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Vol 20, No 20

Radio's Best Read Newspaper

October 2, 1996

NAB Poised to Push IBOC

WASHINGTON Edward O. Fritts, the 19th president of the National Association of Broadcasters, has held that position since October 1982. Also NAB chief executive officer, Fritts has been the association Chairman of the Joint Board and held other board and committee positions.

Among the topics on broadcasters' minds is the future status of the World Media Expo, which Fritts said seems to be in a "state of flux."

The NAB chief has no current announcement to make about next year's WME.

"We're looking forward to a very suc-

cessful 1996 and we'll take 1997 after we review the results of 1996," Fritts said.

The 1996 NAB Radio Show, a part of WME, offers a slate of sessions that address the many topics affecting the overall radio landscape; check the World Media Expo News on site for information about specific sessions.

A director of the Advertising Council and the Museum of Television and Radio, Fritts spoke one-on-one with RW Editor in Chief Lucia Cobo and Correspondent Alan Haber about the future of broadcasting.

RW: We recently spoke with Gary Shapiro, president of the Consumer

Electronics Manufacturers Association (CEMA), who suggested that radio, put up against CD quality sound, has become an inferior medium as far as its sound quality is concerned.

Fritts: I think we all agree that CD quality is the best technical sound available to us today. It's one of the reasons why radio stations are anxious to move toward in-band, on-channel, to certainly be more competitive in the future.

RW: When asked if broadcasters might be worried if something like DAB wasn't

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NEWS ANALYSIS

Ownership Returns to Bygone Days

by Lee Harris

MADISON, Wis. Despite all the wringing of hands and gnashing of teeth about the consolidation of radio ownership spelling the death of local radio as we know it, there is another way of looking at this development.

In many markets, the congealing of 25 or 30 radio stations into five or six broadcasting companies is simply returning those markets to a state of affairs that existed in the 1960s.

As anyone who sold radio advertising in the '60s will tell you, those were halcyon days compared to the confused, post-apocalyptic world of the late '80s and early '90s after docket 80-90 and relocated rimshot signals rained down upon the radio market.

Sunnier, gentler radio days

Not to sound like a certain Republican president, but those long-ago days were sunnier and gentler for people who had to make a living in radio.

The reason is simple ... there was enough revenue for everyone. Instead of being fought over tooth and nail by 13 to 15 companies, the money was apportioned to two or three.

Now, thanks to everything from duopolies to octopolies, those ad dollars are once again finding their way into a limited number of pockets, while listeners have the added benefit of 20 or more additional signals.

For our case study, consider Madison, Wis., Arbitron market No. 120. In 1960, the Madison metro area, consisting of Dane County, had a population of about 222,000.

When you turned on the radio, you had a choice of three commercial stations on the AM band, all engaged in what we would today call full-service programming (see Table 1).

If you were so inclined, you could hear the simulcasts of two of those stations on FM. And if you were really adventurous, you could tune in the good-music sound of the

continued on page 6 ▶

FIELD REPORT

Day in the Life of DAB Field Tests

EDITOR'S NOTE: The digital audio broadcasting field tests are taking place in San Francisco. Given the political tension surrounding the DAB testing process, the Electronic Industries Association requested everyone involved in the field tests sign a non-disclosure agreement.

RW asked the EIA if it would be possible to publish a 'day in the life of' story of a DAB field test observer. Philip Kane graciously volunteered to write about his experience as an observer riding in the test van for a day.

What follows is Kane's article, edited by the EIA to remove any details that might compromise the testing process.

by Philip M. Kane

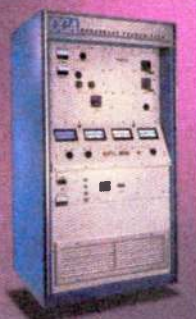
SAN FRANCISCO In the immortal words of Yogi Berra, it was "déjà vu all over again."

During 1972 and 1973, I was the engineer in charge of the Western FM-TV Enforcement Unit of the Federal Communications Commission (FCC). The position entailed traveling throughout the western United States making technical measurements on FM and TV stations.

In that position, I was instrumental in development of FM

continued on page 3 ▶

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Banking on AM Future In Portland

by Bob Rusk

PORTLAND, Ore. Don't tell Jerry Collins that there is no future in putting new, high-power AM radio stations on the air.

While most construction permits issued in the United States today are for the FM band, Collins is betting against the odds. He is set to put KZTW, at 860 kHz, on the air in Portland "around the first of the year."

Making History

It will be the first new 50 kW AM station in the market in nearly 50 years. The station will be a non-directional daytime, and will use a four-tower directional array at night with 5 kW of power.

"This looks like the second-best AM signal in Portland, day and night."

continued on page 10 ▶

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NEWSWATCH

FCC Certifies HollyAnne EAS

GREELEY, Neb. There are now three manufacturers certified to sell Emergency Alert System equipment. In addition to Sage Alerting and TFT Inc., HollyAnne Corp., makers of the HU 961 EAS Encoder/Decoder received its certification from the Federal Communications Commission in early September.

The unit permits broadcasters to receive, store, retransmit and initiate EAS messages required by the new EAS rules. The list price is \$1,250. Anyone interested in more information should call (888) 4-EASINFO.

Jacor to Report Traffic

ATLANTA Jacor Broadcasting of Atlanta will create a new comprehensive traffic reporting service for Atlanta radio, television and cable outlets called Total Traffic.

WKLS(FM), WPCH(FM) and WGST-AM-FM were the first local stations to sign up for the service which begins Jan. 1, 1997.

Total Traffic signed local traffic reporter Keith Kalland already and has two Bell Jet Ranger 206 B-IIIs available for its use.

The Rangers can accommodate a pilot and three passengers that will allow

participating advertisers and media outlets additional programming, promotion and sales opportunities.

NPR Strategy Board

WASHINGTON National Public Radio will establish the NPR Program Strategy Board (PSB). The PSB will be a cross-departmental review board whose mission is to ensure that programs developed and acquired by NPR meet strategic goals.

Sandra Rattley-Lewis, current NPR vice president for cultural programming, has been appointed executive director of the PSB chair. She will manage the PSB

CCA School

ATLANTA CCA Electronics Inc. in Atlanta will hold its next semi-annual service school on Nov. 7-9.

The service school covers installation, operation, service, troubleshooting and repair of the CCA line of FM broadcast transmitters.

Attendance at the school is limited to the first 16 applicants. A \$300 enrollment fee includes a complete operating manual on any CCA transmitter and two lunches.

Anyone interested in the service school should contact Kerstin Benton at (770) 964-3530.

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World Radio History

strategic plan, coordinate research and development of new programming opportunities and negotiate program acquisitions.

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Riding in the DAB Field Test Van

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stereo separation measurement procedures and standards, and I was the driver, maintainer, engineer, observer and inspector, using a five-ton truck as a vehicle.

After the assignment and for the rest of my career, FM broadcasting was "second nature" to me.

Early this summer, I and other members of the Bay Area Broadcast Engineers Society (BABES), the local chapter of the Society of Broadcast Engineers, were solicited to become observers in a series of tests of advanced digital FM broadcast systems being conducted by the DAR subcommittees of the Electronic Industries Association (EIA) and the NRSC in the San Francisco area.

I was asked whether I would be available to be an observer in a series of measurements to be made during a one-day session. I readily agreed to participate and found out that I would be working with one other observer and an engineering specialist from Hammett and Edison Inc., an engineering consultant to the EIA on this project.

I was very excited about this project because digital FM broadcasting is the first real technical advance since the days of stereo. The "Four Channel Quad" that I was on the periphery of during the early 1970s never made it to the marketplace.

The mission

The day was bright and clear, and I made my way to the location in the North Bay where the test vehicle was stored. When the team assembled about 9 a.m., I was introduced to the other three members: Nicholas, another observer who was a senior in communications at a local school; Bob, our driver,

and Dan, the specialist from Hammett and Edison, who was the leader of the expedition.

We discussed the day's plan, which was to make two monitoring evaluation runs in the San Francisco Bay area. The vehicle in which we would ride was a well-used converted camper-shell type of recreational vehicle that was outfitted with receivers and a whole array of test equipment in racks against the driver-side wall.

The process was, we found out, automated with technical data being logged by recorders in the installation. It was explained to us that the digital signal could fall into three basic categories: clearly receivable as CD quality with no defects, impaired with digital "artifacts" such as gurgling or popping, and completely unusable.

The role of the observer was to make a subjective impairment evaluation of the signal.

We were given a set of headphones and a modified game joystick with two buttons, and were instructed to press and hold the yellow button while the signal was distorted, and the red button if the signal was unusable.

The San Francisco Bay area is a veritable obstacle course for FM and TV signals. It sits in a valley defined by two mountain ranges, the Santa Cruz mountains, which run north and south on the spine of the San Francisco Peninsula on the west side of the Bay, and the Oakland Hills, which run north and south on the east side of the Bay.

The two ranges come together in the Santa Clara Valley, some 50 miles south of San Francisco.

Interstate highways and expressways lace the area, making long runs through

varying terrain practicable.

The morning run was to start just south of San Francisco and descend the western slopes of the Santa Cruz Mountains to the Pacific Ocean, proceed along the Pacific Coast about halfway down the Peninsula and then go back over the Santa Cruz Mountains to the eastern slopes.

As I knew from my experience in living and working in the area, the signal quality would be found usable with some distortion effects for about 10 miles along the coast until eventually the signal would disappear all down the coast. It's no wonder that cable has a 95-percent penetration rate on the coast.

And that is how I found the signal quality. There was distortion at certain points through the populated areas along the coast and very clear signals at points back up the Peninsula.

After a quick lunch at a local sandwich shop, we proceeded to the starting point of the afternoon run, halfway down the Peninsula on the Bay side.

We were to cross the Bay, proceed to the Santa Clara Valley and then come back up the Peninsula.

The route was pretty much out in the open ("on the flats" as we say locally) but the distance of about 45 miles from the (presumed) transmitter

location would make a majority of the run appear to be in heavily populated "fringe areas."

Usable Signal

In general, we found that the signal was usable with pockets of distortion. No significant areas of dropouts were experienced. We finished the run just before commute hours and did not run into any heavy traffic.

For me, it was a good day of "observing" while being driven over the major routes in the area. After so many years of listening to frequency limited and highly compressed AM and FM programming, it was refreshing to hear "full fidelity" programming from a broadcast station.

I firmly believe that "digital FM" of this quality can become the broadcast standard of the future.

Philip M. Kane is a communications attorney and Registered Professional Engineer. From 1967 to 1995 he was on the staff of the Federal Communications Commission, retiring as Engineer in Charge of the San Francisco office. Prior to that he was a regulatory consultant to the Ministry of Communications of the State of Israel. He currently practices communications regulatory law at his own law firm, Communications Law Center, in San Francisco and is an active member of both the Federal Communications Bar Association and the Society of Broadcast Engineers.



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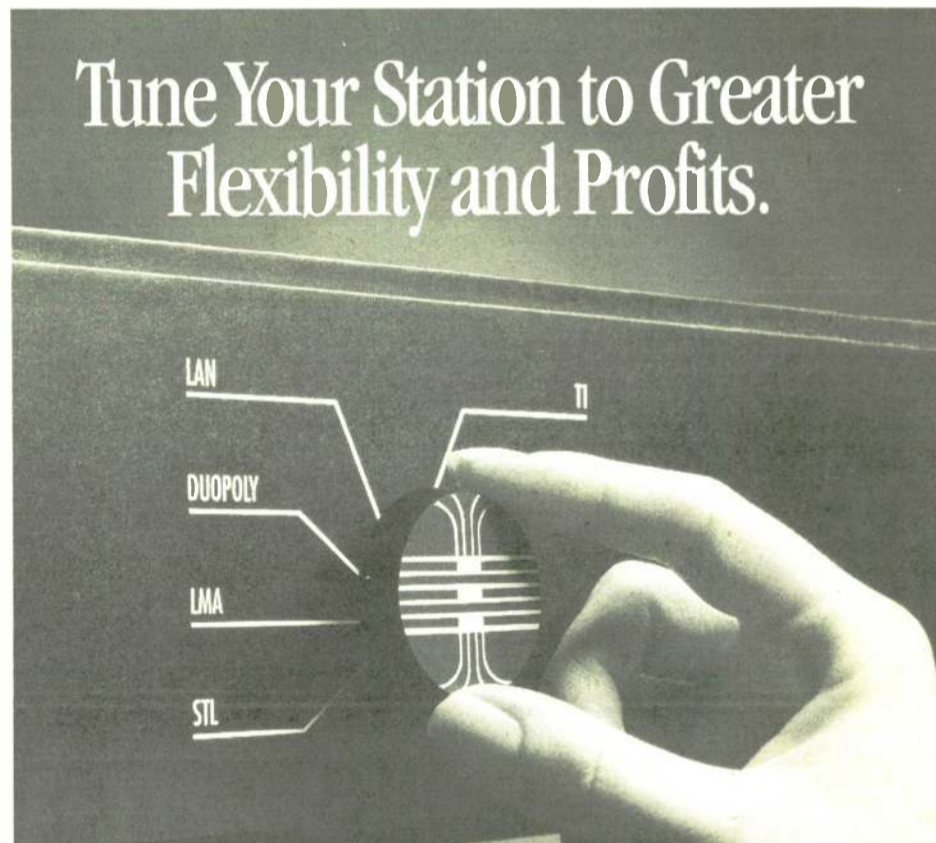
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NAB Readies Itself for IBOC Action

WASHINGTON After last month's interview with Gary Shapiro of the Consumer Electronics Manufacturers Association, I felt that the broadcasters deserved an equal shot at a one-to-one dialogue with **RW**.

Who better to turn to but the eloquent Eddie Fritts, of course. Not only has Eddie been a broadcaster, he has been at the helm of the NAB and made a substantial mark on it for a long time.

I was elated to hear that NAB is not going to let the IBOC languish in testing hell. To wit:

"I think if the in-band, on-channel development continues at the pace it is going, you will see renewed interest by the NAB board to offer ourselves as a secretariat to facilitate testing of in-band, on-channel in a fair and impartial, underlined, capitalized, manner."

Go Eddie. The IBOCs are in need of a level playing field and it needs to be a field staffed with impartial umpires who can explore the options, problems and developments of in-band DAB without undue pressure from manufacturers, but with an eye to what is best for the United States.

And, Eddie's remarks reminded me that NAB is looking ahead to the future of radio and its role in a different consumer marketplace.

"There are probably applications that go beyond our fondest imagination or anything that we could even dream of today that will be available in a decade, that will help make the radio even more than what it is today."

And I think he underscored the bottom line very well when he added: "People don't listen for digital sound. They listen for programming. They listen for their favorite music, for their favorite announcers, for their favorite station which is a mix of all of the above."

As an industry, I think it is important to support the NAB and its efforts to move the DAB process along. If you have not already done so, urge your NAB board representative to support the idea that

NAB needs to commandeer the IBOC testing process and ensure its fairness to all proponents involved.

Another topic we spent some time on was the new ownership structure in radio, post-Telecommunications Act of 1996. If you read Lee Harris' front page



article on Madison, Wis., you'll read that after the dust cleared, Madison now has four radio owners in the market, much like what the market looked like in the '60s and '70s. However, now there are 20-plus radio voices in the market. So, at first blush, it looks like the listeners are better served and the market owners will be healthier.

If that model repeats itself across the country then maybe there is a light at the end of the radio ownership shake-out.

Let's face it, the damage done by docket 80-90 is still haunting many a broadcaster

today. Perhaps this will really help radio.

Our family of celebrities continues to grow. Al Peterson reports that contributing writer Jim Smith, who recently evaluated the Yamaha 02R console for **RW** (Sept. 18, *Studio Sessions*), can now boast of his contribution to an Emmy-award winning television production as well.

"Black List: Hollywood on Trial" was produced by Koch TV of Cabin John, Md., for the American Movie Classics (AMC) cable channel. The program was nominated for three Emmys and won the President's Award, recognizing worthwhile television programming.

The show was also nominated for writing and editing; the outcomes of which were not available at the time of this writing.

Smith created the program soundtrack on the MTU MicroSound workstation. The product was transferred to DA-88 tape and sent along to the production house for final posting.

Other nominations up against "Black List" included "E.R." and "Biography" on A&E.

Groove Radio Hits L.A.

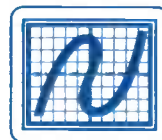
KACD(FM) Santa Monica, Calif., and KBCD(FM) Newport Beach, Calif., recently hit the Southern California airwaves with a CHR/rhythm format that mixes techno-dance, top 40 disco, House, Euro-dance and "worldwide movements in groove."

Pictured left to right at a recent press conference to unveil the on-air talent line-up were: Station Owner Ken Roberts; "Mornings with the Poorman" host Jim "The Poorman" Trenton, and Program Director/On-air Personality Egil "Swedish Eagle" Aalvik.



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World Radio History

READERS FORUM

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Valued professionals

Dear RW,

I appreciate Sue Jones' article in the Sept. 4 issue on the ongoing importance and necessity in today's broadcast environment of good technical support. She covers many of the main reasons professional technical services remain indispensable.

I think it important that what she says be placed in the larger context of modern broadcast business realities so that we who serve the technical needs of this industry can rid ourselves of the old stereotypes that views us only as a necessary evil.

In today's fast-changing business world, we must be not only valued for our technical skills, but we must also be valued as professionals who give leadership and are integral to the success of our company. This perspective can only come through a long-term consistent demonstration of our technical knowledge, our technical skill, our sound judgment, our professional advancement (SBE certification for example), our refusal to be treated as low-paid errand boys or girls, our ability to

work harmoniously with all staff, our ability to communicate well, our dress, our demeanor and, last but not least, our absolute honesty and integrity in all matters; in other words our professionalism. If we expect to be treated like professionals we must act like professionals.

One of several "new" ways I successfully use to highlight my vision for our role in the modern broadcast environment and be of real service to my employer at the same time is through education. Keep in mind, of course, that we informally educate for good or ill all the time by our behavior and approach to our work.

On a formal basis, I periodically hold technical mini-seminars to which all new and other interested staff are invited. I have covered such areas as the Internet, computers, remote broadcasts, general broadcast technology, etc. To make the most of these important opportunities, I:

- Make sure my goal is to help improve the productivity of my temporary students by helping them understand the important role of technology and technical staff to their jobs.

- Always treat my audience the way I would want to be treated when learning something new.

- Carefully illuminate and make clear the technical concepts I need to get across.

- Welcome all questions; they frequently are the means to much greater understanding.

Ultimately, in this business as in every business, our value will be judged by the bottom line. Not only will we be judged by our raw technical skill, but our ability to provide professional leadership. Even if you work, as I do, for a company that values evolving technology and a good technical staff, it will still be necessary to work hard to create a new mindset about our role in today's broadcast climate.

*Ron Steenwyk, Technical Manager
Michigan Media Inc
WKLQ(FM)/WLAV(AM)/WBBL(FM)
Grand Rapids, MI*

Rebel radio musings

Dear RW,

It was interesting to see the article on "Radio Rebels" in the Aug. 21 issue.

At first glance it seems surprising that RW could print an article about unlicensed FM stations without harshly criticizing those who would dare transmit without authorization, even if only with a few watts fed to an antenna a few feet above a rooftop.

You might think RW owes its allegiance to the big money broadcasters and the FCC. But in reality, RW advertisers pay the bills, and the best thing that could happen to most of them would be the relaxation of the FCC grip to allow people to operate neighborhood radio stations.

I remember when the low end of the FM band had dozens of licensed 10 W stations. What has changed since then to make a 10 W station impractical?

One potential frequency for such a service would be 87.9 MHz, a vacant frequency available on virtually every FM receiver, in a band allocated to broadcasting. Of course it is not exactly vacant in the vicinity of channel 6 TV stations, and

Stop Wasting Time

Radio World has long hammered home the notion that DAB is too important to U.S. radio to rush through to catch-up to the Joneses (or the Canadians and Europeans).

The current testing process, steered by the subcommittees on digital audio radio of the EIA and NRSC, lies mired in politics. Only the out-of-band systems are happy with the process and proceeding with the field tests. One of the IBOC systems is out of the process altogether.

The situation is unacceptable, and we have urged the NAB and/or the ROC to step up and take control of the development of DAB testing for the United States.

The time is apparently nigh. NAB President and CEO Eddie Fritts indicated to RW, in our Page 1 interview, that the NAB is poised to "reinvigorate" the process and look into setting up its own testing structure, focused on an in-band solution for U.S. DAB.

There is not time to waste. The focus of U.S. testing should be directed at finding an in-band system that fits the bill for U.S. radio. Broadcasters maintained from the onset they did not want the out-of-band system, Eureka-147. The spectrum is not available in the United States. Period.

The IBOCs were shown to have serious problems of degradation to the host and second-adjacent channels in the lab. The modified systems have addressed those issues, according to proponents — let the real world scenarios prove them right or wrong.

Receiver manufacturers will not ignore the U.S. consumer market; it is safe to say they will cater to it.

NAB, ROC, the industry is ready for your leadership.

— RW

there would have to be adequate spacing with the nearest station on 88.1 MHz. But it would be especially attractive in many cities served by channel 5 TV stations — because, incidentally, I think Mr. Dunifer's suggestion of audio broadcasting in the UHF-TV band is not a good idea — for those interested in keeping a low profile.

It is my understanding that when the Secret Service comes to town, they use any vacant frequency they want, including empty UHF TV channels. Perhaps that is the real reason there are no stations on channel 37.

*Andrew Dart
Duncanville, TX*

EDITOR REPLIES: RW serves the radio broadcast industry by informing it of activities and news that may be of interest or may impact its ability to conduct business. Our running an article on so-called radio rebels is not an endorsement of their activity, but rather a heads-up to broadcasters who might experience interference of their own legal signals.

Appreciative surfing

Dear RW,

It is really gratifying to see the support you give to high school and college radio, month after month. I have been manager and faculty advisor at WOVI(FM) Radio at 89.5 MHz, licensed to Novi High School in Novi, Mich., for over 17 years, and have served as President of the Michigan Association of Educational Broadcasters for the last four years. This organization, founded in 1978, is made up of non-CPB stations in high schools and colleges across the state.

It is exciting to see the innovative and professional operations across our state and across the nation. We have learned that student broadcasters are the ones who "push the envelope" of broadcasting, and are often the source for new programming ideas and new applications of technologies. Of course, our stations are extremely local, not only because of their low-power signals (although MAEB does have some higher power members) but

also because of their strong connection to the community. We can cover local news and sports in a way no commercial station can, particularly in larger cities.

There are many challenges that face us all, commercial and educational stations alike. Technology is changing so rapidly that the head spins. At WOVI, we have added five digital editing workstations in the last few months, along with a DAD486x system for storage and automation. We have added RDS, AP NewsDesk, and plan to begin webcasting using RealAudio this fall, assuming we can work out some questions about bandwidth in our school district's network.

All this technology and live varsity sports, too! It amazes me that only two years ago there were only three or four university stations webcasting, and now it is a technical and economic reality for everyone.

Once again, thanks for the support. Broadcasting gives students communication and technical skills that will serve them well in later life, regardless of the career they pursue. Your columns help illustrate this fact to the broadcast industry.

But personal appreciation for RW does not stop there: a series you did a few years ago on studio space, and your software reviews helped us narrow our choices for our digital audio workstations. We installed five workstations using CardD and Software Audio Workshop; both were reviewed in RW.

*David A. Legg
Station Manager/Faculty Advisor
WOVI(FM)
Novi, MWLTP(AM)-WNUS(FM)*

Correction

The story "Radio Drama is Alive and Well on VOA" (Aug. 21 RW, page 43) indicated Voice of America will broadcast the series via short-wave (SW) only to China. The series will be heard globally on VOA short-wave and medium-wave radio stations. It will still be heard domestically on FM and made available to affiliated AM, FM and cable stations.

Radio World

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Next Issue of Radio World
October 16, 1996

Mergers Recreate Past

► continued from page 1
stand-alone FM, WMFM.

Because not many people chose to do that, for all practical purposes the market's radio dollars were divided among three AM stations.

It's who you were

Seventy-six-year-old Bill Hughes recalls those days fondly. He started selling radio in Madison in 1955 at what was then WISC(AM). At the time, said Hughes, it was not a business of ratings and demographics.

"Clients knew you and liked you and that's why they bought. I wasn't really selling WISC. I was selling Bill Hughes."

Table 1 Madison Radio 1960

Earl Fessler	104.1	WMFM
Madison Newspapers	1310	WIBA-AM-FM
Mid-continent Communications		WKOW(AM)
Midwest Family		WISC-AM-FM
6 Stations/4 Companies		

Occasionally, Hughes would have to resort to presentation techniques.

"Sometimes I'd have the client turn on the radio and listen to our station."

Using these primitive tools, Bill worked his way up to sales manager of WIBA in 1961 and stayed in the position for the next 19 years.

The market changed a bit over the years. For one, Arbitron began rating the

market, at first only once a year.

"I hated selling with the book," Bill said, "but there were times when you had no choice."

After all, Bill had kids to put through college, which he did, selling \$10 spots in such volume that he personally billed as much as \$300,000 a year, back when that was real money.

By 1980, FM was the dominant band both in Madison and just about everywhere else. New stations were popping up on the dial and cutting into the radio revenue pie.

Walk on the FM side

After leaving WIBA, Bill decided to try his luck with a relatively new Class-A FM and daytimer AM combo on the outskirts of town. But after his first paycheck bounced, Bill hung up his order

pad for good. And mind you, this was before the deluge.

By 1992, upgrades and move-ins meant there were no fewer than 15 commercial stations selling or attempting to sell radio advertising in the market (see Table 2).

Table 2 Madison Radio 1992

Double L Broadcasting	WIBA-AM-FM
Enterprise Media	WHIT(AM)/WWQM-FM
Dale Ganske	WYZM(FM)
Joyner Communications	WTFX-FM
Nancy McMahon	WMAD-AM-FM
Mid-continent Communications	WTSO(AM)/WZEE(FM)
Midwest Family	WTDY(AM)/WMGN-FM
Odon Communications	WMLI-FM
Shockley Communications	WOLX-FM
Triple M Broadcasting	WMMM-FM
15 Stations/10 Companies	

These stations could be considered viable, in the technical sense, because each had more than a one share of the audience. This created some bargain rates, but it was not exactly a picnic for retail advertisers; accounts not represented by agencies suffered an onslaught of sales calls from stations they had never heard of and account executives they did not know.

While the market population had increased 49 percent since 1960, the number of stations aggressively selling in the market had risen more than 500 percent. A shakeout was inevitable.

The accounting firm that compiled the monthly revenue report for the \$14 million dollar-per-year Madison radio market noted that the bottom seven stations had combined monthly billings of just \$200,000.

The AM-FM combo that stifled Hughes went dark and many other stations in the market were constantly for sale, either openly or subtly.

The more things change ...

Deregulation and duopolies arrived just in time to keep several other stations in the market from hitting the big "plate off" button for good.

By this year, most of the consolidation will be completed and as Table 3 shows.

Table 3 Madison Radio 1996

(some combinations pending FCC approval)	
Enterprise Media	WHIT(AM)/WWQM-FM
Midwest Family	WTDY(AM), WMGN-FM, WJJO(FM)
Point Communications	WIBA-AM-FM, WMAD-AM-FM, WTSO(AM), WZEE(FM), WMLI-FM
Woodward Communications	WMMM-FM, WYZM(FM), WOLX-FM
15 Stations/4 Companies	

Madison is almost back to where it was in 1960 in terms of companies competing for business: there were four companies in 1960 and there are four today.

The ultimate winners here are the listeners. While duopolies have again concentrated this medium into relatively few hands, the number of choices on the dial is staggering compared to what was available in the final year of the Eisenhower administration.

Some broadcasters might argue that having more stations is not necessarily better, but most listeners will tell you otherwise.

Bill Hughes is an exception. Long retired, he does not pay much attention to the business anymore, but he could not help notice the plethora of new radio stations spotting his once orderly dial.

"They sure play some goofy music," he said.

