If after swapping cue boards the problem persists in the same deck, you'll want to replace C-13(a), (b) and (c), located underneath on the utility card.

After awhile, it becomes good engineering practice to shotgun the capacitor replacement for all boards, you'll save a lot of time, because the machine is pulled apart anyway.

One last tip regarding the ITC line. If your ITC ESL-IV splicefinder ever starts erasing and never wants to stop, Arlan suggests locating R-106. This is a 6.8 K resistor at 2 W. Though it may look OK, check the value — it has more than likely changed.

It becomes good practice to shotgun the capacitor replacement for all boards.

★★★

Speaking of tape, if you have any Otari 10-inch reel hubs that seem to have lost their gripping power, try disassembling, cleaning and then coating the two brass discs directly under the top retaining knob with a light coating of oil. You don't need much, but the lubrication seems to restore the grip of the hubs, saving the expense of replacements.

★★★

Owners of Tascam 122 cassette machines may notice speed problems after lots of use. The problem can usually be traced to the solenoid that engages the pinch roller. With time, the solenoid plunger gets magnetized, reducing its pull. Although we never experienced it, a separate solenoid permits the tape to make contact with the head stack. I suppose it could get magnetized as well, causing its own problem.

The solution involves removing what seems like 100 screws to extract the solenoid plungers. The effort is worthwhile, though, and will cure some frustrating problems.

If you service the infamous MCI JH-100 series reel-to-reel machines, this same fix works for tape lifters that no longer want to lift the tape clear of the heads. Before you start replacing springs, remove the solenoid plunger and degauss it.

★★★

Gary Peterson, the chief engineer of KIMM(AM)-KFXS(FM), and KOUT(FM) in South Dakota took up my offer to comment on the strangest things found inside an audio console. A number of years ago, Gary got a panic call from a CHR jock. The main mic fader on his Auditronics console would only move one-third of the way up from maximum attenuation. The jock was having to really yell to produce a meaningful reading on the VU meters (retired Drake-format production directors would be proud!).

When he got to the station, the problem was just as the jock related it. Pulling the module, he opened up the cover of the P&G fader. There was a 25-cent piece inside! The quarter was jamming the slider assembly. Fortunately, there was no damage done to the inner workings and within a few minutes the jock was back in business.

The jock never asked what the problem was, and Gary never volunteered. Instead, the quarter helped finance a can of soda. After all, there's this unwritten rule that states, "any money that enters the coin slots on the Auditronics console becomes the property of the engineering department."

A few years back, we moved an old console for a station that was relocating studios. After unscrewing the board and removing it from the table top, there must have been close to $5 in quarters, dimes and nickels glued to the table top in a mixture of dried cola, dirt and dust. A putty knife loosened the windfall, which we used for cans of soda as well. Amidst the grunge, however, was the biggest find — a silver dollar. The general manager declared executive privilege on that coin, however.

★★★

Although at hundreds of stations the switch is being made to a hard-drive automation system, a number of older systems are still around and in use. Many of these use the Sigma/Magnacraft data-cell opto-isolator.

This is a little rectangular can consisting of a light-dependent resistor and a light bulb. As with all lamps, sooner or later the bulb will burn out. With replacements difficult to find (and expensive, too), repairing the data-cells is a more prudent means of solving the problem. Besides, you can apply the money you saved to your "hard-drive" fund!

While at WCPT(AM) in Washington, Chris Wilk found the Newark part number 50N8120, type 2187, a good substitute. The bulb is a T-1-3/4 type with wire leads. It's rated for 7,000 hours and costs less than $5 in quantity.

Chris now makes his home at WFLS-AM-FM, Fredericksburg, Va. Not only does he assist in maintaining the AM and FM facilities, but his duties have expanded to troubleshooting the electronic circuits for the printing presses operated by the station's owner, The Free-Lance Star. He can be reached at (540) 373-1500.

★★★

John Bisset is a principal in Multiphase, an engineering services company based in Washington. He can be reached at (703) 323-7180. Tips for this column are encouraged. Fax them to (703) 764-0751, or on-line at wrwbench@aol.com

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65 Years Ago

Reprinted from Radio World (July 18, 1931).
Editor's note: The RW of old, printed for a time in the 1920s and 1930s and today's RW are unrelated except in name.

GERMANS HEARD FIGHT AT 5 A. M.

Schenectady, N. Y.

WGY's short wave stations, W2XAF and W2XAD, carried a complete description of the Schmeling-Stribling fight to Germany. The fight, which began at 11:00 p.m., E.D.T., was received in Germany six hours later, but it is evident that the fight fans among tthe foreign listeners felt the result compensated them for loss of sleep.

The fight story, furnished by the National Broadcasting Company, was carried from the ringside at Cleveland by special wires to the transmitters in Schenectady. The South German Broadcasting Company, a unit of the Republic's broadcasting system, received W2XAF. The message, signed Suedfunk and sent to WGY from Stuttgart, was as follows:

"Ring report Schmeling relayed on all German stations. Reception of W2XAF R-9. Excellent modulation, no fading. Many thanks of German radio audience."

In radio parlance R-10 indicates perfection. W2XAF's signal at R-9 was, therefore, very close to perfect.

South America apparently did not fare as well as Europe. W2XAW, a third short-wave transmitter of the General Electric Company, was used for the transmission of a Spanish story of the fight. Buenos Aires sent a radiogram reporting as follows:

"Rebroadcast fight fair. Continuous interference from code stations."

World Radio History

Opera House Center For High-quality Audio

Vienna State Opera House

VIENNA, Austria Pass through the imposing façade of the Weiner Staatsoper and you enter one the most important cultural venues in Europe.

The state opera in Vienna is renowned for splendid scenery, impressive voices, top stars and directors, fascinating conductors, outstanding musicians, creative designers and ambitious programs.

It is also a center for high-quality audio, as reflected by the opera's intricate sound system and the six performances the Austrian state broadcaster, Österreischer Rundfunk (ORF), broadcasts live each season. Looking into the house with the eyes of a performer, the awesome size and technical complexity of the facility quickly becomes evident. The total stage area, including backstage and the wings, covers 1,700 square meters and is 53 meters high. A hydraulics-driven sinking/sliding stage system is lit by a complete grid with seven movable light bridges and 105 tracker wires.

All the bridges and curtains are remote-controlled by computers. The total connected electrical load for the opera is comparable to that of a small town — 20,000 kW, which is distributed by four power transformers.

The current microphone complement of the opera includes one AKG WMS 900 12-channel wireless microphone system, C5900 WL wireless microphones and almost 100 cabled AKG mics, such as C414s and C747s. AKG K240, K141 and K270 monitoring headphones are also used. Additional Harman Group products at the opera include JBL speakers, Lexicon reverb and effects units, a Soundcraft Delta DLX four-channel console and Studer D731 and D740 CD players. Professor Ing.

Wolfgang Fritz, chief sound engineer for the Wiener Staatsoper and the Bregenz Festival since 1981, oversees the entire audio system of the facility. He developed the general concept for the opera house sound system, and, in 1991, he completed an internationally recognized computer-aided system to integrate musically adapted sound reinforcement into a performance.

According to Fritz, the Vienna state opera differs from most opera houses because the program changes every day, which requires daily changes in the scenery, sound system and lighting configurations. This places enormous pressures on everyone involved to make certain that each performance goes smoothly.

"There is no 'average,' because every production presents very specific changes," said Fritz. "Some productions require gobos (sound baffles) and use 20 to 25 microphones. Only if you realize how large our stage is can you appreciate the huge quantities of materials needed.

The 'horizon' backdrop, for instance, is a blue canvas 26 by 52 meters, and that is only part of the scenery."

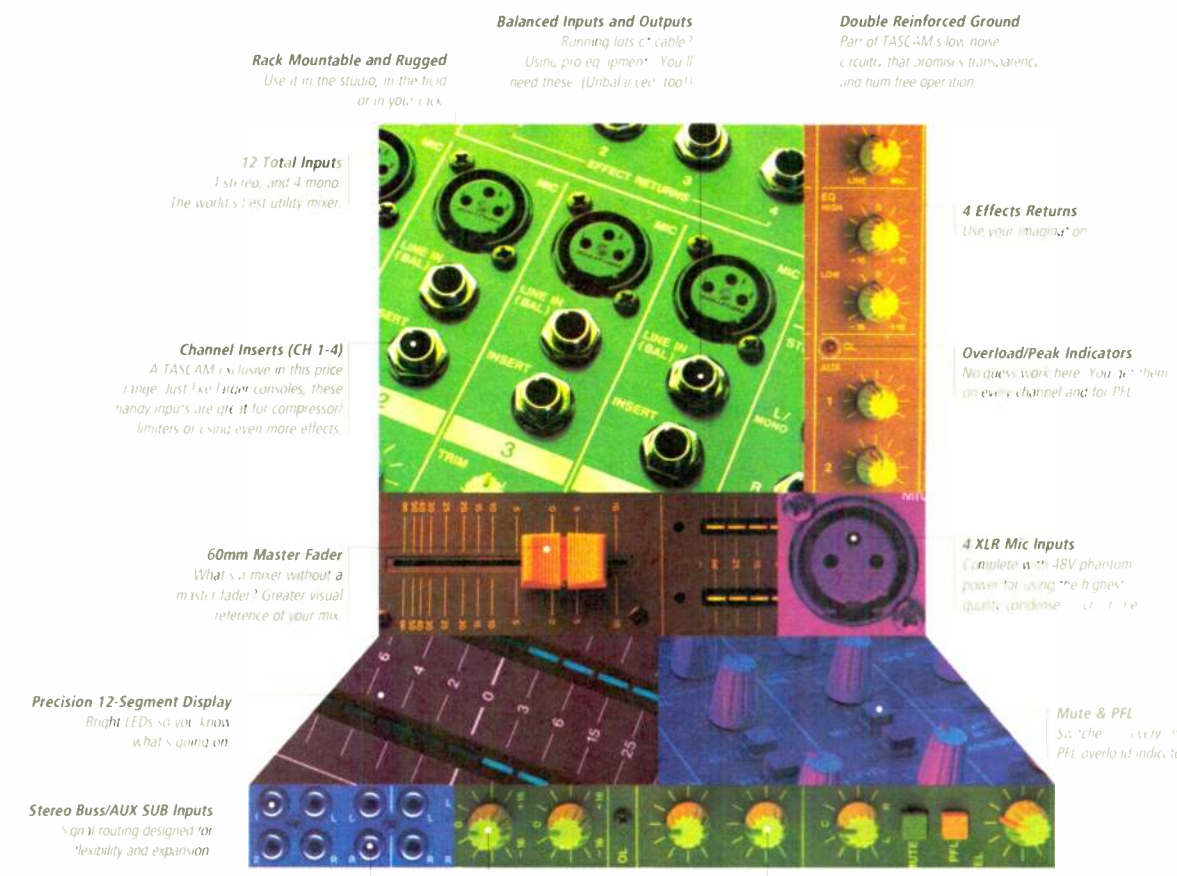
Some opera fans are disappointed to learn that any performer would use a microphone, pointing to legends like Enrico Caruso, who never used one.

In reply, Fritz notes that while he was not around when Caruso was alive, the listening habits and expectations of audiences have changed dramatically.

"Even today, downstage soloists are not amplified through microphones," he said.

"Microphones are used, for example, to amplify a chorus in the wings or backstage, or to mic up the pipe organ that is located in a separate room."

Depending upon the production, Fritz noted, audio effects are added to enhance the ambiance of specific passages, like the chorus of ghosts in "The Flying Dutchman" or the voice of Mephisto in "Faust." In addition to the audio facilities of the opera, the Staatsoper includes an entire ORF studio setup. In addition to the six live ORF Radio broadcasts, the studio is used for several short, 15-minute segments, TV broadcasts and recordings.



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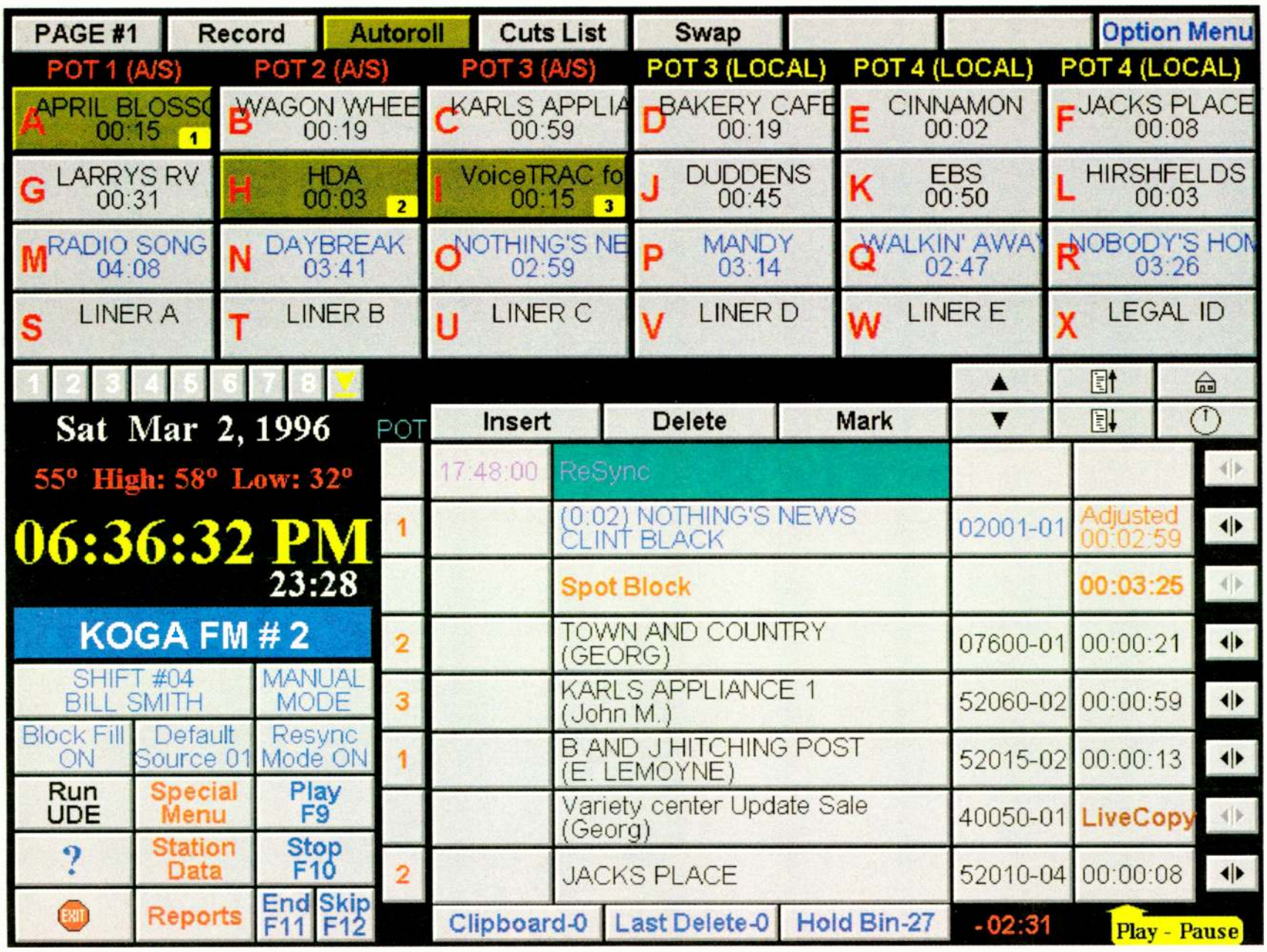

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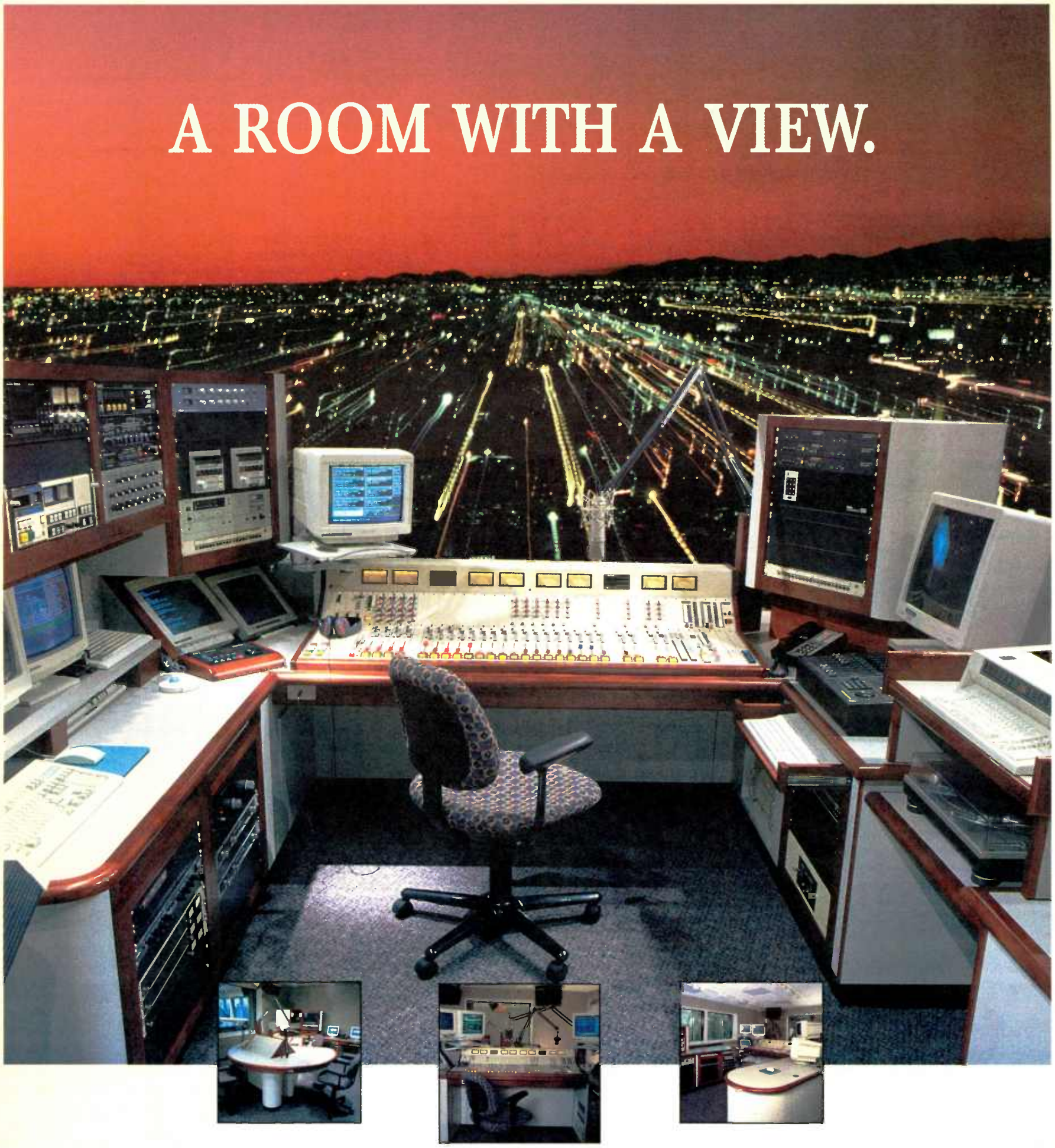

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World Radio History

INTERNATIONAL UPDATE

South Africa Pursues Deregulation

by Pietie Lotriet

JOHANNESBURG, South Africa With the release of two new position papers by the Independent Broadcasting Authority (IBA), South Africa is moving further along the path to a deregulated electronic media environment.