□ □ □

Lee Harris is morning news anchor at WINS(AM) in New York. Send him e-mail at lee@harrisnet.com

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Super Group Targets Hispanics

by Lynn Meadows

DALLAS In 1979, at the tender age of 24, McHenry "Mac" Tichenor took over the 30-year-old family business.

At the time, Tichenor Media System had English-language radio and television stations, video and audio production companies and three Spanish-language stations.

After a few years of trying to work with he diversified company, Tichenor knew something had to change.

"We decided to sit down and pick one of the businesses that we were going to concentrate on. We felt like Spanish radio was the area that we could be doing the biggest and the best in the industry," he said.

venteen years later ...

Earlier this summer, Tichenor sold TMS 11 of its 20 Spanish-language radio stations to Clear Channel Communications. Clear Channel is also acquiring Heftel Broadcasting and its 16 Spanish stations. When the deals are finished sometime in February, Tichenor will run the combined group, which will be called the New Heftel. New Heftel is expected to reach approximately 17.3 million Hispanics or approximately 63 percent of the total Hispanic population in the United States.

Tichenor's grandfather bought his first station in the Texas market of McAllen-ownsville, right on the border with Mexico.

"In those days, the station was a CBS affiliate during the daytime running Arthur Godfrey and Gunsmoke and at night, it was Spanish because it beamed north and you could hear it in Chile and Argentina and it certainly covered Mexico," Tichenor said.

The Tichenors learned quickly that not all Hispanic listeners are alike.

"We pretty quickly learned that there are differences market by market even in markets where you have overwhelmingly Mexican-origin Hispanics," said Tichenor. "Most people understand that the tastes are different from Puerto Ricans who are different from Mexicans and so on, but a lot of people don't understand that Houston is different from San Antonio is different from Chicago is different from Los Angeles even though they are all predominantly Mexican."

Spanish radio proponent

The regional differences meant that one formula will not work everywhere.

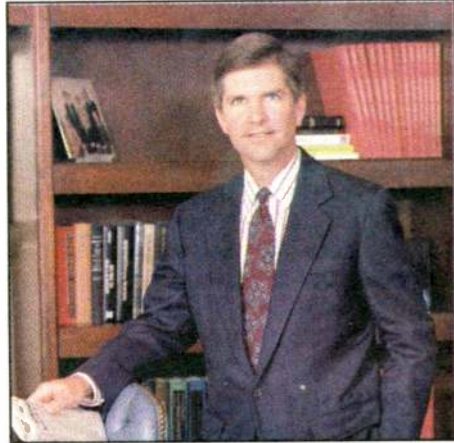
"Certainly, the music has to be done differently and the presentation has to be done differently. And local production is done differently to be fine-tuned to that market," said Tichenor. "You can do a quality spot that will certainly play in all the Mexican markets and there are a number of spots that are done nationally that will play in all the markets, but just because that's true doesn't mean you can program every station the same way."

Advertisers who use Spanish-language stations benefit by reaching a highly targeted group of listeners who may not be accessible through other media.

"It gives the advertiser an ability to address that demographic in its own language," said Tichenor. "Research has shown that when you talk to Hispanics in Spanish, it is much more likely to influence their behavior."

Tichenor, an avid proponent of Spanish radio, is pleased with the newly formed Association of Hispanic Advertising Agencies. He has even spoken at one of their meetings.

"As I told them, it's in all our interests to get together where it is appropriate and



Mac Tichenor

develop our industry. That group clearly has the will and the ability to do that. We're interested in supporting that any way we can," he said of the new association.

Another development that Tichenor said

is good for Spanish radio is the addition of a Hispanic category in the Radio Mercury Awards.

He cited also the merger between Heftel and Tichenor will be good because it provides the "critical mass" necessary to go out and market to non-users of Spanish radio.

The merger

With the New Heftel, Tichenor said a big part of his job will be to help shape and develop the company culture as the two companies merge.

"It's going to be a culture based on working in the interest of our shareholders and to effectively do that, we are going to pay a lot of attention to customers and listeners," he said.

Tichenor said the group wants to solidify its position in markets it is already in through duopolies, triopolies or beyond. After that, he said he thinks they will look at stations in the top 14 or 15 markets.

"San Diego is a very interesting market. There are some other California markets that may make sense once we've got San Francisco and Los Angeles and San Diego," said Tichenor. He added that there are some up and coming markets like Phoenix, Denver and Philadelphia.

TDMA: Americanizing Eureka-147

KOKOMO, Ind. Eureka-147 is the digital audio broadcasting system that is taking the world by storm.

But in the United States, the reception of Eureka has been lukewarm at best. U.S. broadcasters have repeatedly stated they want an in-band, on-channel (IBOC) system so they could use their existing spectrum.

In the United States, there is no spectrum readily available for the Eureka system, which operates on L-band and the VHF band in other countries. Even if spectrum were available (and free), Eureka typically works on a single frequency network (SFN) where several stations share the same transmission area and the same coverage area.

In May, Scott Wright, a project engineer with Deleo Electronics, wrote a Guest Commentary (RW, May 15) discussing how Eureka could be made more palatable to U.S. broadcasters with an idea called Time Division Multiple Access (TDMA). Wright proposed using TDMA to divide the SFN by time and allow each broadcaster his own slice of time.

That way the SFN could be broken down into four separate channels and transmitted over four different transmitters. In theory, then, existing coverage areas — and the economic advantages that go with them — could be maintained.

RW asked Wright to answer some more questions on TDMA:

RW: Could you explain how the unequal service would work?

Wright: With TDMA, unequal coverage is achieved by simply adding more power or more transmitters on the desired channel. The coverage is constructed by the power and placement of the transmitters.

With TDMA, the transmission equipment operates as autonomously as any AM or FM equipment does today. An analogy is the use of a main FM transmitter with multiple translators. The only

difference with TDMA is that the translators operate on the same frequency as the main transmitter.

The Canadians are recreating local coverage using alternate methods such as cell detachment but are accepting different coverage areas and shared equipment (RW, Sept. 4)

With TDMA, transmission equipment can (but does not have to) be shared if the channels are on the same frequency and have overlapping coverage.

RW: Are there going to be enough 6 MHz slices to take care of all stations in a market like New York?

Wright: The entire bandwidth of a Eureka channel is about 1.536 MHz. This frequency is time-shared by four broadcasters. Thus a simplistic approach is to allocate enough spectrum to recreate all AM and FM channels. This is 218 (100 FM and 118 AM) channels total giving a frequency requirement of

$$218 \times \frac{1.536 \text{ MHz}}{4} = 83.7 \text{ MHz}$$

If we assume that all the current stations everywhere fit within the current 218 channels, then about 83.7 MHz of spectrum would be required. It might even be less.

RW: How many transmitters in an SFN must be used to cover a given area?

Wright: A given area is covered by a main transmitter as well as several on-channel repeaters. Because Eureka can operate on both active and passive echoes, an inherent network gain is realized by using multiple transmitters.

These on-channel repeaters can actually obtain audio from the main transmitter over the air negating the need for a costly audio feed such as T1.


Think smaller and more abundant rather than one large transmitter. An appropriate analogy could be the cell phone approach: 75-foot towers and several hundred watts.

"Our immediate focus is to get the companies integrated, operating efficiently, make strategic acquisitions in our existing markets and a couple of other top strategic markets for us and then we'll be ready to fill in."

Asked for his thoughts on the fact that the New Heftel has a stake in not assimilating Spanish-speaking people into the U.S. English-speaking culture, Tichenor responded that his group has an interest in the acculturation of Hispanics if not the assimilation.

"We believe and support that everybody in this country ought to learn English if for no other reason than to maximize their opportunities," he said. "Assimilation implies that Hispanics will become a non-discernable part of the overall population and I don't think that's appropriate or likely."

Tichenor used the San Antonio market as an example of an acculturated market where many Hispanics are "fluent, comfortable and capable in English and yet they have chosen to maintain and even celebrate their Hispanic roots by maintaining their cultural identity as Hispanics."

"We have a tejano bilingual format in that market that is very successful in a very acculturated market and we think in the long run that is where the future of the hispanic population in this country will be." 

RW: Why should the FCC give new spectrum to AM and FM broadcasters? Why not auction it?

Wright: In Europe, the Eureka spectrum is considered "replacement" spectrum. It is envisioned that the AM/FM spectrum will eventually be abandoned. The gain here is CD-quality audio, reconfigurable programming, ancillary data capacity (64 kilobaud), noise and multipath immunity.

If the Eureka spectrum is viewed as replacement bandwidth rather than an entirely new service, I believe that the FCC could accommodate the change without resorting to auction.

The larger problem is obtaining a "united front" of broadcasters and consumer electronic manufacturers.

The HDTV Grand Alliance accomplished similar goals, but as long as the NAB remains entrenched in IBOC only, I don't see much hope for anything.

RW: Could you respond to the idea that although a single owner may own four stations in one market, they like to have them compete and might not jump at an SFN?

Wright: The fact that stations compete is totally irrelevant to whether or not transmission equipment is shared as far as the listener is concerned. The economics of sharing equipment in areas of overlapping coverage areas is incentive enough.

With TDMA, everyone is allowed to share equipment if they want to, but they are not forced to. Unequal coverage areas are formed by adding a channel repeater for only that channel to give the desired coverage.

With TDMA, you can place one, two, three or four channels on one transmitter.

RW: Considering that Eureka is using two transmitters to cover San Francisco during the field tests, no matter how good it sounds, broadcasters will still require two

continued on page 11 ►

Team Still Believes in AM Radio

► continued from page 1
Collins said.

The station has been in the works for about 10 years. It was originally going to be licensed to the suburb of Fairview "because of the way the contours fell for nighttime coverage," said Collins.

Working with neighbors

"But we improved the contours and changed the city of license to Troutdale."

The towers will be located at the site of KVAN(AM) at 1550 kHz, directly across the Columbia River near Vancouver, Wash., with the KZTW nighttime pattern blanketing Portland.

KZTW will duplex with the two KVAN

towers and will build two additional towers. Due to public opposition, it is becoming increasingly difficult to con-

Manager Victor Ives, who came to Portland in the 1970s to program 50 kW powerhouse KEX(AM), said that he and

Two of the top-rated and highest billing stations in Portland are on the AM dial.

struct radio station towers in urban areas. Collins' company, JCO Broadcasting Inc., worked closely with the neighborhood association to "cure some long-standing interference problems."

KZTW Vice President and General

—Victor Ives, KZTW(AM)

Collins are strong boosters of AM radio.

Another consideration, however, was that the local FM band is full.

Collins and Ives are currently considering programming options. One possibility is all-news, which would make it the

only station in the market with that format full time.

"If we were going on the air tomorrow, I'd have to give very high consideration to that," said Ives. "I think the market has progressed enough to support an all-news format."

Another reason news is being seriously looked at is because of Ives' previous experience as founder of a regional news network in the 1980s.

Though the network ultimately folded, Ives feels now may be the time to resurrect it. He regularly hears from stations throughout the area that are still interested in the service.

Second station planned

Collins and Ives are also putting on a new station in Eugene, Oregon's second largest city, which sits 100 miles south of Portland. That station, KZTU(AM), will be on 660 kHz with a 10 kW nondirectional daytime signal.

The nighttime pattern will also be nondirectional, but with only 75 W.

"I could try to get more nighttime power by going directional, but don't think I'd do that," says Collins. "Because of the low frequency, I expect it to cover quite well."

The station is expected to sign on early next year and might simulcast with KZTW.

"We would add local inserts in Eugene," said Ives. "Between these two signals, we will cover most of the population center in Oregon."

They know that the conventional wisdom says standalone AM stations are a good investment, but both are certain they can make it work.

"Sometimes conventional knowledge is wrong," said Ives. "Two of the top-rated and highest billing stations in Portland are on the AM dial. They are consistently in the top five. I think AM stations are becoming far more viable than they have been."

Faith in AM

Ives added that he has learned about station on 860 kHz that recently sold for \$4.9 million.

"Somebody believes in AM," Ives stressed. "We were watching that because we wanted to know what it might portend for that dial position."

Said Collins, "AM is making a pretty good comeback with talk radio."

The two Oregon stations are the only broadcast properties Collins currently owns. He has put eight other stations on the air and owned two others during his 30-plus years in the business. Those facilities were in Wisconsin, Minnesota and California.

Ives is also general manager of Portland TV station KWBP, an affiliate of the WB network.

"There was talk of combining channel 32 with KZTW. That would have been fun, but probably isn't in the cards right now," said Ives.

Collins expects to spend approximately one million dollars getting his new stations on the air.

He and Ives repeatedly stress their confidence in AM radio and strongly believe listeners and advertisers will be supportive.

"We both happen to be boosters of AM, particularly with my background in the market with KEX. We probably are more enthusiastic than someone else might be," said Ives.

"Oregon is one of the best radio markets in the country," Collins added. "I'm excited about putting these stations on the air and so is Victor."

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TDMA: On the Street

RW asked five people to review the questions and original TDMA article and discuss how feasible the idea seemed to them. The discussions quickly turned to political and economic issues.

"This is much more of a societal issue than a technical issue," said Terrence Baun, president of the Society of Broadcast Engineers. Baun, who said his opinions were not necessarily those of the SBE, pointed out that the Eureka system is so different from the way U.S. broadcasting has developed that the implementation would be challenging.

"That's not to say it is bad," said Baun, "just different."

Economic advantages

Small stations would actually like the parity of coverage offered by the traditional Eureka system while large stations would want to use the TDMA approach to keep their economic advantages. Baun noted that WGN(AM) which reaches a huge portion of the country, would need a tremendous number of repeaters to maintain its coverage. Like Baun, John Diamantis, chief engineer at WBQB(FM) and WFVA(AM) in Fredericksburg, Va., said the idea was feasible and interesting.

"From a purely selfish standpoint, I'd like to see Eureka because of the quality it could potentially offer," said Diamantis. He said that the TDMA approach, however, would require more bandwidth for each channel than would the standard Eureka system.

Diamantis also asked where the money to pay for all the transmitter sites was going to come from. He pointed out that in a city like New York canyoned in with buildings, stations would need many transmitters.

George Marshall, chief engineer of WBJB-FM in Lincroft, N.J., agreed that the technical aspect was not the big issue. He said there were huge regulatory, manufacturing and even inter-station cooperation hurdles that would have to be crossed to adopt Eureka.

"My bottom line is does the public really want it?" said Marshall. Noting that AM does need some salvation, he said many more studies need to be done to find out if the public tunes out radio because of the sound quality or because they have other options.

"It is hard to evaluate because it is just a concept as far as I can tell," said David Layer, senior engineer at the National Association of Broadcasters, of the TDMA approach.

He said while TDMA addresses the sharing equipment concern, the most serious problem Eureka faces in the United States is spectrum. He also said that the HDTV Grand Alliance is not a good analogy because spectrum was never an issue for digital TV like it is for digital radio. Even with TDMA, Layer pointed out that stations would not be completely autonomous because they will have to share timing information.

Layer said it would be good to see

▶ continued from page 9

full-power transmitters and that sounds expensive.

Wright: If you envision a transmitter as 50 kW at 500 feet, yes.


Eureka is best achieved with lower power, lower height "cells" much as an on-channel booster does on FM. Realize that any digital broadcasting system, in-band or new-band, will require a greater signal level at the outer limits of the coverage area in order to keep the bit error rate low. AM and FM fail gracefully as the signal level decreases; all digital systems are ON or OFF.

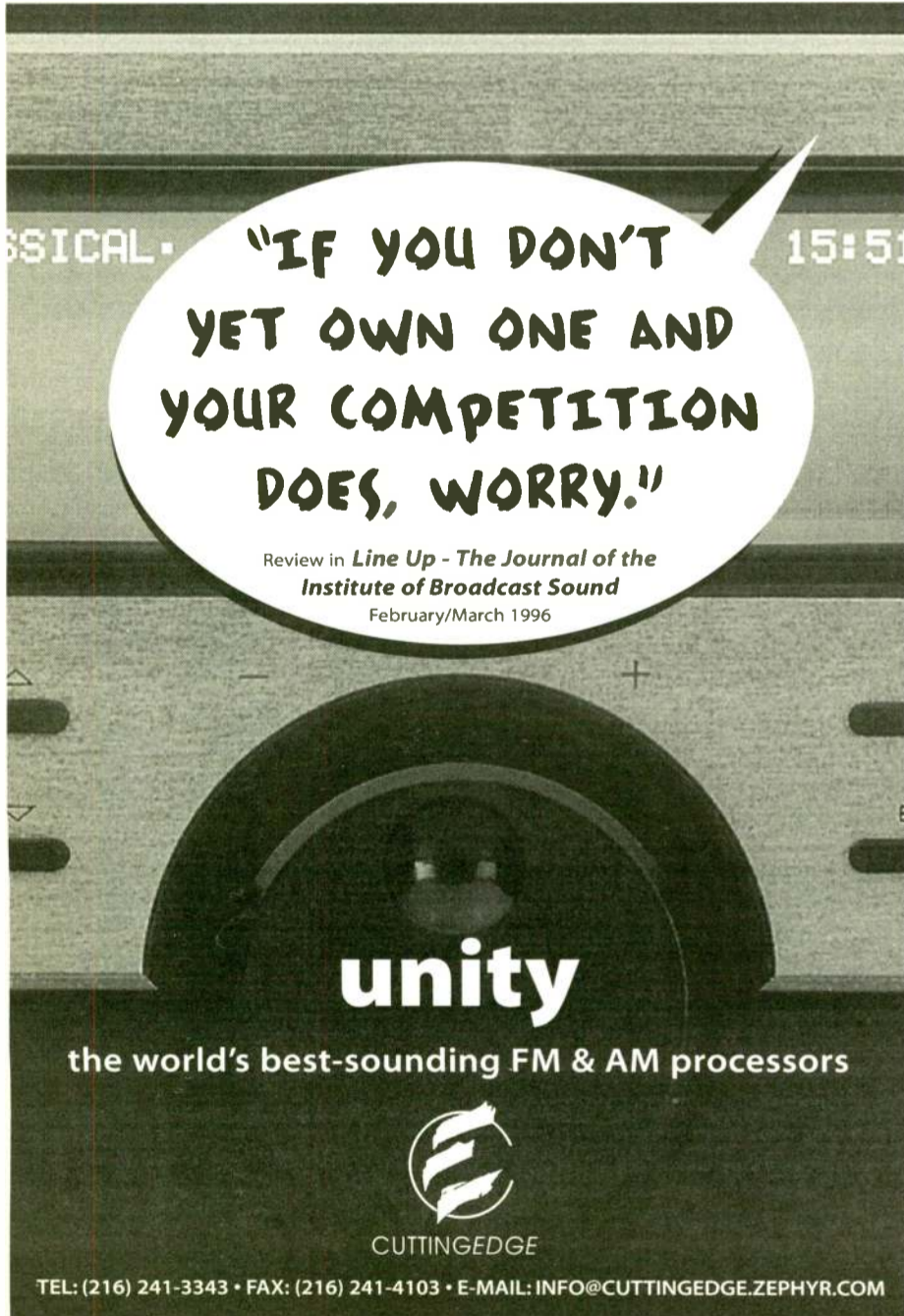
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some preliminary engineering design work and computer simulations on how TDMA will work with Eureka.

"As soon as that information is available, then I think a real meaningful discussion can take place."

In April, the European Broadcast Union


expressed an interest in studying the TDMA approach to Eureka further. The U.S. Working Party 10B which addresses broadcasting issues above 30 MHz is considering a possible submission to the International Telecommunications Union asking them to explore TDMA. 



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Data Receivers

Advanced Digital Systems
Aztec S.A.
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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 208

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Robert L. Adams, President
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Encoders, monitors, data receivers

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Ramsey, NJ 07446
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Long Beach, CA 90810
Receiver manufacturers

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Encoders

Specialized Comm.

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Bellevue, WA 98007
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206-641-9043



Software provides artist, songtitle and miscellaneous data distribution
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Garden Grove, CA 92641
IVHS Services/Differential GPS

VG Broadcast
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United Kingdom
Encoders for radio broadcasters

EIA Web site:
www.eia.org/cema

NAB Publication:
RDS Applications: Opportunities for Radio Broadcasters
(800-368-5644)

ROG ROLL CALL

TOTAL STATIONS = 624

Station	Freq.	City	Station	Freq.	City	Station	Freq.	City	Station	Freq.	City	Station	Freq.	City
ALABAMA			WJST(FM)	94.1	Tempo	WAHS(FM)	89.5	Detroit	WFRS(FM)	88.9	Long Island	KIRO(FM)	98.1	Lawton
WZY(FM)	104.3	Athens	WUSA-FM	100.7	Tempo	WDRZ(FM)	102.7	Detroit	WRHU(FM)	88.7	Long Island	KTST(FM)	101.9	Oklahoma City
WRJM-FM	93.7	Geneva	GEORGIA			WFUM-FM	91.1	Detroit	WSHR(FM)	91.9	Long Island	KXXY-FM	96.1	Oklahoma City
ARIZONA			WABE(FM)	90.1	Atlanta	WHR(FM)	89.3	Detroit	WBAI(FM)	99.5	New York	KVDD-FM	98.5	Tulsa
KZZZ(FM)	94.7	Kingman	WCLK(FM)	91.9	Atlanta	WHPR(FM)	88.1	Detroit	WDFH(FM)	90.3	New York	DREGDN		
KBZR(FM)	103.9	Phoenix	WGHR(FM)	102.5	Atlanta	WJLB(FM)	97.9	Detroit	WFME(FM)	94.7	New York	KZEL-FM	96.1	Eugene
KEDJ(FM)	106.3	Phoenix	WKLS(FM)	96.1	Atlanta	WJZZ(FM)	105.9	Detroit	WFUV(FM)	90.7	New York	KYTE(FM)	102.7	Newport
KHOT-FM	100.3	Phoenix	WNNX(FM)	99.7	Atlanta	WLLZ(FM)	98.7	Detroit	WHCR-FM	90.3	New York	KDPB-FM	91.5	Portland
KKFR(FM)	92.3	Phoenix	WRFG(FM)	89.3	Atlanta	WNIW(FM)	100.3	Detroit	WKWZ(FM)	88.5	New York	KKRZ(FM)	100.3	Portland
KLVA(FM)	105.5	Phoenix	WWEV-FM	91.5	Atlanta	WVIV(FM)	89.5	Detroit	WNEW(FM)	102.7	New York	KMCO(FM)	104.5	The Dalles
KPHF(FM)	88.3	Phoenix	WZGC(FM)	92.9	Atlanta	WPHS(FM)	89.1	Detroit	WNYC-FM	93.9	New York	PENNSYLVANIA		
KRIM(FM)	104.3	Phoenix	WSTH-FM	106.1	Columbus	WSDP(FM)	88.1	Detroit	WQXR-FM	96.3	New York	WRTI(FM)*	97.1	Allentown/Bethlehem
KTWG(FM)	103.5	Phoenix	WSTM-FM	106.1	Columbus	WUDM(FM)	91.7	Detroit	WRGX(FM)	107.1	New York	WFRA-FM	99.3	Franklin
KZZP(FM)	104.7	Phoenix	WDMG-FM	99.5	Douglas	WQRS(FM)	105.1	Detroit	WSKQ-FM	97.9	New York	WITF-FM	89.5	Harrisburg
KSLX(FM)	100.7	Scottsdale	WJTG(FM)	91.3	Macon	WVGR(FM)	104.1	Detroit	WHDU(FM)	100.7	Peekskill	WRVW(FM)	97.3	Harrisburg
CALIFORNIA			WSTR(FM)	94.1	Savannah	WVMV(FM)	98.7	Detroit	WBEF-FM	92.5	Rochester	WBFB-FM	103.9	Jenkintown
KSBR(FM)	88.5	Anaheim	WRAF-FM	90.9	Tacoma Falls	WDBM(FM)	88.9	East Lansing	WSIA(FM)	88.9	Schenectady	WROZ(FM)	101.3	Lancaster
KBakersfield	106.3	Bakersfield	WAFI(FM)	101.1	Valdosta	WKAR-FM	90.5	East Lansing	WMRW(FM)	98.5	Westhampton	WBEB(FM)	101.1	Philadelphia
KALX(FM)	90.7	Berkeley	IDAHO			WGLQ(FM)	97.1	Grand Rapids	NORTH CAROLINA			WBYO(FM)	88.9	Philadelphia
KPFM(FM)	94.1	Berkeley	KCIX(FM)	105.9	Boise	WLVF-FM	96.9	Grand Rapids	WKIA(FM)	101.1	Belhaven	WZAS-FM	105.3	Philadelphia
KPFH(FM)	89.3	Berkeley	ILLINOIS			WKLQ(FM)	94.5	Holland	WMLT(FM)	106.9	Black Min.	WFLN-FM	95.7	Philadelphia
KSIQ(FM)	96.1	Browley	KNJZ(FM)	100.3	Alton	WKRFR-FM	103.3	Kalamazoo	WGLS-FM	89.7	Chapel Hill	WIOQ(FM)	102.1	Philadelphia
KFMF(FM)	93.9	Chico	WRMS-FM	94.3	Beardstown	WKRK(FM)	107.7	Portage	WSDC-FM	91.5	Charlotte	WKDN-FM	106.9	Philadelphia
KPPL(FM)	107.5	Colusa	WCIL-FM	101.5	Carbondale	WKRK(FM)	107.7	Port Huron	WXRQ(FM)	94.5	Eden	WKKW(FM)	101.5	Philadelphia
KVHS(FM)	90.5	Concord	WCBH(FM)	104.3	Casey	MINNESOTA			WQXN-FM	96.3	New York	WHYY-FM	90.9	Philadelphia
KOHL(FM)	89.3	Freemont	WLRW(FM)	94.5	Champaign	KALUS-FM	99.9	Austin	WROZ-FM	101.3	New York	WMGK(FM)	102.9	Philadelphia
KUFJ(FM)	94.5	Gilroy	WARG(FM)	88.9	Chicago	KNBJ-FM	103.7	Benedict	WMMR(FM)	93.3	Philadelphia	WRTI(FM)	90.1	Philadelphia
KCRH(FM)	89.9	Hayward	WBEZ(FM)	91.5	Chicago	KDNW(FM)	97.3	Duluth	WPLV(FM)	100.3	Philadelphia	WRDV(FM)	89.3	Philadelphia
KFSG(FM)	96.3	Los Angeles	WCCQ(FM)	98.3	Chicago	KKEZ-FM	99.1	Mankato	WVNY-FM	93.9	New York	WSTW(FM)	93.7	Philadelphia
KHQI(FM)	97.7	Los Altos	WFMT(FM)	98.7	Chicago	KKCF(FM)	99.7	Marshall	WVNY-FM	93.9	New York	WUSL(FM)	98.9	Philadelphia
KCRW(FM)	89.9	Los Angeles	WJCH(FM)	91.9	Chicago	KKBE-FM	88.5	Minneapolis	WVNY-FM	93.9	New York	WXPN(FM)	88.5	Philadelphia
KCBT(FM)	92.3	Los Angeles	WJKL(FM)	94.3	Chicago	KCFE(FM)	105.7	Minneapolis	WVNY-FM	93.9	New York	WXTU(FM)	92.5	Philadelphia
KKGO-FM	105.1	Los Angeles	WJMK(FM)	104.3	Chicago	KDXL(FM)	106.5	Minneapolis	WVNY-FM	93.9	New York	WYDQ(FM)	96.5	Philadelphia
KKLA-FM	99.5	Los Angeles	WKKD-FM	95.9	Chicago	KFAI(FM)	90.3	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KLSX(FM)	97.1	Los Angeles	WKKD-FM	95.9	Chicago	KJMJ(FM)	104.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KLVE(FM)	107.5	Los Angeles	WKKD-FM	95.9	Chicago	KMOJ(FM)	89.9	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KPCG(FM)	89.3	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KPKF(FM)	90.7	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KPWR(FM)	105.9	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KREA(FM)	93.5	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KRTH(FM)	101.1	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KSCA(FM)	101.9	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KTVW(FM)	94.7	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KUSC(FM)	91.5	Los Angeles	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KATM(FM)	103.3	Modesto	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KHDF(FM)	104.1	Modesto	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KEBR-FM	89.3	North Highlands	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KCSN(FM)	88.5	Northridge	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KPLM(FM)	106.1	Palm Springs	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KSHAF(FM)	104.3	Redding	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KFDX(FM)	93.5	Redondo Beach	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KNPR(FM)	88.1	Ridgecrest	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KRXX(FM)	93.7	Sacramento	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KSFN(FM)	102.5	Sacramento	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KSDS(FM)	88.3	San Diego	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KPBS-FM	89.5	San Diego	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KYXY(FM)	96.5	San Diego	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
XTRAF(FM)	91.1	San Diego	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KALX(FM)	90.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KDFC-FM	102.1	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KCCG(FM)	88.1	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KEAR(FM)	106.9	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KALW(FM)	91.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KFFG(FM)	97.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KFDC(FM)	104.5	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KFRG-FM	99.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KKHI-FM	100.9	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KKIA(FM)	101.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KKSF(FM)	103.7	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KUSI(FM)	90.3	San Francisco	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KJSJ(FM)	92.3	San Jose	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KCBX(FM)	90.1	San Jose	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KDBB(FM)	93.7	San Jose	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KUSP(FM)	88.9	Santa Barbara	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
KSTN-FM	107.3	Stockton	WKKD-FM	95.9	Chicago	KNDW-FM	91.1	Minneapolis	WVNY-FM	93.9	New York	WZLZ(FM)	93.7	Pittsburgh
COLORADO			INDIANA			WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KBCO-FM	97.3	Boulder	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KKFM(FM)	96.5	Colorado Springs	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KCCD(FM)	90.7	Denver	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KCFR(FM)	90.1	Denver	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KHIM(FM)	95.7	Denver	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.9	Bremen
KKHK(FM)	99.5	Denver	WYZZ(FM)	96.9	Bremen	WYZZ(FM)	96.							