Guidelines

The IBA, which is charged with developing a framework for broadcasting in the new South Africa, released a discussion paper on community sound broadcasting services in April and a position paper on private (commercial) sound broadcasting services in May, as well as a paper providing guidelines for prospective commercial applicants.

The release of the position paper on commercial services follows extensive public hearings in all nine provinces of South Africa. Prospective commercial broadcasters and most other stakeholders were unanimous during the hearings in requesting the IBA to apply a light touch in regulating commercial broadcasters. This request did not go unheeded and, generally speaking, the position paper reflects that.

To ensure that self-regulation is effective, the authority asked the industry to establish an association or body representative of all broadcasters. The IBA also encouraged the creation of a broadcasting industry forum that would be representative of all broadcasting-related industries, so that the industry could speak with one voice.

Initially the IBA plans for no time restrictions on advertising or sponsorships.

Self-regulation must be effective.

However, the authority reserved the right to reconsider the policy in the future, in consultation with the proposed forum and the public.

The IBA also charged the proposed industry forum with discussing and making recommendations to the IBA on the issue of a language development fund.

The annual license fee was proposed at a rate of 1 percent of 80 percent of annual turnover of a station.

As part of the process of democratizing the airwaves, the IBA also decided to make eight new licenses available: three 5 kW FM licenses in Johannesburg, one 50 kW AM license in Gauteng province, one 2.5 kW FM license and two 50 kW AM licenses in Cape Town, and one 2.5 kW FM license in Durban.

The sale of the six South African Broadcasting Corp. (SABC) regional radio services to private companies, as well as the proposed sale of Capital Radio in Durban and Radio Bop in Mmabatho, will bring the total number of new commercial broadcasters to 16.

The IBA also plans to invite "expressions of interest" for commercial broadcasting services in areas other than the major metropolitan areas of Johannesburg, Cape Town and Durban. Interested parties are being asked to indicate the target area and to describe broadly the format of the station and its prospects for financial viability.

The closing date for this process is 1 December 1996. The authority will then evaluate the expressions of interest, and applications will be invited in 1997.

Content requirements

The IBA also set several general content-related requirements for private broadcasters.

The authority will require all stations to provide a total of 30 minutes of news during an 18-hour broadcast day (from 05:00 to 23:00), spread regularly throughout the day. The source and diversity of news sources are factors the IBA will take into consideration in determining who will receive a license.

The format proposed by the licensee also will become a licensing condition. If an applicant wishes to change more than 15 percent of its format during the broadcast day, it has to apply for an amendment to its license. The IBA indicated it would be cautious in granting an amendment if the format originally was an important factor in granting the station's license. The authority reaffirmed its desire to maintain diversity in commercial broadcasting.

There are no plans for the IBA to specify the broadcast language of a commercial broadcasting service in most cases, but it will encourage broadcasting in all 11 official languages of South Africa. The authority will ask the proposed industry forum for recommendations about this issue.

In terms of local music content, the authority ruled that any commercial broadcasting service that devotes more than 15 percent of its airtime during the performance period to music will have to devote at least 20 percent of its time to local content. This quota will be increased to 40 percent by the year 2000.

The IBA plans to review these regulations after three years.

The license fee was set by the authority at 1 percent of turnover, less agency fees and other deductions, to a maximum of 20 percent, payable three months after the end of each operational year.

Other fees include 30,000 rands for license application, 2,500 rands for the issuance of licenses, and 30,000 rands for an application to amend a license.

Advertising practices

The IBA Act states that all broadcasting licensees must adhere to the Code of Advertising Practice as determined and administered by the Advertising Standards Authority (ASA). The ASA is a self-regulatory body established by marketers, media owners and advertising agencies 27 years ago. While the IBA recognizes the ASA Code, the authority has indicated that it will consider additional restrictions on tobacco advertisements on radio and alcohol advertisements during certain programs.

The IBA is also likely to develop general advertising standards for radio and television.

The authority intends to consult with the industry on these matters through the proposed industry forum. The IBA also indicated it wants to discuss issues such as racism and sexism in advertising, and that it will provide the forum with guidelines.

As far as sponsorships are concerned, the authority requires a clear distinction between advertising and sponsorships. Sponsorships must be clearly identified through appropriate credits at the beginning and end of programs, and sponsored programs must retain their editorial integrity.

As with advertising, the IBA intends to address these concerns in consultation with the industry forum.

All candidates who succeed in receiving a license will be expected to comply with a set of license conditions. Proposals to the IBA in support of applications will be regarded as promises of performance and, if the applicants are successful, the promise of performance will be included in the license conditions of the licensee. Failure to adhere to the terms of the promise of performance will be a breach of the license conditions.

All radio broadcasters are expected to identify their station at least every 45 minutes, as well as before and after news bulletins. The authority may introduce further regulations relating to call signs.

It is clear that the process of deregulation of the South African electronic broadcasting industry is now well under way, and toward year-end, for the first time, South Africa will have commercial, public and community broadcasters competing on a level playing field for listeners and advertisers.

□□□

Pietie Lotriet is a radio consultant based in Johannesburg, South Africa.

INTERNATIONAL UPDATE

UK Proposes Relaxed Radio Ownership Rules

by Lawrence Hallett

LONDON A new Broadcasting Bill is taking shape for British radio, but plans to relax radio ownership rules are exposing fundamental disagreements among existing operators, particularly between smaller stations and the larger networked groups.

The planned changes also are creating friction between the U.K. Radio Authority and the government.

Of course, given the nature of the political process, by the time a final bill is approved, the details that worry some operators and authorities could change or be replaced by new proposals.

Lobbying to compete

For some time now, large operating groups like Great Western Radio PLC (GWR) have lobbied for the rules to be changed. GWR claims that if a station owns more than one outlet on the same waveband it would not compete with itself; instead the station would offer a wider range of programming to listeners.

Such a station could also economize by drawing upon the facilities of its other outlet(s) in the market.

Advocates also have argued effectively that poor AM reception makes it desirable to move oldies music services from that waveband to FM.

Under the current rules, no company can own more than one local station in the same waveband; however, a company can own up to 20 percent of any second service. Currently, many stations operate outlets on both AM and FM in a market.

The Commercial Radio Companies Association (CRCA), formerly known as the AIRC, is in favor of the change, although its views are not supported by its entire membership. In fact, a disagreement within the membership of the CRCA has led to the formation of the Independent Radio Forum.

In essence, this organization is an association of CRCA members that are not part of larger radio groups. Its aim is to promote and lobby for diversity in programming and plurality of ownership, and for that reason the Independent Radio Forum opposes government proposals allowing one company to control two FM or two AM outlets in any one market.

Consolidated ownership

In its submissions to the government, the Independent Radio Forum warned that ownership of nearly 70 percent of independent radio in the U.K. is consolidated in the hands of a few large groups. It noted that these groups dominate the CRCA trade body and that the views expressed by the CRCA to the government and members of Parliament merely reflect the policy of these larger companies.

Other lobbying bodies, including the Community Radio Association (CRA) and the Scottish Association of Small-scale Broadcasters (SASB), also oppose the move.

These organizations are particularly concerned that changes in the present

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INTERNATIONAL UPDATE

Southwestern Germany Reforms Radio

by Michael Lawton

COLOGNE, Germany "Radio is a matter for the states." This ideal is the constitutional principle behind the organization of broadcasting in Germany. Each state decides how it wants to organize both public and private broadcasting. Each state also sets up a public broadcasting authority and a private broadcasting licensing authority, gives them rules — and lets them get on with the business of broadcasting.

In some cases, several states joined together to establish one broadcasting authority between them. In that event, each state makes certain its affairs are properly reported from broadcasting centers in each state capital, with plenty of opt outs for state coverage or even separate channels.

The ARD

The public authorities belong to a federation, the ARD, which provides and coordinates activities among the broadcasters and organizes a system of cross subsidies from the larger stations to the smaller ones.

The system was granted to Germany by the three Western occupying powers — the United States, the United Kingdom and France — after World War II.

It was designed to ensure that never again could a strong central government, such as that of the Nazis, control all the electronic media.

However, there is one anomaly. In the southwest of the country, one public authority covers one and a half states, while another covers just half a state.

It too is a leftover of the occupation. Südwestfunk (SWF) was set up by the French for their area, Rhineland-Palatinate and Baden, and Süddeutscher Rundfunk (SDR) was set up by the Americans for the state of Württemburg.

In the 1950s, when Baden and Württemburg joined into one state, the broadcasters were left as they were.

Now, money is short, public broadcasters complain that the new license fee is inadequate, and the debate is on about redrawing the map.

SWF and SDR already cooperate considerably, with a joint cultural program, S2, a joint regional program for Baden-Württemburg, S4, and a common television channel, Südwest 3.

SWF, in addition, has its own regional program for Rhineland-Palatinate, SWF4.

But the politicians in Baden-Württemburg would like to have their own statewide authority like everyone else, and the search is under way for a more efficient structure.

This position is encouraged by the fact that both states must renew their contracts with SDR and SWF spring 1997. Formal negotiations begin in the fall.

SWF prefers a model whereby SWF and SDR simply merge, using modern technology to provide separate programming for the two states within a common framework.

Existing broadcasting centers in the state capitals, Stuttgart and Mainz, would ensure strong state input. The headquarters would be in Baden-Baden, the historic home of SWF, which would provide much of the central programming.

In addition, regional centers would add to the kaleidoscope with further opportunities for local programming. Arthur Landwehr, spokesman for SWF, said the idea would be to establish single-state station identities, which could use much common material.

The system was granted to Germany by the three Western occupying powers.

"But each state center would be independent. It would have its own board of governors, and the two would come together to consider the joint budget or to appoint the director general," he said.

SDR argues that a model that includes SWF and SDR would be inadequate.

Two other stations should be taken into account: Saarländischer Rundfunk (SR) and Hessischer Rundfunk (HR).

SR, a tiny station broadcasting to the Saarland, a tiny state that remained occupied by the French until the '50s, is highly dependent on payments from the larger stations. HR in the state of Hesse, on the other hand, balances the books on its own and even has a little over to subsidize the smaller authorities.

Two suggestions have come from SDR. Either set up one authority for Baden-Württemburg, and another for the other three states. Or, have a single four-state authority with autonomous state centers, using the historic headquarters in Baden-Baden to provide central services to all four.

SWF is not interested in the first of these options, which would create a three-state authority with fewer listeners than SWF currently has.

Nor is SR, which insists that the single-state broadcasting authority is an important political element in the German federal constitutional system.

"If you have multistate authorities," said Fritz Raff, deputy director general of SR, "then you begin to break the federal concept."

The subsidy his station gets, he said, is a guarantee of the political stability of the German republic.

But SR would be happy with a cooperative model that maintained its independence.

HR also is not interested. Its spokesman Michael Dartsch said firmly, "We are a station that can survive on its own and is rooted in its state. We will not join any other authority."

SDR maintains its proposals are a contribution to a new way of thinking about the federalism of the public stations — a way of maintaining state identity, while ensuring financial stability.

But Germany is well known for its tendency to hold on to old structures, especially when bureaucratic institutions are involved. All those director generals and their senior staffs, appointed in careful reflection of the political weight of the various parties (that whole system would be up for grabs. The Social Democrat-controlled states and their broadcasting authorities will not want to move into a broadcasting environment where the majority is Christian Democrat, and vice versa.

The state premiers stated their preferences some time ago.

Social Democrat Kurt Beck of Rhineland-Palatinate said he prefers a four-state option, which would give the three Social Democratic states a slight majority.

Christian Democrat Erwin Teufel of Baden-Württemburg, however, said he favored the two-state option, which would mean his large state has a clear majority.

Currently the state governments are holding back with clear positions, as they do not want to prejudice the forthcoming negotiations.

□□□

Michael Lawton, a free-lance broadcast journalist, reports on the industry for Radio World from Cologne, Germany.

Making a brief stop in Atlanta for the FOX 97 Ultimate Oldies Concert, Davy Jones charmed his way through a guest appearance on the FOX 97 morning show. The May 18 concert featured twelve chart-topping artists and television stars from the '60s. Pictured with Jones are FOX 97 morning show personalities Spiff Carner, left, and Randy Cook, right.

World Radio History

Antenna Maintenance

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as the inverse distance field or IDF.

Another factor that influences the amount of signal received at a particular point is attenuation. Over perfectly conducting earth, the amount of signal received at a distance would be inversely proportional to the distance from the transmit antenna.

This relationship is known as the inverse distance rule. For example, if at a distance of 1 km a field strength of 100 mV/m is present, at 2 km the field strength would be 50 mV/m. At 4 km, the field strength would be 25 mV/m, and at 8 km it would be 12.5 mV/m. If you were to graph this relationship as field strength versus distance on log-log graph paper, it would plot as a straight diagonal line.

In the real world, the earth is not perfectly conductive. Ground conductivity varies from very good (seawater) to very poor (rock and certain soils). The more conductive the ground is, the less a signal from an AM antenna will be attenuated and the more the field strength versus distance plot will resemble the inverse distance line. Over ground that is less conductive, the more a signal from an AM antenna will be attenuated and the more the field strength versus distance plot will curve away from the inverse distance line.

A family of groundwave curves is published by the FCC for each group of frequencies, showing the effects of different ground conductivities. These curves are the basis for predicting distance to a field strength and thus the entire U.S. allocation system. A slightly different set of curves is used internationally, the reason for this having to do with treaties that predate the adoption of the current set of U.S. groundwave curves.

We previously mentioned the efficiency expressed as the inverse distance field of a nondirectional antenna. You have probably already figured out that the conductivity of the ground in the region between the antenna itself and the receive point 1 km away will cause the field strength at that point to be attenuated below what it would be over perfectly conductive earth.

How, then, can one accurately measure the efficiency of an antenna? The answer is with many measurements taken radially, beginning very close to the antenna — usually at the point where the first on-scale reading can be taken. The very close-in measurements establish the unattenuated IDF while measurements farther away from the antenna establish the conductivity of the ground between the antenna and the last point measured.

Nondirectional antennas can come in several forms but, by and large, these are simple vertical radiators. One type is base insulated and series-fed; the other is grounded base and shunt-fed.

Ideally, the electrical length of an AM antenna will be 90 electrical degrees (one-fourth wavelength) or more. Antennas of this length provide adequate efficiency and bandwidth. Sometimes, though, aeronautical or structural considerations force broadcasters to use shorter towers. The apparent electrical length of short towers can be increased through the use of top loading. Top loading increases the capacitance to ground, and is usually achieved through use of a top hat (a flat, horizontal disk attached to the top of the tower) or by using bonded guy wires.

Because of mechanical considerations, the use of top hats is not as common as other methods. The top hat usually must support its own weight and withstand wind, ice and other environmental hazards unsupported, so top hat size (and thus effectiveness) is limited.

By far, the most common method of top loading is through use of bonded guy wires. This method uses sections of guy wires bonded to the top of the tower that are usually bonded above the first insulators to adjacent guy wires. Often, other nonstructural guys are added and bonded to structural guys to increase the effectiveness of the top loading. It is not unusual to see six or more guy wires bonded together in a "spider web" fashion in a top loading arrangement.

The advantages of top loading are increased base resistance, reduced base capacitive reactance, lower Q and improved bandwidth. While all this sounds very attractive, it is almost always better to achieve these qualities with increased tower height rather than top loading.

Sectionalization is a method of increasing the groundwave efficiency of a vertical radiator, improving groundwave performance and reducing skywave radiation. In a sectionalized tower, an insulator is placed near the center of an electrically long radiator and a network is placed between the sections. In simple terms, the current in the upper section can be adjusted to be in phase with the signal in the lower section, thus focusing the signal radiated toward the horizon and reducing the signal radiated above the horizon. While such an antenna may appear to be more efficient than a shorter, nonsectionalized antenna, the spherical (total) radiation in both antennas will be the same for a given amount of input power, assuming all losses are the same. Sectionalization simply puts the signal where it is needed — toward the horizon — in much the same manner as a multi-bay FM antenna achieves antenna "gain."

Next time we will look at current distribution, vertical radiation, base impedance, base towers and ground systems.

□□□

Cris Alexander is director of engineering for Crawford Broadcasting in Dallas. He can be reached at (214) 445-1713; or by e-mail at 76440.1670@compuserve.com

UK Radio Ownership Rules

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Broadcasting Bill may negate hard won assurances that newly available FM spectrum between 105 and 108 MHz would be used to expand small scale broadcasting in the U.K.

In the end, however, major groups like GWR, EMAP Radio and Capital could see all their campaigning backfire, because rules governing ownership of local stations by local newspapers would also be relaxed.

In amendments to the Broadcasting Bill, the government suggests rules that would allow one company to own two FM licenses and one AM or two AM and one FM in the same area, so long as the company operates the stations in the "public interest."

The proposed public interest test, which is yet to be finalized, is "designed to meet concerns about alliances between those who shape the agenda of social and political debate in the press and those who comment on and depict society in broadcasting," according to Lord Inglewood, the government National Heritage Minister.

Under the test, the Radio Authority will consider whether allowing one station to operate two FM or two AM stations in a market would represent a threat to plurality and diversity. If it perceives such a threat, the authority will consider if there are any overriding economic reasons, such as the protection of jobs, that would compel them to approve the merger.

"There is a presumption that the merger or acquisition will be allowed to proceed unless it is in the public interest," Lord Inglewood said.

For its part, the Radio Authority welcomed the comments of Lord Inglewood. Previously, the authority maintained that the present situation should remain almost unchanged, arguing that an increased concentration of radio ownership in a given market would reduce competition and listener choice, as well as potentially harm the interests of advertisers.

The Independent Radio Forum is not so optimistic, saying that the proposed public interest test would be unworkable in practice.

Also a source of friction between the authority and the government is a schedule in the Broadcasting Bill that prevents the BBC from holding commercial TV licenses; the Department of National Heritage (DNH) has not extended this ban to independent radio. The DNH, while indicating that the matter remains under discussion, confirmed that this was not a mistake. It is part of the government's policy to encourage the BBC to develop its commercial (non-license fee) operations.

Other proposals currently contained within the Broadcasting Bill may allow national newspaper groups that reach less than 20 percent of the population to control a non-BBC radio license, again so long as it passes the public interest test.

One limit on ownership appears likely to remain unchanged. At present, all non-BBC stations are graded on a points system according to size, and no company can hold more than 15 percent of the total available points.

□□□

Lawrence Hallett is a director of Radica Broadcast Systems Ltd. Contact him at telephone: 44-1444-258285 or via e-mail at radica@gn.apc.org

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World Radio History

USER REPORT

Auditronics 2500 Hits the Jackpot

by George Thomas
Chief Engineer
Regent Broadcasting
of Las Vegas
and Jim Wagner
Technical Consultant
Jim Wagner Associates Inc.

LAS VEGAS The motion picture "Casino" shows Sharon Stone exiting a Las Vegas bank that looks strangely familiar to the staff of KKDD(AM), KSNE(FM), KFMS(FM) and KBGO(FM).

Its former lobby and teller area now holds nine radio studios, and within its 14-inch reinforced concrete walls is the main production room.

Clearly, Regent Broadcasting of Las Vegas has built one of the more prestigious radio facilities in the Southwest to take advantage of the economies of scale of the multiple station operation.