Equipment and Applications for Radio Production and Recording

Equi=Tech Balances Out the Hum

Noise and Hum Reduction Technology Starts at the Most Logical Place: The AC Lines to the Studio

by Bruce Bartlett
with Jenny Bartlett

ELKHART, Ind. Eliminating hum and buzz can be a pain. Ground lifts, matching balanced to unbalanced gear, trying extra grounds ... it never seems to end.

There is a simple solution. Equi=Tech offers a symmetrical power system that it claims will to reduce the noise floor in a studio up to 20 dB and eliminate hum and buzz.

The Equi=Tech system is a black box that fills a few rack spaces (or a flight case). Inside, a toroidal transformer converts unbalanced power to balanced in a process similar to balanced audio lines. On the back are several AC outlets for studio gear or outlet strips.

Balancing act

The system cancels hum with a center-tapped power transformer. Instead of one 120 VAC line and one 0 VAC line, you have two 60 VAC lines.

The lines are in phase with each other and sum to 120 VAC but connect to the center-tap ground out of phase (one is +60V, the other is -60V). Any hum or noise on the grounding system cancels out. Figure 1 makes this clear.

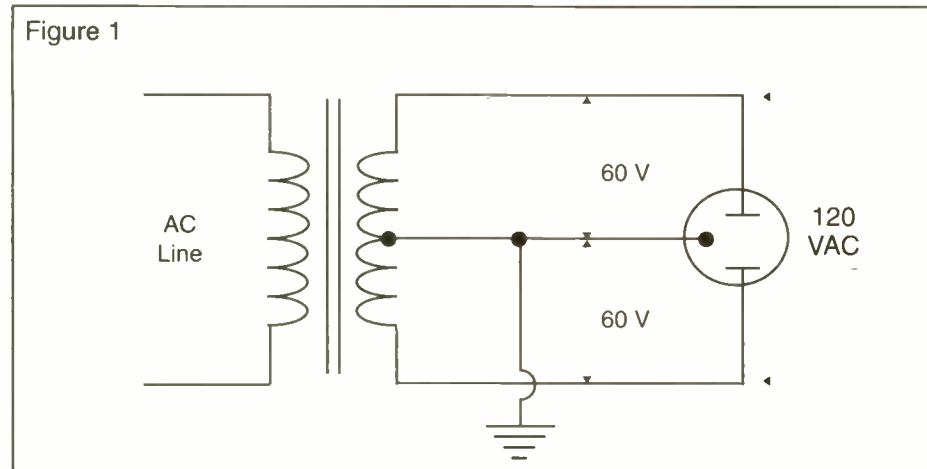
The unit is claimed to reduce hum, buzzes, EMI, RFI — all noise but thermal noise. Because the system eliminates electromagnetic interference (EMI) in a studio environment, electric guitars no

longer pick up hum. This is good news if your station airs live musicians or cuts guitar tracks as a matter of production.

You need not redo your studio power wiring. Just plug the Equi=Tech unit between an AC system and your audio equipment. Gone are the buzzes and hum that plagued you in the past. The company says you can expect 10 to 12 dB hum reduction in an unbalanced audio system, and 15 to 20 dB in a balanced system.

How it works

Regular unbalanced AC waveforms are



not clean sine waves, but are distorted by harmonic currents reflected from loads such as fluorescent light ballasts. Switching power supplies and balanced RF filters on an AC line can also leak

currents and noise to ground.

With the Equi=Tech system, reactive currents generated by the power load are symmetrically balanced. They null (sum to zero) at the center-tap for a clean, noise-free ground.

The system also prevents ground loops or current paths, a major cause of hum. A current path is a difference in voltage between two chassis that are connected together. Even when two different chassis are connected to the same ground, there can be different voltages on the two chassis.

The power supplies in each device reflect different voltages onto the chassis even with the same ground reference. When the chassis are connected with an audio cable, current flows along the

shield and appears at the input as noise.

In the Equi=Tech system, all device grounds are referenced to the transformer center-tap. Here, the AC waveform is at the zero crossing point, where voltage and current are zero. Two components grounded here have zero voltage reflected onto the chassis to cause a current path.

Equi=Tech has done 200 installations since 1994, and claims great results in several industries. Station KCNA-FM in Grants Pass, Ore., is one user.

Some large automated stations do not work reliably because of excessive ground noise. Equi=Tech claims that its power system can solve this problem. The system meets 1996 National Electrical Code and includes industrial breaker distribution, magnetic and electrostatic shielding, a double-isolated internal chassis, transient voltage protection and ground fault protection.

Applications

Some applications for balanced power are PA systems, radio and TV stations, recording studios, film and video post studios, home stereos and test labs. For the purposes of this article, we will limit ourselves to radio applications.

In monitoring systems, the only sources of hum may be the console and associated equipment. Power amplifiers seldom are the hum source. So you can power

the console and effects off balanced AC, and juice the power amps as usual. Just lift pin 1 at the power amp input.

Audio devices may have a "dirty chassis" condition that is usually due to a power supply problem, poor internal grounding or bad shielding. This causes noise even with balanced AC power due to voltage on the chassis.

To find which component has a dirty chassis, leave all connections in place and turn your system on, one component at a time. When noise starts, you've found the guilty party.

To deal with this component, balance its audio output with an isolation transformer and run the signal into a balanced input (some balanced mic preamps can handle +4 dBm).

An alternative is to run its output into pins 2 and 3 of a balanced input, and float pin 1. Ground the chassis of any device with two-prong power cords.

Field test

I installed the lowest-cost Equi=Tech unit, the ET1.5R, in our microphone test lab at Crown to try out for myself. Even with no load, it popped a circuit breaker when plugged in.

According to Mark Brown with Equi=Tech customer support, the transformer requires a high inrush current to magnetize the core: 400 amps for 3 milliseconds. After I flipped the breaker a few times to "charge up" the transformer field, the AC line stayed on.

To avoid this, a heating and air conditioning-rated breaker (HACR-type) is recommended. These are designed to shake off the initial high-current demands of motors and compressors.

Our fluorescently-lit mic test lab uses all unbalanced equipment, including a mic preamp, power amp, real-time analyzer and an outboard TEF analyzer with printer. Power to all equipment is fed from a single three-wire outlet strip.

First I plugged the outlet strip into regular unbalanced AC power, then into balanced power. Meter readings and head-



Equi=Tech ET1.5R

phone listening showed balanced power made little or no improvement.

Component count

This is typical performance with only one or two components in the chain. The results may be entirely different in a large radio station. The more devices in series,

continued on page 16 ►

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Hyperprism Turns Mac Into High-quality DSP

by Ed LaComb

SYRACUSE, N.Y. I love my Mac. As computers go, it is certainly the easiest to use and most intuitive hardware/software combination I have found out there.

The only problem is when I head to my local software store. There I see 10 aisles of PC software and, if I am lucky, one shelf for Macintosh.

Adding further insult to injury, most of that small slice of Mac heaven is just chintzy game software without very much substance. It is almost enough to make you trade in that faithful old Mac for a (gasp) PC.

Well Mac gurus, fear not. Every now and then, one discovers a piece of Mac software that blows the rest away. For the Mac-lover in everyone, I would now like to introduce you to a neat program from Arboretum Systems called Hyperprism.

Getting hyper

Hyperprism is a sound effects DSP program that gives you 21 different programs to shape soundfiles. The entire gamut is here, from modulation effects to filters, reverbs to pitch shifters and delays to stereo enhancers. It is a thing of beauty, and if you are a Pro Tools user, it is almost religious.

First things first. Hyperprism is designed to work on any Power PC Macintosh. By using the advanced processing capability of the PPC chip, Hyperprism can create effects without add-on hardware or accelerator cards. The effects are real time; no rendering here.

The algorithms have 32-bit internal precision and the program supports 11, 22 and 44.1 kHz sampling rates and 8- or 16-bit resolution. You can use it as a stand-alone program, or better yet if you are a Pro Tools user, Hyperprism is TDM (time division multiplexing)-compatible and loads into Pro Tools as a plug-in.

Hyperprism works with standard Mac AIFF files and Pro Tools Sound Designer II files. One minor annoyance for me is that Arboretum uses an authorization-deauthorization process to make the program work on your hard drive without the master key disk.

Look, I paid for it; why do I have to worry about losing authorizations accidentally or by a hard drive crash, thereby making my investment worthless? Of course I would expect Arboretum to help out any registered owner if this actually happened, but why the inconvenience?

Having vented that, I note that the actual process of authorizing and deauthorizing is quite easy and identical to the Pro Tools auth/de-auth process.

Diving in

So how does Hyperprism work? If you are thinking it is a set-and-forget type of interface, you are wrong.

The really cool hook of this program is its real time interactive Blue Window. Imagine a big blue square with a pointer dead center. That is your starting point.

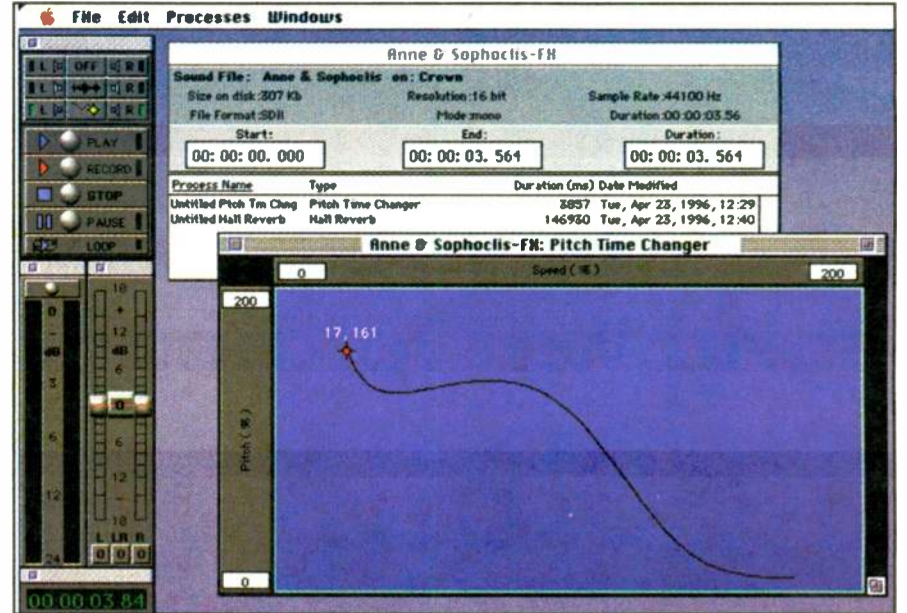
As you move the pointer during playback of your soundfile, you will hear the effect you have chosen change with your movements. For example, a reverb algorithm will increase the amount of reverb

as you raise the pointer.

The direction and velocity of pointer movements is recorded as an automation file that can be recalled for playback. Hyperprism does not actually change your source file but only applies an effect to it. This saves gobs of disk space.

Hyperprism looks pretty, but how about the guts? Frankly, I have seen better and worse, but Hyperprism performs well. The reverb programs are as good as any heard in outboard boxes, with the exception of the Lexicon PCM-90.

continued on page 19 ▶



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Balanced AC Power System

► continued from page 14

or the more mix channels in use, the more hum; all sources are synched to the 60 Hz AC, so they add in phase. In a large complex, balanced AC power can make a huge difference.

Next I tried the Equi=Tech system in my project studio, which includes a digital eight-track recorder, console, power amp, DAT and effects loop. There is also a Korg M1 synthesizer that Equi=Tech says has a "dirty" chassis. Line-level connections are unbalanced and both three-prong and two-prong power cords are in use.

I set all the mixer faders to unity gain, ran the mixer line output into a DAT

recorder mic input and turned its gain up full. I listened to the noise floor over headphones and measured the noise level on the DAT meter. The noise consisted of hum, hiss and a slight buzz.

Without the synth, balanced AC power made no noticeable improvement. The noise floor sounded and measured the same with both regular and balanced AC.

My mixer has a two-prong power cord and an ungrounded chassis. Equi=Tech customer support recommended I tie the mixer chassis to the unit ground terminal. Now there was a drop; the hum and noise sank 6 dB with balanced power.

Next came the synth with its dirty chassis, cabled directly to a mixer line input.

With unbalanced power, the noise was buzz and hash. With balanced power, the noise dropped another 6 dB to a mellow hum and hiss.

Even quieter

A direct box made things more dramatic. I connected the synth through a direct box into a balanced mic input. Balanced power dropped the noise floor by 12 dB, for a total improvement of 18 dB. It really does work.

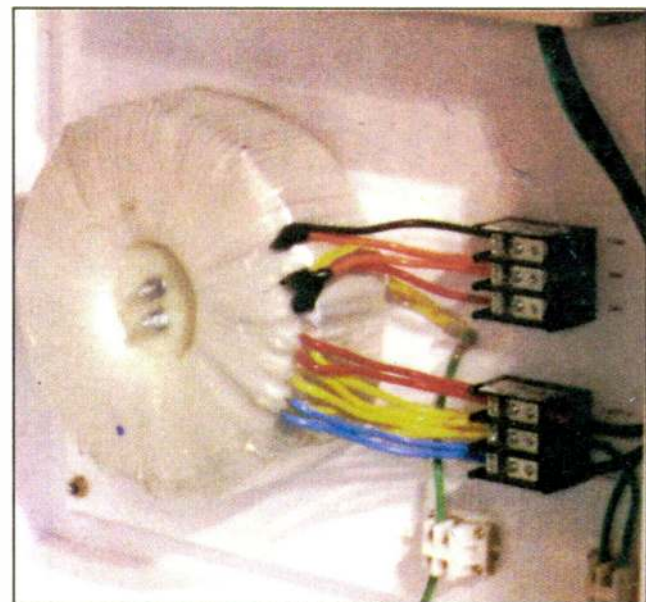
Equi=Tech provides not only a product, but application tips and project engineering services.

The system comes with a white paper that covers many more ways to reduce hum and noise. The company offers five rack-mount models that range from 12.5A to 41.3A output. Cost ranges from \$1,349 to \$2,889. All rack systems are ETL listed.

Larger wall-mounted systems cost from \$3,959 to \$5,359. Two portable systems are priced at \$3,859 and \$4,859.

Options include super isolation, EMI/RFI filter and European/World power conversion.

Now that the digital audio age is here,



Toroidal Transformer Is Heart of Hum-buster

keeping a low noise floor is more important than ever. The Equi=Tech balanced power system can be a useful tool to help you do that.

Equi=Tech Corp. is in Selma, Ore., at telephone: (541) 597-4448 or toll-free (888)-ACSOURCE. Check out its Web site at www.equitech.com

□□□

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.

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Although still very popular, the VRC and others that model the VRC cannot be expanded beyond the system's basic capabilities.

However, operation with the GSC3000 can cover anything from a single site with minimal requirements



to a large number of sites with extensive requirements—it's whatever you need it to be today and tomorrow!

To accomplish this, Gentner uses a modular approach with the GSC3000. Much like the VRC product line, the GSC3000 provides micro processor-based "smart" units that establish the ability to operate transmitters from many locations. (The radio "walkaway" mode).

For more information on the GSC3000, contact Harris.

1-800-622-0022

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Features and Benefits

Site expandability that is easy to manage

Operation of one to 256 sites

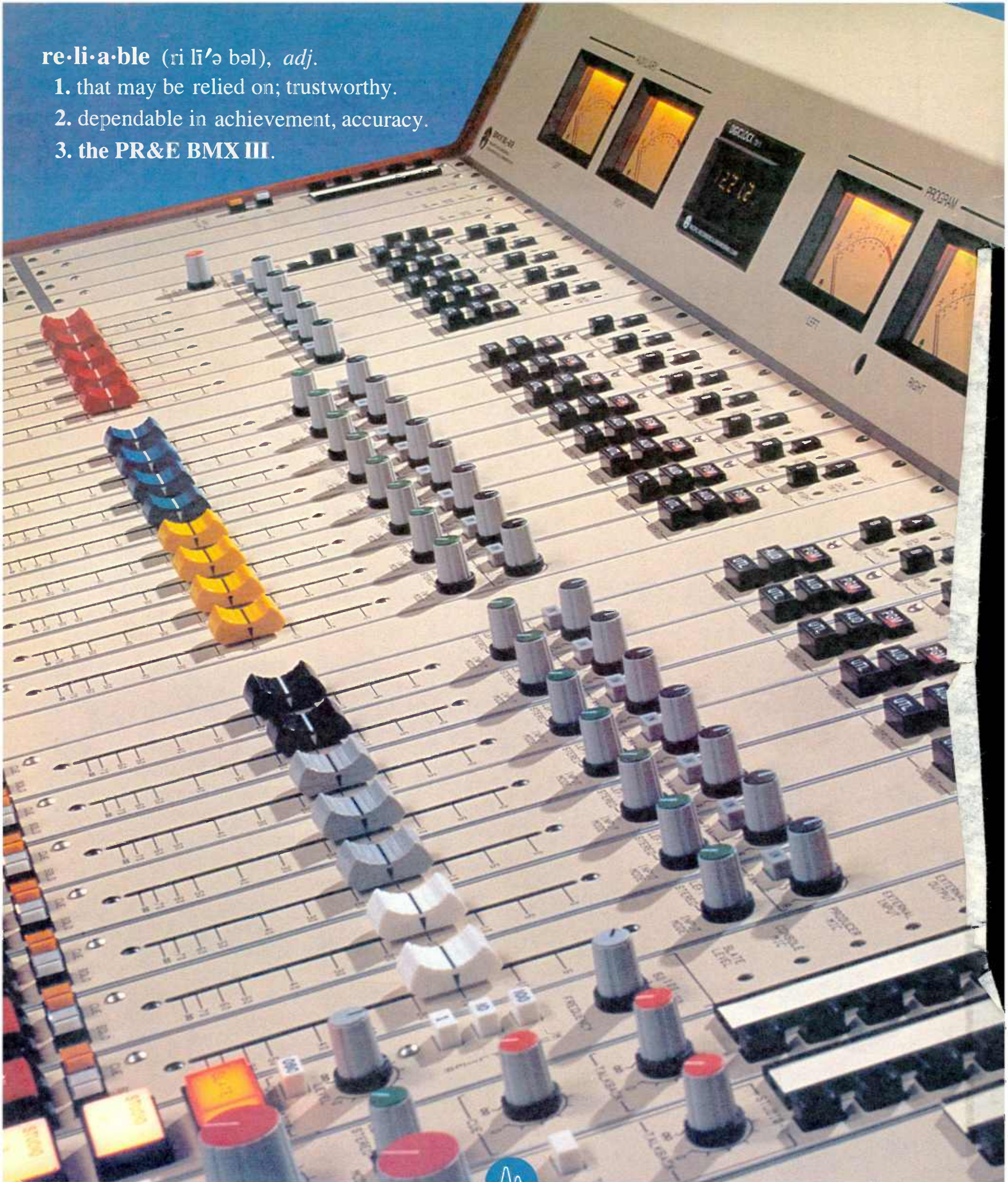
8 to 256 logical channels of metering, status, and command, *per site*

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**Cover a single site
with minimum needs
or multiple stations with
extensive requirements**

re·li·a·ble (ri lī'ə bəl), *adj.*

1. that may be relied on; trustworthy.
2. dependable in achievement, accuracy.
3. the PR&E BMX III.



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Circle (47) On Reader Service Card

World Radio History

Hyperprism Processor

► continued from page 15

Hyperprism uses a smoothing technique that compensates for jerky motion across the blue window. It constantly measures the distance between your last point and your new point and averages the motion. The degree of smoothing is controllable, so if you actually do want a jerky change, you've got it.

I like the clean pitch shifter, but was less impressed with the delays. When you set it and forget it, everything is fine. But when you decide to make a change in the middle of your sound file, you get garbage.

We use the higher, industry-standard sample rates at NewCity Production Services, so I did not test low sample rate quality. Based on experience with other equipment, I imagine you would lose most of your highs as well as dynamic range. But hey, isn't that an effect too?

I created my coolest effect with Hyperprism was by feeding a 1 kHz tone into the Ring Modulator algorithm. Sliding the pointer around the blue window created a variable, shortwave radio-ish heterodyne effect.

Wild, huh? Thousands of dollars of the cleanest high-tech Macintosh computer tools available today, just to create the sound of an ancient radio. You gotta love the '90s.

If you like the final version of your soundfile with its new effect, save that version of it to disk by choosing the command "Process To New Sound File."

For multipass projects (more than one effect on a sound file), Hyperprism allows you to place your first effect, save the result as a new soundfile and then put your second effect on and so on.

I would prefer true linking of effects by feeding one into the other, but at least in the digital domain, quality does not suffer from repeated generations. About the only thing you will lose is time. Not so terrible, if you have enough to waste.

Easy does it

Hyperprism, for all of its features and flexibility, is easy to use. There are four main menus. The File menu gives you the basic commands to open and save files, create new files and record audio into your Mac for later use.

The next menu is your standard Edit menu for cutting, pasting and copying. After that, you have the Processes menu which is where the individual algorithms are. Just pick the one you want, and its associated window and blue window pop up on your screen ready for you to do your magic.

The final menu is the Window menu that allows you to decide which of Hyperprism's four main control windows you want to see next. If you want, you can choose to have all four windows open during your session. I found that there was plenty of room for all of them, and I was using a simple 15-inch Sony monitor.

If you use Pro Tools in your studio, I would recommend Hyperprism to you over any outboard box that you could put in. Combined with the standard plug-ins that Pro Tools provides, you have a great start on totally digital, onboard effects for your creative juices to begin mingling over.

If you are producing soundfiles for multimedia use, Hyperprism is a great choice. So, you see, my Macintosh friends, there is a reason after all to stick with your Mac. We may not have the

most software available — or if we do, it is not the easiest to find — but we do have the best software.

At just \$279, Hyperprism deserves a spin. I think you will fall in love with your Mac all over again. Arboretum Systems is at 915 Cole St., Suite 387, San Francisco, Calif. 94117.

□□□

For more information, contact Arboretum Systems at (415) 626-4440 or circle Reader Service 1.

Ed Lacombe is production director for NewCity Production Services, coordinating production for five radio stations in central New York. Contact him at (315) 472-9797 or edlacombe@aol.com

64 Years Ago

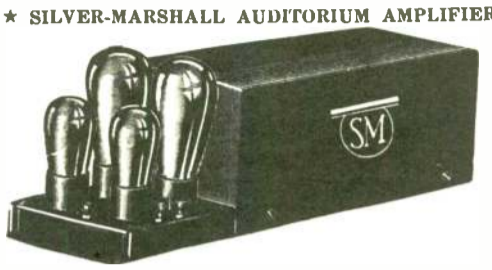
Reprinted from Radio World November 5, 1932.

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.

Back in 1932, radio shops were in great abundance and each carried its particular line of products and components. Fans of tube amplification were able to buy this Silver-Marshall "auditorium amplifier" from such a shop in New York for less than \$13.00.

The circuitry drew 85 W from the wall while putting out "maximum undistorted output" of 6 W. It was also capable of providing "field current" to the loudspeakers of the day that employed field electromagnets rather than permanent magnets.

The unit weighed a lot more than it cost. Shipping weight for the Silver-Marshall was 38 pounds.



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DENON
The First Name In Digital Audio

Add FTP to Your News Operation

by Rich Rarey

WASHINGTON No sooner had the ink dried on our first *Public Domain* installment about FTP-ing files around the Internet, when we received a call from a well-known public radio producer.

"I want to use the Internet as a free 'path' for stations to receive our radio series, in case they miss a satellite feed of a particular episode," he said. "Is this feasible?"

Feasible, yes. Practical for everyone, all the time? Probably not.

Because of the nature of the Internet, you do not have control of the routing when the bits leave your computer. However, you do have some influence over the "first-mile/last-mile" path.

For example, NPR foreign-based reporters were intrigued with the idea of filing high-quality audio from their hotel rooms and homes or offices.

Tempus Fugit

NPR reporter Andy Bowers quickly found that such a filing innovation has its drawbacks. He recorded a news spot on his desktop computer in his London home, used his 14.4 kbps modem to connect to the NPR FTP site via his CompuServe account, and was dismayed to find that it took at least 25 minutes to file a 53 second piece.

Why? Blame that first mile, his dialup modem, the slowest link in the chain. Still, Bowers admitted, it saved him a one-hour round trip to the NPR bureau at the BBC Bush House and sounded much better than a phoner.

An account with a provider such as CompuServe, which maintains telephone access numbers around the world, means a local phone call can connect one into the NPR FTP site.

By the way, Bowers has since become the NPR reporter in Moscow, and uses a dedicated data link to file audio and text.

In another instance, BBC reporter Chris Nuttall found he experienced repeated data time-outs in trying to connect to NPR through CompuServe from Ankara, Turkey. This obviously made FTP transfer impractical.

He found it easier to simply e-mail the audio file as an attachment to the BBC headquarters in London, and have the BBC play it as an analog signal to NPR over our existing fiber optic lines. Nuttall found that using ADPCM digital compression reduced his file size dramatically, bringing the resultant sound quality down to that of a G.722 Switched 56 transmission.

He has since successfully e-mailed an entire radio piece for NPR's "Morning Edition" and reports he is looking forward to the day when connection speeds higher than 9,600 bps will become possible in Ankara.

Closer to home

Back in the United States, the NPR FTP site has been used by stations with no other high quality point-to-point transmission method. Northwest Public Radio (NWPR), for example, filed news spots regularly during the Washington State flooding in early 1996. Boise State

University Radio Network Statehouse Bureau Chief Steve Jess has used the site to transmit a news spot from his office on a recent afternoon, but found to his

throughput) to the NPR site.

He reported that the transmission slowed to 5 kbps and took about seven minutes to finish the 3.1MB file transfer. The unexpectedly slow transfer (by T-1 standards) made it impractical to turn around the audio file for air so close to deadline so Jess wound up filing by regular telephone.

In investigating the poor performance of what should be a lightning-fast FTP transfer, NPR Information Technology systems analyst Miles Oliver says the amount of



PUBLIC DOMAIN

annoyance the data moved slowly (slow

If our marketing department had been as talented as our engineers, you'd probably be using a Prisma™ workstation right now.

The alternative workstation.

Okay, granted, there are already a lot of digital audio workstations out there. Some are so expensive that you can only afford one for six editors. Some are little more than PC sound cards that can't lock to picture without timecode drift. Some are so complicated that after you've bought a Mac™, 5 add-in boards, a bus expansion box and 12 pieces of software, it almost nearly works most of the time.

That's why you should explore our radically different approach. Admittedly, we're guilty of spending far more time perfecting our products than advertising them. But today, a growing number of major post production facilities and recording studios are reaping the benefits of our meticulous engineering. They also rave about our great service and quick support - available worldwide via internet, fax, or phone without having to wait on hold for hours.

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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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*via linked CPUs

information flowing "around" the 'Net at any moment noticeably affects performance.

"As each data packet is sent," he said, "it travels the same route for the life of that connection. The routes appear and disappear continually and unexpectedly, so you probably won't have the same routing each time you connect to a site."

So when more people use the Internet during a particular daypart, expect to see throughput slow down during those popular high-usage times of the day.

Ponderables

Returning to the feasibility of a radio program repository, one must consider the following points:

First, is a satellite feed to your client

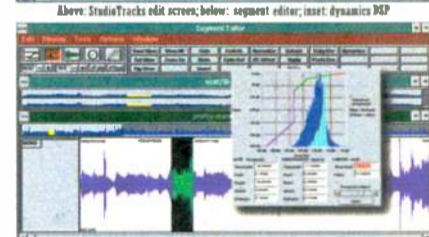
continued on page 32 ▶

Get the whole, hitherto untold Spectral workstation story.

Prisma™, Express™, Producer™ and StudioTracks™ are just part of our product line. They all come from an established company that specializes in digital audio workstation and connectivity solutions. Call, fax or e-mail for complete, detailed information on our practical approach to enhanced productivity.

We've been keeping it a secret for far too long.

†The software program Formerly Known As Prisma Music. Our previous Marketing Department did it.



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The "Super Duopoly" System...

PAGE #1	Record	Autoroll	Cuts List	Swap		Option Menu
POT 1 (A/S)	POT 2 (A/S)	POT 3 (A/S)	POT 3 (LOCAL)	POT 4 (LOCAL)	POT 4 (LOCAL)	
K APRIL BLOSSOM 00:15 1	B WAGON WHEEL 00:19	C KARLS APPLIA 00:59	D BAKERY CAFE 00:19	E CINNAMON 00:02	F JACKS PLACE 00:08	
G LARRYS RV 00:31	H HDA 00:03 2	J VoiceTRAC fo 00:15 3	J DUDDENS 00:45	K EBS 00:50	L HIRSHFELDS 00:03	
M RADIO SONG 04:08	N DAYBREAK 03:41	O NOTHING'S NE 02:59	P MANDY 03:14	Q WALKIN' AWA 02:47	R NOBODY'S 03:26	
S LINER A	T LINER B	U LINER C	V LINER D	W LINER E	X LEGAL	
<div style="display: flex; justify-content: space-between;"> Sat Mar 2, 1996 POT </div> <div style="display: flex; justify-content: space-between;"> 55° High: 58° Low: 32° Insert Delete Mark </div> <div style="display: flex; justify-content: space-between;"> 06:36:32 PM 17:48:00 </div> <div style="display: flex; justify-content: space-between;"> 23:28 02:31 </div> <div style="display: flex; justify-content: space-between;"> KOGA FM # 2 Clipboard-0 Last Delete-0 Hold Bin-27 </div> <div style="display: flex; justify-content: space-between;"> SHIFT #04 BILL SMITH MANUAL MODE </div> <div style="display: flex; justify-content: space-between;"> Block Fill ON Default Source 01 Resync Mode ON </div> <div style="display: flex; justify-content: space-between;"> Run UDE Special Menu Play F9 </div> <div style="display: flex; justify-content: space-between;"> ? Station Data Stop F10 </div> <div style="display: flex; justify-content: space-between;"> End F11 Skip F12 </div>						

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2	Clear Line	Jill Taxes Lincoln	On Hold	
3	Clear Line	Mary Football Team Lincoln	ON AIR	
Next 4	Clear Line	Mark DIA Airport Denver	On Hold	
5	Clear Line	Bobby Gambling Laws Grand Island	On Hold	
				Delay Unit ON
				Hybrid Run by audio5
				Clear All Lines



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World Radio History

SHORT TAKE

Antex Unveils Two New High-end Soundcards

There are two new high-quality digital audio cards available from Antex Electronics, a manufacturer of high-end sound cards and audio products for the PC.

Production directors and recording engineers looking to upgrade PC-based digital audio editors will want to read about these.

The SX-34 adapter is a half-size add-on card, compatible with 386/486/Pentium and PS/2 ISA systems. It offers multiple sampling rates of 5.1 kHz to 48 kHz, 16-bit input resolution and features an on-board buffering scheme two-and-a-half times faster than DMA transfers, allowing glitch-free data transfer.

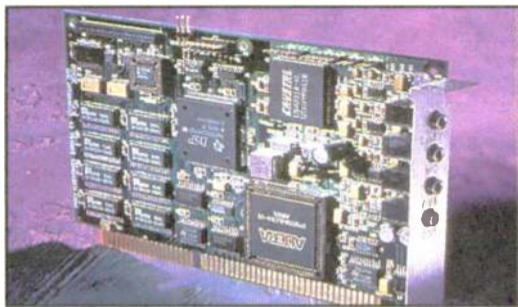
The Antex SX-34 offers MPEG Layer II bit rate reduction for compression rates of up to 16:1, and supports MS ADPCM, IMA ADPCM, OKI ADPCM and CD-ROM XA.

Drivers are provided for both DOS and Windows and the SX-34 is fully supported under the MS multimedia extensions.

Mic, line and aux inputs are featured on the SX-34 as well as an on-board mixer. Dual device design allows simultaneous recording on one stereo channel while playing back another.

Even more power can be realized with the Antex StudioCard, a 32-bit memory-mapped board with four independent balanced I/Os, a 40 MHz DSP, 18-bit sound quality, 92 dB dynamic range and less than .003 percent THD.

Multiple adapter capability allows the



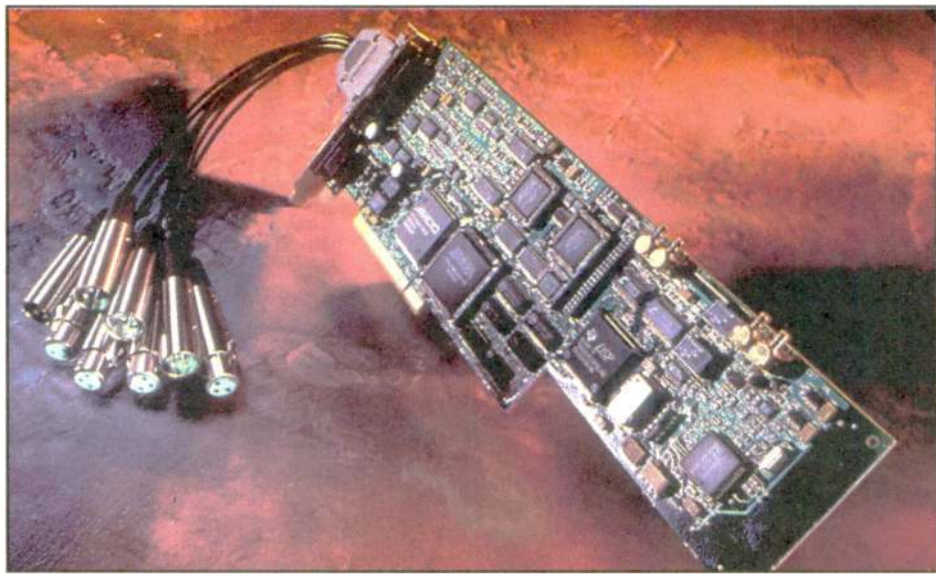
SX-34 Adapter

installation of four such cards in a PC for 16-track recording. An on-board SPx expansion connector enables the use of optional daughterboards for compression or enhanced DSP operations.

The Antex SX-34 is now available at a list price of \$695. The StudioCard will be available shortly at a list price of \$1,595.

For information, contact Antex Electronics in Gardena, Calif., at (310) 532-3092, or circle Reader Service 54.

-Alan R. Peterson



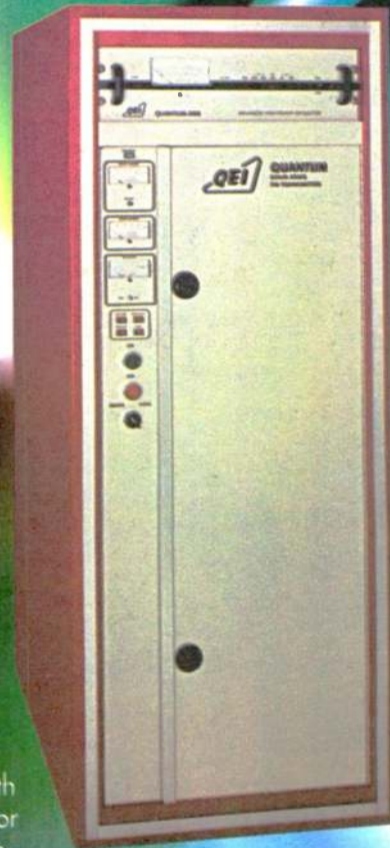
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World Radio History

PRODUCT EVALUATION

The Roland VS-880: A Closer Look

Part II of II

by Ty Ford

BALTIMORE In the last issue of *RW* (Sept. 18) I took a global tour of the newest digital audio workstation from Roland, the pizza-box-sized VS-880. Since then, I have had the chance to play with it a bit and even take it out on the road. Read on to find out the rest ... of the story.

Just shy of 17 inches wide, 12 inches deep and 3 inches high, the VS-880 is the most complete eight-track digital scratch-pad I've seen. Its 540MB internal drive is, as expected, a little quieter than the two mounted in the DM-800. Depending on your requirements, it may be too noisy for use near open mics.



Roland VS-880 Workstation

The VS-880 is very menu- and button-intensive. The Shift and Play/Display functions get used a lot and, even if you have an octave-plus-two reach, the buttons are far enough apart to require two hands. The Play/Display button acts sort of like an Escape button, taking you back to the top of the menu. You will be using it a lot.

Conversion and compression

Starting a new production requires that you set the sample rate — 32, 44.1 or 48 kHz — and decide whether or not to use data compression. Remember, the VS-880 offers three: MT1, MT2 and Live. If you expect to use more than four tracks, you must employ some form of compression.

The VS-880 has a built-in signal router that allows you to choose which input jacks are connected to which tracks and whether the input is analog or digital.

I recorded Chris Isaak's "Wicked Game" in the uncompressed mode, then compared the VS-880 output to the analog output of my Technics SL-P520 CD player, using my Mackie 1604 mixer for A/B switching.

I chose the tune because of the fragility of the sounds and the reverbs. The difference was very subtle. The stereo sound-field seemed to stay intact. No frequencies or lack of frequencies jumped out at me, but there did seem to be a very minor "hardness" to the sound coming off of the VS-880 disk.

I opened a new production, this time using the MT2 record mode (2:1 compression), and recorded the same song again. The comparisons were almost opposite. Although the stereo field was the same and the EQ virtually identical, the direct tracks from the CD sounded very slightly "harder" or "clearer" than the MT2 playback from the VS-880.

The bottom line is, if you don't like the sound of 2:1 compression and you only

need four tracks, you can run in Master mode and still achieve a good balance of price and performance.

Editing

Because each of the eight tracks on the VS-880 has eight Virtual Tracks, you can have a total of 64 tracks, eight of which are available at any time. You can also copy parts from each Virtual Track and paste them into a new Virtual Track.

I decided to start with something simpler: a stereo jingle with V/O tracks, to exercise the editing capabilities of the VS-880.

Recording is fairly simple, and while

Cut and Erase are too, the manual falls short of providing complete information. It instructed me to make settings for the start and end points without telling me which buttons to push to get to those settings.

Experimentation eventually led me to the Parameter buttons, but Track Three still sat blinking, regardless of what I did. I went through the process a number of times and finally made it.

Here's the secret, and a good example of how intense the VS-880 menu and button routine can be:

Hit the Track button under the LCD. When the top line of the LCD prompts you

with, "TRK Track Cut?", hit Yes. If you have hit the CH Edit button on the mixer section for the track you wish to edit, you should then see, "TRK Cut Tr. =" followed by the number of the track you selected, a dash and a flashing number.

The flashing number represents the Virtual Track for the track you are on. (In case you missed the first installment of this review, each of the eight tracks can store a total of eight tracks, any one of which may be activated.)

After selecting the right Virtual Track, you are now ready to select the IN and OUT points. Hitting the right Parameter button brings "Trk St=" (Track Start) to the top of the LCD screen.

Now you can use the Time/Parameter wheel to dial in the desired In point, use the locator buttons or enter the actual

continued on page 29 ►

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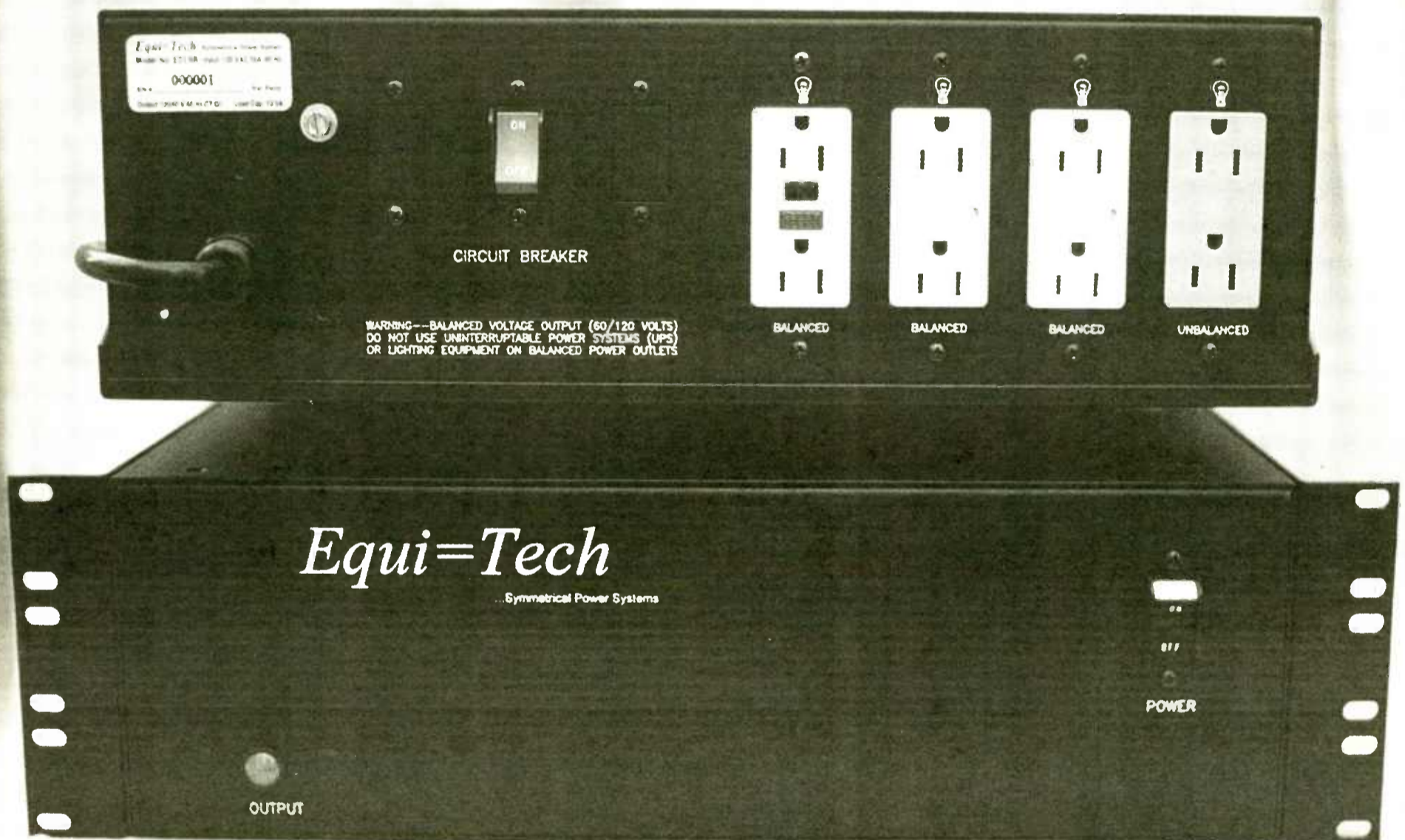
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Making Tracks with the VS-880

► continued from page 27

number of hours, minutes, seconds and frames using the "Numerics" feature. This turns the Locator buttons into Number Buttons.

Hitting the right Parameter button again brings the "TRK End=" (Track End) field up. You can select the Out time just as you did the In time.

Now, hit the right Parameter key one more time to get the "TRK Track Cut OK?" prompt. Hit Yes, and you've just done your first edit.

Ahh, but you have to be careful not to inadvertently touch any of the other tracks' CH Edit buttons or you will cut audio from those tracks as well; that is, unless you went back in and told the VS-880 not to mess with those tracks.

Fortunately, the tracks about to be edited blink on the mini LCD screen. You can also check for the correct tracks by using the Parameter buttons to look at which tracks have been selected. If you have selected more than the ones desired, you can hit the Play/Display button directly under the LCD and start over again.

Marking and erasing

Erasing was also an experience. I wanted to erase the space between the end of the first donut and the beginning of the second so that I could recognize each one better.

The VS-880 LCD screen — did I mention it's very small? — doesn't allow for naming or waveform display. You just get a black dotted line to indicate the presence of audio.

The Scrub feature works something like those in the DM-80 and DM-800. I used it to find the end of the first jingle and dropped a locate mark. Scrubbing forward to the beginning of the second jingle, I dropped a second locate mark.

From there, I hit the Track button under the LCD, and used the Parameter buttons to toggle to "TRK Track Erase ?" Then a quick poke on the Yes button and the CH Edit buttons for tracks 1 and 2 on the mixer.

It is important to note that 1-1 means track 1, Virtual Track 1, and that 2-1 means track 2, Virtual Track 1.

Hitting the right Parameter button brought me to "TRK St" (track start or In point). I then hit LOC1 at which I had stored the end point of the first jingle.

Another jab at the right Parameter button again to get to "TRK End," then LOC2 to enter the time just before the second jingle began. One more hit of Parameter took me to the "TRK Track Erase OK ?" prompt, followed by a Yes. The display flashed "Complete."

So where is it?

I had done it, but I couldn't see the space on the tracks on the LCD. To see the hole I had to hold down the Shift key and poke the Play/Display button several times. I hit the Shift and Rewind buttons together to save my session, and moved on.

Next was the standard "inhale edit" test, in which the center of a breath is edited out. The user-adjustable scrub wheel can be set for broad or fine resolution: from Measure, Beat, Marker, Second or 10 Frames, down to Single-frame resolution. Crossfade times are adjustable from 10, 20, 30, 40 or 50 millisecond settings.

Setting the scrub wheel for 10-frame increments gave me enough definition to place the Locator markers.

The VS-880 comes stock with three-band digital EQ on each track. The EQ seemed somewhat less responsive than

The VS-880 is the most complete eight-track digital scratchpad I've seen.

the numbers and LCD curves indicated, so I headed for Tony Eichler's studio and his Loftech TS-1 tone generator and frequency counter.

While the frequency response of the VS-880 is remarkably flat from 30 Hz to 20 kHz, the EQ changes shown on the device did not always match what was going on.

The +12 dB we applied to a 12 kHz high-shelving setting measured out at about 1 dB. We had to lower the corner frequency to 6 kHz to get a +3 dB change at 12 kHz.

The time compression and expansion algorithms work on music, but were somewhat iffy on voice. I tried compressing and expanding a 35-second voicetrack by two seconds, both in uncompressed and MT2 compressed mode.

Both created some sort of "underwater" artifact. It would also be nice to have a "before" and "after" indicator to allow for more accurate time fit.

Checking the -91 dBm S/N ratio, we noticed that Roland gave the figure in context with a +4 output. Using the nominal -10 output at which the VS-880 operates, we arrived at -88 dBm.

We also noticed some aliasing artifacts while running frequency sweeps in the MT2 (2:1) compression mode. At 2.2, 4.5 and 9 kHz, there were obvious increases in noise and harmonics. Eichler commented that, as apparent as they were, they were much less obvious than those he had heard from ADAT machines.

MIDI and effects

The VS-880 has a fairly robust MIDI capability and uses MIDI time code (MTC) for mastering or slaving to other MIDI devices.

In the Compu-mix mode, the VS-880 can transmit its mixer settings and operations as control change or system exclusive MIDI messages that can be used to provide mix automation.

In addition to mix levels, Compu-mix also controls EQ, MIX and Aux sends and pans, Master level and balance and Aux level and balance settings.

The optional VS8F-1 effects expansion board with its 100 presets (\$395) is a "must buy." Through two separate internal digital busses, it provides 18 reverbs, four gated reverbs, nine delays, 10 vocal efx, 11 guitar effects, nine guitar amp simulators, five bass presets, five comp/limiter presets, nine chorus/flanger/phaser/pitchshifter presets and twenty others.

Most of the effects have at least half a dozen adjustable parameters that can be

saved as presets. The quality of the reverbs is very good and the vintage guitar amp simulation programs are extremely convincing. The VS-880 also has two other AUX sends for your outboard analog gear.

Note to DM-800 users: Sorry to break the bad news, but this board does not fit the DM-800.

The back pages of the manual have listings of all parameter settings, their defaults and their ranges. Unfortunately, in many instances where the manual is incomplete or incorrect.

To its credit, Roland has published an interim series of job-specific simplified instruction sheets. Laura Tyson of Roland promises that a new manual is due by the end of this year.

Hangups and lockups

There were also a few strange hangups with what I assume is the software. Occasionally the system got into a Record/Pause mode lockup, even though it was on internal sync. Several times, although I had already hit Stop, I had to hit it again before I could get the menu to advance.

While the VS-880 can be set up for simple record/playback operation with minimal training, taking advantage of all of its features requires the learning and retention of a lot of keystrokes. If you have a photographic memory and don't mind pushing a lot of buttons to get around, it can be a wonderfully powerful recorder.

Alternately, if you lack in any of these areas, the VS-880 may seem like the Rubik's Cube of workstations, although priced amazingly low for what it offers.

On the other hand, to anybody with a cassette portastudio, a failing reel-to-reel system or old cart machines, the sound, editing and effects of the VS-880 (with the optional VS8F-1) will be hard to resist.

Its unbalanced inputs and outputs seem a deliberate move to keep it distanced from the DM-800. How much of a problem this will be when operated in high RF areas remains to be seen.

Product Capsule:
Roland VS-880 Workstation

<p style="text-align: center;">Thumbs Up</p> <ul style="list-style-type: none"> ✓ Good price/performance ratio ✓ Optional effects board 	<p style="text-align: center;">Thumbs Down</p> <ul style="list-style-type: none"> ✓ Time compression ✓ Awkward manual ✓ Unbalanced I/O
--	--

For more information, contact Roland at (213) 685-5141 or circle **Reader Service 3**.

□□□

Ty Ford's book "Advanced Audio Production Techniques" is available from Focal Press. He may be reached at tford@jagunet.com

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Korg Harmony Module

Korg USA is distributing the *ih* Interactive Vocal Harmony module.

This processor generates four-part harmony from one vocal source and is MIDI-controlled which allows the use of a sequencer or keyboard to select the harmonies.

Three sliders and six buttons adjust levels and placement of the harmonizing parts.

Mic input is on a balanced XLR connector and output is +8 dBu max on stereo quarter-inch balanced jacks. Sampling rate is 16-bit at 31.25 kHz.

The *ih* Interactive Vocal Harmony processor has applications for jingle production and music produced for broadcast.

For information, contact Korg at (516) 333-9100 or circle Reader Service 56.

Furniture for 02R Console

Omnirax, a manufacturer of studio furniture, introduces the MixStation 02R, designed specifically for the Yamaha 02R digital console.

The heart of the MixStation's ergonomic design is the recessed center section housing the 02R console (not included). It features a padded wrist brace area and a sturdy shelf above the meter bridge that can support a monitor screen up to 31 inches wide.

Left and right rack areas each have a total of 21 rack spaces for ancillary equipment. Cable grommets provide for neat wiring and casters allow easy access to rear inputs.

The MixStation 02R is available in five colors, weighs 240 pounds and lists for \$1,199.95.

For information, contact Omnirax at (800) 332-3393 or circle Reader Service 31.

Compressor and Pitch Shifter

Wave Distribution will release two new products next month: The Empirical Labs Inc. (ELI) Distressor analog compressor and Wave Mechanics Pure Pitch pitch-shift

Digital controls, based around large knobs with high-resolution numbering, are used to select ratio, detector and audio modes. The unit has eight compression curves, including the 10:1 "Opto" mode and a brickwall limiter called "Nuke."

The developer claims large amounts of compression can be used while retaining a pleasing effect, due to the device's smooth curves and "spongy" sound quality.

Pure Pitch is a state-of-the-art pitch shifter that compensates for changes in the formants of the human voice.

This allows natural sounding



algorithm for the Digidesign Pro Tools.

The Distressor is a unique classic "knee" analog compressor incorporating second and third order harmonic distortion to emulate the sound of classic compressors of decades ago.

shifting while maintaining musical integrity of other tracks also being shifted.

For information on either product, contact Wave Distribution at (201) 728-2425 or circle Reader Service 159.



duplicate up to 25 CDs per unattended session. With a stock 4X CD writer, a 74-minute master can be created in about 18 minutes.

The MediaFORM/NTI system consists of the autoloader, Yamaha recorder, NTI software, SCSI adapter, cables, 25 caddies and 10 CD-Rs. All documentation and technical support is included.

List price of the MediaFORM/NTI package is \$7,695.

For information, contact MediaFORM at (610) 458-9200 or circle Reader Service 134.

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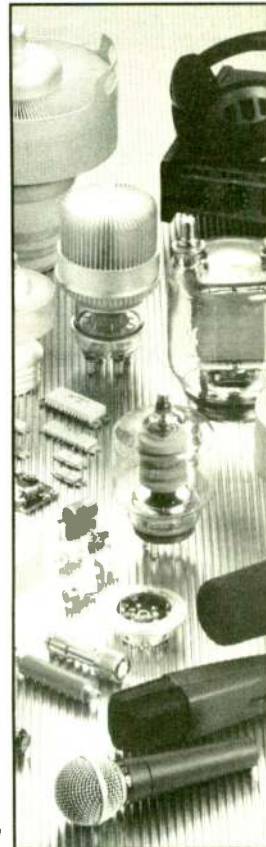
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FTP and News Transmissions

► continued from page 21

stations, an ISDN feed, or mailing a copy of the episode out of the question? These mechanisms are well-established in public radio, but require the coordination of a number of people.

The beauty of the FTP site is that no human need supervise the transfer of files.

Second, do your targeted stations have a computer with sound card, an Internet service provider, and if necessary, a modem? If not, an FTP site will not help.

Those stations that must use a dial-up modem to receive audio files will find the amount of time to download a hour-long radio program to be painfully significant. The large download (several

hundred MB) can take hours to complete.

Stations affiliated with colleges and universities could connect to their institutions' data pipeline as did Northwest Public Radio, and enjoy the benefits of high-speed data transmissions that reduce download time to minutes, not hours.

To continue, as owner of the repository, do you operate the server out of your office, and do you have a fast dedicated data link to your Internet provider?

Speed and security

If not, you will still need a fast data link just to place your audio files on to whatever server you have contracted. If you have the server computer in your office,

obviously you must take extra steps to ensure it will be available when you need it. This means uninterruptible power supply, security log-in, tape backup and so forth.

Having a fast link to the Internet means that you have considered the "last mile," that the path to your site will not be the clog in the data stream.