The mission

Our mission was to build a showcase for its stations, featuring the latest digital and analog technology married to familiar gear from the past, and to combine four radio station operations scattered around town under one roof: Soft AC KSNE, Country KFMS, Oldies KBGO (all 100 kW) and satellite-delivered KKDD.

The facility needed space to add stations five and six. Finally, the studio layout and equipment configuration had to be flexible enough to accommodate any format whatsoever. All of this had to be accomplished on a moderate budget.

Regent decided to undertake the project in a planned, orderly fashion. Thus, requirements for studio and office facilities were defined prior to any sites being explored. Five satisfactory sites were determined, from which one was selected.

We undertook the same careful thought and planning when choosing equipment. After studying many competing consoles, we selected the new **Auditronics** 2500 series for six of the studios, since it offered flexibility for integration with conventional equipment as well as with the new Broadcast Electronics AV100 digital audio system.

The 18-channel input frame was used in four control rooms with the six-channel model selected for the two announce and voice track rooms. The desktop model was chosen over the "drop-in" mounting for simplicity.

Easy adaptation

The Auditronics 2500 delivered most of the features of the more expensive Auditronics consoles. Thus, it was easily adaptable with the new Gentner TS612 phone system used at Regent. An Auditronics 851 series, 24-channel console was purchased for the main production room. Auditronics, through Harris, was able to meet our tight delivery requirements without any problems whatsoever.

The Auditronics 2500 series offers an exceptional value and has proved dependable under demanding conditions. The Auditronics consoles have all been well received by the air talent, which is no small accomplishment.

Some of the 2500 features, such as A/B input switchable I/O logic controls, two stereo and two mono program busses, DC audio control (keeping audio out of the switches and faders), selectable logic control for cue start, stop and muting at fader detent and patch points are absolutely required in larger facility design.

The 2500 offers a fully enclosed steel console for maximum RF immunity, an important consideration with the proliferation of modern portable electronic devices such as cell phones and laptops.

Desirable features

Other desirable features include extensive headroom, P(G faders, mono busses for mix-minus, and selectable monitor dim or muting. The 2500 series assumes the user will employ an outboard monitor amplifier to properly tailor the speaker system to room acoustics.

Late this spring Regent moved its office staff and program operations for each station into the Desert Inn Road studios. The end result was studios that differ in size, shape and character, but are similar in equipment and layout and interchangeable in minutes. Learning the operation of any one studio allows the operation of any other. Thus, time and planning in the beginning pays off in the end.

For more information from Auditronics, contact Bob Greenwald in Tennessee at (901) 362-1350; fax: (901) 365-8629; or circle ***Reader Service 12****.*

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USER REPORT

AEQ BC-2000 Fits in at WSUA(FM)

by Julio Miguel Alvarado
Chief Engineer
WSUA(AM)

MIAMI One of the most interesting and versatile consoles that I have had the pleasure to work with is the durable and easy-to-install AEQ BC-2000.

I first experienced the console during World Cup '94. I needed to find a console that was small, durable and easy to work with in an international broadcast center. I chose the BC-2000.

Sizing it up

The most important factor at that time was the size of the console. AEQ was able to provide the same number of modules and an internal power supply in a chassis half the length of a normal 18-module on-air console. Of those 18 modules, two were BC-2030s, which are internal phone hybrids. These simple innovations made the job easier for the board engineer and saved me valuable rack space that I needed for other equipment.

After the World Cup I dismantled the studio and brought the console back to Miami, where I started to use it as a news production console to prepare and broadcast reports via satellite to Colombia.

One of the many things that I like about the console is its durability. The frame is made of wood and metal and can withstand abuse from even the roughest board operator without skipping a beat. The slide faders have not required any maintenance or repair from me.

> **One of the many things that I like about the console is its durability.**

Because the console has a true modular design, it allows you to configure it to your specific station needs. It has three independent signaling busses for three groups of mic channels, and it also mutes the corresponding monitors. You can mount the console any way you like — from vertical on a rack to flat on a table — because the VU meters and the Cue speaker are on a separate bridge.

The versatile modules have an EQ and a Balance pot. You also will find a toggle switch that allows you to switch from stereo to mono output. Another great feature is that all the inputs and outputs are XLRs. The console allows you to use five- or three-pin XLRs, depending on what function you need to perform.

As you very well know, one of the most difficult parts of an installation is building the plugs pin by pin or screwing down conductors to the motherboard. But, as I mentioned before, you do not have to do that with the BC-2000. This will cut down on a lot of your installation time. You will probably spend more time running cable than hooking up your sources.

Language barrier

Like all consoles, this one has its drawbacks in installation. The translation of the instructions from Spanish to English is awkward and may sound a little funny. The drawings that are provided help out a lot. If you are bilingual, the instructions are also provided in Spanish.

AEQ offers an internal or rackmountable external power supply for the BC-2000. Because it has three signal busses it is feasible to run two studios and a master studio from one console.

If you are looking for a console that will last a long time and requires little maintenance, this is the one. I have done minimal service on it, and it still functions like it did two years ago when I bought it.

The AEQ BC-2000 is one of the most user-friendly consoles on the market today and I would recommend it to any engineer who needs a new console that is flexible but not too expensive. After all, we know how general managers and accountants can be about that.

For more information from AEQ, contact the company in Arizona at (602) 431-0334; or circle ***Reader Service 59.***

USER REPORT

Autogram Finds a Home On the Prairie in Texas

by Paul N. Strickland
Director of Engineering
Service Broadcasting Corp.

GRAND PRAIRIE, Texas Our facility is located in beautiful downtown Grand Prairie, Texas, a small town in the northern part of the state. KKDA(FM) has been using an **Autogram** RTV-20 console with a great deal of success for the past seven years. This success led us to purchase another RTV-20 for KRNB(FM).

We have benefited from the numerous plusses offered by the RTV-20 and have experienced relatively few problems. I will try to cover these areas and explain how we resolved any difficulties with the console. We currently are installing the second RTV-20, so I will rely a great deal on our experiences with the KKDA(FM) console.

Why did I buy an RTV-20 in the first place? Good question. A likely answer: The Autogram plant is in Plano, Texas, a mere one-hour drive from the studio. Perhaps more importantly, past experiences with older Collins consoles from Ernie Ankley and that design team, plus frequent work with IC-10s and IC-8s, made me a devotee of the Autogram design.

A simple plan

The RTV-20 is a simple console on the inside. The audio cards are simple and neat, connector locations are easy to see and get to, and buttons and pots can be easily replaced — even while the station is on the air. The four mic preamps that come in the console are on one standalone card.

The outputs are not directly tied to any one channel of the console. This allows a "patch point" to do audio processing on the mics before entry into the actual mixer section. This is great if you want to have a compressor, reverb or EQ only on the mics.

Channel input cards are active balanced for a great clean input. There are jumpers on the channel cards to allow a range of input levels from -10 dB consumer devices to +4 dB pro gear. Each input card has an input for remote channel on/off control, which is great if you want to have a channel control in your news booth.

The remote control outputs for equipment are all open-collector active low, which, with today's equipment, makes interface a breeze. For the few stray pieces that need something else, a relay can easily be driven from the card and the console power supply.

When using the RTV-20, one will need to keep a couple of the pots for the monitor controls on the shelf along with a spare knob for the same. Replacement push-buttons for the on/off and channel control also are needed.

Uncovering a better console

One of the first things we did to the new console after anchoring it to the furniture was move the power supply regulators off the rear of the console. These regulators are on a heat sink and could become a pen and pencil holder for someone. A metal pen placed in the heat sink will cause more problems than desired.

We moved the regulators through the furniture and mounted them to the area under the console and out of harm's way. "Hotshotting" a card back into the card frame on this console is a big time no-no. We also removed the cover over the audio cards because we did not have an AM or FM transmitter in the back room. This made maintenance cleaning easy.

A 20-channel console gives you a lot of inputs to work with, eliminating many of the problems that come from doubling up inputs and such. But for a few problems, the RTV-20 has worked very well over the last seven years and is a true value.

For information from Autogram, contact Jon Hutson in Texas at (800) 327-6901; or circle ***Reader Service 15.***

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USER REPORT

WDEL-WSTW Finds a New Buddy

by George Moyer
Chief Engineer
WDEL(AM)-WSTW(FM)

WILMINGTON, Del. How many times have you had to make three trips up the steps to the second floor ballroom with the equipment for a talk show or lug the gear across the parking lot and all the way to the visitors' side of the grandstand for a football game? Too many? Me too.

A 75-pound road case held our mixer, mic processor and headphone amp along with the PA feed controls. Then there were the two suitcases for the mics, cables and assorted hardware. You have been there and done that.

Then along came my buddy — the **Comrex** Codec Buddy. With this beauty

The Codec Buddy is making friends in Delaware.

in tow, an away game fits in one suitcase and weighs about 20 pounds. Even the waterboy might be bribed to carry it up the steps to the pressbox for you. For a talk show with three people and a producer, you will need the second suitcase. But still, the 75-pound boat anchor stays home.

When I first saw the brochure on the Buddy, I was amazed what Comrex had packed into the little box. All of "my ideas" and then some were right where they should be. Separate headphone controls (the color man is always deaf in one ear) and the ability to mix what goes to whose ear is great. As a producer, my favorite feature is being able to talk to the host and not upset the guests as they speak.

Is it an away game and you need to frequency extend? It is in there. Telephone? Forget it; your boom mic does it all.

Telephone talk shows with an audience have always been a problem for audio feed to the PA. Our station uses radio IFB with mix-minus from the station. Blending program and IFB always left a bit to be desired until the Buddy came along. Now we feed IFB into the Aux port, mix the mics for the balanced preferred, set the PA level and forget it.

For local football games, a Radio Shack AM/FM clock radio supplies the audio for headphone monitoring and local basketball uses phone lines. All in all, flexibility is the key factor.

If you were standing at the corner bus stop one morning waiting to go to work and a hearse drove up with the grim reaper driving, a cute mountain girl in the middle and a sheik in the passenger seat trying to give you candy, what would you think? Do not look in the back or you would see the producer, engineer and the Buddy feeding a Marti transmitter. All of this was to do a morning show on an FM station. Crazy? Sure, but the Buddy worked fine. The driver is another story. By the way, this was Halloween.

By the time you read this, we will have done the morning show on a bus that was driving its normal route around our town.

Now we have our second Buddy and the sports director claims he will not give it back. He will if he ever breaks it.

I have said it before and I will say it again, the people at Comrex did their homework when they designed this little beauty. It sure makes my life a bit easier. My point is that there is still no job we have come up with that the Buddy cannot do — except maybe make coffee.

Hey Comrex, I have this idea ...

For more information from Comrex, contact Lynn Distler in Massachusetts at (800) 237-1776; or circle ***Reader Service 57.***

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Express™ is a creative tool for broadcast and commercial production with a no-frills interface so simple to use that even a program director could learn it. It uses Producer's hot-key shortcuts to reduce the learning curve if you upgrade.

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Above: Producer Edit panel; below: Mixer panel

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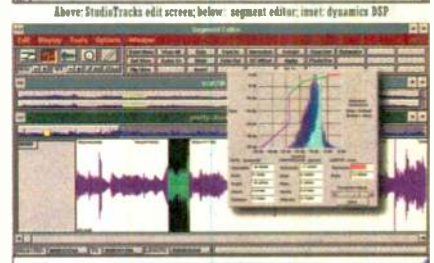
Above: StudioTracks edit screen; below: segment editor; inset: dynamics DSP



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USER REPORT

PR&E Meets Long-term Needs

by Tom Cox
Chief Engineer
KFMB-AM-FM

SAN DIEGO In April, 1996, KFMB(AM), the 50 kW home of the San Diego Padres, finished an extensive project to rebuild its on-air studios. The new design replaced two studios, a control room and production room that were built in the late '70s to play records with a master control room and a talk studio to fit the talk format adopted in June, 1994. The studio design had to fit within the confines of the existing walls.

Midwest Television Inc., the parent company for the KFMB stations, is cautious when it comes to spending capital and it was clear that whatever audio console we chose for the installation had to last 10 to 15 years.

Good track record

Pacific Research & Engineering products have a super track record for long-term reliability and ease of service. We chose its BMXIII series console as the backbone of our installation because of its superior audio quality, functionality and ease of operation.

The PR&E approach to selling consoles is firmly grounded in a systems mentality. While it is possible to buy a console from the company and never take advantage of the other resources it offers, it probably is not very smart. We chose to have PR&E work on the studio design and build custom cabinets for this project.

The BMXIII series console is available in a number of frame sizes ranging from 10 to 34 inputs. Microphone and line input modules are purchased based on need and may be placed in any one of the input slots. Each module features "A" and "B" inputs with full control logic for each position.

Input and output connections are accomplished using 0.062-inch Molex connectors located on the back panel of the console. This location can be a problem when attempting to place the console against a wall as we did. PR&E solved this problem by constructing a custom umbilical from the back panel to a duplicate panel that mounted underneath the console. This allowed us to make use of every available inch of space in the room and have easy access to console interconnections.

We purchased a BMXIII-34 mainframe and populated it with six microphone modules, 19 line modules and a console-mounted Telos hybrid controller for on-air phones.

This left us with enough spare slots to provide some separation between banks of modules of different function and also leave ample room for future expansion.

Minor challenge

The sheer size of the 34-input mainframe makes operation a minor challenge for those with short arms, but it allowed

PR&E and KFMB make a good team.

us to meet one of our prime design criteria to limit the number of steps required to initiate any input used more than once an hour to one.

We chose to buy the send/return option on all the input modules to give us some extra output busses. We do a lot of multiple feed broadcasts that utilize every available output bus in the console.

Maximum flexibility

The BMXIII logic design provides maximum flexibility in studio-to-studio communications.

We used the console talkback system as basis for a four-zone intercom. This allows us to independently talk to the control room, the talent, the newsroom and remotes without crashing into to someone live on the air.

The stock design did not exactly meet our needs, but after a few minor modifications we were in business. The logic design is conducive to a talk show environment where the host is in a studio with guests and needs to be able to control their microphones as well as his own. The custom talk table built by PR&E came with remote microphone control panels built in, as well as headphone jacks and volume controls at each position.

The audio architecture of the BMXIII uses straightforward analog design. There are no surface-mount parts, so replacement in the event of failure is a piece of cake. The circuit boards are all high-quality and hold up well to desoldering.

The audio quality is impeccable. The console we replaced was mid-1970s technology with all input and output connections made through transformers. These devices seriously hampered the transient response of the console and left the station with a dull sound. The BMXIII shines in comparison. The audio is clean open and transparent. Noise and

continued on page 64 ▶

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World Radio History

PRODUCT EVALUATION

Mackie Mixer Includes User Ideas

by Val Davis
Broadcast Automation Consultant

EMMETSBURG, Iowa If you are in the market for a new mixer, man have I got good news for you. It is the **Mackie** CR1604-VLZ. This mixer represents a breakthrough in the price-vs.-quality category. I have worked on mixers that cost 10 times more than the CR1604-VLZ but did not sound as good or handle nearly as well.

To start, when Mackie builds a mixer, the company plans on it being around for a while. This unit is built like a tank. Little touches, like the knobs being just a hair off of the mixing surface so any impacts are absorbed by the entire surface rather than just the knob, make this mixer a remarkable feat of engineering. Everything from the inner supports to the slide faders are designed to take some punishment — some salesmen stand on the unit to demonstrate its durability.

Ask and receive

If you find the CR1604-VLZ has everything you could ever ask for, there is a reason for it. This unit represents years of requests from users who would say "If there was just one more aux bus, it would be great," or "Two sub groups is great, but four would be perfect," or "Man, I wish there were inserts on all the channels." The point is, people asked for more features and Mackie said "OK." The CR1604-VLZ is the culmination of the experience of people like you all over the country.

The Mackie mixer features a blend of user suggestions.

The CR1604-VLZ features 16 inputs, four sub groups and a master stereo bus. Each of the 16 inputs features low z inputs, high z inputs, insert, trim, four aux sends, three-band parametric EQ with sweepable mids, low cut, pan, mute, solo and assignments to 3-4 or master L-R.

If that is not enough, there is a full monitoring section where you can assign specific subs to monitors. You can also assign the additional tape input to monitors.

In addition, aux returns 1 & 2 can be assigned to monitors or you can solo aux returns 1 & 2. You can also solo just the aux returns to hear your effects by themselves.

Also included are direct outputs for channels 1-8, tape in and out, master inserts for left and right channels and left and right C-R outputs. This board works perfectly either in a multitracking environment or in a club for live sound. It is amazing.

Phantom power

The CR1604-VLZ has phantom power so you can do away with batteries for your condensers. It is such a good phantom power supply that a lot of guys using big mixers carry around a 1604 for the phantom power. I hear they like the EQ as well.

The Mackie even has the jack for a light so you can mix great live sound.

I am keeping the loaner Mackie sent me to write this article, and if anyone tries to take it away they will have a fight on their hands.

*For more information from Mackie, contact the company in Washington state at (800) 898-3211; or circle **Reader Service 38.***

USER REPORT

BE Mix Trak Console Part of Major Upgrade

by Sidney J. Levet III P.E.
CEO & Chief Engineer
WCKW-FM

LA PLACE, La. WCKW-FM was in the middle of a major upgrade of facilities. We were very fortunate to have the assistance of two engineers who had just rebuilt three major radio stations in the New Orleans area.

We engineering types wanted a console that was known to be mostly trouble-free with no surprises. We wanted a console that was state-of-the-art, modular and designed to provide the operator with advanced operating and performance features — one that would be easy to service while it was on the air with modules that could be removed without popping the fuses in the power supply or causing noises on the air.

In addition, we wanted a console that was easy to clean and had a surface that would stand up to the 24-hour, 365-days-a-year wear and tear from the talent.

Easy decision

After a thorough analysis and investigation of all the audio consoles that were available with the required modules and at the best delivered price, plus what would be required to install and that cost, we decided that the **Broadcast Electronics** Mix Trak 90 (now called the Mix Trak 100) would fit all the required specifications at a cost that brought a smile to the money types in the front office.

Cory Meyer at Audiomedia assisted us in the final design of the console. It was a BE Type MT90-18 containing three mic channels, 15-line input modules plus a control room monitor module, two input expander modules, two tape/cart source remote switch modules, a digital clock/timer module, a timer control module and an array of LED bargraph meters.

These meters had programmable meter ballistics that would allow them to act like a VU or PPM meter. The unit had source remote control modules.

The power supply was mounted in the bottom of the custom cabinetry along with the mic EQs and the audio power amp for the speakers.

The well-packed consoles arrived on time, with no shipping damage. Like all consoles of this type, the installation was a major undertaking. It had to be thought out before the first wire was pulled and many feet of cable were used before it was finished. Once all the wiring was completed and all of the various components connected, the testing began.

Clean sound

When power was applied, the console had no problems — no blue flashes, no smoke, no frying sound and no funny smells. We grabbed a CD and inserted it into our consumer CD player in use at that time. Out of the monitor speakers came a clean sound.

Next, we brought out the audio test gear and began to check for phase wiring errors, noise, distortion, etc. Yes, we had transposed some of the many wires we had installed and had to correct our errors. Next came the audio response, distortion and noise test. The BE Mix Trak was flat from below 20 Hz to past 20 kHz on all inputs. Noise and distortion was below the range of the meter.

At high noon on August 6, 1990, commercial broadcast operations began from the new studio facilities using the BE Mix Trak Consoles. It is now the spring of 1996 and the consoles have been in continuous service since that August day.