Some organizations have successfully pursued the "audio repository" concept; Kansas Public Radio has been maintaining its audio repository for some time now, and it is extremely easy to use. KPR affiliates simply use a web browser to connect to the site.

Each weekday, the KPR staff prepares the day's news feed, and the affiliate

need only click on the filename (classified by YearMonthDay.WAV) to download it.

Each audio file is recorded at 22 kHz sampling frequency as a 16-bit, uncompressed WAV file. The sound is splendid, although the file size for a seven-and-a-quarter minute feature was over 18,653,000 bytes!

Our download time using a 14.4 kbps modem would have been about four-and-a-half hours. Because the four KPR affiliates all have T-1 connections to the Internet, their download time is metered in minutes, not hours.

KPR news director Nick Haines says that prior to the KPR "net," affiliates had only two filing choices: mail or telephone. Since the KPR networking project was commissioned, affiliates now enjoy timely access to high-quality regional news material and the ability to teleconference as well. The latter enables affiliate news directors to attend KPR meetings without spending hours driving to them.

When KPR has material to send to NPR, Nick Haines simply creates the audio file and places it on the web site. NPR technicians, in turn, need only start a web browser and click on the file name to receive it.

Is FTP right for your needs? With a modicum of equipment, it can make an economical, high-quality audio transmission path where no practical real-time alternatives exist. Or, it can be a frustratingly slow and balky process that can make you yearn for an extended vacation. The difference between the two, apparently, is a wise perspective.

Until next month, I remain Your Obd'n't eng'r.

□□□

For information on FTP sites, contact the following people mentioned in this series: Nick Haines, news director at Kansas Public Radio (e-mail: nhaines@falcon.cc.ukans.edu) or B. Dale Harrison, news director, Northwest Public Radio (bdharrison@wsu.edu)

Rich Rarey is technical director of NPR's "All Things Considered." Contact him at rrarey@npr.org

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Burglars Hit Phoenix Tower Site

by Ernie Hopseker

In August, burglars struck at the tower site of KGME(AM), "The Game" in Phoenix. Ernie Hopseker, Director of Engineering for New Century Media, writes about the incident for RW.

Bill Eisenhamer, chief engineer of KGME(AM)/KEDJ(FM), noticed he had remote control but could not turn on the transmitter, and went to investigate. While on Shaw Butte, he noticed that the tower lights over at KGME in Glendale were on. He realized that power was on,

previous month. Bill had placed deadbolt locks on both doors so that any future burglars, lacking a key, would be trapped in the building. This would help police catch them when the alarm went off.

As he approached the darkened building, Bill noticed the deadbolt lock mechanism lying on the concrete step in front of the door. A rag stuffed in the hole kept light from escaping through the lock opening. He froze, and heard noises from inside the building.

Was that a rat, a burglar or his imagination? The question was answered when the shop light came on and Bill heard the clanking of tools.

Face to face

At this point, Bill made a decision that I think may have saved his life. He returned to his truck, started it quietly and left without lights, locking the gate behind him to impede the intruders' escape. From the safety of a 7-Eleven parking lot, he called 911, and seven police cruisers arrived.

Back at 74th and Camelback, the cars continued on page 41 ▶



Scene of the Crime: The Back Door at the KGME Site

PHOENIX Sometimes, big heroics come out of small incidents, and sometimes, quick thinking works better than cowboy valor.

On Aug. 14, a monsoon storm hit the Phoenix metropolitan area with winds up

so apparently something else was causing the off-air condition at KGME.

Early signs of trouble

After driving through downed trees and power lines, through miles of intersections without traffic signals, he arrived at

A chase around the antenna field ensued. The two were finally caught, after one was bitten by a police dog.

to 115 miles per hour. Power poles twisted off, trees tumbled, traffic signals went out and radio stations went off the air. Most of us know that feeling of dread.

When the storm hit, 1360 "The Game" went down, as did 106.3 "The Edge."

74th and Camelback. Bill unlocked the front gate and drove to the rear of the building.

The site is in a residential neighborhood. It is fenced and alarmed, but it had been hit by two burglary attempts in the

Audio Highway Debuts With Internet 'Radio'

by Frank Beacham

NEW YORK Promoted as the world's first Internet "radio," the Listen Up Player is scheduled for final field testing in November and is slated to go on sale to the public in the first quarter of next year.

The tiny device weighs less than four ounces and is smaller than a pack of cigarettes. A product of start-up Audio Highway, it will for the first time allow Internet users to hear on-line broadcasts away from their personal computers.

"With a Listen Up Player and an Internet account, consumers will be able to simply peruse and select audio versions of news, information, entertainment, education, books and business selections for storage and replay through their Listen Up Player," said Nathan Schulhof, president and CEO of Audio Highway, Cupertino, Calif.

As in conventional radio broadcasting, all Audio Highway content is

advertising-supported and delivered free of charge to listeners. Unlike conventional broadcasting, however, lis-



The Listen Up Player allows Internet portability.

teners can choose from a vast array of programming on demand and select the type of advertising they want to hear.

Audio Highway will use the Internet's World Wide Web as the

continued on page 37 ▶

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COLE'S LAW

Public File Rule: Changes Ahead?

by Harry Cole

WASHINGTON The local public inspection file is kind of like an appendix. We are all supposed to have one, but it's not at all clear what good it does ... and it can be a serious pain if it gets messed up.

The main difference between an appendix and a public file is that the obligation to have an appendix is imposed on us by nature. The obligation to keep a public file is imposed on us by the commission. You would like to think that maybe something could be done about that. Yet the public file requirement has been with us for three decades.

As you know, each broadcast licensee must maintain in its public file a collection of documents relating to the licensee's operation. These include copies of certain types of applications, ownership reports, employment reports, requests for political time and the like. If you do not have a list of documents you are supposed to have in your file, get one from your communications counsel.

Open access

The oft-stated purpose of the public file is to permit members of the public, the great unwashed, access to information concerning each station's operation. The trouble is that (a) the documents in the file don't really provide much useful information, although the uselessness of the

documents probably doesn't make much difference because (b) even if they know that those documents are available (which they probably don't), the great unwashed do not generally bother to review those documents anyway, in part because (c) the location of any station's local public file is likely not known or easily knowable by the vast majority of the public.

(To develop some empirical data on this, and also to inaugurate our new e-mail address, we invite you to e-mail us at coleslaw@erols.com telling us about how many people have asked to see your public file in the last five years. We will report the results in a future column.)

The public file might ordinarily seem to be one of those "regulatory underbrush" rules that the commission has made a point of eliminating in recent years. Unfortunately, when the FCC was defending its initial efforts to deregulate the broadcast industry in the early and mid-1980s, the commission relied heavily on the existence of the public file rule to justify deregulation.

According to the commission, while deregulation was taking the agency out of the day-to-day review of station operations, the public would still be able to keep on top of those operations through review of the public file.

The theory went that the ever-vigilant public, regularly reviewing public files everywhere, would engage in a

"dialogue" with broadcasters based on that review. Ultimately, the FCC would look to the public to uncover misfeasors, who would then be brought to justice.

While many might agree that that scenario was significantly less credible than your average episode of "The X-Files," the Court of Appeals bought the argument in the '80s. As a result, any abandonment of the public file requirement at this time would presumably have to include some explanation of the impact it might have on the continuing deregulation effort by the FCC. This could explain why the public file rule has enjoyed such exceptional longevity (much like the cockroach in that respect).

In August, however, the commission indicated that some move might be afoot to revise the public file rule. The FCC issued a public notice soliciting comments on four petitions for rule making proposing changes in the rule. While none of the petitioners flat-out urges the complete elimination of the rule, all offer practical suggestions that would make the rule somewhat less, er, unrealistic.

New owner, old files

One petition proposes that somebody who acquires a station through an assignment of license should not be required to ensure that the station's public file contains all the documents that the former licensee was required to maintain. The proposal is based on the largely incontestable notion that documents relating to the former licensee are irrelevant to the new licensee's operation.

The three other petitions all suggest that a station should be allowed to keep its public file exclusively at the main studio, regardless of whether the studio is located in the station's community of license.

In the credit-where-credit-is-due department, three of the four petitions were filed by attorneys or law firms in their own names. They were David Tillotson, Marjorie Esman (for the firm of Hardy &

Carey) and Lauren Colby. The fourth was filed by Anne Goodwin Crump (of Fletcher, Heald & Hildreth) on behalf of a client.

That these petitions have made it to the "public notice" stage is significant. If the commission had no interest in acting on them, it simply would have ignored them, pretending they were never filed. Indeed, that was pretty much what had happened to three of the four: while the Tillotson petition was filed in July, 1996, the others were filed between August, 1993 and March, 1995 — meaning that they had been sitting around for up to three years gathering dust before now.

The apparent movement of these petitions may indicate that someone within the FCC has decided that the time has come to revise the public file rule in some way. If that is the case, we suggest that broadcasters take this opportunity to let the commission know the nature and extent of their practical experience with that rule.

Bear in mind that none of the four petitions proposes the elimination of the rule; rather, each petitioner would simply maintain the rule, but tweak it in one or another respect. If broadcasters think that the public file rule is an anachronistic obligation that serves little or no useful purpose, now might be a good time to let the commission know.

Don't hold your breath for immediate action, though. We are only at the beginning of a process that could take several years. If the commission decides to consider some rule changes, it must next issue a notice of proposed rule making inviting more comments and reply comments. Still, the FCC has taken the first step. If you want to see the rules revised, encourage the commission to continue to move in that direction.

If you want to advise the commission of your position on these or any other matters, you should first consult with your communications counsel.

□ □ □

Harry Cole is a principal in the Washington-based law firm of Bechtel & Cole, Chartered. Contact him at (202) 833-4190. Now you can also reach him on the Internet at coleslaw@erols.com



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MANAGER'S NOTEBOOK

Manage by Wandering Around

Part I

by Sue Jones

SPRINGFIELD, Va. One of the most effective things a general manager can do is get out of the office and talk with the staff on a regular basis. Tom Peters calls this "management by wandering around" but successful leaders have used it for centuries. Abraham Lincoln spent more time *out* of the White House than he did in it. This seemingly simple technique has multiple benefits.

Improve decision making

By getting out and talking to the staff, you find out what is happening. Visit the site of one of your remote broadcasts, to mingle with the staff, the client and your listeners. Accompany sales representatives on calls to see the client interaction and to look for ways to improve it.

As the general manager, you must seek and demand reliable, up-to-date information. Certainly you should not wait for every fact before making decisions, but the more sources contribute to the process, the more balanced and correct your decisions will be. You can act swiftly and decisively if you have real-time information.

You then need not rely only upon reports from department heads to make your decisions. No manager is more powerful than one who knows the facts. Once the staff and department heads are aware that you have facts first hand, they will be less likely to present slanted or incorrect information to you. The information that you receive from your staff will be more accurate because it will be direct, unbiased by filters and prejudices. They will understand that if you doubt the information, you may then go to the source to make your own observations.

In an informal setting, people tend to be more relaxed, more direct and more truthful than they are in a formal meeting. Seek and encourage honest talk if you want to know the truth.

Build loyalty and commitment

President Lincoln called on Congress regularly. He was the first sitting president in more than 25 years to attend a regular working session of the Senate. He knew he needed the help of representatives and senators. One of the first steps in gaining support is to be visible and accessible. Human contact, instead of written memos and e-mail, is an excellent way to convey the message that you are all a team.

Bill Marriott Jr. stops to shake hands with every uniformed worker on his frequent inspection tours of the chain's hotels. He poses for pictures with most of the employees he meets. Most workers are eager to shake hands with the man who manages the empire.

When the Civil War ended, Lincoln was in the field, returning from a trip to the recently captured Confederate capital of Richmond, where he had toured the city, sat in Jefferson Davis' chair and heard the troops break into cheers.

One of the most effective ways to gain acceptance of a philosophy is to show it in your daily actions. By entering your subordinates' environment — by establishing frequent human contact — you create a sense of commitment, collaboration and community.

Bill Marriott says of his frequent visits to the hotels, "More than half of this is about morale. If the workers can see me, it helps them personalize the company. And in the end, good morale means good productivity."

If subordinates know that they have genuine easy access to their leader, they tend to view the leader in a more positive, trustworthy light. Their thinking: "This manager really wants to hear from me, to know what I think and what is really going on and must be committed to making things work."

Morale is enhanced further when they see the manager setting a good example.

If your subordinates can stand the pressure of the front lines, so can you. Demonstrate it regularly. Lincoln made a point to inspect personally every state regiment of volunteers that passed through Washington on their way to the front.

Enhance morale

Take this opportunity to heap praise on individuals and teams that have improved performance. Give a good, honest, hardy handshake and mean it. This type of personal contact will help show the staff that you appreciate their efforts. Take this time to tell them of your vision for the station and how they are helping to

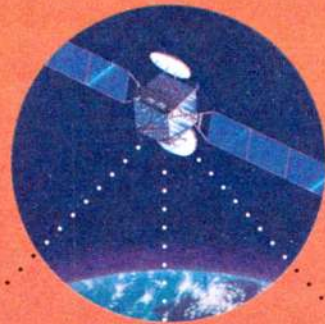
achieve it. Let them know they are doing the hardest work and deserve the greatest credit. Marriott says, "Celebrate your people's success, not your own."

Remember that everyone likes a compliment. Offer them when they are genuinely deserved. A former boss asked me one day, "How is the manager who has the toughest job in the company? I have always admired how you hang in there, meeting the biggest challenges and solving the most difficult problems." At that point, I would have walked through walls for him and I still remember that compliment 12 years later.

□□□

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

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Circle 133 On Reader Service Card
World Radio History

Ponder Web Page Pros, Cons

by Richard Mertz

FAIRFAX, Va. You can't escape it.

Whether you are reading newspaper ads, watching TV, reading a company's letterhead or passing a billboard, you cannot miss the familiar "www." These three letters, usually in lower case, indicate that more detailed information awaits anyone with access to the Internet's World Wide Web.

"The web" is fast becoming the newest advertising medium. Unlike conventional print or broadcast media, a web page gives the advertiser an opportunity to make up-to-the-minute changes to detailed information about products and services.

You may have seen news stories recently that raise questions about how many

people are staying with the Internet; some observers point out that many try it but don't stay. Others note that most of the advertising is by computer companies, and they ask whether anyone else is making money on it yet. These are valid questions. But if you have not yet done so, educate yourself about the Internet now. The future of the web remains bright.

What does this have to do with radio?

As Barry Mishkind pointed out in an article about the Internet in the Sept. 4 **RW**, people are signing up for Internet access accounts. In some cases, for as little as \$13 a month, you can get unlimited Internet access time and the software.

I signed up for one such Internet service with Erols, a Washington-area Internet Service Provider (ISP). For \$13.99 a

month, Erols provides unlimited access through 28.8 baud dial-up circuits along with a licensed copy of Netscape, Eudora e-mail software and an e-mail address.

Erols makes things easy, even for users who are not computer literate, by providing a real live person for tech support. Erols is typical of the services available around the country. With this kind of access to the Internet, the general public is finding it easier to "surf" the 'Net.

With so many people using the Internet, the potential audience for web page advertising is also growing. Advertisers are there already, touting their products and services. Many are computer companies, who were positioned to take advantage of the Internet first. But that is changing, as a glance at the business and news sections of your newspaper will tell you.

OK, I know, what does this have to do with radio?

Successful stations became successful not only by having the "hot" or niche format, a terrific signal and an aggressive sales department, but by having an active promotions department that is "wired" into the community. Playing the hits is just not enough.

Stations that conduct off-air promotional events need a means other than their air signal to promote these activities. Rather than placing flyers in the local music stores and convenience stores or tacking them up on telephone poles, a station can use its web page to present

promotional information to its current and potential audiences. That is one reason that the NAB has offered an "Internet Bootcamp" at its conventions for the past several years.

If the point hasn't come across yet, a web page is cheap advertising. If this doesn't get your attention (or that of your general manager), I don't know what will. You can have multiple pages for the same monthly fee. Each page can contain news and information about air personalities, station events and even community events.

A station can solicit listener comments via e-mail that might aid in research efforts. You can give national and local advertisers a more intimate view of your station. With the right tools, you can broadcast programs and concerts live, to listeners far away, all via the Internet. Remember, a web page has global visibility.

OK, you're interested, so what's next? You're ready for www.yourstation.com. How is a web page set up, what type of programming is involved, and who makes the changes to the information on the web page? What exactly is a web page?

A web page is a series of text written in a language called HyperText Markup Language (HTML). These files reside on a server connected to the Internet. Graphic files are in gif or jpeg formats.

Let's say you want to operate your own server. (Selection of this option shows your commitment to the task and intestinal fortitude.) The hardware can be as sophisticated as a Sun workstation or as pedestrian as the customary PC.

Most of the stand-alone PC systems I

continued on page 39 ▶

Internet 'Radio' Debuts

▶ continued from page 33

delivery mechanism for the new service. Thousands of audio selections will be stored on its web servers (<http://www.audiohighway.com>) where Listen Up users will be able to search a database and select the content they want to hear. Once chosen, audio selections will be delivered to the hard drive of the user's personal computer for transfer to the Listen Up Player via a pass-through parallel port.

The user can automate the process with program preferences and scheduled downloads at pre-selected times. For example, a user could select several favorite daily programs, schedule them for automatic download during the night, and listen during the morning commute to work.

The Listen Up Player, with an estimated retail price of \$350, will allow listening through headsets or through wireless transmission to an automobile radio or stereo system tuned to a particular frequency. Audio is stored in flash memory (there will be one- and three-hour capacity models available) and the sonic quality approximates that of AM radio broadcasts.

The Player includes random access to audio programming, an LCD readout to provide title information, touch-sensitive controls, power through batteries or cigarette lighter and a built-in microphone for voice input. Each Player will come complete with a docking station, hookup cables, stereo headphones and software for Windows (no Mac version is available).

E-mail capabilities

In addition to listening to audio programming, Audio Highway users will also be able to forward e-mail messages to their Listen Up Players and, with special software, convert text e-mail messages into electronic speech for future playback in a mobile environment. As a mobile digital recording device, the Listen Up Player will also allow the user to record voice messages that can then be forwarded via e-mail to others with a multimedia PC or Listen Up device.

The company says programming for the Audio Highway server will go

beyond that now available on broadcast radio. Among the initial content choices will be thousands of selections ranging from news, books, self-improvement programs, magazine articles, radio and television programs, and movie reviews. Content providers included in the field tests are Associated Press, Berlitz, CMP Media, CyberVision, Harper Audio, Newsweek, PR Newswire and Time-Warner Books.

Audio Highway has set up a system where content providers are paid royalties based on the exact number of times their program is downloaded by listeners. In the advertiser-supported "free content" model, Listen Up users will either select three minutes of audio advertising messages for each 50 minutes of content desired, or the audio messages will be selected for them based upon their user profile. One minute of ads will then be stored at the beginning, middle and end of each 50 minutes of content selected. If desired, users may choose instead to pay for each selection on a pay-as-you-go basis, without ads.

World of uses

Because the Listen Up Player has interactive controls and random access memory, Schulhof said it can be used for a variety of specialty applications such as walking and sightseeing tours, corporate training via "intranets" and delivery of medical information.

Download time for programming from the Audio Highway server to the PC hard drive using a 28.8 modem is about 47 minutes. Transfer of that hour of audio to the Listen Up Player takes about three minutes and is done with the push of a single button.

Audio Highway's sound content is transmitted using a proprietary compression scheme. Programming can also be heard at the company web site on a multimedia PC without the Listen Up Player. The technology is adaptable to other delivery methods, including high-speed cable modems. Higher bandwidth would allow dramatically faster download times and higher audio fidelity.

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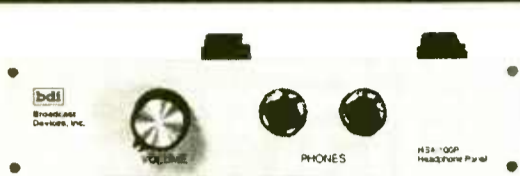
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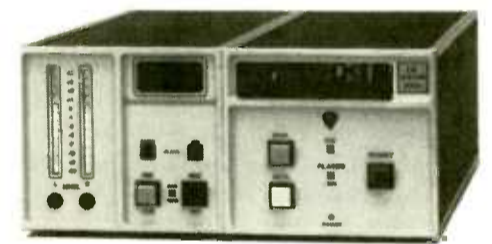
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Watch Out for the Web

► continued from page 17

have seen are running one of the shareware Unix operating systems like Linux or Free BSD. Both operating systems come packaged in sets of two to four CDs and are available over the counter at vendors like Micro Center or CompUSA. I've seen both operating systems at weekend computer shows. Prices range from \$15 to \$35.

If you have never experienced Unix, prepare to spend some time learning the commands and syntax. Unix commands are case sensitive. This adds a bit of spice — or frustration, depending on your point of view — to your computing.

Many of the computer magazines suggest that using a Windows NT server is the only way to operate the web site. I

have heard mixed reviews. If you are familiar with Windows NT, go for it. Many of the professional computer network shops recommend Novell Netware 4.1 as an alternative.

Operating your own server requires, in addition to the cost of the gear and software, a monthly expense for the connection to the 'Net via a digital phone line (ranging from 56 kbps up to T-1) and a fee to the Internet Service Provider that handles the routing of your digital traffic. UUNET, Netcom and PSI Net are such providers. Their charges start at about \$400 per month depending on the amount of bandwidth you need.

An alternative you need your own

server is to lease web site space on an existing server. Many ISPs provide web site storage space with prices starting at about \$100 per year and up depending on the amount of storage space you need. Some providers charge based on the amount of traffic at your site. Find them in your phone book or the computer section of your local newspaper, or ask for suggestions from an area computer supplier.

Next, you must register your domain name (www.yourstation.com) with the Internic in McLean, Va. It costs about \$250 to register your domain name for a year. This is necessary so that when a surfer types "www.yourstation.com", the registered name, it connects to a server or web site address ("cmpconsulting.com" appears to your computer and the 'Net as "206.64.65.1").

With the hardware and service options

out of the way, the next step is the programming of a web page. As I mentioned earlier, web pages are written in a language called HTML — text surrounded by formatting codes that dictate graphic placement location data, text font codes and other general information. The reader's web browser (Netscape, Mosaic, Microsoft Browser, etc.) reads the HTML file information, strips off the formatting codes and presents the web page he or she sees on the screen.

Next time, we will delve into the actual codes involved with the layout of a web page.

□ □ □

Richard Mertz is a principal in the firm of Cavell, Mertz & Perryman, Inc., Fairfax, Va. Reach him at (703) 591-0110 or via e-mail. His address is rmertz@cmpconsulting.com

67 Years Ago

Reprinted from Radio World (October 5, 1929).

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.

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INDUCTANCES: Air core and iron core, types of air core inductances, unit of inductance, calculation of inductance.
INDUCTANCE REQUIRED IN RADIO CIRCUITS: Relation of wavelength and product of inductance and capacity, short wave coils, coils for broadcast band, coupling and mutual inductance, calculation of mutual inductance and coupling.
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POWER AMPLIFICATION: Square law, effect of load, calculation of output power, undistorted output power, parallel tubes, push-pull systems, plate resistance.
GRAPHS AND RESPONSE CURVES: Types of paper, utility of curves, types of curves, significance of curves, voltage amplification, power amplification, power output, radio frequency amplification.
MULTIPLE STAGE AMPLIFIERS: Resistance coupling, design, calculation of values, effect of resistance, calculation of coupling capacity, effect of plate load, effect of input tube capacity, calculation, reactance coupling, tuned double impedance amplification, underlying principles, transformer coupling, turns ratio, voltage ratio, types of cores, plate current limitation, grid current limitation.
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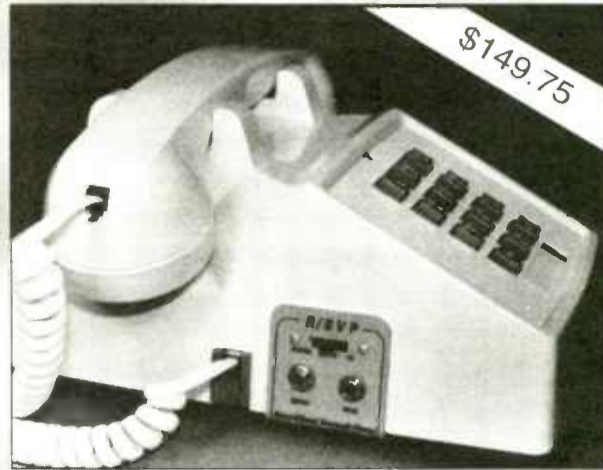
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Lessons of a Break-In

► continued from page 33

were joined by K-9 units and a police helicopter. Startled by a real "Cops" TV-type entrance through the front door, two suspects ran out the back door. A chase around the antenna field ensued. The two were finally caught, after one was bitten by a police dog. The suspects were photographed and carted off to jail after claiming they "were only looking for records." The police left Bill with an information pamphlet and a case number.

At 4 a.m., a shaken Bill Eisenhamer was also left with two radio stations off the air. The thieves had loaded up three large boxes of tools, parts and assorted items including meters, test tapes and field sets. They had removed the tubes from the backup transmitter, and were working on stripping the racks. A large wrecking bar remained by the back door: apparently it had been used to knock out the lock set. Might it have been used to dispatch Bill, had he entered the building? An emergency flare was left next to the backup transmitter: it could have ignited the



Thieves left a massive splice job for the phone company.

in the penal system and become attorneys in the process can probably outsmart the best alarm yet devised by man. Do not take anything for granted, because your life may depend on your momentary decision.

Last, but not least, broadcasting is not a "special" vocation in the eyes of the law. Not only do many police officers and politicians resent and suspect the media, but they simply may not have the time to deal with your losses in light of the heinous crimes with which they must cope every day.

Bill Eisenhamer is lucky. He is also smart. We can learn from his handling of the situation.

Was that a rat, a burglar or his imagination? The question was answered when the shop light came on.

building after it had been stripped.

The hundred pair telephone feeder had been cut inside the telco splice box, which had been disassembled and then reassembled, and the alarm had been completely destroyed. Clearly this was not the work of curious amateurs looking for records and CDs, but the police had already gone.

Business first

The off-air emergency comes first, so Bill went to work. He used the RPU system as a makeshift STL. A generator returned KEDJ to the air until the power company could replace the twisted-off utility pole that normally feeds the mountain. By the time he felt he could go home, Bill had been on the job for 29 hours.

Later, station management felt that the authorities were not pursuing the prosecution with vigor. They retained a private attorney and presented the prosecutor with photos of the tower site. At this writing, one suspect has pleaded guilty to charges in connection with the incident; the disposition of the second suspect is yet to be determined.

What do we learn from this incident?

First, Bill Eisenhamer should be given a medal, but will not receive one.

Second, discretion is the better part of valor in dealing with a dangerous situation; John Wayne-style cowboy approaches could cost you your life. We can't know what would have happened if Bill had walked in on these individuals, but I am chilled by the thought of the wrecking bar and the flare. Be careful. We live in a dangerous world and we work in a dangerous business.

Third, "security" systems are not secure. Burglars who have received their Ph.D.s

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OFFBEAT RADIO

Radio Haven Exists for Stogie Fans

by Brian Holmes

ST. PETERSBURG, Fla. When David Zepowitz started his talk show about cigars in the summer of 1995, he thought he would have only about 20 listeners or so. He was wrong.

"Smoke This! Talk Radio for the Cigar Connoisseur" was born after Zepowitz and WSUN(AM) General Manager Todd Leiser left a business lunch. They stopped to buy some cigars, lit one up and wondered how many others enjoyed their passion for the stogies.

"I jokingly said we should do a show on this," says Zepowitz, now also

known as Cigar Dave. "To my surprise, he liked the idea. We came up with the name 'Smoke This' and were on the air a few weeks later."

Cigar Dave took to the Tampa airwaves on WSUN that July. He scheduled several guests for the first show, assuming that the incoming call load would be light. Once again, he was wrong.

"The biggest complaint we had was that the show wasn't long enough," says Zepowitz. That problem soon changed when "Smoke This!" expanded to a two-hour timeslot on WSUN two months later.