We have had our share of unexpected events but, as far as I can determine, no coffee or cola baths for the consoles. The consoles have operated with no loss of air time.

All additions and/or changes were made while on the air. To date, the audio sounds just as good as at the initial turn-on. We have upgraded our CD machines to the latest Denon units and the turntables are gone. Soon our cart machines will be gone as we are now selecting a computer for that audio source.

*For more information from Broadcast Electronics, contact Mike Troje in Illinois at (217) 224-9600; or circle **Reader Service 78.***

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World Radio History

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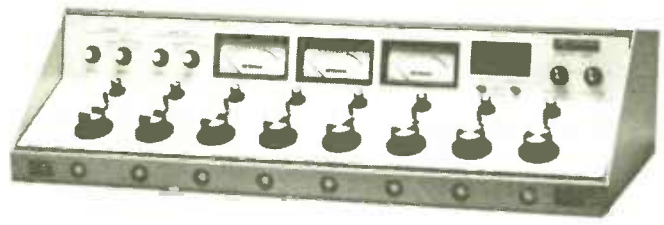

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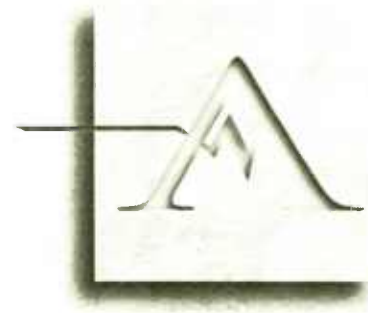

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READER SERVICE NO. 20

World Radio History

USER REPORT

Neotek on Track with Élan Board

by Gordon Carter
Chief Engineer
WFMT(FM)

CHICAGO The Neotek Élan series audio consoles are multitrack recording and mix-down consoles. Neotek has been around for quite a few years now, but you may not have heard of it.

The company makes most of its consoles for recording studios. These consoles are notable for their excellent audio performance — especially in their microphone preamplifiers — and low prices. The Élan series is Neotek's most recent entry into this field.

Musical equalizer

Each input module has both line and microphone level inputs. Phantom power is standard and can be switched on or off on each module. An input pad, phase inversion switch and level trim are provided on each input. Each module has an equalizer section that can be defeated as desired. If you are using the equalizer, it is optimized for microphone equalization. Many people feel it is a very "musical" equalizer.

The line inputs are all unbalanced, which is common in recording studios but a bit unusual for broadcasting. The outputs are also all unbalanced. You can order a balanced output option for the two-mix (stereo) output. We provided an external distribution amplifier on the stereo output to drive a number of recording devices.

WFMT(FM) is a classical music station with a large music performance studio. This console was purchased to use with the music studio, both for live broadcasts and for recording. The studio is available for rent and the console is an important selling point when finding clients.

The control room provides two-track and multitrack digital and analog recording capabilities for the client, so the audio performance of the console is crucial. We also use the console for post production mixdown from multitrack to two-track.

The size and configuration of the console is determined when you place your order. You may specify the number of input modules and their location. Each input can be assigned to various outputs in pairs through a series of assignment switches and the pan pot. The console has 24-track outputs as well as a left-right or two-mix output. A patch bay is standard with the console, allowing access to the various inputs and outputs of the console and any associated equipment.

Extra modules

Our station needed a console with subgroups. Although this console does not have subgroups as such, we ordered ours with eight extra input modules and had the line level inputs of each of these extra modules normalled through the patch bay to the first eight track outputs. These points are all available on the patch bay, so you can use other channels as desired. The user can then create subgroups by simply assigning the inputs to the output that is normalled to the desired sub (line level input of the extra modules).

Installation of the board is very straightforward. All inputs and outputs to the patch bay (and thus the console) are on multipin Elco connectors that are provided with the console. Wiring to these connectors is a simple matter of crimping the pins and inserting them into the block of the connector. Tooling can be purchased or may be borrowed from Neotek. Complete wiring diagrams are provided for easy installation.

Easy to use

The console is fairly easy to use once you become familiar with the controls. The versatility of the console makes it a bit confusing at first, but after you realize it is really two consoles in one, the controls begin to make more sense.

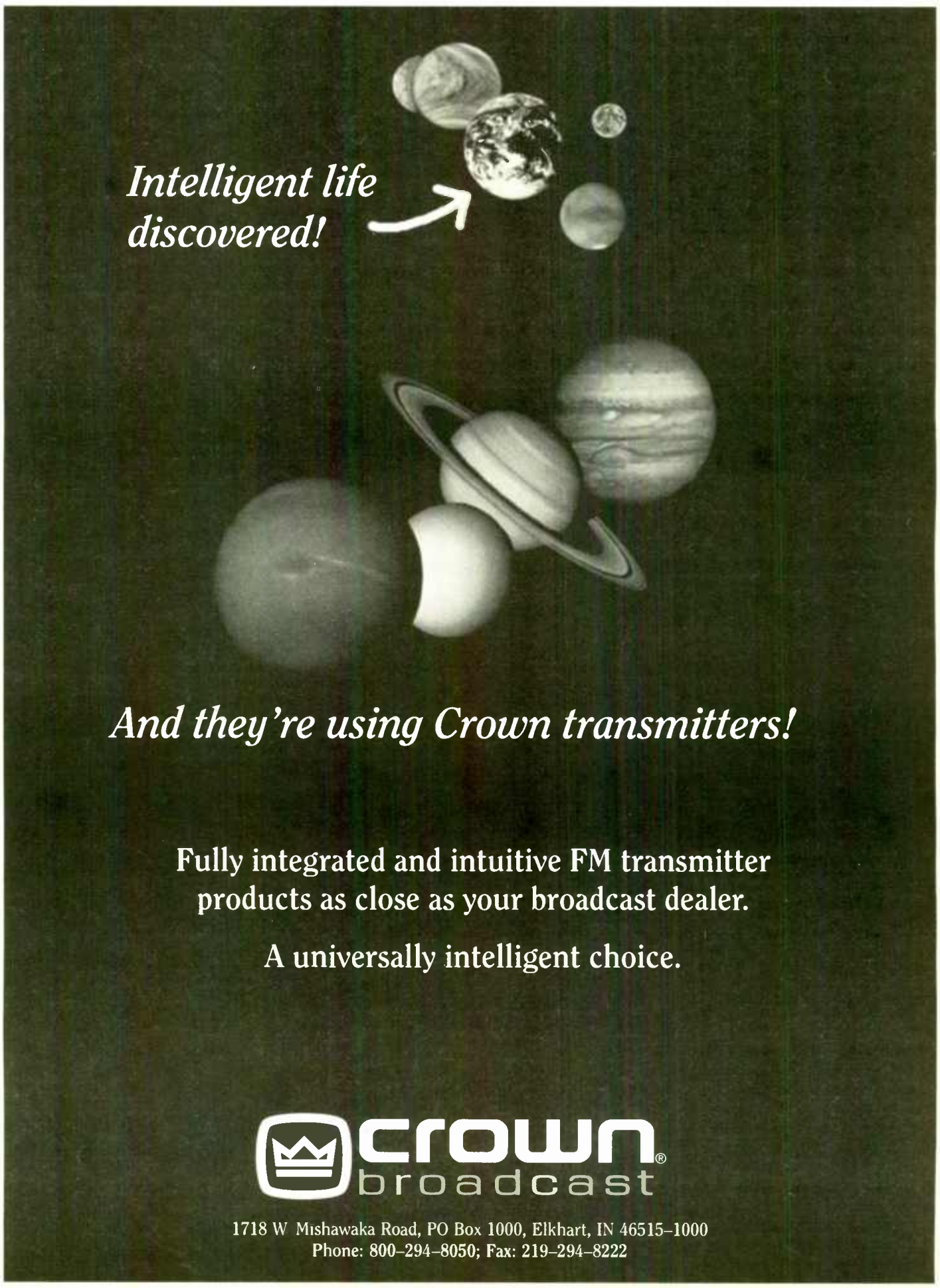
The instruction manual is of some help here, but a good conversation with the dealer or rep who sells you the console is more helpful.

Maintenance of the console is fairly easy, but there are some cautions. The console is modular in design, but the modules do not plug into a motherboard. Ribbon cables connect the modules and can be unplugged to service the modules, but the modules are hot until they are unplugged. It is almost impossible to remove a module with the power on without damaging something. After pulling the module out of its location, you can lay it on top of the console if you put something under it to protect the knobs of the other modules. This is not a serious problem, but it does require some caution.

The weakest point in the Neotek console is the documentation. Operating instructions are sketchy at best, and seem to be oriented toward the experienced multitrack user. Novices will require some time to get used to the console. The maintenance manual is just as poor, providing schematics and component location drawings, but not much else. Once you become familiar with the console, operation is easy and flexible.

The console performs well and is easy to understand, but the manuals are not. However, in my opinion, this is the best multitrack console you can buy for the money.

For information, contact Chris Walsh in California at (800) 582-3555; fax: (818) 284-3092; or circle ***Reader Service 99.***



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World Radio History

RESOURCE GUIDE

Furniture, Acoustic Tile & Studio Components

This is a list of manufacturers of furniture, acoustic tile and studio components that responded to our request for information about their products.

ABG Inc.
Contact: Dave Howland
2342 S. Division Ave.
Grand Rapids, MI 49507
(800) 999-9281; fax: (616) 452-1652
Reader Service 10

ABG studio furniture is designed and engineered specifically for the efficient housing and operation of today's digital hard drive storage/studio automation systems and workstations. With more than 400 systems installed to date, ABG offers six distinct lines of custom studio furniture in all price ranges.

Acoustical Solutions
Contact: Terri Murphy
2720 Enterprise Pkwy., Suite 101
Richmond, VA 23294-6340
(800) 782-5742; fax: (804) 346-8808
Reader Service 30

Acoustical Solutions offers a full line of sound and noise control products for the recording/broadcast, architectural, telecommunications, educational and industrial markets. Products include AlphaPyramid and Wedge acoustical forms, AlphaSorb wall panels, Soundtex fabric wall covering, Audioseal sound barrier, modular recording booths and Sonex acoustical foams and AlphaTec ceiling tiles.

Anthro Corp.
Contact: Cathy Filgas
10450 S.W. Manhasset Dr.
Tualatin, OR 97062
(800) 325-3841; fax: (800) 325-0045
Reader Service 9

Anthro designs and markets mobile and incredibly strong technology furniture. AnthroCarts are used for personal computers, rack equipment, multimedia applications and broadcast equipment. All AnthroCarts are shipped within 24 hours and come with a lifetime warranty. Call for a free catalog.

Applied Construction Technology
Contact: Gavin Bolla
1077 Florence Way
Campbell, CA 95008
(408) 370-7710; fax: (408) 866-1522
Reader Service 190

From San Francisco's Silicon Valley, ACT designs, fabricates and installs advanced ergonomic furniture, consoles and cabinetry for the electronic media, digital graphic production and corporate presentation facilities. To the traditional skills of carpenter and joiner, ACT adds a thorough understanding of plastics and metal forming — vital qualities in furnishing today's workspace.

Arrakis Systems Inc.
Contact: Rod Graham
2619 Midpoint Dr.
Fort Collins, CO 80525
(970) 224-2248; fax: (970) 493-1076
Reader Service 69

Precision modular manufacturing methods yield quality at reasonable prices. Solid oak trim, balanced laminated panels, color choices and radius corners provide elegance and durability. Available in three product families with thousands of variations, an Arrakis studio furniture package can easily be configured to meet your specific requirements.

Audio Accessories Inc.
Contact: Tim Symonds
Mill Street, P.O. Box 360
Marlow, NH 03456
(603) 446-3335; fax: (603) 446-7543
Reader Service 170

Manufacturers of audio jack panels and jacks; pre-wired audio patch panels; patch cords; patch cord holders; video panels; RS-422 patching.

ESE
Contact: N. Luke Perez
142 Sierra St.
El Segundo, CA 90245
(310) 322-213; fax: (310) 322-8127
Reader Service 50

From the ESE ES-185A GPS master clock to master clocks referencing line frequency, any of the company's five master clocks can drive up to 100 slaves with your choice from five different display sizes and many enclosure types. The new LX-5112 is a self-setting analog clock that slaves to time code and self-sets. Also available are standalone clocks and timers, audio level indicators and interfaces.

Harris
Contact: Scott Beeler
3712 National Road West
Richmond, IN 47375
(800) 622-0022; fax: (317) 962-8596
Reader Service 29

Harris Broadcast Division has every accessory the broadcaster needs for a finished studio product. From Neutrik and Switchcraft SLR connectors to the most elaborate, custom furniture, you can depend on Harris Broadcast Division studio products.

Industrial Acoustics Company (IAC)
Contact: Martin Hirschorn
1160 Commerce Ave.
Bronx, NY 10462
(718) 931-8000; fax: (718) 863-1138
Reader Service 49

Industrial Acoustics Company (IAC) supplies TV, radio, recording and music practice studios with vibration isolators. Also supplied are standalone soundproof doors, window, ventilation systems and RF shielding. IAC has just introduced its new modular Quad VIII broadcast studio.

Klotz Audio Interface Systems GmbH
Contact: Bodo Falkenried
Hans-Stiessberger-Strasse 2a
D-85540 Haar/Munich
GERMANY
49-89-461000-0
Fax: 49-89-461000-52
Reader Service 90

Klotz is a German manufacturer of professional high-end audio and video cable systems (multicores, premade and bulk cables) for pro audio installations, contracting and rental companies, Mi-dealers, radio and television stations, musical and opera houses, convention halls, etc. Klotz is represented by local distributors all over the world.

Littlite/CAE Inc.
Contact: Barbara Burns
P.O. Box 430
10087 Industrial Dr.
Hamburg, MI 48139
(810) 231-9373; fax: (810) 231-1631
Reader Service 8

Littlite Gooseneck Lamps are available in lampsets or individual goosenecks. All are available in six-, 12-, or 18-inch lengths and include either a 5 W or 2.4 W bulb. Lampsets come equipped with chassis, fully adjustable dimmer, six-foot cord, snap mount set for removable mounting and mounting screws.

Murphy Studio Furniture
Contact: Dennis W. Murphy or Sandy Berenics
4153 N. Bonita St.
Spring Valley, CA 91977
(619) 698-4658; fax: (619) 698-1268
Reader Service 230

Murphy Studio Furniture designs and produces Elegant Studio furniture for radio stations and production facilities. The company offers six modular furniture designs and does complete custom layouts.

Neutrik USA Inc.
Contact: Kathi Evans
195 Lehigh Ave.
Lakewood, NJ 08701
(908) 901-9488; fax: (908) 901-9488
Reader Service 70

A complete line of audio connectors and accessories. Featuring 1/4-inch and TT patch panels, patch cords, XLR cable ends, XLR receptacles, 1/4-inch plugs and jacks, Speak-On, ProFi, Combo, circular miniature connectors, circular DIN, adapters, modules and transformers.

Nigel B. Furniture
Contact: Katherine Brent
10655 Vanowen St.
Burbank, CA 91505
Fax: (888) 4-NIGELB
Reader Service 129

All steel furniture that includes desks, consoles and a complete line of accessory items too numerous to mention here. Call or fax us for our 40-page catalog that lists everything from DAT and CD-ROM drawers to reel-to-reel and mixing stands.

Pacific Research & Engineering
Contact: Barbara Laramie
2070 Las Palmas Dr.
Carlsbad, CA 92009
(619) 438-3911; fax: (619) 438-9277
Reader Service 110

PR&E designs and manufactures both standard and custom studio furniture and cabinetry (pre-wired or non-wired). The company also manufactures PR&E audio consoles and audio peripherals, as well as distributes audio equipment from other major manufacturers to function as a turnkey supplier.

Sandar Electronics
Contact: Wiggo Evensen
P.O. Box 2004
N-3202 Sandefjord
NORWAY
47-33459600; fax:47-33459333
Reader Service 28

Audio routers: 64 x 64 AES/EBU in only 2 RU; 128 (128 analog mono in only 6 RU; 32 (32 analog stereo in only 1 RU. Control systems: PC-software and control panels, control of up to 8 router lev-

continued on page 64 ▶

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World Radio History

▶ continued from page 62

els; up to 1,000 salvos possible. Other products: analog and digital video routers for broadcast and telecom.

Sonifex Ltd.
Contact: Marcus Brooke
61, Station Rd.
Irthlingborough Northants., NN9 5QE, UNITED KINGDOM
44-1933-650-700 fax: 44-1933-650-726
Reader Service 109

The Solutions 1 radio studio package comprises a complete set of studio equipment, including furniture and cables, providing a ready-to-run radio operation. The Mentor series of PC clock cards synchronize your PC clock to ±1 second per week, or to the MSF/DCF radio signals.

Spacewise Broadcast Furniture
Contact: Peter Palagonia
P.O. Box 91034
Tucson, AZ 85752-1034
(800) 775-3660; fax: (520) 579-9877
Reader Service 89

Spacewise Broadcast Furniture manufactures and markets radio and recording studio furniture, digital system monitor turrets, fabric-covered acoustic panels, copy racks and furniture finished equipment racks for studios.

Wheatstone Corp.
Contact: Gary Snow
7305 Performance Drive
Syracuse, NY 13212
(315) 452-5000; fax: (315) 452-0160
Reader Service 48

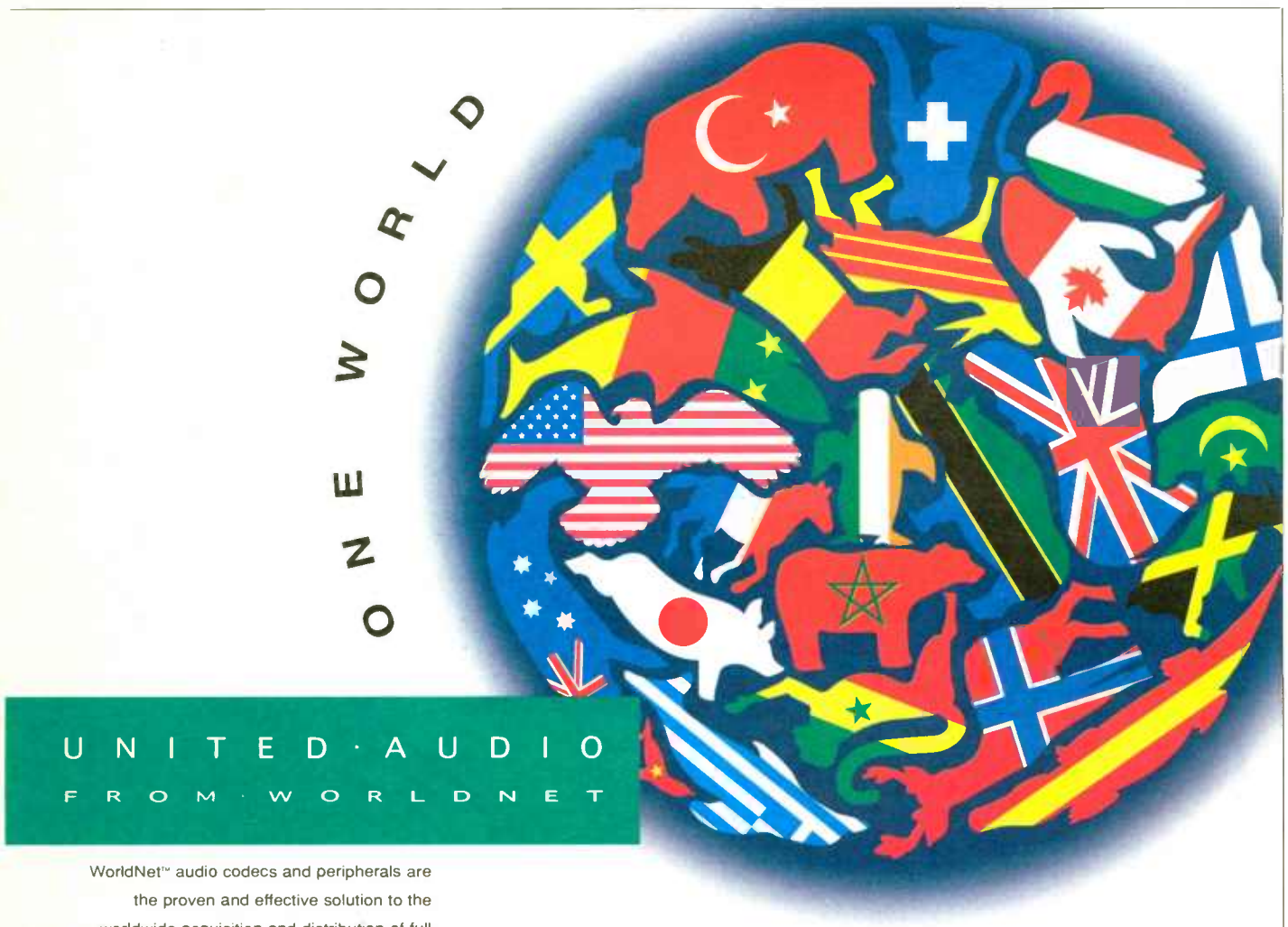
Wheatstone's new line of custom-designed furniture for radio stations incorporates a stylized approach to radio console furniture. The design is based on a curved style of architecture and includes a combination of hardwoods and laminents. The U-shaped counter array includes a sweeping curve toward the interview area, and the interview counter is kidney-shaped. The furniture includes a substantial amount of storage space as well as generous wire raceways and hinged punch block panels.