After expansion came nationwide

syndication in December 1995, something Zepowitz had not even dreamed of. The first affiliate was WIOD(AM) in Miami; other major stations followed

including KFI(AM) Los Angeles, KEX(AM) Portland, Ore., KOH(AM) Reno, Nev., WCNN(AM) Atlanta, WWNZ(AM) Orlando, Fla., and 13 others. A full-time affiliate relations manager now works with affiliates and seeks new ones.

U.S. retail cigar sales topped one billion dollars last year, up from \$860 million in 1994 and \$705 million five years ago,

according to the Cigar Association of America. Smokers purchased almost 4 billion cigars last year at prices from \$4 to \$15. In mid-August, Consolidated Cigar, makers of Dutch Masters and El Productos, offered its stock on Wall Street. The price rose 23 percent in the first day. Also in August, Caribbean Cigar stock prices posted similar results.

This all spells success for Cigar Dave and his show. He works closely with major manufacturers to ensure he has answers for his audience every Saturday. Executives of those businesses not only listen to the show, they support it. Consolidated Cigar, Cuesta Ray, Arturo Fuente, Caribbean Cigar, Colibri Lighter and General Cigar have long-term adver-

you must enjoy a cigar while listening to the show. Second, you must tell five cigar-loving friends about the show. Third, you must call and participate in the show.

After a brief explanation of these rules, each show begins with a traditional lighting ceremony of his own and his listeners' cigars. The cigar evangelist describes in detail what kind of cigar he will smoke



during the show, works his cigar guillotine into the microphone for everyone to hear and then lights his cigar with his Colibri Prime Minister butane lighter.

He then moves on to the callers, his "cigar lieutenants," who greet Zepowitz with the traditional "Long ashes to ya!" They are part of the "world's largest cigar club that meets via the airwaves." He answers questions while smoking and puffing the whole time. Listeners ask him how to keep their cigars fresh, where to find their favorites and how to discover a favorite stogie without spending a lot of money.

"This is a long-term trend, a lifestyle trend," Zepowitz said. "During the course of the week, people hear so many

Cigar smokers purchased almost 4 billion cigars last year at prices ranging from \$4 to \$15.

tising contracts on a national basis.

On the local level, "Smoke This!" affiliates enjoy success selling the show to cigar retailers, cigar bars and cigar-friendly restaurants. Some stations also sell to luxury car dealers, jewelers, men's clothiers and golf retailers. Several affiliates sell out during the show and have waiting lists for clients.

Cigar Dave has three show rules: First,

political talk shows and they're at work dealing with so many serious matters, that come Saturday, it's their one free day. They can sit back, light up and enjoy the show and a good cigar."

"Smoke This!" is a fast-paced show with bright production elements throughout the two hours. Traditionally, the show's audience consists of men 25 and

continued on page 60 ▶

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The Master Control Studio, shown right, is one of seven Arrakis studios in Sony's Manhattan network origination center for SW Networks.



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Circle (157) On Reader Service Card

Radio Inventor Put 'Sig' in L.A. SigAlert

by Bob Rusk

LOS ANGELES On a sunny summer afternoon, two hours before the start of rush hour, traffic problems are already choking Southern California freeways.

"The situation continues to clear out of the way for you in the Acton area," Dona Dower, Metro Networks' midday traffic anchor for KNX(AM), tells listeners. "Eastbound San Bernardino past Atlantic, that injury collision is still clearing. And we still have the trouble with the SigAlert in the Diamond Bar area."

For more than 40 years, the mention of a SigAlert has let motorists know that traffic is jammed. In this case, a spilled load of about 50 bags of cement on the westbound 60 freeway has blocked the number three lane.

"When people hear the term 'SigAlert' they listen a lot more carefully," Dower said in a break between reports. "It's a



Loyd Sigmon, left, with Radio Pioneer Lee de Forest

great way to let them know about the traffic problems."

The California Highway Patrol issues an alert whenever they expect an unplanned blockage or closure to stall traffic for 30 minutes or more. Such a delay could result from something as minor as a disabled vehicle, or as serious as a head-on collision.

Most motorists assume the term refers to "signal," but SigAlert is named for legendary Los Angeles broadcaster Loyd C. Sigmon. He spells Loyd with one "l" but is better known to his friends as Sig.

He invented the system while serving as vice president and general manager of KMPC(AM). Now 87, Sigmon recalled that he came up with the idea as a way to attract more listeners to the station, which he owned with singing cowboy Gene Autry.

"As an entertainer, he thought it was a good idea if it would work," Sigmon said with a smile.

Sigmon originally had no intention of sharing his invention with the competition.

"When I went down to the police department," he said. "Chief Parker told me, 'Sig, we can't operate this just for your station. You would have to make it available for all stations.'

"So," continued Sigmon, "I had no choice. We started with six stations and all of us chipped in and bought the equipment; it didn't cost the police department anything."

It was the chief who suggested the name SigAlert. There were SigAlert parties; a race horse was named SigAlert. More receivers were built so other stations could tune in the alerts.

Today, broadcasters can tie into the highway patrol's computerized dispatch system, so that when a SigAlert is issued,

it shows up as a message on their computer screens. They also can monitor a special frequency on their newsroom scanners. Originally, SigAlerts were transmitted via a sub-audible tone sent out by the police department.

"When there was a problem, a button at the traffic control center would be pushed, which transmitted the tone to radio stations. The alert could be recorded or the policeman's voice could be put out over the air," Sigmon said.

KMPC preferred the latter method — unless Autry's California Angels baseball team was playing and the station was

broadcasting the game.

"I gave strict instructions that when an alert came in we were to immediately broadcast it," Sigmon said. "A lot of times we would actually break into programming."

"We were accused of having a tie into the police department so we could get the information first, which was not true."

Some broadcasters took out newspaper ads to promote SigAlert, according to Sigmon. KGIL(AM) put up an elaborate billboard with a clock showing "KGIL Time" and promoting the station's music, news, weather and SigAlert broadcasts. Authorities issued the first SigAlert on

Labor Day in 1955 and got a much bigger response than Sigmon or the police expected.

"A train going from Los Angeles to San Diego turned over on its side," he said. "When the SigAlert went out, more doctors and nurses showed up than the police knew what to do with."

A collision of two boats in the Los Angeles Harbor prompted another early SigAlert.

"That's when the police department decided they couldn't take care of the water, too," Sigmon explained.

"Then there was the time when a natural gas line ruptured. There was concern that the gas would seep into homes. A major SigAlert was issued, warning people to

continued on page 45 ▶

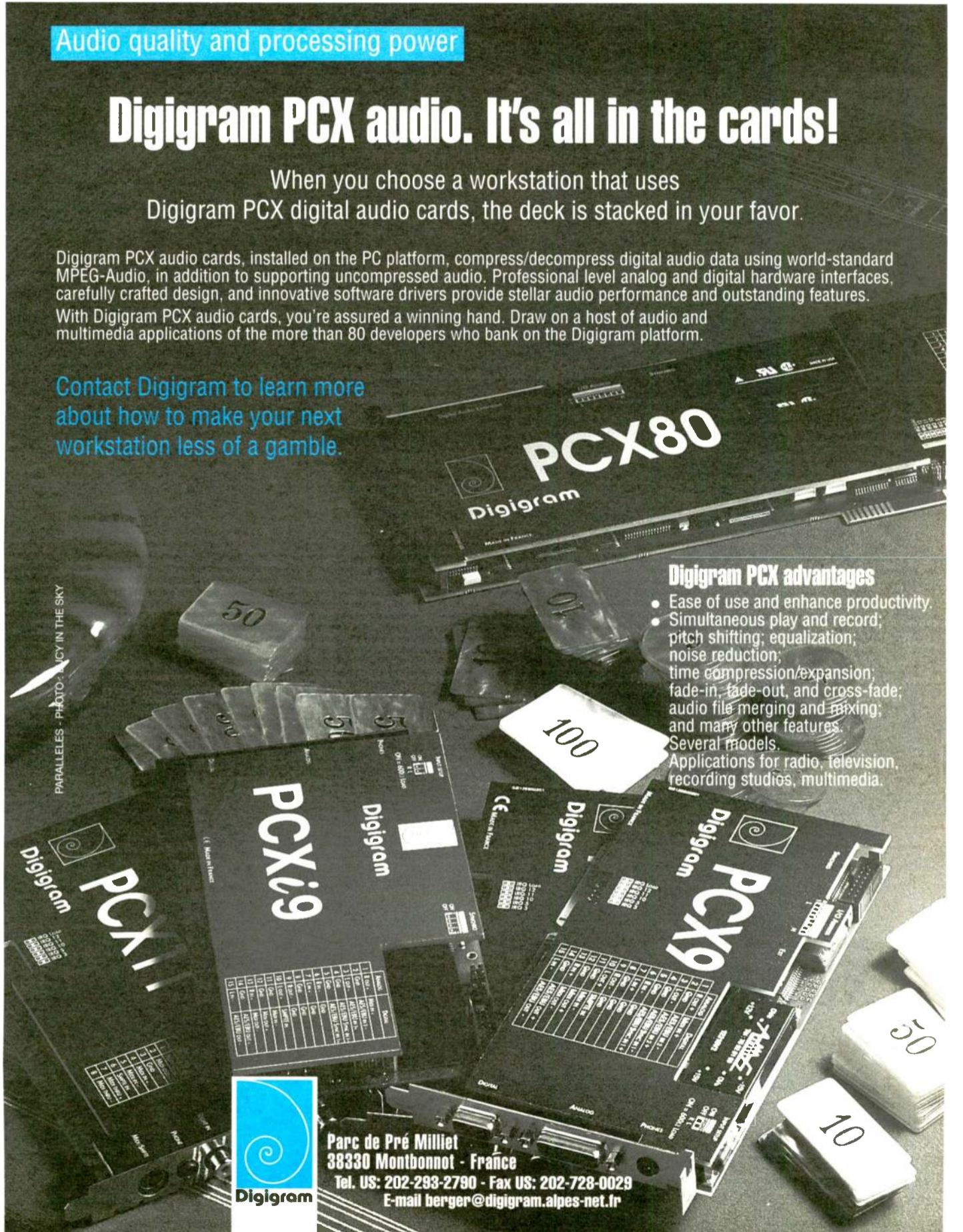
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SigAlerts Still Sound

► continued from page 43

turn off their gas meters to avoid a possible explosion."

Today SigAlerts are restricted to the roads, mostly freeways. An occasional alert is issued for a major traffic tie-up on city streets, however.

Citizen Sigmon

Sigmon, who was an engineer before switching to radio ownership and management, began his career at WEEI(AM), Boston, and KCMO(AM), Kansas City, Mo.

In World War II, he served in the U.S. Signal Corps and was named Officer in Charge of Radio Communications for the Supreme Allied Command in Europe.

After Germany fell, Colonel Sigmon served in the military government in Berlin under General Dwight D. Eisenhower.



Loyd C. Sigmon

Sigmon holds the United States Legion of Merit, was named an honorary member of the French Signal Corps and is one of the few Americans to receive, by order of King George VI, the Order of the British Empire.

Also giving freely of his time to the radio industry, Sigmon served on the NAB board of directors and was an honorary board member of the California Broadcasters Association.

Though he could have profited from the SigAlert, Sigmon never made a dime off of his invention.

"I never wanted to commercialize it," he stated. "That was never my intention. The purpose was to offer it as a community service and get more radio listeners."

Through the years, though, the SigAlert has also caused frustration at times.

"It had been operating for just a few months and there was a major SigAlert on the San Bernardino Freeway. Some fella had been stuck in traffic for two or three hours."

"He called me at one in the morning and blamed me for not getting the alert out earlier," Sigmon recalled.

Even though he is the father of Los Angeles traffic reporting, Sigmon has no special pull when he encounters roadway snarls.

"I just came in from Palm Springs a few hours ago and it was bumper-to-bumper. I thought there was a lot of traffic 40 years ago. But now it's so bad that I think I ought to get out of here!" he said with a chuckle.

□ □ □

Bob Rusk writes for RW from Seaside, Ore. Reach him via e-mail at rrusk@pacifier.com

WME: Ready for the Show?

LOS ANGELES If you are in the City of Angels next week for World Media Expo, here are a few tips to make the experience more enjoyable.

Wear comfy clothes. You may feel the urge to dress sharp to impress your colleagues, but unless you are looking for a job or speaking at a seminar, you'll be a lot happier if you dress for comfort.

Take along some Advil or similar pain reliever. Booth staffers with a lot of hours logged at conventions know that you can reduce swelling and make your feet happier by popping one of these.

Plan your day. World Media Expo makes it easier for you to visit exhibitors by consolidating four or five shows into one marketplace. But you could still spend all three days looking at toys and miss important exhibitors. Make a game plan for walking the floor and a list of exhibitors you must see. If your station sent more than one representative, divvy up the work

in advance. The same tips apply for attending seminars. **Eat, drink and sleep wisely.** Sure, the rich food and liberal drinks at a convention will tempt you, especially if the boss is paying. But you will pay the price for indulgence tomorrow, when you feel sluggish or hung over. Further, your body rebels when you break its established food and sleep cycle. **Be ready to buy.** Exhibiting companies often run show specials. Don't be afraid to ask. These deals are usually good for orders placed at the show or for a limited time afterwards. If you are in the market to buy, come to the show with authority to say "yes" or get a swift OK from the bean counters back home. **Get a freebie bag.** Carry the literature you pick up in one of the giveaway plastic bags that many exhibitors use to promote their booths. Even better, just bring a pack of business cards and give them to booth staffers with a request that they send the information. You will save the trouble of carrying around all that paper ... much less packing it in your suitcase.

—Paul J. McLane

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Tower Plumb, Twist and Tension

Part I

by Troy Conner

BRASSTOWN, N.C. An alarming number of the smaller towers I climb are woefully out of plumb, have abhorrently low guy tensions, or both. Many of these structures are between 10 and 30 years of age, and some are even older. In most cases, I can find no records or documentation of attention to the guy cables, termination hardware or anchor system.

The EIA/TIA structural standards for guyed towers recommend that the owner conduct a major inspection, including a check of plumb, twist and tension, at

least every three years. Self-supporters, which are inherently more stable and lack catenary (guy) systems, should be inspected at least every five years.

Consider a schedule of more frequent inspection if your tower is in a coastal area or other corrosive environment, or if it is subject to potential vandalism. Also, conduct post-storm inspections if high winds, ice buildup or any other extreme loading have assaulted your tower.

Those of you nervously sitting in hurricane zones are all too familiar with the havoc wreaked by high winds. I saw three wind-induced tower collapses on The Weather Channel in the last storm season alone, and I know of several

more. The forces in a hurricane are tremendous.

A glance at a guyed tower suggests that maintaining the correct guy tensions is critical to the overall integrity of the structure. Excessively high tensions can contribute to aeolian (high frequency, wind induced) vibration. Abnormally low guy tensions can result in guy galloping (low frequency vibration) and slack-taut pounding.

Either of these dynamic behaviors, combined with additional wind, ice or other loading, can precipitate a tower collapse. Prudent, conservative caretakers often opt for annual tower inspections and budget for plumbing and tensioning every



two to three years.

The plumbing and tensioning procedure is reasonably straightforward if the tower engineers, manufacturer and erectors did their jobs properly. During the design stage, engineers create a guy tension-temperature chart for use during erection. These data also provide a critical reference for future re-tensioning and tower plumbing.

Check the drawings

In some cases, you may find this information on the original tower design drawings. A tension-temperature chart provides the tower erector and riggers with the correct tension for each guy level, for a range of anticipated ambient temperatures.

If the tower has been properly erected and re-tensioned, future checks of plumb, twist and tension will be perfunctory, barring any severe external forces exerted on the structure. Most guy cables exhibit some post-erection sag unless they have been prestressed (stretched) by the manufacturer.

With post-construction strand tightening and stretch corrected, any further dramatic change in guy tension usually indicates a serious problem. Possible causes include loose cable hardware, connection slippage, anchor settling, uplift or other unintended motion, tower foundation movement or damage from extreme wind or ice buildup.

Initial guy cable tensions normally are engineered to 10 percent of the cables' published breaking strength. Broadcast Communications Systems of New Glarus, Wis., (800) 872-7513, recently introduced a nifty little Windows-based program. This inexpensive software calculates guy tension when you give it ambient temperature, guy size, height of the guy pull-off and distance to the anchor. This simple program eliminates most of the tedious calculations in creating a tension temperature chart. It has a permanent home in our office computers and in the laptop that accompanies our crew in the field.

The program does not cover all of the exotic calculations mandated by torque arms, face guys, candelabras, short radius guys or anchors with dramatic elevation differences. However, it is an invaluable quick reference for small, conventional towers on reasonably level terrain.

Measuring tension

We classify methods for measuring guy tension as direct or indirect. We can calculate tension mathematically using tangent intercept or sag, where the droop of the guy cable is sighted. This is an indirect method. Another is the pulse or swing method, in which tension is

continued on page 48 ►

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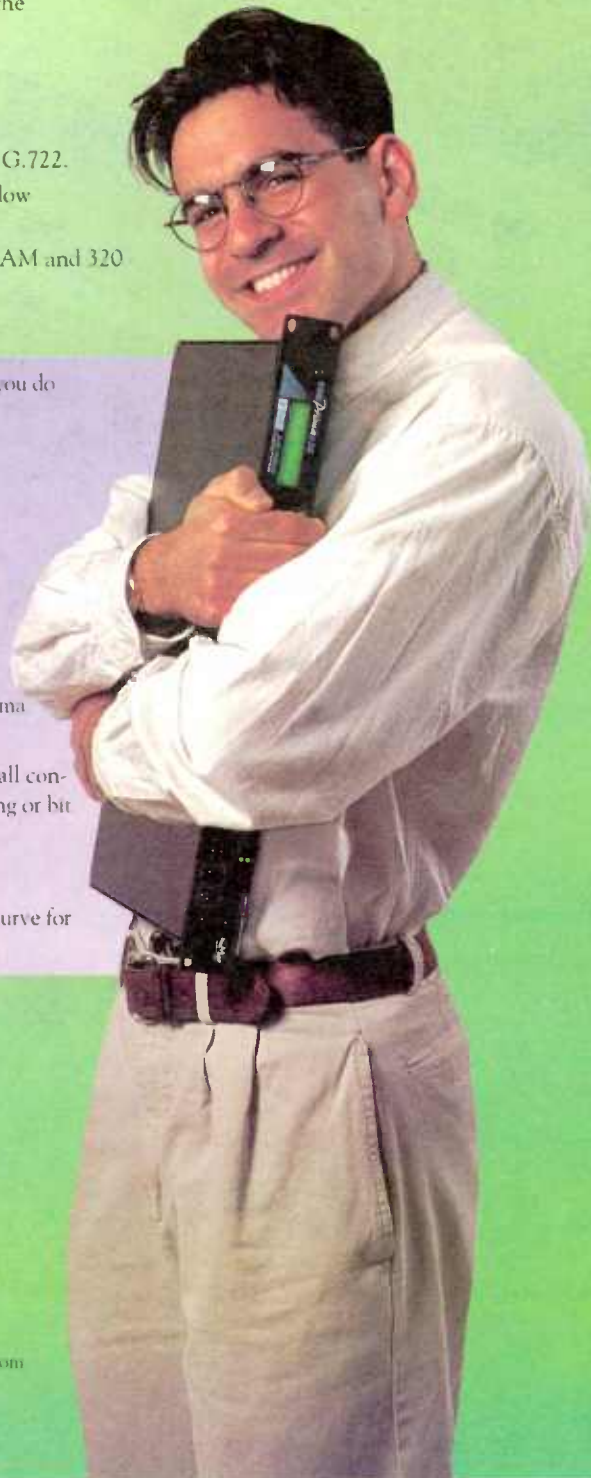
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STATION SKETCHES

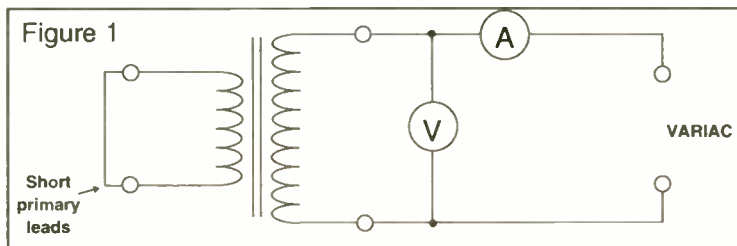
Protect Your Transmitter Supplies

by Tom Vernon

HARRISBURG, Pa. Sometimes in spite of our best efforts, things fail for no apparent reason. A classic example is the power supply in your transmitter.

Even with regular maintenance and good surge protection, the plate transformer and/or rectifiers can still blow up, seemingly at random. Let's take a systems approach to understanding transmitter power supplies, and explore some often-overlooked specifications.

Frequently, power supply failures occur when the circuit breaker, power transformer and rectifiers do not work together



as a system due to poor design or field modification. For example, the transformer or rectifiers may have been replaced with an unsatisfactory substitute.

When an engineer needs a replacement power transformer, he or she usually

specifies primary and secondary voltage, current ratings and perhaps physical size. An often-neglected spec is the full-load

percent impedance, also called the full-load regulation. A good filament or plate transformer should be specified at 3 percent to 5 percent.

This specification is important for two reasons. First, a transformer with a high impedance spec will produce a poorly

regulated supply. In the case of the plate transformer, this in turn will cause excessive carrier shift because the supply cannot meet the current demand on high modulation peaks. Filament transformers in high-power transmitters must limit the inrush current to the PA tubes.

Second, the impedance of the transformer determines the proper rectifier and circuit breaker specifications. I'll have more on that later.

Transformer data sheets often do not provide a specification for full-load regulation. You can get it from the manufacturer. Better still, check it yourself.

The procedure requires a Variac, digital voltmeter (DVM) and AC ammeter. First, disconnect the secondary windings and measure the unloaded secondary voltage. This value we will call V_{NL} . Note that this value may be different from that specified as the secondary voltage, because the line voltage in your area may vary above or below the specified value.

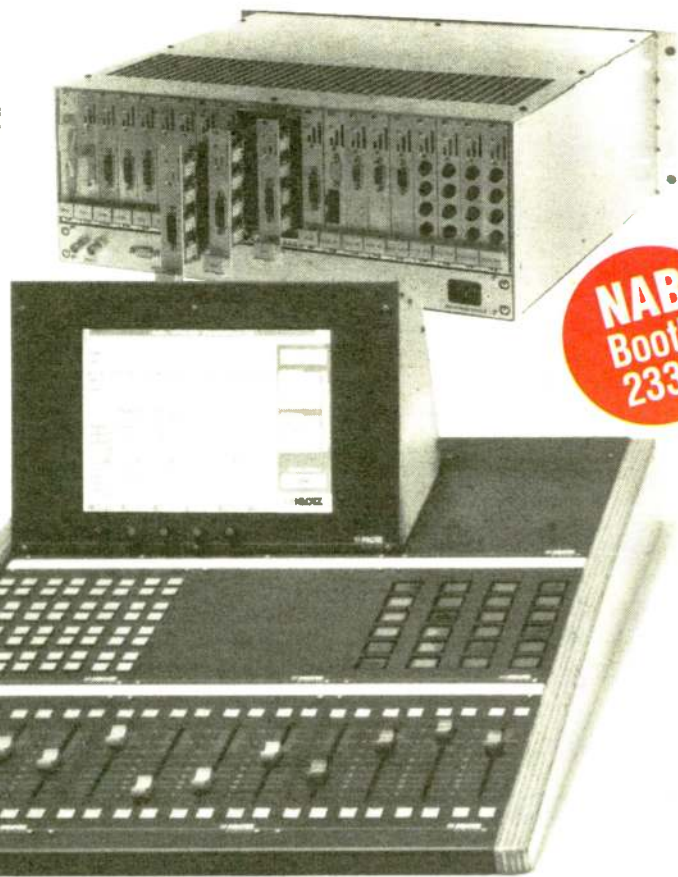
Label and remove all wiring from the transformer. Next, short out the primary windings and wire the Variac, DVM and AC ammeter as shown in Figure 1. Increase the voltage to the transformer while observing the ammeter. When you reach the specified current rating of the secondary winding, stop and note the voltage. This is V_L . Note that you may have to use a 230 V AC supply on some transformers in order to reach the specified current.

continued on page 50 ►

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► continued from page 46
derived from the cables' frequency of vibration. We can measure guy tension directly with a dynamometer (crane scale), electronic load cell, a system using hydraulic jacks or some other appropriate mechanical tensiometer.

The direct methods involve a physical reading of the cables' tension by transferring the actual guy tension load to the measuring device. Old-timers often used one of the indirect methods because they involve no rigging and are generally much quicker to perform.

Having tried both "swing" and "sag" indirect techniques, I favor any of the direct methods for their overall accuracy and operator simplicity.

Next month, we will continue our discussion of plumbing and tensioning.

PS — While we always appreciate the opportunity to bid on new work, we have been a bit overwhelmed by the response to our recent articles in RW. We have heard from readers in Texas, California, North Carolina, West Virginia, Maryland, Wisconsin, Georgia and Ohio, to name a few.

Ours is a small company and we apologize for any delays in returning calls or preparing bids and for our general reluctance to take on new customers outside the Southeast.

□ □ □

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

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CIRCUIT THEORY

Understanding Alternating Current

by Harold Hallikainen

SAN LUIS OBISPO, Calif. So far in this series, we've analyzed DC circuits. Let's start looking at alternating current. We can analyze circuits using the same techniques we've used before, but with complex numbers to represent the magnitude and phase of voltages, currents and impedances.

We'll start with a brief review of trigonometry.

Figure 1 shows a right triangle on the x-axis of the x-y plane. Relative to angle *a*, the three sides can be identified as the *adjacent*, marked *x*, the *opposite*,

marked *y*, and the *hypotenuse*, marked *r*.

The adjacent side is marked *x*, because it is along the x-axis.

The opposite side is marked *y*, since it

sine	sin(a)	y/r
cosine	cos(a)	x/r
tangent	tan(a)	y/x

Table 1 Basic trig functions

is in the same direction as the y-axis. Finally, the hypotenuse is marked *r*, since it can be thought of as the radius of a cir-

cle centered at the origin (0,0) as the angle *a* is varied.

Further, a point at the far end of the hypotenuse has coordinates of (*x*,*y*) and is *r* units from the origin.

The three basic trig functions are shown in Table 1.

The first column gives the English spelling of the function, the second gives the mathematical function notation and the third column shows how to calculate the function.

In the triangle of Figure 1, we can determine *r* as the square root of (*x*²+*y*²) or about 3.606.

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Protecting Transmitter Supplies

► continued from page 48

Now that we know the loaded and unloaded voltage ratings, we can plug the numbers into the formula below to get our full-load percent impedance.

$$\%Z_{FL} = \frac{V_L}{V_{NL}} \times 100$$

By knowing percent regulation, plate voltage of the transmitter, and KVA rating of the transformer (as found on the ID tag or spec sheet), we can work our way through one more formula to calculate how many amps the rectifiers must be rated for during short circuit condi-

$$\text{Short circuit amps} = \frac{\text{KVA} \times 100}{\text{KV} \times \sqrt{3} \times \%Z} \times 1.414$$

tions. This will give us good numbers for single-phase transformers. For three-phase supplies, omit the last step and do not multiply by 1.414.

Here's an example. Assume we have a transmitter with a plate voltage of 2.5 KV, and the plate transformer is rated at 10 KVA with a full-load impedance of 1 percent. Putting these numbers into our for-

$$\text{Short circuit amps} = \frac{10 \times 100}{2.5 \times \sqrt{3} \times 1} \times 1.414 = 326.5 \text{ amps}$$

mula, we get: Now let's assume the same circumstances, but give the transformer a full-load percent

$$\frac{10 \times 100}{2.5 \times \sqrt{3} \times 7} \times 1.414 = 46.6 \text{ amps}$$

impedance of 7 percent: As you can see, full-load impedance specifications have a profound effect on rectifier requirements. This may help us understand why those replacement diodes occasionally give out.

The most important rectifier specification in this regard is surge or short circuit current. This value must exceed the short circuit amp rating of the transformer by a suitable safety margin. This surge current is specified for a finite length of time, sometimes 1 second, more often 67 milliseconds, depending on the manufacturer.

As you might guess, this time spec influences the type of circuit breaker required.

Next time, I will continue with rectifier and circuit breaker specifications that are necessary to make your power supply components work as a system.

Tom Vernon divides his time between consulting and completion of a Ph.D. Send him email at TLVernon@aol.com or call him at (717) 367-5595.

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Philip Urso, GM
WDGE/WDFG,
Providence, RI

"We've had five DAD workstations in action for over a year, and I really don't know how we could get along without the system. It allows all three of our stations to present a consistent on-air sound and frees the talent to concentrate more on communicating with the audience. We're still finding new and innovative ways of using the system a year later. In my opinion, if you're planning on automation, you can't do it RIGHT without ENCO!"

Chris Andree, Asst. PD
WWKL/WYMJ/WCMB,
Harrisburg, PA

"We're a news programming provider and deal with a large number of actualities every day, so speed in production and getting it down the line are paramount. DAD allows us to bring information in, and seconds later it's ready to go. The greatest feature is the ease of editing and file transfer between our four workstations. On-air is a breeze."

Dane Wilt
Radio News Company,
Las Vegas, NV

"Way cool. The greatest thing about DAD is that it acts and thinks like a cart machine and doesn't intimidate the talent. We use touchscreens, and the learning curve is about 2-1/2 hours before they're up and running. From an engineer's standpoint, it's great because DAD uses off-the-shelf hardware, so maintenance is a snap."

J.R. Rogers, Asst. CE
KSON/KIFM,
San Diego, CA

"The DAD system was on the cutting edge of systems we looked at, and there was some initial reluctance to enter the digital arena. After having the system in-house for a month, the entire production and on-air staff felt like they could never do without it again. Now our news staff has a system of their own, and we're getting a third system for our sister TV station."

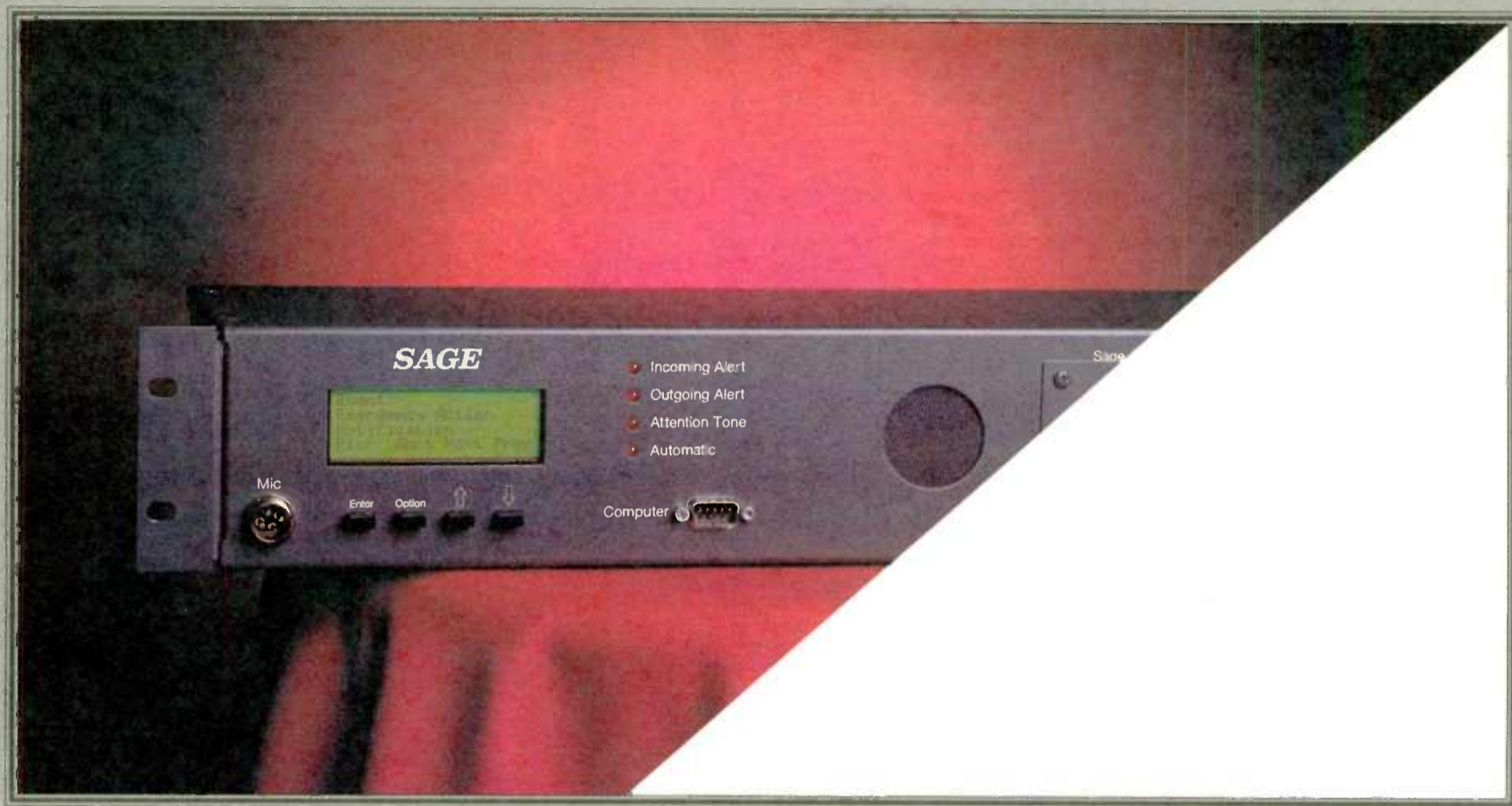
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Alternating Current

► continued from page 50

This gives:

$$\begin{aligned} \sin(a) &= 2 \div 3.606 = 0.555 \\ \cos(a) &= 3 \div 3.606 = 0.832 \\ \tan(a) &= 2 \div 3 = 0.667 \end{aligned}$$

We can use these values and the inverse trig function to determine the angle. For example, the arctangent (\tan^{-1}) of 0.667 is 33.7 degrees. Similarly, the arcsine (\sin^{-1}) of 0.555 and the arccosine (\cos^{-1}) of 0.832 are both about 33.7 degrees.

If we set $r = 1$, then as a varies from 0 to 360 degrees, it scribes a unit circle, a circle with a radius of 1. This simplifies the sine and cosine as being the y and x values of the point on the unit circle.

Above, we referred to the angle a in

degrees. A degree is $1/360$ of the full cycle formed by the angle a before the point on the unit circle returns to the point it started. We generally measure this angle from the positive x -axis. If the point on the unit circle is below the positive x -axis, we can say the angle is negative, or between 270 and 360 degrees.

We can also measure angles in *radians*, that angle formed when the circle scribed by the increasing angle draws an arc length equal to the radius of the circle. Because the circumference of a circle is π times its diameter, and the diameter is two times the radius, the circumference of the full circle is $2 \pi r$. Therefore, the full circle of 360 degrees is equivalent to 2π radians.

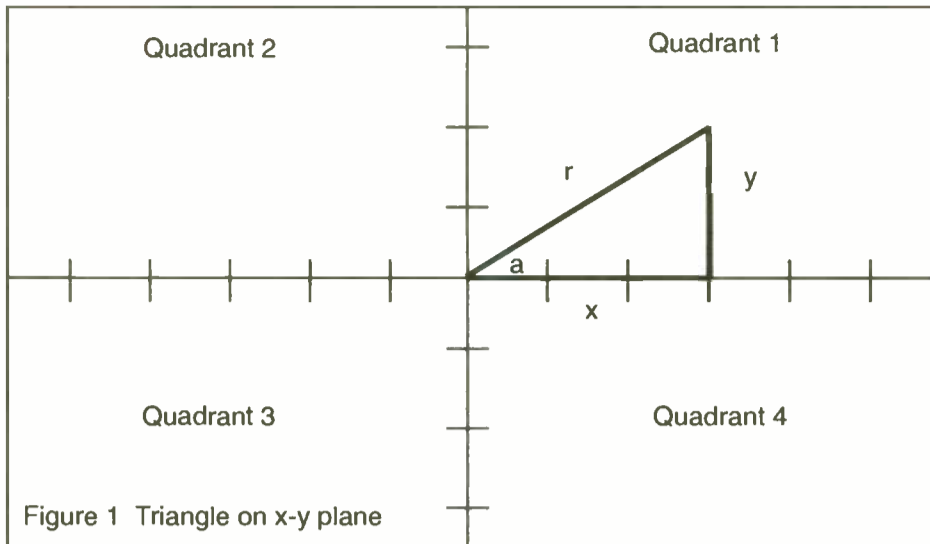


Figure 1 Triangle on x-y plane

Figure 2 shows how the $\sin(x)$ varies as x varies from -2π to $+2 \pi$ radians.

The sine varies between -1 and $+1$. We can multiply this by a constant and end up with a sine wave whose peak amplitude is equal to the constant. Further, we can substitute $360 \cdot f \cdot t$ for a and get a sine wave that progresses with time, assuming the sine function expects an argument (input) in degrees and that f is the frequency in Hz (1/seconds) and t is time in seconds.

If our sine function expects an argument in radians, we can use ωt (where ω is the Greek letter omega) as the argument (the input) to the sine function. Here, ω represents the frequency in radians per second.

In Figure 3, we've set f to 1,000, and $\omega = 2 \pi f$. Further, we've multiplied the

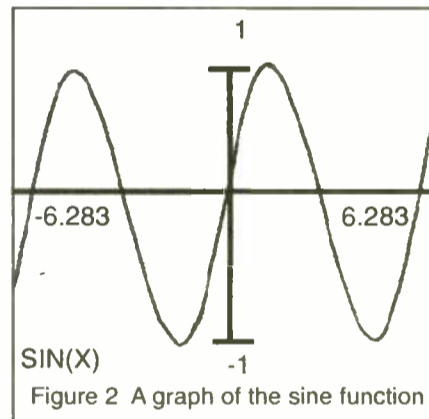


Figure 2 A graph of the sine function

sine function by 2, giving a peak amplitude of 2. The resulting waveform is a 2V peak sine wave. The amplitude (which could represent a voltage or current) can be determined at any instant in time using the function $V(t) = 2 \cdot \sin(\omega \cdot t)$ where $\omega = 2 \cdot \pi \cdot 1000$. This is assuming the sine function accepts an argument in radians. If the sine function expects an

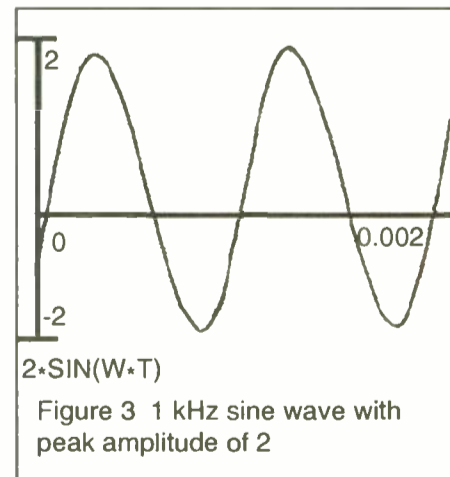


Figure 3 1 kHz sine wave with peak amplitude of 2

argument in degrees, the function becomes $V(t) = 2 \cdot \sin(360 \cdot 1000 \cdot t)$. Next time, we'll look at average value, RMS value, period and wavelength.

□ □ □

Harold Hallikainen designs transmitter control and lighting equipment for Dove Systems, teaches electronics at Cuesta College and is an avid contra dancer. Call him at (805) 541-0200.

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Fritts Talks Radio

► continued from page 1

coming down the pike to increase audio quality. Shapiro said he thought they would. In other words, kind of a "DAB to the rescue" type of thing.

Fritts: I think that has an element of truth to it. But it's not the reason why broadcasters are anxious to move to in-band, on-channel solely. Anytime there's a technology that allows a broadcaster to upgrade their service, I think we're always interested in it. There are always tradeoffs involved. The question is, how many people are listening to CD music as compared to listening to radio stations? I haven't heard any listeners complain about degradation of signal or other technical aspects of radio in the recent past. It seems that radio, with its current technology, is well serving the American public.

RW: Do you think that the progress of DAB testing has been acceptable?

Fritts: We're not comfortable with it.

RW: Why not?

Fritts: Partially because of the structure of the committee that votes on the way that the DAB testing conclusions are drawn.

RW: How would you see it improved?

Fritts: In terms of the testing processes and procedures, EIA entered into a joint venture with NAB. They have controlled that process from day one. We have reason to believe that they are interested in serving the manufacturing community as a higher priority than they are interested in serving the total community combined of radio broadcasters and manufacturers.

RW: Given the political situation that we now have, where one proponent is all the way out of the testing, what can U. S. broadcasters do?

Fritts: The facts speak for themselves. In this process, the criteria changed as the testing took place. Certain advantages were given to Eureka in the testing processes, as compared to what was announced in the original proposals.

I don't know why they changed, but it was an internal decision by EIA for them to change. They were given certain advantages in that process.

In terms of the long term, we know that spectrum is not going to be available in the United States. So the Eureka system in the United States is flawed from its outset, because it requires new spectrum.

The alternative for radio broadcasters is the development of in-band, on-channel. We're excited about that technology. We believe it has great promise. Have there been some stumbling blocks? Yes. Are those being overcome? We believe so.

RW: Does a new structure need to be put in place for the in-band part of DAB testing?

Fritts: If the in-band, on-channel development continues at the pace it's going, I think you will see renewed interest by the NAB board to offer ourselves as a secretariat to facilitate testing of in-band, on-channel in a fair and impartial, underlined, capitalized, manner.

RW: Is it possible that all this work on DAB testing is being done for a consumer market that may not become

viable? In other words, a consumer market that isn't showing a demand for this product?

Fritts: I think that's the threshold question. The United States and North America clearly is the largest marketplace in the world. It has been and will



Edward O. Fritts

be. The automobile manufacturers are the largest producers of radios in the world, in spite of other interests.

We believe that the next generation of radios, in-band, on-channel, will offer superior quality, and will offer additional features, data broadcasting and other forms of transmission ancillary to that, which can provide additional services to the American public, and not only will be able to provide the same superior local service, but will be able to offer additional features as well.

RW: What about the idea of quality? For a recent article, we spoke to an anonymous industry source who told us the following: "We keep forgetting John Q. Public is a non-educated, non-informed listener. Most people couldn't tell you that the radio station they're listening to plays compact discs or is running analog tape." Do you think that's the case?

Fritts: I'll let you make your own decision on that, but in order to do a demonstration on DAB, every one I've ever participated in has used headsets. And that tells you that the distinction may not be great enough with automobile traffic noise and with other features to be that significant in the final analysis.

RW: So, given that, and playing devil's advocate, how do you convince consumers that, in order to get this new service, they need to go out and buy brand new radios?

Fritts: I think we're at least a decade away (from) having a major population increase in the digital radio universe — point one, it seems to me. Point two, the automobile manufacturers are going to drive the market when they come on stream with their new radios that do in-band, on-channel.

And thirdly, ancillary services will become more important for the consumer in the future than they are today.

RW: As the DAB process is continuing, radio stations are starting to broadcast on the Internet. This is obviously on the rise. Is it possible that something like

this could get to a point where it becomes so popular that there's really no need for another service like a DAB?

Fritts: People don't listen for digital sound. They listen for programming. They listen for their favorite music, for their favorite announcers, for their favorite station that is a mix of all of the above. So they listen to programming. They don't necessarily listen for quality, per se. If you can combine the two, you have the best of both worlds, and that's what I think we in radio, particularly the broadcast industry, are attempting to do.

Let me just make a general statement. As long as somebody's tied to a telephone line or a cable line ... (listening to the radio on the Internet) probably will never be as good as listening to an over-the-air radio station in the market area.

And if quality means that much, as some are saying, then I have to think that the Internet quality has to go a quantum leap before it's really acceptable to the ... population.

RW: Let's talk about RDS. Do you agree with the CEMA assertion that it has broken the chicken-and-egg cycle with this technology?

Fritts: I don't know whether the chicken-and-egg cycle has been broken, but I do know that progress is being made and that's encouraging. As we go forward in that arena, I think you'll see that more and more stations continue to see the benefits of RDS.

RW: There's a lot of work being done on high speed data services. Is there a danger that everything going on with RDS will be eclipsed by high speed?

Fritts: I think if you look at the multimedia applications from a whole range of activities — landline-based, wireless-based and broadcast — I don't think anybody can predict with any degree of definitive accuracy as to which one of these particular elements is going to take off and in which form it will take off and be most successful. I think there will be a lot of experimentation by a lot of people until somebody

finds the right niche and makes it go.

I encourage stations to continue experimenting with it, to continue their development and their interest in it, because, eventually, you know, there will be opportunities. I can't tell you what those are today, because I don't think anybody can. Could be we all race to a market and the telephone companies are already there.

RW: How are things going to be different for radio when we turn the calendar on the year 2000?

Fritts: I do think that all of us take sort of an inventory toward the end of a regular year. It might well be that (in) the year 2000, we take a more extensive inventory of things we want to accomplish for the future, sort of a grander review of the last year, rather than take it just so. ☺

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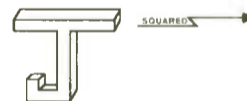
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WORKBENCH

by John Bisset

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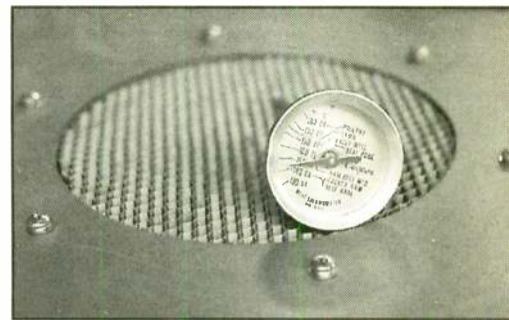
★★★

Figure 2 shows another use for a meat thermometer: monitoring the stack temperature of an FM transmitter. In this case, it is a Continental 25 kW. A record of intake and exhaust temperatures is useful in tracking transmitter efficiency versus power output.

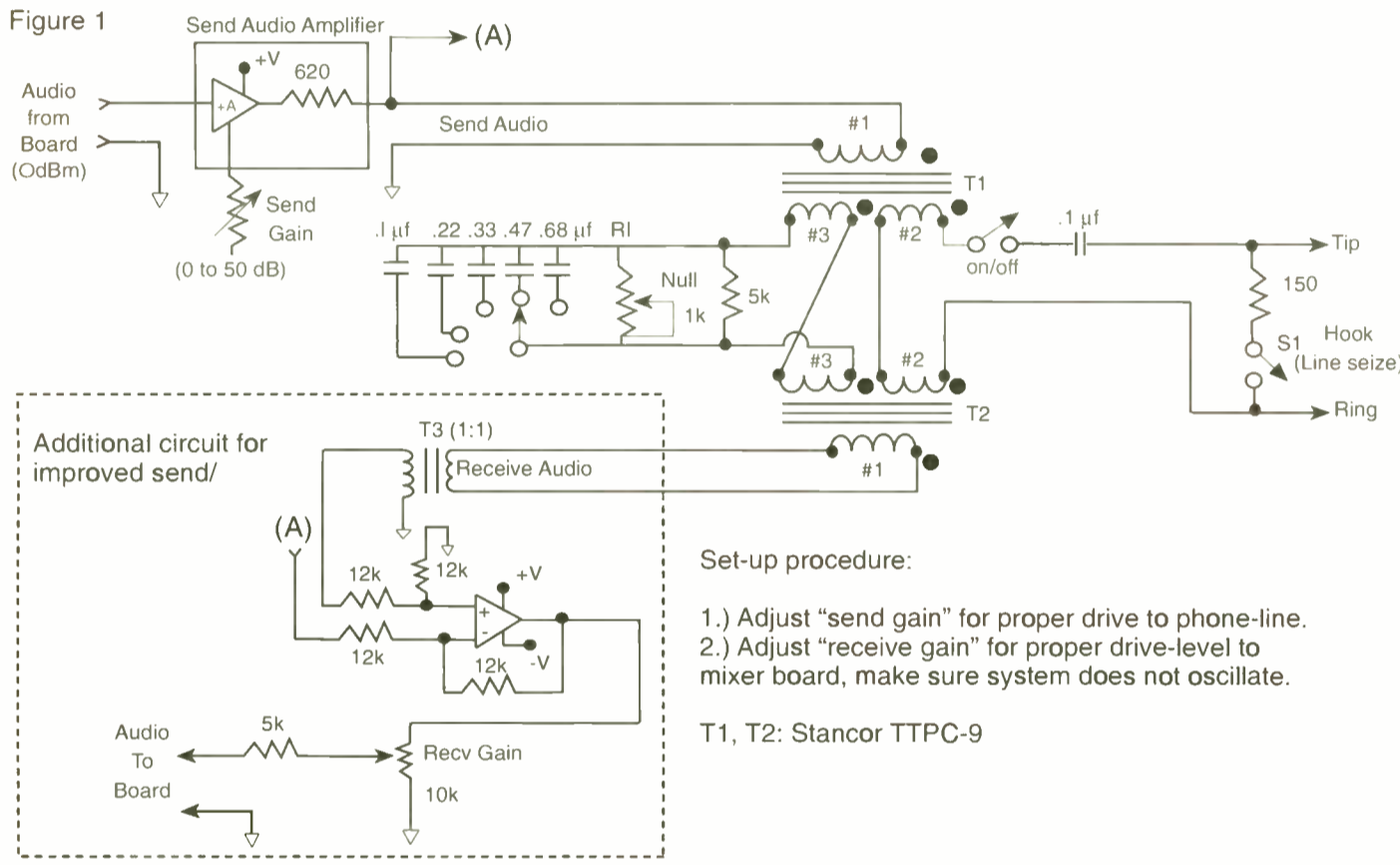
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John Bisset is a principal in Multiphase, a technical services company based in the Washington suburbs.

Published submissions qualify for SBE recertification credit.



Veal, chicken or beef?



Let me know if you have adopted this technique in other situations.

★★★

Figure 1 is a revision of a "Poor Man's Hybrid" that we featured in RW on June 14, 1995. The original article called out an Audisar transformer. Gary Brefini made the changes shown in Figure 1, and replaced the transformer with a less expensive Stancor version. The circuit also uses a differential summer to obtain better isolation. Other features include a small audio amplifier to drive the "send" port of the hybrid.

Setup is simple. First, send a test tone down the phone line from the studio via the send line.

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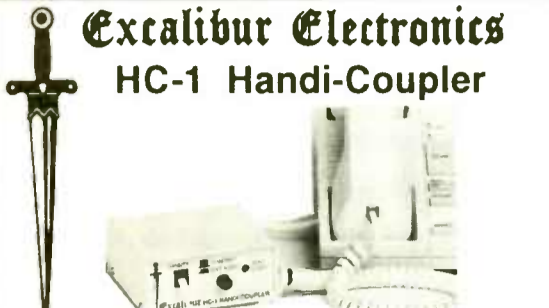
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PIONEER PROFILE

WHO Service Legacy Lives On

by Barry Mishkind

DES MOINES, Iowa In the earliest days of radio, experimental stations in places small and large emerged. However, as broadcasters learned the value of the medium as a source of news and information as well as promotion for the owner's business, most of the larger stations were tied to major cities.

Several factors led to this development. Many colleges and small companies simply found the costs of operating a radio station difficult to justify when equipment was expensive and required constant attention and maintenance.

More important, the major manufacturers of radio receivers were in the larger cities, and much of the necessary "talent" to fill the programming schedule was also found there. Telephone lines to the Midwest and the western United States were prohibitively expensive, even after the network era began.

Nevertheless, the potential of AM radio for covering large areas made it an ideal vehicle to reach the small, rural communities of the Farm Belt. Despite a relative lack of professional talent, stations appeared all over the Midwest.

A voice for Iowa

Early in 1924, George Kuhns, president of Banker's Life Company in Des Moines, Iowa, dedicated a new 500-watt radio station at 570 kHz. It was Kuhns' idea to build the station to provide service to midwestern farmers, in effect becoming "the Voice of the Middle West."

This was a logical move. Banker's Life made a great deal of its money from farmers and it held many farm mortgages. Its financial health was tied closely to farmers, who were experiencing some very hard times in the post-World War I economic bust. Kuhns made airtime available for news and for advice from anyone who could help farmers with their problems.

When the farmers tuned in for the latest news, weather and market reports, the station reminded them who was providing the programming: "This is WHO — Who? — Banker's Life, Des Moines, Iowa."

WHO quickly became one of the most famous call signs in the Midwest, with Banker's Life tied right in to it. Coverage increased further in early 1925 with a power increase to 5,000 watts. Kuhns was prepared to take advantage of WHO as, in effect, a Banker's Life salesman welcomed into the homes of listeners.

Yet, station programming was not focused entirely on the insurance business. WHO sought to provide real public service to its listeners. Consider the Great Corn Sugar Giveaway of 1925.

The idea was to revitalize the farming community by making table sugar from corn glucose. A Corn Sugar Orchestra was formed, and the station offered a free sample, a pound of corn sugar, to any listener who wrote in. The result proved the power of radio: more than 100,000 requests came in. However, the project failed to catch on, and years later the WHO basement still contained some of the corn sugar!

Even after joining the NBC Radio Network in September 1927, WHO

continued to program locally for a large part of the day. But shortly thereafter, the government struck a terrible blow.

Disaster and rebirth

Early in 1928 came word that WHO must move from 570 kHz on the dial to 1000 kHz. Worse yet, WHO would have to share time with WOC in Davenport. Both stations protested, but the Federal Radio Commission was resolute that Iowa would not have two clear channel stations.

At the new dial position, 5 kW no longer "got out" as far, and the reduced schedule limited the potential growth of

the station. Because Banker's Life had lost over \$600,000 during the years, managers had no appetite to spend even more for a 50-kW transmitter or better programming. This reluctance produced a decision to sell to WOC and Col. B.J. Palmer.

Various efforts to maximize the facilities ensued, including, for several years, a synchronous operation for the combined WHO/WOC, not unlike WBZ and WBZA in Massachusetts. Yet, so unsatisfactory was the reception in many areas, Palmer eventually filed an application to use 50,000 watts from Des Moines. With the Depression, prospects for the station

appeared so poor that two directors sold all their stock and quit the company.

In the meantime, the "Iowa Barn Dance Frolic" began, at first originating from the Davenport studios, then moving to Des Moines in 1932. The program was a long-time favorite on WHO, and it introduced many famous celebrities including Andy Williams, Roger Williams and Ed Reimers. Later in the 1930s, another future luminary inaugurated the WHO sports department. Ronald Reagan was the first sports director on the station.

The new 50 kW transmitter began operation on April 22, 1933. Coverage improved all over the state. Still, the merged WHO/WOC was considered "too remote" for listeners in Davenport. Therefore, Palmer bought station KICK on 1420 kHz and moved WOC's

continued on page 60 ▶

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World Radio History

Stogies and Talk Radio Thrive

► continued from page 42

older, but Zeplowitz says a growing number of women are smoking cigars, a trend that has doubled in the last few years.

He proclaimed the major motion picture "Independence Day" to be the most cigar-friendly movie he has seen, due in part to the scene in which actor Will Smith refused to get into his plane without one.

Each show begins with a traditional ceremony as Cigar Dave and his listeners light their cigars.

How does he talk about cigars for two hours every week? He not only answers regular questions but also informs his audience about cigar trends he detects.

Cigar Dave also expressed pleasure with the presence of cigars in the movie "Chain Reaction."

He also takes the show on the road. The

program invites affiliates to arrange local appearances for Cigar Dave. While in town, he accompanies station account executives on client visits. Zeplowitz has appeared at Tampa's cigar bar at the Columbia Restaurant in the cigar-influenced city of Ybor City, and celebrated the show's first anniversary from the Havana Room at the London Steak House in Pompano Beach. He recently appeared at the Boomtown Casino in Reno for a cigar dinner.