Wright Line
160 Gold Star Blvd.
Worcester, MA 06106
(508) 852-4300; fax: (508) 853-8904
Reader Service 150

MediaLinx from Wright Line is a modular furniture system designed for multimedia, video, publishing, graphics and other highly technical environments. MediaLinx features a steel framework combined with a variety of worksurface and equipment management components. In addition to this workstation system, Wright Line also offers the Optimedia multimedia cabinet system, a modular storage cabinet designed to store a variety of media and supplies, including CDs, tapes and diskettes.

Z Systems Audio Engineering
Contact: Lee Auerbach
4641-F NW 6th St.
Gainesville, FL 32609
(352) 371-0990; fax: (352) 371-0093
Reader Service 130

Z-Systems manufactures a line of Digital Detanglers — available in eight, 16 or 32 stereo pairs — that combine the features of a patchbay, router and distribution amplifier for AES/EBU and S/PDIF digital audio. Operable under manual, remote or computer control, the Detanglers allow digital gear to be physically interconnected in the digital domain and routing patterns to be changed dynamically without having to unplug and rearrange cables.



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PR&E Meets Long-term Needs

▶ continued from page 58

distortion are practically nonexistent and exceeded the published specifications in all configurations.

The documentation supplied with the console consists of a three-ring binder that is almost three-inches thick with large, easy-to-read schematics and wiring diagrams. The circuit descriptions are well-written and easy to follow.

Installation procedures are straightforward and well thought out. The extensive installation section made it quite simple for us to predesign the wiring for the entire installation. Using CAD and spreadsheet computer programs, we were able to generate full, single-line drawings and wire charts well before the console arrived. This cut installation time from bare walls to operational studios to four days.

No installation is perfect and this one was no exception. It would have been nice if the line modules had the same talkback logic capability available on the microphone modules, but they do not. This was sacrificed to allow for external machine control logic because real estate is at a premium on the circuit board. In this particular installation it would have been handy. I also think better documentation on the talk turret accessories would have been helpful.

PR&E has been in business a long time and has listened to its customers. Its products are designed to meet the majority of broadcasters' needs right off the shelf and its professional approach and team effort has kept us coming back to them year after year.

For more information from PR&E, contact the company in California at (619) 438-3911; fax: (619) 438-2977; or circle ***Reader Service 17.***

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022	048	074	100	126	152	178	204	230
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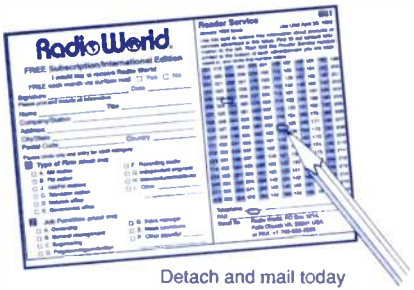
World Radio History



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World Radio History

USER REPORT

Radio Systems Chosen for LMA

by Tom McNally
Chief Engineer
WMID-AM-FM

ATLANTIC CITY, N.J. When Arbitron recently combined our home county, Atlantic County, N.J., with the county directly south of ours, Cape May County, WMID-FM, a Class A facility in Atlantic City found itself at a signal disadvantage, not covering the entire rated area.

Our solution was to enter into an LMA arrangement with another Class A station in Cape May County, 35 miles to our south, and simulcast our Atlantic City signal. We decided that, considering the distance, we needed a solid signal feed, not off-air. We installed a discrete STL system and a Telos Zephyr as a backup to cover some fades during coastal fog and matched the audio processing gear box-for-box to achieve an identical sound on both frequencies.

Time to upgrade

Having a separate feed to the station meant we could also program it separately from our Atlantic City studio if we had the proper studio equipment. Because the existing console was a simple rotary pot/lever switch-style console, it was not capable of anything too fancy. It was time for an upgrade.

The **Radio Systems** RS-18 was my first choice as my past experience with the RS line at other stations was excellent. After discussing our needs with the factory, Radio Systems proposed that we purchase a modified version of the RS-18 that would do exactly what we needed to do without tying up the Audition buss.

Still working

The mod consisted of adding Radio Systems' optional mix-minus boards in a fashion that would feed each station with the main program buss and its own set of cart machines. This way we could do a spot break with common and separate spots and return to music seamlessly. We also had a switch installed that would change the function of the audition meters to watch the second station. All of this functionality cost us very little; certainly much less than a big mainframe console would have cost.

The RS series uses semi-modular construction with the input control cards that are easily removable from the bottom of the front panel and motherboards for the mixer and output boards. My experience has shown them to be reliable over the years. In fact, one of my contract stations has an RS-12 that took a lightning hit and has a hole the size of a quarter blown in the output board. I patched around the chip that was blown away (the unused Talkback audio) and it is still working 10 years later.

The Radio Systems production manager, who happens to live nearby, delivered the console in a timely fashion. Installation could not have been easier. I am partial to wiring directly to sources; no patch bays or punch blocks. Radio Systems' use of plug-in "Euro-connectors" made it quick and painless.

Another advantage of that connector system is flexibility. If you do not like the way the inputs are grouped, you can simply unplug and replug them. Each input has easy selection of any level from mic to high line level, with simple plug-in DIP header attenuators. Unbalanced source equipment can be used as well.

We purchased the optional cart machine interface boards that allow the lamps on the console to follow the machines and also mute audio at the end of a spot (or CD), making for a cleaner signal. The built-in remote control allows you to either pulse or maintain a start signal to a machine, as well as remotely turn a channel on or off. This is handy in an unattended operation, as you can simply maintain the closure for a particular channel with a switch or jumper. The console will come back up on the air after a power failure, a feature some of the all-electronic microprocessor-controlled consoles cannot do.

Radio Systems uses rugged and easy-to-repair CMOS logic, all plug-in chips, and DBX VCAs, so any repairs down the road will be easy. It also has an overnight replacement program for those who do not want to mess with component level repairs.

I did have a little AM RFI in the system until I rearranged some grounds, after which I found it to be very clean. We are right under the AM tower and have two 50 kW FM stations across the street. I experienced a problem with an input card when the lamp in the Off button blew with a hard short. The protection device is a resistor that smoked and opened, but did not take the console down. I had to replace the resistor and driver transistor. Total cost: about a dime.

A few more

The RS-18 features 36 total inputs, assignable to either program, audition or mono busses, and with the modifications I described, two additional busses. It also has the ability to monitor program, audition, mono, cue and four external monitors on either the speakers or headphones. I could use a few more monitor inputs these days, as it would be nice to be able to monitor the outputs of the individual station feeds, the Zephyr return audio and other things with one-button ease.

The few times I have had to contact Radio Systems for parts, it has been responsive and timely in delivery. I will definitely go with another RS console the next time one of my stations wants to upgrade. Price, function and reliability cannot be beat.

For more information from Radio Systems, contact JoAnn Dunn in New Jersey at 609-467-8000; fax: 609-467-3044; or circle ***Reader Service 32.***

AEQ offers a solution for all your requirements

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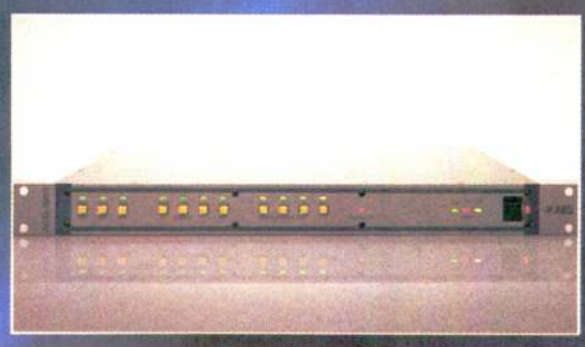

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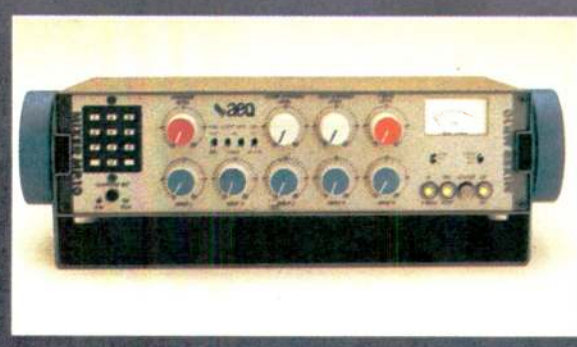

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World Radio History

USER REPORT

Ward-Beck Console on the Edge

by David Haydu
Engineering
CFNY(FM)

TORONTO CFNY-FM, 102.1 "The Edge," is a leading alternative music format radio station. Until its acquisition in late 1995 by Shaw Communications Inc., the station broadcast from a nondescript strip mall in Brampton, Ontario, a suburb on the western outskirts of Toronto.

Because the majority of our listeners are based in Toronto and our signal is beamed from the CN Tower, a decision was made to relocate to The Eaton's Centre, a prestigious address in downtown Toronto. As is usually the case in the radio business, once this decision was made we had a limited time frame in which to complete the transfer of facilities and be up and on the air in our new location.

Greater visions

Fortunately for us, the choice of **Ward-Beck Systems Ltd.** Renaissance MKII 16-channel console had been made previously through a corporate buy by Shaw. Ward-Beck had the frame on hand at the factory, and all that was required was for us to define how to equip the console.

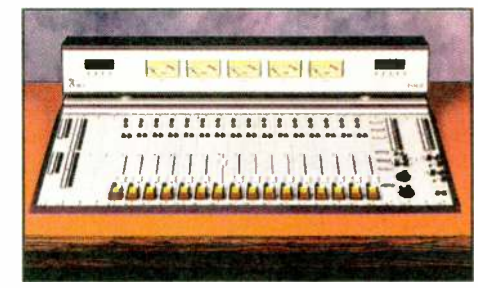
We had originally envisioned a design for a much larger mainframe, but were pleasantly surprised by the versatility and comprehensive input and output handling capability offered by the MKII that allowed us to stay with the 16-input channel design.

Further discussions with the engineering and sales staff at Ward-Beck confirmed that we could realize our operational goals with a few minor modifications to the standard mainframe.

The Renaissance MKII is located in the Edgelink on-air studio where it is used to air the most important morning and evening drive-time shows. The Ward-Beck engineers listened to our unique requirements and designed a system including studio control turrets tailored to address the demands of the morning show format. The Ward-Beck product line now includes a "Humble Turret" and a "Fred Turret," so named for the on-air personalities of the morning show.

CFNY does numerous remote broadcasts and has an interactive roadside broadcast studio at the edge of Yonge Street where "Live in Toronto" airs nightly. The Renaissance MKII, with its electronic switching and VCA faders, is the ideal master control console when we are in this operating mode.

The console, as ordered, was equipped with four microphone input channels, 10 stereo high level input channels, 10 stereo high level inputs, two stereo program outputs complete with mono sums and integral mix-minus output. Through internal programming, the mix-minus output may be assigned to as many as four external telephone lines.



CFNY relocated with Ward-Beck.

A stereo monitor channel with 10 input selects, Stereo/L/R/Mono mode switching and the unique shaft encoder level controls for monitor and headset levels is included.

Standard features on the console includes a clock, time and five LED-illuminated VU meters. All switching is electronic, all indicators are LED and the channel fader is a VCA-controlled by a Penny & Giles linear actuator.

Phone home

This was the first Renaissance console I had installed and, with the pressure of time, we ran into a few glitches. A couple of quick phone calls were all that was required to have the problems addressed. Often the solution was reached over the phone, but when required, personal attention by the helpful, friendly Ward-Beck staff was at hand.

The installation of the console, which was delivered first, went relatively smoothly.

We would have preferred to have the studio turrets factory-tested with the console in order to minimize the time spent on site to make the system operational. The powering scheme employed for the studio turrets was a little disappointing. The AC cord plus a low voltage converter was marginally acceptable.

All in all, Ward-Beck delivered a professionally executed package. The equipment looks good and has performed very well during the first month in our new location.

We know that we can count on support form the factory if and when we need it. I would definitely buy another Renaissance console from Ward-Beck.

For information, contact Eugene L. Johnson in Canada at (416) 438-6550; fax: (416) 438-3865; or circle ***Reader Service 52.***

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World Radio History

USER REPORT

Wheatstone Makes News in Boston

by Michael LeClair
Chief Engineer
WBUR(FM)

BOSTON Two years ago, when WBUR(FM) began planning to move to a new building, it was not a moment too soon. Our existing studio facilities, designed for live radio drama, were built during the predominantly tube era of 1957. Upon changing to an all-news and information format about three years ago, producing programs became a delicate balancing act. Our mixing consoles were a venerable 20 years old and showing their age.

As a station that produces many programs for national distribution via NPR, including "Only A Game," "Campaign Connection" and the popular "Car Talk," our goal was to design and install a technical plant of the highest technical quality. The choice of consoles is perhaps the most important element in this technical design.

How does it handle?

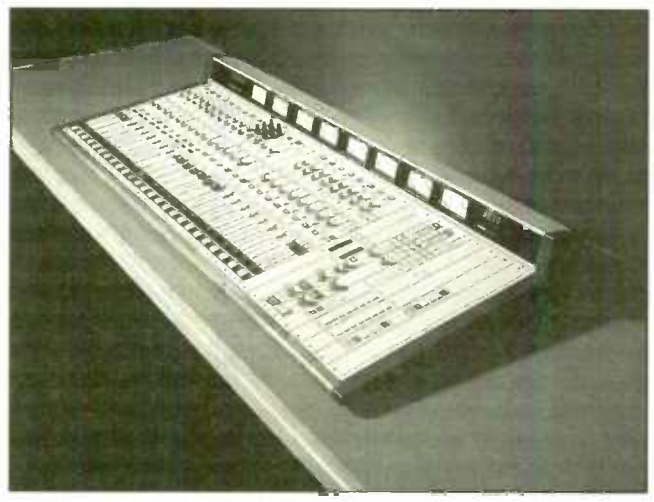
As an all-news format station, WBUR also required consoles that could handle complex program requirements with ease. Programs that are run live for national distribution often require up to four or five unique mix-minus feeds to make sure that none of the participants in the show receive annoying "echoes" of their own speech or distortion producing feedback. In a given program, we might have an ISDN interview with an expert in San Francisco, another in Texas and other comments arriving via telephone.

We also wanted to customize our consoles to allow mounting of controllers for our new master routing switcher, a Sierra 32000 series to make operation similar for the engineer.

After much careful analysis, including the pros and cons of experimenting with one of the new digital designs, we decided to go with the newly developed A-6000 console from **Wheatstone.** No other design featured the high performance and flexibility that we required. And Wheatstone likes to do custom work, including high-quality artwork that matches the finish of the rest of the console.

The A-6000 consoles use the latest generation integrated circuits, specially designed for audio applications by Analog Devices. Dynamic range is an impressive 115 dB (roughly equivalent to 20-bit digital). Bus crosstalk and assign isolation are -95 dB at 20 kHz. In our tests of these consoles after installation, we found that we were able to meet or even exceed these specifications.

These latest designs also allow a higher level of integration, permitting an order of magnitude increase in features in the same size console. All insert points are balanced for improved immunity to interference and grounding problems. There are four stereo mix busses, four individually assignable mix-minus busses, a stereo cue bus and a mono send bus on the consoles that we purchased (with the capacity for one more send bus if required). All sends and inserts can be configured to be pre- or post-fader via DIP switches in the console. Any module can have individual A or B inputs with separate logic to control remotes, studio muting, and even warning lights.



WBUR upgraded with the Wheatstone A-6000.

Extra logic

We found that we needed this extra level of logic control for our Studio 2, the primary air studio. This control room has both a large studio and an announce booth attached. In addition, during our fundraising broadcasts (we are a listener-supported station), this studio allows us to air from a large telephone bank room. All three of these areas have full monitoring, muting and warning lights that are controlled by the A-6000.

Installation of the consoles went smoothly, using the special crimp type DB-25 connectors and tool supplied by Wheatstone. All the necessary connectors and installation information were preshipped by Wheatstone. With careful planning we were able to have most of the audio and control wiring complete except for final length and punchdown to 66-type interconnection blocks. This was important because our timeline allowed us barely three weeks to install four studio suites, each of which had a console and two announce booths.

Our installation featured some additional custom work, developed by WBUR, that permits an IFB system using standard Wheatstone intercom modules. This IFB allows an engineer or a producer to talk to the three announcer positions in the studio either individually or together, which is essential in a radio talk show environment. I was able to accomplish this with an external chassis and using the input/output signals available on the A-6000 intercom modules with no required internal modifications.

We also added Wheatstone intercoms between studios and our newsroom and found its system to be an inexpensive alternative to a standalone intercom package. Wheatstone specially modified its console module to allow us to use a standard gooseneck microphone for all of these communication functions.

Installation issues

A difficulty came with Wheatstone's decision to locate the level controls on the modules internally to prevent accidental damage and tampering. The adjustment of the microphone modules to accept the high output level of a Neumann U87A microphone literally took hours to accomplish using the extender card/cable provided.

Another surprise in installation was the amount of time it took to set up the console modules internally. Because we were using the capabilities of these consoles to their maximum, it was necessary to make many switch settings in each module to accommodate the various mix-minus possibilities, timer controls and muting requirements.

The lesson learned is that all of this customization and flexibility can have a dark side: You need to do more planning and have more time to set these consoles up correctly. However, the results are well worth this extra investment.

I would not hesitate to recommend the Wheatstone A-6000 console to any station looking for the best in both quality and features. Our experience with this equipment and the company has been nothing but the best.

For information, contact Ray Esparolini in New York at (315) 455-7740; fax: (315) 452-0160; or circle ***Reader Service 232.***

TECHNOLOGY UPDATE

RCS

Klotz Digital Console from RCS

SCARSDALE, N.Y. The RCS Digital Audio Control console built by **Klotz Digital** allows you to custom design a fully digital, user-defined mixing console with faders, rotating pots and push-button modules. Up to 48 input channels are allowed, each with five-band parametric equalizers and level controls. The console comes with an IBM-compatible PC for graphical display.

The RCS console is easily networked to other consoles and allows for simple automation interfacing. Ergonomically compact, the digital console is 65 mm high. It can begin small and grow to fit future studios.

The VADIS Digital Audio Switcher permits audio switching of up to 1024 channels. The switcher allows all output channels access to all inputs without having every imaginable connection available. DSPs can be added quickly and easily.

For more information from RCS, contact Richard Darr in New York at (914) 723-8567; fax: (914) 723-2258; e-mail: info@rcsworks.com; or circle ***Reader Service 91.***

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World Radio History

TECHNOLOGY UPDATES

KORG

WESTBURY, N.Y. The 168RC Digital Recording Console from **Korg** is a 16 (8 (2 completely digital mixing console with full automation and two built in stereo effects. Two eight-channel ADAT Optical Digital Interfaces allow the 168RC to communicate with adats or other recording devices entirely in the digital domain. Up to six 168RCs can be digitally linked for 96 channels of digital mixing.

The unit has 16 digital inputs in the form of two ADAT optical inputs. There are also eight analog inputs, four TRS balanced line inputs, two XLR mic inputs with phantom power and inserts and two balanced TRS mic inputs with inserts. All 24 inputs can be used simultaneously. There is a stereo analog input for two-track playback. Converters are 18 bit.

There are 16 digital outputs through two ADAT optical outputs, two analog effect sends, analog and SPDIF digital stereo master outputs, and analog monitor output. D/A converters are also 18 bit.

MIDI In, Out and Thru are used to dynamically automate the mix using an external sequencer. A word clock in and out facilitate digital audio sync.

There are three-band parametric EQs on 12 channels, 50 locations for storing effect patches and 100 memory locations for instant recall of all mixer snapshots.

For more information from Korg, contact the company in New York at (516) 333-9100; or circle ***Reader Service 132.***

ATI

HORSHAM, Pa. The Vanguard Series of broadcast consoles from **ATI** offers superior performance and reliability with minimum maintenance. The lighted, quiet, snap-action switch array digitally selects all mixer inputs, outputs and monitoring functions. All level controls feature DC-operated VCAs to eliminate fader noise and tracking errors while reducing the need for premium faders.

Vanguard Series consoles feature linear or rotary faders, four-input headphone amps, cue amplifier and speaker and balanced, bridging inputs. The consoles are 24- or 32-inches wide and include four input monitor drivers, two mic preamps, active balanced outputs, an external power module and effective RF protection.

Optional features on ATI Vanguard Series consoles include tally light relays, start-stop switching and dual, five-input expanders. Also optional are additional mic preamps; dual, stereo LED bargraph meters and a dual mix-minus telephone adapter.

For more information from ATI, contact Sam Wenzel in Pennsylvania at (215) 443-0330; or circle ***Reader Service 92.***

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SOUNDCRAFT

NORTHRIDGE, Calif. The B800 by **Soundcraft** has proven itself to be a versatile and powerful audio desk for TV, radio and remote live broadcast and production work. The mono input module features a 48 V switch for phantom-powered mics, a Mic/Line switch, a Phase Reverse switch and a high-pass filter. There is also a Tone switch that applies a signal to the modules input to verify its operation and check your sends and routing.

There are six mono auxiliary sends and two stereo aux sends for a total of 10 aux busses. They can be switched from pre- or post-fader and can be used to create additional mix-minus sends FX loops or foldbacks.

The Cue switch logic is tied into the fader. If the fader is fully-down, then pushing Cue routes a PFL signal to the Cue bus. The Cue is canceled if the fader is moved up, then if you push cue when the fader is up, it acts as an AFL/PFL switch (AFL or PFL is selected by a switch in the master section).

The fader is also tied to a pair of remote start/stop relays to control external machines. An On switch arms the relays and, if line input is selected, the start relay will activate when the fader is raised and the stop relay will activate when the fader is fully off.

There is also a Stereo Source Select Module available, and Soundcraft has custom designed a Surround Sound monitor module and Stereo Group module, which are now available as production items.

For more information from Soundcraft, contact Alex Welti in California at (818) 227-1807; fax: (818) 227-2974; e-mail: awelti@harman.com; or circle ***Reader Service 172.***

MARKETPLACE

Recently Introduced Products for the Radio Broadcast Professional

Measurement Information On Internet

Actual Radio Measurement has introduced new hardware and software systems. The company produces a variety of radio and retail research products, including ratings reports based on in-car listening. ARM detects AM and FM listening events using its Traffic Survey Unit (TSU).

The new hardware includes a computer designed specifically for the new TSU, and new software packages are available for gathering and compiling data into ARM market reports.

For more information from Actual Radio Measurement, contact Karl Baehr in New Mexico at (505) 828-0488; e-mail: karl@arminc.com; or circle ***Reader Service 112.***

Additional information about ARM is also available via the World Wide Web at: http://www.arminc.com

Wind-up Radio

The wind-up Freeplay radio from Baylis Generator provides 30 minutes of listening for 20 seconds of winding. Equipped with AM/FM and shortwave, the Freeplay is designed to withstand harsh conditions and operate anywhere without the need for external power.

Introduced in North America by BayGen USA, the Freeplay was developed to bring communications to isolated regions of the world where electricity and batteries are scarce or nonexistent. A handle is flipped out for fast winding and when the radio is in operation the handle slowly unwinds.

For more information from BayGen USA, contact the company in New York at (800) WIND-234; fax: (914) 258-3213; or circle ***Reader Service 192.***

Information about the Freeplay is also available via the World Wide Web at: http://www.freeplay.pair.com/

New 75 ohm Connectors

RF Connectors introduced its new series of coaxial connectors that include 75 ohm BNC adapters and cable connectors. The connectors are available with both nickel and silver plating, Delrin and Teflon dielectric and all feature gold-plated captivated center contacts.

For more information from RF Connectors, contact the company in California at (800) 233-1728; e-mail: 102061.2261@compuserve.com; or circle ***Reader Service 152.***

Sound Forge 4.0 Released

Sonic Foundry Inc. has released Sound Forge 4.0, the latest version of its sound editing software for Windows 95. Improvements on version 4.0 include audio quality and accelerated processing speed.

Direct edit mode now gives users an option to work directly on the file, thereby making opening and saving files nearly instantaneous. Sound Forge 4.0 also features improved time compression/expansion, redesigned pitch shift and graphic fade with dithered/noise-shaped fades.

For more information from Sonic Foundry, contact the company in Wisconsin at (608) 256-3133; or circle ***Reader Service 212.***

Information about Sonic Foundry is also available via the World Wide Web at: http://www.sfoundry.com

International Terrain Databases

SoftWright LLC, developer of the Terrain Analysis Package (TAP), recently acquired several new international terrain databases. Over 90 countries are now available in digital elevation models.

These can be integrated into TAP to substantially reduce the time and labor in evaluating the suitability of radio transmitting and receiving sites. Accurate coverage studies can now increase the confidence in such radio services as conventional two-way radio, paging, cellular and air-to-ground as well as FM and TV broadcasting.

For more information from SoftWright LLC, contact the company in Colorado at (303) 344-5486; fax: (303) 344-2811; e-mail: sales@softwright.com; or circle ***Reader Service 171.***

Information about SoftWright is also available via the World Wide Web at: http://www.softwright.com

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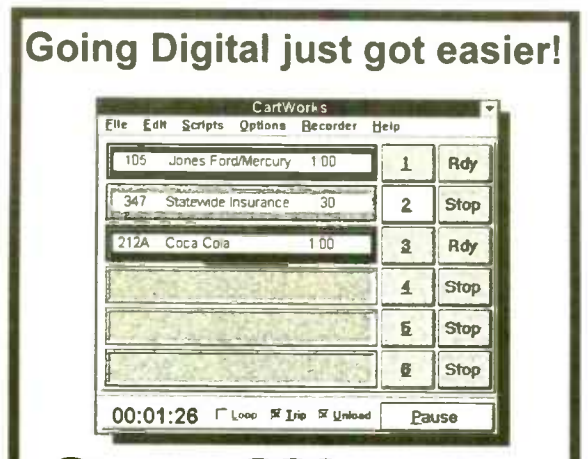

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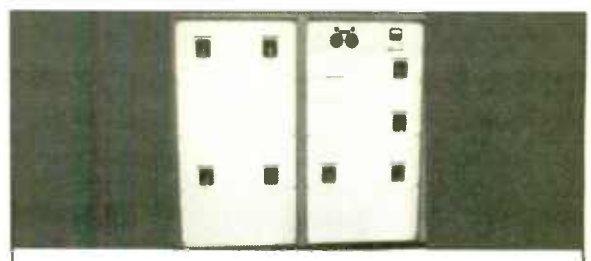

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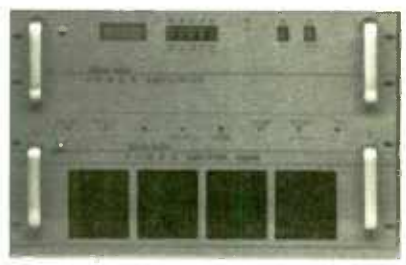

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World Radio History

65 Years Ago

Reprinted from Radio World July 18, 1931. Editor's note: The RW of old, printed for a time in the 1920s and 1930s and today's RW are unrelated except in name.

"Recording Detective" to be Used for Evidence Against Suspected Stations

INSTEAD of using stenographic service, which is expensive and sometimes open to attack for the possible error factor, the Federal Radio Commission will use phonograph recordings in gathering evidence against stations suspected of abusing their broadcasting license.

A portable recording device made by RCA Victor Company on specifications and order of RCA Photophone, Inc., was demonstrated before the Commission and proved highly satisfactory. The device is AC operated. The turntable revolves 33 1/3 times a minute, as in talking movies and transcriptions for radio program service. The outfit cost $1,000 to build, but this is not the production price.

A receiving set, very selective, a recording microphone, an engraving head, two turntables, a high-gain audio amplifier, and blank records are used. The overlap is considerable, so that nothing will be missed, and programs of indefinite duration may be recorded.

"We believe the operation of this device will solve many of the problems that have been confronting us for several years," said Acting Chairman E. O. Sykes, following the demonstration.

"With it we will be able to record radio broadcasts in any section of the country and have a permanent record for use in any emergency.

"Heretofore we have been obliged to resort to stenographic reports and oftentimes they have proven unsatisfactory. Now we shall have an absolutely perfect record which, if need be, can be introduced at hearings before the Commission's Examiners to support the allegations in the Commission's bill of complaint.

"With this new device in operation we shall be able to maintain close contact with all broadcasting activities and when it becomes generally known that we have installed the apparatus, we believe it will be the means of lessening the number of infractions against the Commission's rules and regulations.

"The portability of the apparatus, which can be transported in three small cases, will make it possible for it to be transported, when necessary, to remote places where it will be operated by a radio engineer who shall be competent to qualify as an expert at any necessary hearings.

James Baldwin, secretary of the Commission, said that use of the new apparatus should result in increased efficiency and economy in the conduct of radio hearings. Instead of sending for affidavits in support of complaints against particular stations under investigation, he explained that recordings will be made, providing a complete report on the particular station's activity, at a fraction of the cost of hiring stenographic reporters. In several instances the cost of stenographic transcriptions, he said, has equalled or exceeded the cost of the apparatus itself, due to completeness of the record.

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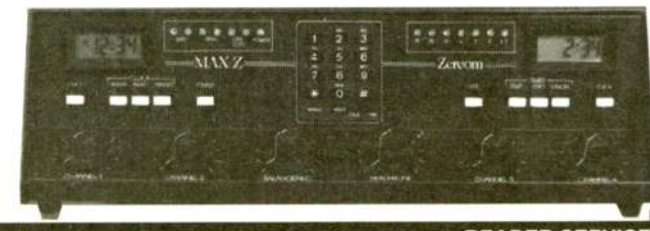

READER SERVICE NO. 231

World Radio History

INDUSTRY ROUNDUP

New Consoles Rolling in Soon

by Christopher Nicholson

WASHINGTON The next wave of digital products is on the verge of invading the shores of the radio broadcast industry.

Next to digital transmitters and receivers, the final product needed to complete the all-digital airchain that is still not yet commonplace is the digital console. In the coming months, several manufacturers are planning to have their digital consoles off the production line and ready to ship.

Tag Borland is president of one of those companies, Logitek, and is anxious for the digital consoles to start hitting the market. Borland said he sees the consoles as a way for radio stations to quickly move toward consolidation. "The console," Borland said, " will allow one operator to control many radio stations at once."

Borland added that "as soon as the (radio) companies start gobbling each other up, six, seven and eight stations will all be running off of one board — this is not possible on an analog console." The Logitek Serial Sound is slated to begin shipping this September.

Harris Corp. has just begun shipping its digital console, the DRC-1000. Jim Woods, director, studio products for Harris, sees the consoles as the last link in the all-digital facility. "The consoles will provide a lot of flexibility in the studio," Woods said.

Woods added that a large facility will be dramatically simplified, as will the interconnection of products.

Of the many companies that are already manufacturing analog consoles, only a handful are venturing into the digital domain at this point. Because of this fact, the competition between these companies could be heated.

Fidelipac President Roger Thanhauser pointed out that money will obviously play a big part in determining which companies have a strong impact in the marketplace. The Fidelipac Dynamax MX/D is also expected to hit the streets this September.

"My experience is that broadcasters don't pay for technology, per se," Thanhauser said. "They buy the equipment to save money." Thanhauser explained that he does not expect stations to pay a lot more money for a console just because it is digital.

Borland said he expects the digital console market to develop much like the PC market has in that two or three manufacturers will have standard audio engines while numerous others will manufacture add-on equipment.

Bob Greenwald, sales manager for Auditronics, noted that with digital consoles comes a new slate for manufacturers to start on.

"The companies will have to prove themselves again," Greenwald said. He added that customers will be changing loyalties as they start to shop for digital consoles.

The NuStar from Auditronics is scheduled to ship later this year.

Wheatstone Director of Sales Ray Esparolini said that this type of competition is already taking place in the TV industry with the switch from VCA to digital, and will probably do the same in radio.

"The key to a digital console," Esparolini said, "is that the layout must be consistent. It must be a digital replacement for an analog device."

According to Greenwald, "The first company out of the gate with the right product should be successful. The first offering has to work and it has to work well."

Borland sees a bright future for digital consoles. He explained that many stations will be buying the consoles to complete their digital airchain, and he also noted that, if digital transmission to digital receivers becomes a reality, there will be a big switchover to digital consoles.

"Initially, all the stations that are either rebuilding or moving to new facilities will be the major buyers of digital consoles," according to Esparolini. He added that the second type of stations to buy the consoles will be those that currently have a mix of digital and analog equipment but are concerned about their audio prod-

continued on page 72 ▶

TECHNOLOGY UPDATES

FIDELIPAC

Digital Offering from Fidelipac

MOORESTOWN, N.J. The Dynamax MX/D from **Fidelipac** will enable broadcasters to establish a fully integrated digital signal path. The console is the result of a collaboration between Fidelipac and Graham-Patten Systems. Mixing, switching and audio signal processing within the MX/D are performed by a modified version of the main processor section from the Graham-Patten Systems D/ESAM 200.

The MX/D features eight input boards, each providing two channels backed by separate XLR connectors. Input boards are analog or digital and may be selected in any combination. Analog modules digitize incoming audio and convert that signal to the MX/D mixer's internal data format while digital modules convert all incoming digital signals to a common sampling rate and synchronize data with the internal matrix.

The GPS main processor board uses the latest in DSP and microprocessor technology to perform mixing, switching and audio signal processing in a single 24-bit data stream.

Three digital channels and three analog channels are available for the MX/D's output and both digital and analog outputs support program, audition and mono. Digital output is provided at a 48 kHz sampling rate, although the rate can be preset at 32 kHz by the factory prior to delivery.

Initial shipments of the MX/D will begin in September.

For more information from Fidelipac, contact the company in New Jersey at (609) 235-3900; fax: (609) 235-7779; or circle ***Reader Service 111.***

LOGITEK

Logitek Close to Delivering Serial Sound

HOUSTON Serial Sound is a new, all-digital console system by **Logitek.** It features 32-bit floating point processors and can have up to 28 inputs and 28 outputs (56 in mono).

Analog ins and outs are handled with 20-bit conversion and each digital input has a sample rate converter. Serial ports are provided for connection to automation systems, hard disk systems or by modem to Logitek support.

The control surface is separate from the rackmount audio engine and connects via an RS-422 link. It has 10 slide faders with the usual on/off and bus assign buttons. Above each fader is an LCD screen that shows the current input.

Turning the select knob scrolls through all the inputs available to that fader. This can vary from only one to every input connected to the audio engine.

Whole console layouts can be saved so that changing the jock mic from "Morning Mike" to "Rockin Rick," for example, can cause all the fader inputs to be reassigned. A PC-based program run during installation steps the user through the setup of the inputs and control system.

The Serial Sound will begin shipping in September.

For more information from Logitek, contact Tag Borland in Texas at (800) 213-5870; fax: (713) 782-7597; or circle ***Reader Service 131.***

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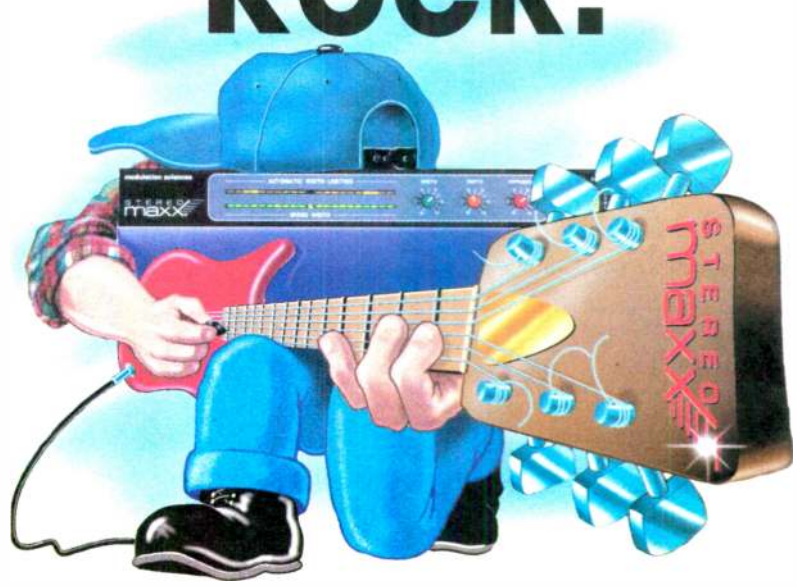

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World Radio History

PR&E Set to Expand

CARLSBAD, Calif. Pacific Research and Engineering (PR&E) plans to expand following the closing of its initial public offering (IPO) of 500,000 units.

PR&E is a leading manufacturer of broadcast consoles, digital audio workstations and peripheral products for radio broadcast. A privately held company for 27 years, PR&E plans to use the proceeds of the IPO to increase marketing focus both domestically and abroad and to expand new product development efforts.