"Smoke This!" is available to stations on a market-exclusive, barter basis on Satcom C-5, Transponder 23, SEDAT Channel 49. The show contains seven minutes per hour of network spots and 10

minutes for affiliates to sell.

□□□

Brian Holmes is the evening air personality for oldies WSRZ-FM and OM of all-news WSPB(AM) in Sarasota, Fla. He is also an anchor for Metro Traffic-Tampa and a radio columnist for Music Forum Magazine in Tampa. Call him at (941) 388-3936.

WHO's There

► continued from page 59

programming there. After November 11, 1934, WHO occupied Iowa's clear channel assignment alone.

With its new stature as a major station, WHO began an aggressive campaign to build up its programming and news departments. WHO created its Farm Service Department, the first full-time farm information service in the world. In 1937, WHO

In 1936, the station received 700,000 letters.

originated National Soil Conservation Field Days.

WHO responded strongly to local and regional emergencies. Fundraisers and public service announcements and broadcasts consumed as much as 32 percent of its broadcast time over a five-year period before World War II. After the war, WHO spearheaded efforts in the Midwest to provide relief for destitute persons in Europe.

The impact of WHO on its listeners can be measured easily by noting that in 1936 alone, the station received more than 700,000 letters, a stack more than 400 feet high. On an average day it took in 3,000 letters; "excellent" days exceeded 18,000 letters!

After a final facility change in 1941, WHO settled on 1040 kHz. Today WHO(AM) is owned by the Palmer family. Vice President and General Manager Mark Halverson said the owners recently sold the TV side of their operation and have indicated their intention to sell WHO and its sister FM station next year.

WHO continues to serve the midwestern United States. For many people all over the country, especially those from Des Moines, WHO remains a beacon, a friend to farmer, city dweller and traveler.

□□□

Thanks to Craig Rogers, production director at WHO, for his kind assistance in preparing this article. Call Barry Mishkind at (520) 296-3797, send him email at barry@broadcast.net or visit his home page at <http://www.broadcast.net/~barry/>

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BE Spotmaster 10 cart deck, \$900. P Deen, WAJQ, 208 Douglas St, Alma GA 31510. 912-632-1000.

FS12B System, (2) 48-tray stereo Insta-Carts, (2) 24 stereo Go-Carts, (4) 42 Go-Cart machines & computer, \$2500 for complete system, might consider selling individually. C Mandel, KAMP, 626 Main St, El Centro CA 92243. 619-352-2277.

IGM EC System, (3) 48-tray stereo Insta-Carts, 24 stereo Go-Cart & computer, \$2000 for complete system, might consider selling individually. C Mandel, KAMP, 626 Main St, El Centro CA 92243. 619-352-2277.

ITC Delta stereo, 6 PB, 1 R/P. Bay View Bldg, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-1959.

ITC SP mono play, vgc, \$295; Augicord 2 deck stereo play, vgc, \$425; ITC 3D Series, mono play 3 deck, vgc, \$695. P Willey, WBTN, Historic Rte 7, Bennington VT 05421. 413-663-3419.

ITC 3 deck, mono; Gates mono & stereo; Audi-Cord stereo PB. P James, 419-782-8591.

ITC Delta 1 (3), mono, play, triple tones; (3) BE 3100P mono, play, triple tones; ITC Delta PD II, mono, play; (2) ITC Delta PD II, mono, R/P, wood cart racks, 100 capacity, Fideleipac carts, Kevin, KMCM, 1404 E 332 Minnesota St, St Paul MN 55101. 406-232-5626.

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ITC Delta - new pinch rollers: Mono playback (2), record/play (2), stereo record/play (1). MOTIVATED! Spotmaster series 2000 record (1). Wes, 818-798-9128.

Marathon test carts: #301 head cleaner cart, #302 torque tester, #303 speed indicator set, #303 speed cart only, \$10 ea. M Crosby, 408-363-1646.

STL alignment carts: C0030-FI (NAB), C0031-F1 (IEC), C0234-2-FI (stereo IEC), X1235-1-FI (3150 Hz flutter), unused, \$30 ea. M Crosby, 408-363-1646.

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Denon 951FA, \$500. Bay View Bldg, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-1959.

Pioneer CAC-V3000 300 CD capacity auto changer, \$2750. J Phillips, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

CONSOLES

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Autogram RTV-12, slide faders, stereo, vgc, \$3500. G Blau, KXST, 9416 Mission Gorge Rd, Santee CA 92071. 602-956-9696.

Harris stereo 80, \$1000; Sparta AS40B 8 chnl board, D Rose, KDUC, POB 432, Barstow CA 92312. 619-256-2068.

LPB Signature III (2) S-13 8-chnl stereo consoles, excl cond, \$2500/ea/BO; Ramko DC5MS 5-chnl stereo console, \$200. T Steele, WIKE Radio, POB 1490, Newport VT 05855. 802-766-4485.

Arrakis 10 chnl, 1 mono, 1 stereo. Bay View Bldg, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-1959.

BE 4M50 4 chnl mono board, works gd, \$250; Fostex 350 8 chnl mixer w/meter panel, \$350; BE 8M150 8 chnl 16 input mono board program, aud, cue works gd, \$650. P Deen, WAJQ, 208 Douglas St, Alma GA 31510. 912-632-1000.

LPB Signature III 12 chnl stereo console, \$1950. M Osborne, WKSQ, POB 9494, Ellsworth ME 04605. 207-667-7573.

CCA Ultimate III 10 chnl stereo/mono, just removed from service, gd cond w/documentation, \$1500. B Suwalski, WPNA, 408 S Oak Park Ave, Oak Park IL 60302. 708-848-8980.

Soundcraft 600, 32x16, w/patch-bay, mint, \$6950; Tascam 512, 12x8 mixer, \$750; Tascam 520, 20x8x16 mixer, \$1750; Allen & Heath SYNCON 28x24, great sound, \$8000; Ramsa 820 mixer, \$2200. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

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Harris MSP90, \$300; Inovonics 270 AGC limiter, \$300. D Rose, KDUC, POB 432, Barstow CA 92312. 619-256-2068.

Inovonics 222 AM processor/limiter NSRC, new, \$450; CBS stereo FM volumax units (2), good cond, \$90. T Steele, WIKE Radio, POB 1490, Newport VT 05855. 802-766-4485.

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Sennheiser MD421-U5, clean, \$300. M Crosby, 408-363-1646.

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AMCO equip rack, 70"x25"x23", no back door, black w/vinyl wood-grain accents, vgc, \$500; equip rack, 82"x20"x14" with back door, very heavy, \$200. B Suwalski, WPNA, 408 S Oak Park Ave, Oak Park IL 60302. 708-848-8980.

Broadcasting equipment: from the 20's-50's. WE, RCA, Gates: amps, boards, mics, compressors, remote amps, EQs, speakers, tubes; extensive list of tube equipment, call for info. J Phillips, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Collins IC 6 audio console; CG-25R 25Hz generator; (5) Otari ARS-1.000 open reel machines; Wagener 1816-24 freq agile satellite rcvr. C Mandel, KAMP, 626 Main St, El Centro CA 92243. 619-352-2277.

Comdial Executec 8 station capacity, 3 outside lines, PBX & phones, \$750; Conex CS 25A tone sensor & Conex tone gen, \$225. P Deen, WAJQ, 208 Douglas St, Alma GA 31510. 912-632-1000.

Panasonic KX-T616 electr modular switching phone system, 6 lines x 16 stations, uses standard phones, music on hold, paging, call reporting & all manuals, working when removed from service, \$700. B Croghan, KLTW, POB 2770, Sterra Vista AZ 85636. 520-458-4313.

Rane RE-27 1/3 oct EQ w/pink noise; **UREI LA-22** compressor limiter 2 ch; **UREI LA-10** compressor limiter 1 ch; **JBL M-644** 4 ch noise gate; (2) **EV XEQ-2** elec crossover EQ; (200) **TDK SA-SM60N** new audio cassette tape; **Middle Atlantic** rack 72"x19", black; (8) **Ampex 489-DM** 126 42 mins; (10) **Ampex 467-R15** DAT tapes; (4) **Sony PDP-15** DAT tapes. B Hernandez, 11419 Turkey Flat Dr, San Antonio TX 78245. 210-675-5149.

UTC A-21 & ADC 114F & 114E transformers, \$15/ea; GE & Sylvania 6J7 & 6V6 GT tubes. E Davison, 217-793-0400.

Want To Buy

Loss of audio alarm, silence sensor. J Powley, WNGS, 9279 Dutch Hill Rd, West Valley NY 14171. 716-942-3000.

RCA TA-19 instruction manual. J Powley, WNGS, 9279 Dutch Hill Rd, West Valley NY 14171. 716-942-3000.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recdgs, 228 East 10th, NYNY 10003. 212-674-3060.

MONITORS

Want To Sell

Dynaudio BM10's studio monitors, perfect for FM production rooms, \$750. K Thomas, Rebel Recording, 5555 Radio Ln, Jacksonville FL 32205. 904-388-7711.

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Zephyrus 300 Series analog radio satellite rcvr, \$1500/BO. S Avery, KRAJ/KLOA, 731 N Balsam, Ridgecrest CA 93555. 619-371-1700.

Wegener 1601 mainframe, many cards, analog, \$1500/BO; Zephyrus 300 series analog radio satellite rcvr, \$1500/BO. S Avery, KRAS, 731 N Balsam, Ridgecrest CA 93555. 619-371-1700.

Want To Buy

EBS encoder/decoder, old system not new EAS. J Powley, WNGS, 9279 Dutch Hill Rd, West Valley NY 14171. 716-942-3000.

RECORDERS

Want To Sell

Ampex AG440 (4) 1/2" FT rack mount, \$200 ea. F Pierce, WMBW, POB 73026, Chattanooga TN 37407. 423-629-8900.

Ampex AG-440 stereo rcdr, rack mount, good cond, \$500/BO; Otari MX-5050BII2 stereo R-R rcdr, vgc, \$850/BO; Ampex ATR-700 stereo R-R rcdr, good cond, \$400/BO; Ampex AG-440 stereo rcdr in new Russ Lang cabinet, vgc, \$750. T Steele, WIKE Radio, POB 1490, Newport VT 05855. 802-766-4485.

ITC Delta 3 deck player, stereo, vgc; \$1100; ITC Delta single deck players (5), stereo gd cond, \$4000. G Blau, KXST, 9416 Mission Gorge Rd, Santee CA 92071. 602-956-9696.

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McMartin B-802 8 chnl mono, \$250. T Toenjes, WREN, 201 NW Hwy 24, Topeka KS 66608. 913-437-6549.

McMartin MX-5 5 input mixer, similar to Shure M-67, excel cond, \$125. D Meyer, 805-962-8273.

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Otari ARS 1000 (2), BO: (2) Otari MX 5050, BO: (2) Sony RS 700 DAT, \$500. C Bannowski, Good News Network, 3213 Huxley Dr, Augusta GA 30909. 706-733-8201.

Ramko, \$150 ea: Technics SL1200 MK2, \$350. D Rose, KDUC, POB 432, Barstow CA 92312. 619-256-2068.

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Ampex 440B 3-3/4 & 7-1/2 in vgc, mono 1/2 trk w/sel sync (2), \$275 ea. J Reichard, WIAV TV, 2501 Greenway Ctr Dr, Greenbelt MD 20770. 301-345-2743.

Nagra 4.2L pilot tone model, vgc, BO. C Kocsis, Knobs On, 7315 Oriole Ave, Springfield VA 22150. 703-913-9143, chrisk@access.digex.net.

Ampex AG602-2, stereo, rack-mounted, \$250; (2) Ampex Sampsonite cases for 600 Series, mono, brown, \$50/ea; stereo, grey, \$50. M Crosby, 408-363-1646.

Otari ARS 1000 DC stereo PB (3), w/25 Hz cue detector; (3) ITC 770, stereo PB w/25 Hz cue detector; (3) Technics RS-1506-US P/R, 4 trk stereo; two person programmers, 3A w/auto sequence. Kevin, KMCM, 1404 E 332 Minnesota St, St Paul MN 55101. 406-232-5626.

Otari 5050, as is, \$1000; ITC 3D stereo 1 deck out, \$450; ITC 3D stereo, working, \$600; ITC 3D stereo working w/record amp, \$900; ITC mono record amp, \$50. S Bush, Bountiful Bldg, 3595 S 1300 W, Salt Lake City UT 84119. 801-264-8250.

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Phillips CDR, like new, \$2400. R Swafford, IAM Satellite Radio, 610 A.E. Battlefield #238, Springfield MO 65807. 417-887-7788.

Tascam 34B 4 trk, excel cond, new motor, \$750. Bay View Bldg, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-1959.

Tascam 122, stereo, 3 heads, 1-7/8 & 3-3/4 ips, VU meters, rack mount, 5-15/16x13-9/16 w/full manual, no head wear, immaculate cond, \$450; Marantz PMD 360 stereo, 3 heads, 1-7/8 ips, VU meters, full manual, no head wear, low mileage, 120V or matterly operation, immaculate cond, \$250. S Lawson, KAK Prod, 928 Hyland Dr, Santa Rosa CA 95404. 707-528-4055.

New & used Ampex 350 style tape transports, motors & parts, various prices. M Crosby, 408-363-1646.

Otari MX70's 16 trk 1", mint, 150 hrs w/video layback system, \$6950; Tascam ATR60-2 in stand, \$1200; Tascam ATR60-8, \$2750; Tascam 58 8 trk, \$1950; Tascam 38 8 trk, \$1650; Otari 5050-8 Mk III, \$2200; Ampex 440C-8 1", \$2900; Ampex 1200 PURC cards, \$400 ea; nakamichi 550 portable cassette, \$250; Custom locator for ANY deck, \$495. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

Otari MX70 16 trk 1", like new, 150 hrs, \$5950; MX70 video layback system, \$900; gd used 1/2"x2500" 456 tape, \$20; 1"x2500" 996 & 250, \$35; Nagra III sync rcdr w/SLO resolver, \$695/both; Nakamichi 550 great port cassette, \$250; new 2" MRL short test tapes, \$229. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

Revox A77 recdrs (2), both need work, \$50/ea. M Crosby, 408-363-1646.

Want To Buy

Technics SLP1200 in new to gd cond, J Burdick, Chicago Groove, 3 Eastpark Blvd, Villa Park IL 60181. 414-638-9077.

Any older DAT machine for PB use only, must indicate real time, for proofreading, \$200-300 range. L McKeever, 515-254-1738.

Otari CB-120 autolocator. Grant 816-931-8735.

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

Ampex machines, record electronics, mixers. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

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Want To Sell

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Comrex LX-T encoder for single line freq extension, seldom used, like new cond, \$500. A Clough, Ski Areas of NY, 2144 Currie Rd, Tully NY 13159. 315-696-6550.

Comrex 2XP two-line encoder, case scratched in placed, \$650. R Links, Links Sound, 1656 California St, Berkeley CA 94703. 510-845-5557 aft 6:30 PM PST.

Marti RMC 15T 15 chnl remote control; RMC 15S 15 chnl remote control & Ry-15 relay unit, \$550/BO for all. D Sorenson, SBC, 600 N Kiwanis, Sioux Falls SD 57104. 605-334-1117.

CRL SGC-800 stereo gain controller, excel cond, \$1000; Sony DSP-R7 digital delay, stereo, excel cond, \$800. G Blau, KXST, 9416 Mission Gorge Rd, Santee CA 92071. 602-956-9696.

Moseley MRC 1600 STL/TSL modems, \$500; Marti RMC-15 STL/TSL modems, \$400. T Toenjes, WREN, 201 NW Hwy 24, Topeka KS 66608. 913-437-6549.

Technics SP-25 TT, 2 speed, Audio Technica ATP-12T tonearm & Ortofon cartridge, w/Pro-base mounting board, \$200 +shpg. R Links, Links Sound, 1656 California St, Berkeley CA 94703. 510-845-5557 aft 6:30 PM PST.

Comrex 2-line, \$1500; Shure mixer, \$400. T Balistreri, WAUK, POB 51332, New Berlin WI 53151. 414-784-2863.

Gentner SPH3 telephone hybrid, \$200. S Bush, Bountiful Bldg, 3595 S 1300 W, Salt Lake City UT 84119. 801-264-8250.

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Moseley PCL-505C pair on 950.50, not modified, \$750. J Sands, KJMZ, 702-868-7222.

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Telfax GX-440 remote mixer, as new, \$795. P Willey, WBTV, Historic Rte 7, Bennington VT 05421. 413-663-3419.

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Lots of misc carts, hundreds, all lengths, can't be bothered checking them out. \$100/BO. T Steele, WIKE Radio, POB 1490, Newport VT 05855. 802-766-4485.

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Sencore FC51 counter to 1 Ghz, manual, calibrated at factory, \$275. W Moring, WSCI, 2187 Wapoo Dr, Charleston SC 29412. 803-795-9401.

Tektronix 2754P 21 Ghz spectrum analyzer, w/digital storage, excel cond, \$10,000. G Blau, KXST, 9416 Mission Gorge Rd, Santee CA 92071. 602-956-9696.

Audio Precision System One. 2 chnl, Bur-Gen option, (2) interface cards, HP 8 pen color plotter, all manuals, cables, software & updates, mint cond. D Campbell, 352-378-6275.

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Technics SP-15 3 speed w/ton-arm (3). Kevin, KMCM, 1404 E 332 Minnesota St. St Paul MN 55101. 406-232-5626.

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OmniCraft SP-1 50 Hz-1kHz tone gen, \$100/BO. R Branske, Southwest Comm, POB 952, New Lenex IL 60451. 708-399-5444.

Orban Optimod 8000A, \$1200. Bay View Bdcg, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-2638.

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BC5P 2.5 kW, \$4000 & Collins 20V 1 kW, \$1000, working when removed from service, FOB, Durham NC & Blacksburg VA. V Baker, Positive Radio Group, 540-961-2377.

Cetec/Sparta 1.5 kW FM in gd cond w/stereo gen w/o exciter, \$3500. J Arzuaga, WLAZ, Clermont FL. 787-895-0000.

Collins 830-IFB 10 kW FM xmtr, 25 yrs old, used as main for 17 yrs, avail w/wo 310-22 exciter, in decent shape. BO. J Linn, WITF, POB 2954, Harrisburg PA 17105. 717-236-6000.

Harris FM 2.5H3, excel cond, \$5000; Harris FM MX-15 exciter, \$1500; EQI 1983 675T3500 exciter, \$7500. Bay View Bdcgt, 4359 S Howell Ave #106, Milwaukee WI 53207. 414-482-1959.

Energy-Onix MK-22 22-kW FM transmitter with exciter. One year old. Like new. Priced right!! 816-628-5959.

Tepco J-317 translator, \$1300; TTC translator XL10FM 10 W type N connectors. S Bush, Bountiful Bdcgt, 3595 S 1300 W, Salt Lake City UT 84119. 801-264-8250.

Two 3.5 kW FM and two 5 kW AM transmitters, two FM antennas and various transmission line. Steve or Don. 806-372-4518.

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

Harris AM MW1 1kW, ok if needs work. C Mellon, WILI Radio, 720 Main St, Willimantic CT 06226. 860-456-1111.

Need manual or readable copy for ITA 10,000 D/S xmtr. J Addison, KHCB-FM, 713-520-5200.

McMartin AM/FM xmtr, any model, exciter or stereo modules. Goodrich Ent., 11435 Manderson, Omaha NE 68164. 402-493-1886.

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Harris FM2.5k 2.5kw \$9,500
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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 Darin, Steve, or Tyler

770-964-3530

Gates BC-1T 1kW AM xmtr, 1490KHZ, gd cond, \$750/BO; Gates BC-250GY 250W AM xmtr, 1490, \$250/BO. T Steele, WIKE Radio, POB 1490, Newport VT 05855. 802-766-4485.

Gates BC-250P2 5 kW tuned to 1590, no pcbs, BO. N Lent, WWIS, Rt 1 Box 279A, Black River Falls WI 54615. 715-284-4391.

RCA BTE 15A FM exciter (2), \$250 ea. F Pierce, WMBW, POB 73026, Chattanooga TN 37407. 423-629-8900.

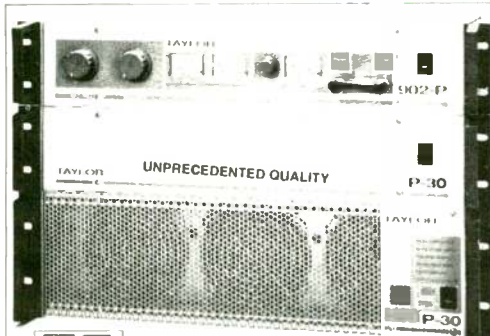
RF 6 600 W continuous load, 1500 W surge, 50 Mhz air cooled, \$275. W Moring, WSCI, 2187 Wapoo Dr, Charleston SC 29412. 803-795-9401.

CCA FM5000D w/Collins 310Z exciter on 94.1 mHz, set of new spare tubes, works but needs some work, \$3000/BO; RCA BTF-1 1 kW FM xmtr, no exciter, BO; CCA 660 exciter, on 94.1 mHz, built in SCA & stereo gen, \$200; Harris stereo gen module for TE-3 exciter, \$50. J Sands, KJMZ, 702-868-7222.

CSI 500 W AM; AEL 2.5 kW FM; Harris SX-1, SX-1A 1000 W AM; RCA 3" coax 4 port relay; RCA 1500 dummy load. P James, 419-782-8591.

Gates BC1H1 1000 W AM, new 807 tubes, needs some work, pick up only, \$1000. P Deen, WAJQ, 208 Douglas St, Alma GA 31510. 912-632-1000.

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20 Watt	\$3,880	600 Watt	\$5,960
40 Watt	\$5,046	1K Watt	\$8,716
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400 Watt	\$13,171		
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New McMartin 20W, BIM-8000 FM exciter, New McMartin IBM10050 FM relay/rebroadcast rx; also some used McMartin B910 exciters, 15W Goodrich Filter, 11435 Manderson St, Omaha, NE 68164. 402-493-1886. Fax 402-493-6821.

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3.5 KW FM 1979 McMartin BF3.5M	10 kW AM 1980 Harris MW-10
5 KW FM 1969 RCA BTF 5D	10 kW AM 1976 Continental 316F
10 KW FM 1965 Collins 830F1	25 kW AM 1982 CSI T-25-A
10 KW FM 1970 Harris FM 10H3	50 kW AM 1978 Harris MW50C3 (1100 KHZ)
10 kW FM 1968 RCA BTF 10D	50 kW AM 1978 Continental 317C-1
10 kW FM 1976 RCA BTF 10E	50 kW AM 1973 Continental 317C
20 kW FM 1974 Collins 831G2/Cont 816R2	50 kW AM 1981 Continental 317C-1
20 kW FM 1975 Harris FM20K	50 kW AM 1982 Harris MW-50B
25 kW FM 1980 Harris FM25K	

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Full time 3 station Chief Engineer with good knowledge of studio and FM transmitters trouble shooting in TV construction Mus have good sense of organization and excellent Resumes to Mike Shafer 315 Kennedy Avenue Grand Junction CO 81407 (970) 333-3696 EOE

Sports Radio WKNR seeking an Assistant Engineer. Experience in studio and transmitter maintenance; knowledge in computers and computer networking desir- able. SBE Certification preferred. Send resume to:

Sports Radio WKNR 9446 Broadview Road Cleveland, Ohio 44147 Attn: Brian Wolf

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1996 Graduate w/FCC license, ready to add talent to your New Jersey radio station. reside in Somerset County. Call Brian for demo tape. 908-359-3085.

26 yr old w/FCC license seeks any position w/Washington DC or Maryland station, reside in Price Georges County. Call for resume & audition tape. Albert, 301-434-8914.

30-yr pro seeks small market management opportunity in SE. Broad knowledge, creative, orga- nized, high integrity. Send inquiries to Potential at POB 14706, Greenville SC 29610.

Fun and friendly lady seeks posi- tion behind the mic, recent gradu- ate interested in Oklahoma/Texas or California areas. Carla, 405- 632-2343.

I know Adult Standards, played them when they wer MOR. Grown up announcer needs job in Southeast. Alex, 513-777-8423.

J.J. Shannon 12 yr pro now in Florida, will relocate. Top 40/AC/Oldies/Classics. Competitive markets, west, south, east. 407-770-4749.

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Operations manager of a Christian station seeks OM, PD, or GM position at a station w/same format. Air-shift & prod exper, intan- gible qualities include strong work ethic & honesty, will relocate. John, 209 Hodges Manor Rd, Portsmouth VA 23701. 757-488-7964.

Sports, sports, sports, I know it & love it. Give me a listen, play-by-play, color, talk. Derik, 405-366-3175.

Syndicated Nostalgia Radio Host with large audience looking for new opportunities. Ed, 201- 791-4610.

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One telephone order person to handle accessory and support product sales from our main office in Glen Falls, N.Y. Send resume's to or contact Rich Redmond, at Northeast Broadcast, P.O. Box 1179, So. Glens Falls, N.Y.12803 (518) 793-2181

Chancellor Broadcasting

Chancellor Broadcasting Co. is seeking an experienced Chief Engineer for KEEY & KFAN in Minneapolis. Qualified candi- dates will have experience in High Power AM directionals, FM transmitters, Computer networks and automation systems. This position requires hands-on ability in addition to management skills. Compensation will be based upon experience. If you are one of the best, self motivated and ready for a change,

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central New Jersey radio stations, seek a qualified Chief Engineer to head a department of 3, at one of the country's top suburban radio operations. WCTC is 24 hour news/talk/sports and WMGQ is A/C. Both stations have a heavy remote schedule. A highly experienced and motivated pro is needed to manage the technical operation of these major market facilities. Competitive salary/full benefits, EOE. Resumes w/salary history to

Andrew Santoro VP/GM WCTC/WMGQ Box 100 New Brunswick, NJ 08903 or FAX 908-249-7562

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K92 Radio in Roanoke/ Lynchburg is seeking an FM broadcast engineer with several years experience. Requirements: Technical school graduate. SBE certified, proficient at trou- bleshooting audio quality, radio station RF and studio systems, strong PC & digital system knowledge. Send resume & salary requirements to: EEO Coordinator (#14), K92 Radio, P.O. Box 92, Roanoke, VA 24022. Minorities & women are encouraged to apply. EOE/M-F.

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Table with 6 columns: Page No., Advertiser, Reader Service No., Page No., Advertiser, Reader Service No. Lists various advertisers and their corresponding page numbers.

Table listing staff roles and names: Publisher/CEO (Stevan B. Dana), Chief Operating Officer (Carmel King), Production Director (Lisa Stafford), Production Manager (Lisa Lyons), Publication Manager (Heather Heebner), Classified Coordinator (Alex Frosini), Showcase Coordinator (Vicky Baron), Ad Traffic Coordinator (Kathy Jackson), Production Assistants (Kris Willey, James Cornett), Ad Coordination Manager (Simone Mullins), Circulation Director (Eleya Finch), Circulation Manager (Robert Green), Accounts Receivable (Steve Berto).

Advertising Sales Representatives

Table listing advertising sales representatives and their contact information: U.S. East: Skip Tash (703-998-7600), U.S. West: Dale Tucker (916-721-3410), U.S. Midwest: Sandra Harvey-Coleman (317-966-0669), International: Stevan B. Dana (+1-703-998-7600), Latin America: Alan Carter (+1-703-998-7600 ext 111), Europe: Dario Calabrese (+39-2-7030-0310), Japan: Eiji Yoshikawa (+81-3-3327-2688).

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Classified Advertising Rates Effective January 1, 1996

Table with 4 columns: Line Ad, 1x, 3x, 6x, 12x. Lists rates for various ad types like 1-9 col inch, 10-19 col inch, Distributor Directory, Professional Card, Classified Line Ad, Blind Box Ad.

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$195, at the 3x rate \$186, at the 6x rate \$174, at the 12x rate \$156, etc.



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