Founder and CEO Jack Williams said, "PR&E has developed a strong business serving the needs of major market and network broadcasters. We now wish to take the company to the next logical step in its evolution and introduce our high quality sensibilities to the international and middle market segments."

The infusion of capital will be used to build the infrastructure needed to launch multiple simultaneous growth initiatives, according to Michael Dosch, chief operating officer for PR&E.

The company expects to introduce several new products that have been in development since before the IPO. PR&E's expertise in studio design will assist broadcasters through the recent trend of station consolidation.

Dosch said, "We have always had to govern our growth based on the limitations of retained earnings. Now we have the resources to properly execute an ambitious growth plan."

PR&E also announced the promotion of longtime sales engineer Michael Uhl to the position of sales manager.

As sales manager, Uhl plans to reorganize the PR&E sales force into an organization capable of providing high-level consulting expertise and of working in partnership with all levels of station management.

Uhl began his career as an audio sales representative in 1978. Except for a brief period in 1984 when he became national sales manager for Auditronics, Uhl has spent his entire sales career with PR&E.

Dosch added, "Mr. Uhl has nearly 20 years with the company and brings an extensive understanding of today's radio marketplace to the job."

Consoles Ready to Roll In

▶ continued from page 71

uct. Esparolini cited stations such as those playing jazz and classical music as those that fit into the second category.

Will other console manufacturers venture into the digital arena?

"The technology involved is newer and more esoteric," Thanhauser said. "Some conventional console manufacturers are without the ability to make a digital console and there are other companies that are currently not making consoles that might start," he added.

"In three to five years," Woods said, "it will be farily hard to find analog consoles." He noted how quickly stations jumped from tape- to PC-based automation.

About the companies that are not currently making digital consoles, Esparolini said, "I think they'll have to if they plan on staying in business."

TECHNOLOGY UPDATE

STUDER

Digital Mixing Console From Studer

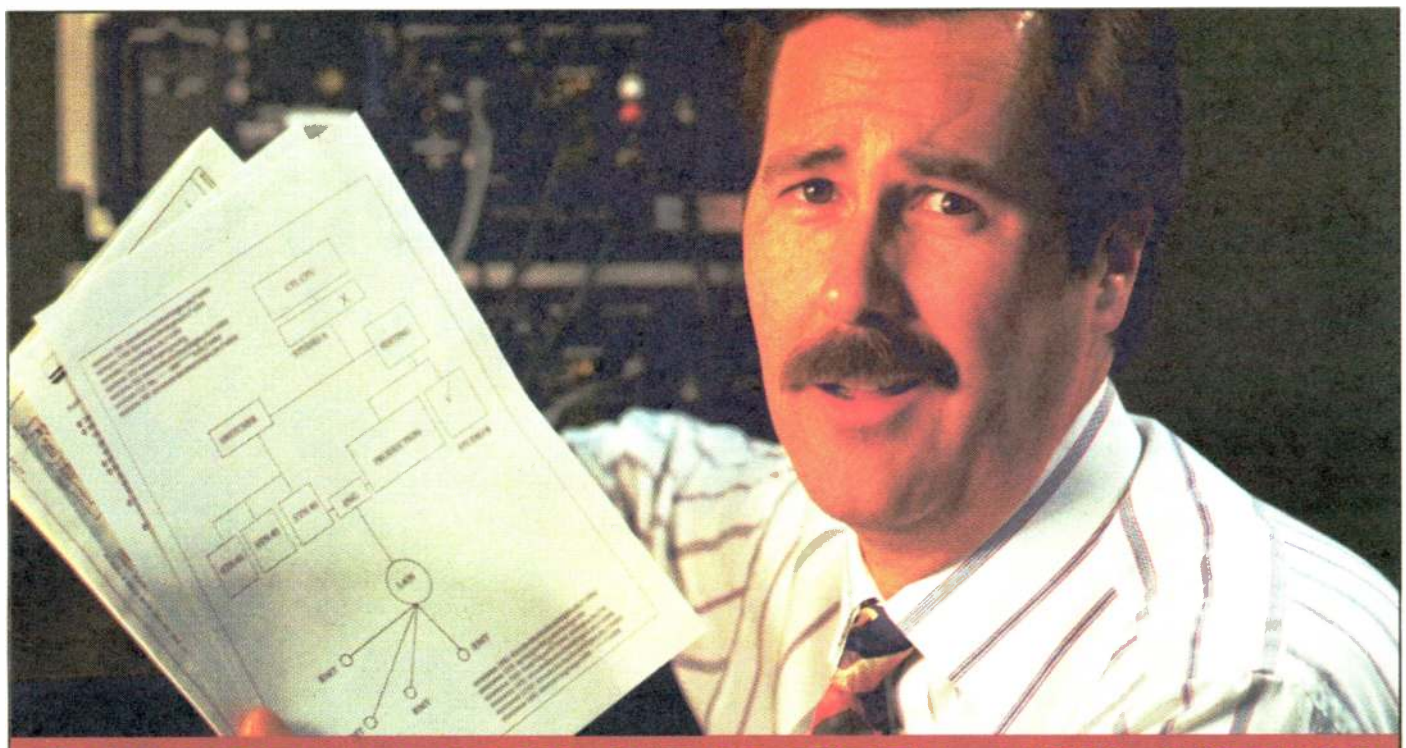
NASHVILLE, Tenn. Studer has recently taken a number of orders for the D940/D941 digital mixing consoles. The customers range from Korean Broadcasting (KBS) and Italian Radio (RAI) via Swiss National Radio (DRS and RSR) to West German Broadcast (WDR) and East German Broadcast Brandenberg (ORB).

The Studer D940

The D940 console features full dynamic automation and can be tailored exactly to the studio's needs owing to a high degree of modularity when it comes to console sizes, the DSP power or the analog and digital audio interfacing. The console allows the channel functions to be operated from the channel strip itself and/or the channel approach, the central approach or a combination of both.

An integrated DSP routing matrix enables flexible audio routing, avoiding the need for an external mechanic patch bay. There are up to 64 busses to be used as multitrack sends, groups, masters, etc., in any combination.

For more information from Studer, contact the company in Tennessee at (615) 391-3399; or circle ***Reader Service 151.***



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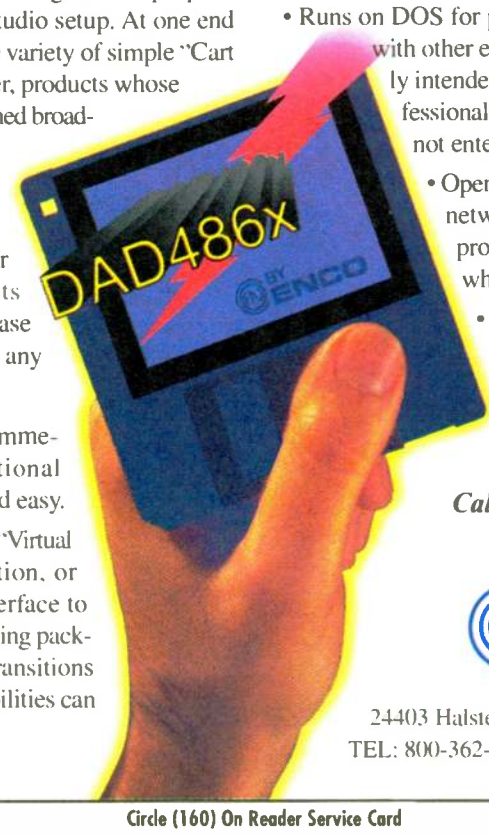

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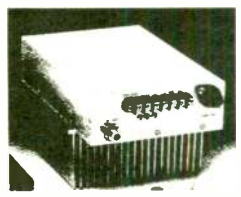

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Valley People Kepex II's (2), brown face hor; (2) Valley People Gain Brains, brown face hor; (2) Valley People Maxi Q's w/pwr supply & rack, all in gd cond, $700. Tait Recdg Srvs, 1347 S Capitol St SW, Washington DC 20003. 202-488-3905.

Digidesign Session 8 digital audio workstation, new never used, won at NAB, $2700. B Updyke, WRGN, RR#3, Hunlock Creek PA 18621. 717-477-3688.

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ADC patch bays, 1/4" 52 points. $169; ADC TT bays, $129 up; Furman 1/4" to 1/4", $95 ea; Rane ME15 graphic EQ, $150; Digitec 3.6 sec delay, $150. W Gunn, 619-320-0728.

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EMT-981 pro CD player, as new cond, BO. Harry, 508-234-4295 x145.

COMPUTERS

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CONSOLES

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Shure mixer, $600. T Balistreri, WALT, 1801 Coral Dr, Waukesha WI 53186 414-784-2863.

Ampex AM10 6x2 mixer, $495. J Price, Price's Recdg Std, 2651 Globe Ave, Dallas TX 75228 214-321-6580.

Autogram AC-8 8 chnl stereo workhorses in gd cond (2), $2200 ea/$4200 both T McGinley, WPGC, 6301 Ivy Ln, #800, Greenbelt MD 20770, 301-441-3411.

Tascam 208 studio mixer, 8 in, 4 out, slide pots, separate 4 band EQ, XLR, RCA & 1/4" inputs & outputs, pro quality & quiet, $550 +shpg. RK Hatcher, Rainbow Prod, POB 147, Yorktown IN 47396, 1-800-371-3548.

Mackie 1604, $725; Tascam 512, $950; Tascam 520, $1750; Allen & Heath SYNCON 28x24, $8000; Ramsa 820, $2200. W Gunn, 619-320-0728.

Want To Buy

Autogram RTV-20, 20 chnl console ASAP in gd cond. T McGinley, WPGC, 6301 Ivy Ln, #800, Greenbelt MD 20770. 301-441-3411.

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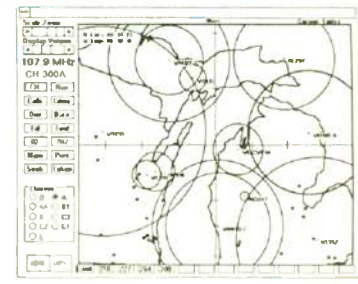

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Neumann U89 w/shock mount, gd cond, BO. Tait Recdg Srvs, 1347 S Capitol St SW, Washington DC 20003. 202-488-3905.

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MICROPHONES...WTS

HME-WM 252 wireless w/SM58 mic xmtr. $195; Telex WT-200, $300; Telex WT-50, $250. J Price, Price's Recdg Std. 2651 Globe Ave. Dallas TX 75228. 214-321-6580.

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RCA 77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights. Top price paid Fast response. Bill Bryant Mgmt, 2601 Hillsboro Rd. G12, Nashville TN 37212. 615-269-6131. FAX: 615-292-3434.

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Raymer TPA-1 telephone paging adapter, $15; WE 20B2 pwr unit, talk & ringer voltages, $15; Comdial voice express 6 button telephone, $35; TIE mdl 100, 10 button new key telephones w/service manuals, $50/lot. E Davison, 217-793-0400.

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Azimuth T-A-07 test tape. 30 ips. 1". BO; T-W-07 sweep freq 30 ips NAB, BO. M Crosby, 408-363-1646

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Lyrec tape timers (3), $300 ea; (7) Seike/Spotmaster tape timers, $175 ea; (5) Spotmaster TP1B cart winders w/timer, $225 ea; (5) Spotmaster TP1B cart winders, no timer, $50 ea. Mel Crosby, 408-363-1646.

Want To Buy

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Mic flag for RCA 77DX from medium to major market station. D Winslow, KLDE, 5353 W Alabama #410, Houston TX 77056 713-622-5533

Issues of Audio Engineering & Audio magazine from 1940's, 50's & 60's. P Chance, Imperial Analog, 925 Clinton St, Philadelphia PA 19107 215-574-8147.

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Otari 5050B 2 trk R-R, 7.5/15, no problems, $1400 +shpg; Otari MKIII-8 1/2" 8 trk R-R, 7.5/15, remote transport, no problems, $1600 +shpg, free delivery in SF Bay area. D Litwin, 415-255-2737.

Ampex 440-B 4 trk in original console, gd cond. $650; Ampex AG-355 2 trk 1/4 trk, gd cond, $350; Ampex 351 (2) original tube electr, original heads, like new cond, BO; (2) Ampex AG-600 mono, grey case, gd cond, BO. Tait Recdg Srvs, 1347 S Capitol St SW, Washington DC 20003. 202-488-3905.

Revox service & parts manuals for B77, PR90, operation manual for A77, $35/lot. E Davison, 217-793-0400.

Studer A807 VU+K, low hrs, RS232, mic pre, BO. Harry, 508-234-4295 x145.

Alignment tape: B346-1, 7.5 ips FT 0 VU 1/4", $20; 4690005-01 15 ips NAB 1" FT, $200/BO; 4690007-01 15 ips NAB 2" 8 trk, $200/BO. 4690048-01 30 ips AES 1", $220/BO. C0005 1/2" 7.5 ips NAB 185nW, $125/BO; C0006 1/2" 15 ips NAB 185nW, $125/BO; C0007 1.0" 30 ips AES 185nW, $140/BO; C0023 1/2" 3.75 ips NAB 185nW, $130/BO: X1353 3150 Hz flutter, 1/2" 15 ips FT, $95/BO; X1252 3150 Hz flutter, 1/4" 30 ips, $60/BO; X1352 3150 Hz flutter, 1/2" 7.5 ips FT, $85/BO. M Crosby, 408-363-1646.

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Teac X-2000R r-r, 10", dbx I NR, full motion sensing, 1/4 trk stereo, BO. M Sophos. WDFH. 914-693-3963 after 4PM Eastern

Various cassette & R-R recorders including Otari, MCI's, Ampex's, Gauss & EMT, to numerous to list, call for info & pricing. J Price, Price's Recdg Std. 2651 Globe Ave, Dallas TX 75228. 214-321-6580.

Ampex AG602, unmounted, $250; rackmount for 600 series, $30; (2) Samsonite cases, 600 series, mono, brown, gr cond, $50 ea; Samsonite case for 600 series, stereo, grey, gr cond, $50; 601 tube type in case, $200; (7) Ampex 7.5 ips alignment tapes, unused, $20 ea, BO; various used Ampex capstan & reel motors, working, as is, $50 ea; Microtran table top degausser, like new, $150; AL 500-2 recorder, as is, $100; (2) AG440A mono FT, as is, $150 ea; AG440 mono FT, play only, $100; Scully 282-4, 4 trk 1/2" tape, $800. Mel Crosby, 408-363-1646.

Bell Tape Record-O-Fone model RT65B, pre 1950's. 617-337-1952.

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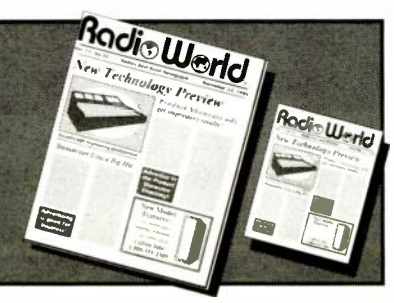

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World Radio History

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Circle (26) On Reader Service Card

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3CX2500F3	4CX15,000J
3CX2500H3	4X150A
3CX3000A7	5CX1500A
3CX3000F7	5CX1500B
3CX10,000A3	572B
3CX10,000A7	5U4G
3CX10,000H3	SV655OC
3CX15,000A3	6AS7G
3CX15,000A7	6BM8
3CX15,000H3	811A
4CX250B	833A
4CX250BC	833C
4CX250BM	EL34
4CX250R	SV811-3
4CX350A	SV811-10
4CX350AC	TH5-4
4CX400A	TH5-6
4CX800A	TH6-3
4CPX800A	TH6-3A
4CX1500A	YC130/9019
4CX1600B	8560AS
4CX1600U	SK300A
4CX3500A	SK1300
4CX5000A	SK1320
4CX10,000D	

- Watch this list grow.
- Shipment from USA stock.
- Manufactured in Russia's largest power tube factory.
- Generous* warranty based on high quality.
- Honest prices based on quality at low cost.

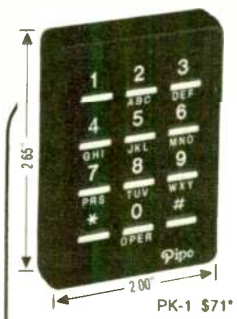
Broadcasters
Phone: 800-239-6900
205-882-1344
FAX: 205-880-8077
OEMs, Distributors
Phone US: 800-578-3852
Int'l & US: 415-233-0429
FAX: 415-233-0439

Circle (27) On Reader Service Card

D and C Electronics Co.
Lowest Price on Tubes including:
4-1000A/3-1000Z/ 8877/4CX250B/833A 4-500/5-500/4-400/ 4CX 3500/5CX1500
and much more!
Factory Warranty!
1-800-881-2374
(352) 688-2374
Se habla Español
FAX: (352) 683-9595

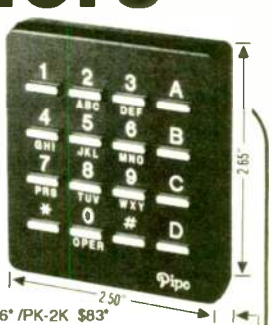
ADVERTISE Call your advertising representative
for details & deadlines **800-336-3045**

DTMF/encoders
STEEL KEYS
SEALED GOLD CONTACTS
An ultra high quality DTMF Encoder for absolute reliability and function.
- Contacts are: Water Proof/Dust Proof
- Completely Self Contained — No RFI
- Simple 3-Wire Connection • Output Level Adj
- Wide Operating Range 5 to 16vdc
- Wide Temperature Range -22°to +160°F
- Supplied with Instructions, Schematic, Template & Hardware



PK-1 $71* /PK-1K $78* w/Relay

Call or Write for Free Catalog
VISA/AMEX
*Request Quantity Price



PK-2 $76* /PK-2K $83* w/Relay

Mail Order To: **Pipo Communications**
Emphasis is on Quality & Reliability
P.O. Box 2020
Pollock Pines, California 95726
(916) 644-5444
Fax: (916) 644-PIPO

Circle (1) On Reader Service Card

World Radio History

TUBES...WTS

Premier Eimac® Remanufacturing

Have Your Power Tubes

Remanufactured by the Original Manufacturer

- Factory Processing
- Factory Testing
- Original Specifications
- New-Tube Warranty

Worldwide Availability Through Richardson Electronics, Ltd (708) 208-2200

Call 800-414-8823

Int'l. (415) 592-1221

or Fax 415-592-9988

CPI Communications & Power Industries

Eimac division

SVETLANA DEALER

US807, 4CX300, 6146, 833, +++

Sound In Mind:

800-755-2365

FAX: 540-249-5064

REBUILT ELECTRON TUBES

Partial List: 6623, 23791, TH150, 6425F, 6427, 8550, 6804, 6696, 6697, 5681, 5682, 5671, 7804, 3CX10,000H3, 3CX20,000H3, 4CX5000A, 4CX35,000C

Worn out power tubes purchased

Vacuum Tube Industries, Inc.

1-800-528-5014

508-584-4500 X75

ECONCO

Quality Rebuilt Tubes

Approximately ½ the Cost of New

Call for Our Price List

800-532-6626

916-662-7553

FAX 916-666-7760

Circle (43) On Reader Service Card

TURNTABLES

Want To Sell

Russco Studio-Pro mdl B, 45/33 w/tonearm, $100 +shpg; Ramko SP-8E stereo preamps, $25. Ramko MA-7 mono preamp, $15 +shpg. H McDonald, KKJV, POB 807, Veradale WA 99037. 509-484-4531.

Gates TT w/Micro-Trak tonearm, recently removed from srvc, platter is 18", tonearm is 14" w/Stanton cartridge, base is 21" sq on cabinet 24" sq & 31" high, custom pre-amp can be included or removed. G Johnson, WLDY, POB 351, Ladysmith WI 54848. 715-532-5588.

DON'T GAMBLE WITH YOUR ADVERTISING DOLLARS

Advertise in Radio World and reach 18,000+ broadcast professionals. Call Simone TODAY!

800-336-3045 Ext.154

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.

I would like to receive or continue receiving **Radio World** FREE each month. ❑ Yes ❑ No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

☐ D. Combination AM/FM station ☐ F. Recording Studio
☐ A. Commercial AM station ☐ K. Radio Station Services
☐ B. Commercial FM station ☐ G. TV station/teleprod facility
☐ C. Educational FM station ☐ H. Consultant/ind engineer
☐ E. Network/group owner ☐ I.Mfg. distributor or dealer
☐ J.Other _____

II. Job Function

☐ A. Ownership ☐ G. Sales
☐ B. General management ☐ E. News operations
☐ C. Engineering ☐ F. Other (specify)
☐ D. Programming/production _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

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 listee.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966

ADVERTISING SPACE IS AVAILABLE!

Call

800-336-2045 ext. 3045

for more information!

SERVICES

- Terrain Analysis
- FM Studies
- Population Studies
- FCC/FAA Databases
- Contours

Communications Data Services, Inc.

800-441-0034

fax 703-532-5497

http://www.comm-data.com

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Falls Church, VA 22044

G.K. PAINTING CORP.

Industrial & Commercial Painting

Sandblasting & Waterblasting

Special Coating (specialize in radio towers)

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Fax: 703-978-1824

5141 Bradfield Drive, Annandale, VA 22003

Tower Sales & Erection

Turnkey Site Development
Installation & Maintenance
AM/FM Broadcast, TV
Microwave Systems,
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TOWERCOMM Communications Specialists

Ben Wall
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REMOTE EQUIPMENT RENTALS

COMREX and GENTNER

1, 2 & 3-Line Extender Systems
Now With The New TELOS ZEPHYR
MARTI VHF/UHF RPU Systems
ISDN & Switched-56 Systems
Call or FAX Dwight Weller

WELLER AUDIO-VISUAL ENGINEERING

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FAX: (410) 252-4261

STATION REMODELING

FM Stations or Construction Permits

we assemble all

call for quote

Quality Bays, Inc.

516-681-0878

For details on space availability contact Simone at 1-703-998-7600 Ext.154

World Radio History

EMPLOYMENT

To place ads in this section, use the ActionGram form. To respond to box numbers write Radio World, PO Box 1214, Falls Church, VA 22041. Attn:_____

HELP WANTED

Program Director

Are you interested in working in a station with one of the largest audiences in the country...with an adult contemporary\inspirational music format? Do you have proven track record as a Program Director with strong communication skills; able to model and develop your staff to build and maintain audience involvement; loyalty and response? Position will include a daily air shift; oversee music selection and placement; creative development and execution of on-air promotions and building team involvement in "selling" the station on-air. If you have these qualities along with a personal commitment to ministry and spiritual character, call Roger Booth at WFRN, at 1-800-933-0501. EEO Employer

Beasley Broadcasting Group

owned stations in eastern North Carolina seek full time Chief Engineer. Currently own two Class C's and one AM. Great stations and company. Competitive compensation package. Send qualifications to Bruce Simel, PO Box 3436, New Bern, NC 28564. EOE.

Sales Engineer

Gentner Communications Corporation has immediate openings for two Sales Engineers in our Broadcast group, one to concentrate on building domestic USA business and one to concentrate on the International broadcast market. If you have an excellent understanding of telephone interfacing and transmitter remote control equipment and the ability to explain these type of products to both technical and non-technical customers, we'd like to talk with you!
Relocation to Salt Lake City will be required; if you would like to live within a few minutes' drive of 7 world-class ski resorts, along with mountain hiking, hunting and fishing, please mail or fax your resume with salary requirements to Gary Crowder, Sales Manager. Gentner is an equal opportunity employer.

Gentner Communications Corp.-1825 Research Way, Salt Lake City, UT 84119 tel: 801-975-7200 fax: 801-977-0087.

Advertise!
Call 800-336-3045
Ext.154
for details

COLORADO SPRINGS
CHIEF ENGINEER

Top-rated, heritage CoSprings Country Station has immediate opening for Engineer with strong audio, digital & maintenance. Good salary, great lifestyle. Resumes to GM% KKCS, Box 39102 CoSprings, CO 80949. EOE

Berkshire Bdctg seeks multiskilled individuals to fill 3 FT positions in our radio group. Candidates should have positive attitude, friendly personality, & a willingness to learn & grow in the job. Positions include:

On-air talent for full service, news intensive, community format. Creativity & strong production skills required. Exper. w/Arrakis Digilink & Trokstor desired.

News/sports reporter, writing skills, news gathering & play-by-play exper. required.

Promotions & Mktg Coord., must possess advance computer skills with a working knowledge of desk top publishing & the internet. Retail promotionol exper. desired. Send your resume/tape, ASAP, to Cory Thurston, Berkshire Bdctg, POB 707, North Adams, MA 01247. EOE.

Engineer wanted for Full Service Consulting/Contract Engineering Service serving Northeast. Must be licensed, reliable, communicate well & take interest in clients needs. Digital,studio& Hi/Lo pwr RF experienced. Resume to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #96-7-10-4RW

ASSISTANT ENGINEER

to maintain all aspects of our three radio stations. Computer knowledge, AA degree in engineering or equivalent, two years broadcast experience a must. EOE.

Resume to: Radio Chattanooga, Inc., ATTN: Mike Murrell, Chief Engineer, P.O. Box 11202, Chattanooga, TN. 37401

P.M. Drive & Production Director for Soft A/C. Total digital production & editing. Min. 2 yrs. experience. Send tape, resume, references & picture for this Central PA opportunity to: Radio World, POB 1214, Falls Church VA 22041. Attn Box #96-7-24-1RW

POSITIONS WANTED

Kevin Hilley, 15 yr pro, avail now to jump start your morning show. Fun, great phones & a team player, willing to relocate. T&R, 717-944-7673.

Proven sportscaster looking for new challenge. Talk show host, reporter, anchor, play-by-play, or behind the scenes work. Enthusiastic & knowledgeable. Eric, 614-291-5081.

22 years on-air, MD, PD, currently GM/GSM of small market AM/FM combo, seeking bigger challenge, prefer Midwest. Inquiries to: Radio World, POB 1214, Falls Church VA 22041. Attn: Box #96-07-10-1RW.

30-yr pro seeks small market management opportunity in SE. Broad knowledge, creative, organized, high integrity. Send inquiries to potential at POB 14706, Greenville SC 29610.

Atlanta GA & Ohio: 6 yrs exper as jock, news guy, PD, MD, seeks FT position in these markets preferably. On-air or PD sought especially, hard-working, creative & dedicated. Ron, 419-893-7968.

Experienced tech seeks bdct engrg or tech position, possible mgmt, FCC General lic, tower climber, AS degree, 32 yrs old, willing to travel. S Youngblood, Rt 1 320A, W.WA FL 32465. 904-648-4098.

Manager avail now for Christian radio, will help you go from a CP to a top 10 station, or a complete turnaround at your FM station, salary negotiable depending on compensation plan, will also consider investing in, LMAing or buying CP or existing FM, commercial or non, exper in computer automation, satellite tech & the Internet. Mac, 206 Hunters Mill Ln, Woodstock GA 30188.

Young veteran, middle market PBP, sports talk talent. Seeking division one or minor league professional football/baseball/basketball PBP - Sports Talk - Sports Director position. Respond to: Radio World, POB 1214, Falls Church VA 22041. Attn Box #: 96-7-10-2RW.

19 yr old w/FCC license seeks any position w/New Jersey stations, reside in Somerset County. Call for audition tape. Brian, 908-359-3085.

Professional announcing, production & engrg, 35 yrs exper & still enthusiastic, would like to relocate to southeast. Alex, 513-777-8423.

Don't Gamble with your Advertising Dollars!

Advertise in Radio World and reach 18,000+ subscribers.

Call Simone at 800-336-3045 Ext.154 today!

TRANSMITTERS

Want To Sell

CSI Electronics EX-20F solid state FM exciter. R Lankton, 4027 Cochise Ter, Sarasota FL 34233.

Tepco J-316-M FM translator w/manual in excel cond, 107.7 MHz receive, 101.7 MHz transmit, $1250. Bob, 802-649-3510.

Harris/Gates FM-1C 1 kW FM w/RCA BTE-15 exciter, gd working cond, you pick up or ship, $2250. M Worrall, KCSN, 18111 Nordhoff St, Northridge CA 91330. 818-717-5579.

Modulation Sciences DSCA-108 data Sidekick used in transmission of data on SCA network, BO. D Leinen, Metracom, POB 23498, Oklahoma City OK 73123. 405-728-2525.

Used equipment for sale: Belar SCM-1, Belar RFA-1, Belar FMS-1, Belar FMM-1, Moseley MRC 1600 system, TFT EBS receiver/generator, Gentner patch panel, and Harris racks. Call Transcom Corporation 800-441-8454 or 215-884-0888.

Want To Buy

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

TRANSCOM CORP.

Serving the Broadcast Industry Since 1978

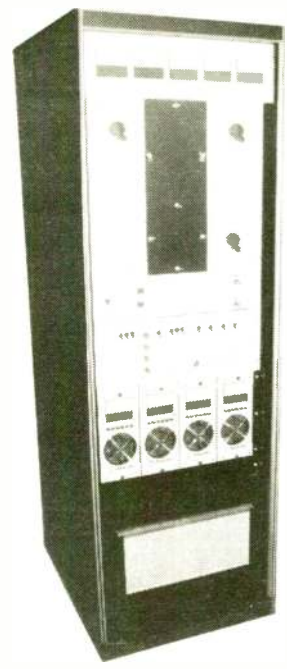
Fine Used AM & FM Transmitters and Also New Equipment
For the best deals on Celwave products,
Andrew cable and Shively antennas.

1 kW	FM	1978	Collins 831C-2	1 kW	AM	1982	Harris SX1
2.5 kW	FM	1983	Harris FM2.5K	1 kW	AM	1978	Harris MW1A
5 kW	FM	1981	McMartin BF-5K	1 kW	AM	1963	RCA BTA 1R1
5 kW	FM	1969	RCA BTF 5D	5 kW	AM	1977	RCA BTA 5L
10 kW	FM	1968	RCA BTF 10D	10 kW	AM	1974	CSI T-10-A
10 kW	FM	1971	Collins 830F-1B	25 kW	AM	1982	CSI T-25-A
10 kW	FM	1976	RCA BTF 10E	50 kW	AM	1978	Harris MW50C3
20 kW	FM	1974	Collins 831G2/Cont 816R2				(1100 KHZ)
20 kW	FM	1968	RCA BTF 20E				

1077 Rydal Road #101, Rydal PA 19046
800-441-8454 • 215-884-0888 • FAX No. 215-884-0738
IF YOU WISH TO CONTACT OUR HOME PAGE,
WE ARE AT WWW VOICENET.COM/~TRANSCOM
IF YOU WISH TO E-MAIL US, WE ARE AT TRANSCOM@VOICENET.COM

Circle (81) On Reader Service Card

WHEN YOU'VE GOT SOMTHING THIS GOOD, YOU CAN'T HELP BUT BLOW YOUR OWN HORN!



There comes a time when a company knows it has a break through product. And for Energy-Onix, that time is now.

The ECO 15-30, Single tube, High Power Grounded Grid Transmitters up to 32 KW.

- Soild State driver up to 2 KW serves as emergency transmitter
- Straight Forward field proven control system
- VSWR Protection & More
- BEST OF ALL THEY ARE ECONOMICALLY PRICED!

"The Transmitter People"
Energy-Onix
752 Warren Street, Hudson NY 12534
518-828-1690
FAX: 518-828-8476

Circle (22) On Reader Service Card

World Radio History

TRANSMITTERS...WTS

CCA ELECTRONICS

NEW SPECIALS!
3 YEAR WARRANTY!
AM 1000D 1kw AM $10,500
FM 1000SS 1kw FM $12,000
Compact Solid-State

CCA DEMOS
FULL 3 YEAR WARRANTY!
CCA FM 100GS 100w $4,200
FM Exciter

USED TRADES
Harris FM2.5k 2.5kw $9,500
FM w/MX-15 exciter
BE FM3.5 3.5 kw FM $11,500
w/FX-30 exciter
Harris FM10G 10kw $9,500
FM w/Collins 310Z exciter
CSI T3F 3kw FM with $7,500
EX-20 exciter

Call Darrin, Steve, or Tyler
770-964-3530

Advertise!
Call your advertising representative
1-800-336-3045 Ext.154
for details & deadlines

RADIO WORLD

Where In The World Are You?

Reach radio professionals worldwide by advertising in **Radio World's** international edition.

Call for more information.

800-336-3045 Ext.154

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED

Any company or station can run "Help Wanted" ads for $1.50/word or buy a display box for $60/column inch. Payment must accompany insert, use your MasterCard or VISA; **there will be no invoicing.** Blind box numbers will be provided at an extra charge of $10. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for details.

POSITIONS WANTED

Any individual can run a "Position Wanted" ad, FREE of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a blind box number is required, there is a $10 fee which must be paid with the listing **(there will be no invoicing)**. Responses will be forwarded to the listee, unopened.

Mail to: **BROADCAST EQUIPMENT EXCHANGE**

PO Box 1214,
Falls Church,VA 22041
Attn: Simone Mullins

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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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Accounts Receivable ..... Steve Berto

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U.S. West: Dale Tucker ..... 916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman ..... 317-966-0669 Fax: 317-966-3289
International: Stevan B. Dana ..... +1-703-998-7600 Fax: +1-703-998-2966
Europe: Dario Calabrese ..... +39-2-7030-0310 Fax: +39-2-7030-0211
Japan: Eiji Yoshikawa ..... +81-3-3327-2688 Fax: +81-3-3327-3010

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.

SUBSCRIPTION/READER SERVICE FORM

Radio World

FREE Subscription/Renewal Card

I would like to receive or continue receiving **Radio World** FREE each month. ☐ Yes ☐ No

Signature _____ Date _____

Please print and include all information:

Name _____ Title _____

Company/Station _____

Address _____

City _____ State ____ ZIP _____

Business Telephone ( ) _____

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
☐ F. Recording Studio
☐ K. Radio Station Services
☐ G. TV station/teleprod facility
☐ H. Consultant/ind engineer
☐ I. Mfg, distributor or dealer
☐ J. Other _____

II. Job Function

☐ A. Ownership
☐ B. General management
☐ C. Engineering
☐ D. Programming/production
☐ G. Sales
☐ E. News operations
☐ F. Other (specify) _____

Reader Service

July 24, 1995 Use until Oct 24, 1996

Please first fill out contact information at left. Then check each advertisement for corresponding number and circle below.

Purchasing Authority
1. Recommend 2. Specify 3. Approve

001	023	045	067	089	111	133	155	177	199
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003	025	047	069	091	113	135	157	179	201
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006	028	050	072	094	116	138	160	182	204
007	029	051	073	095	117	139	161	183	205
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016	038	060	082	104	126	148	170	192	214
017	039	061	083	105	127	149	171	193	215
018	040	062	084	106	128	150	172	194	216
019	041	063	085	107	129	151	173	195	217
020	042	064	086	108	130	152	174	196	218
021	043	065	087	109	131	153	175	197	219
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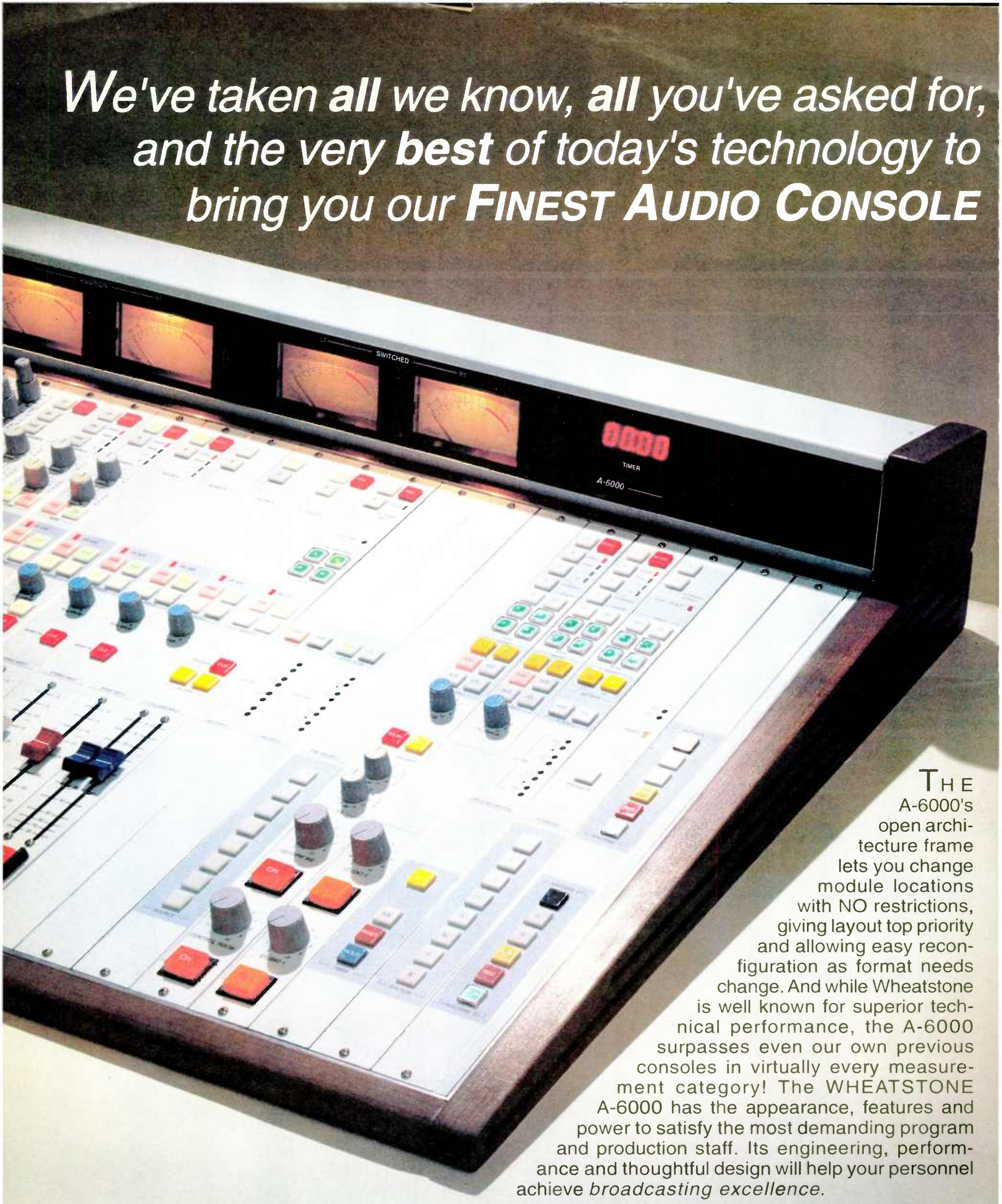

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