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FCC Obscenity Policy Vague

by David Hughes

Washington DC ... In the wake of its controversial decision to take a tougher stand on explicit language on radio and TV, the FCC indicated in early June that it will not determine beforehand whether a planned broadcast violates its criteria.

In May, the Pacifica Foundation had asked the FCC to rule in advance if a reading of the James Joyce classic *Ulysses* in June over its New York station, WBAI, would violate the new indecency standards.

However, outgoing FCC Mass Media Bureau Chief Jim McKinney said the Commission would not become involved in prejudging whether material is indecent or not.

The FCC's response to Pacifica comes at the same time a joint petition for reconsideration was filed by more than a dozen organizations, including the Radio-Television News Directors Association, EZ Communications and National Public Radio.

The petition asks the FCC to allow individual stations to determine which programming would be offensive to their communities. The NAB submitted its criticism of the policy separately.

The recent activities come in response to the FCC's decision on 16 April that it would issue warnings, and possibly even fine or revoke licenses, if stations air material that refers to sexual and other "indecent" topics at times when children might be listening.

The new policy, which has been widely criticized by broadcasters as being not specific enough, was a change in direction for the FCC.

Previously, the Commission rarely got involved in governing the content of radio and TV programs and only occasionally responded when any of the so-called "seven dirty words" had been broadcast.

Before the scheduled *Ulysses* reading, an annual event at Pacifica's WBAI, the Mass Media Bureau, which was later backed by the commissioners, notified Pacifica that it would not predetermine whether a broadcast reading of *Ulysses* would be indecent.

In asking the FCC to rule on the matter, Pacifica maintained that the new indecency standards are too vague. It also added that listeners had not complained at previous readings of *Ulysses*.

Despite the FCC's decision not to judge whether *Ulysses* violates decency standards, the 16 June reading, which lasted seven hours, took place on schedule at 7 PM. WBAI officials reported no calls of complaint.

The Commission had told Pacifica that it was not going to get into the business of "prior restraint."

In a letter to Pacifica, McKinney maintained that the FCC will not advise broadcasters in advance whether they should broadcast questionable material.

He said such a move by the Commission would be infringing on the editorial judgement of broadcasters.

Following McKinney's letter, Pacifica asked the full Commission to overrule the Mass Media Bureau. However, the commissioners stood by McKinney's letter.

Pacifica was one of several station owners cited by the FCC in its April crackdown.

Pacifica's Los Angeles station, KPFK, was cited by the FCC for airing a play about homosexual encounters.

Other stations cited included WYSP, Philadelphia, which simulcast the Howard Stern show, and KCSB, a Santa Barbara station that broadcast an allegedly indecent song.

The complaint about the KPRK program, which was entitled "IMRU," featured excerpts from a play entitled *Jerker*. The program was broadcast at 10 PM.

The FCC, which determined that the program was "indecent," forwarded its complaint to the US Department of Justice "for possible criminal prosecution for obscenity."

The Commission determined that a broadcast would be considered indecent if, as a 29 April public notice indicated, it contains: "language or material that depicts or describes, in terms patently offensive as measured by contemporary community standards for the broadcast medium, sexual or excretory activities or organs."

But the latest round of criticism, in a petition for reconsideration filed by more than a dozen broadcast groups, claims the FCC's new indecency standard is too

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White House Position

by Alex Zavistovich

Washington DC ... FCC Mass Media Bureau (MMB) Chief Jim McKinney has ended speculation about his future by accepting an appointment at the White House.

The 47-year-old McKinney made public in mid-June his intention to become Director of the White House Military Office, replacing Richard Riley, who will assume a position with the Treasury Department.

As Military Office Director, McKinney will be responsible for the presidential telecommunications system, limousines, aircraft, and other duties, and will be in charge of 1,600 personnel.

The job means a $5,000 pay increase (to $82,500) for McKinney, who anticipated beginning in early July.

Upon learning of McKinney's imminent departure, FCC Chairman Dennis Patrick named MMB Deputy Chief Bill Johnson as acting chief. At press time, Johnson had already assumed McKinney's FCC responsibilities, which the outgoing bureau chief acknowledged was fitting.

"It's inappropriate, now that it is known that I'm going to the White House, for me to have any opinion on FCC business," McKinney explained.

Johnson, who began taking on the duties of MMB chief 17 June, noted he is now acting chief in virtually all matters. However, Johnson said, he was "told not to expect anything permanent to come out of this."

Still, Johnson would not deny his

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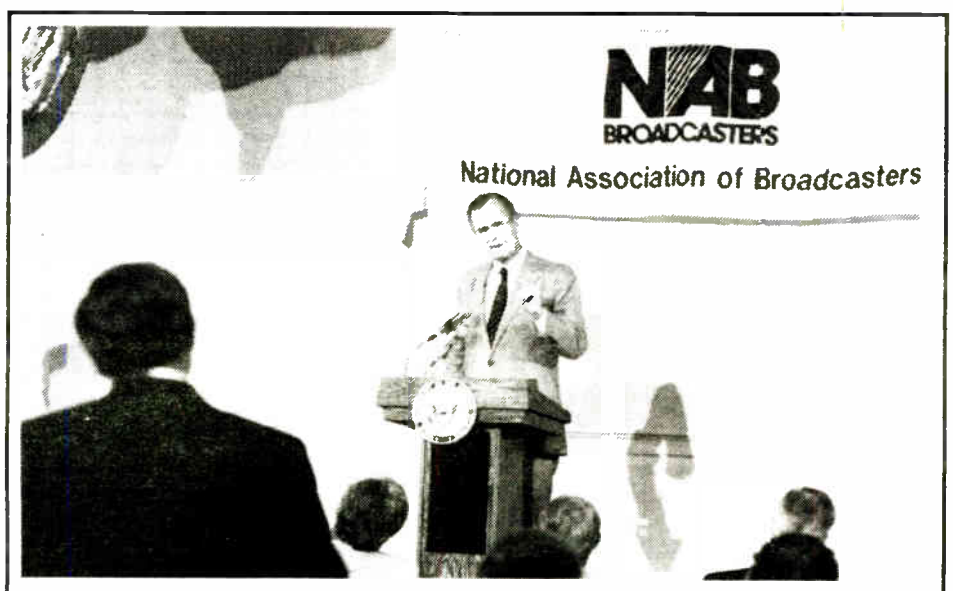

VP at NAB

Washington DC ... Vice President George Bush was one of several dignitaries to address and field questions from the NAB Board of Directors. The Board held its annual meeting in late June and took up a number of issues.

Regulatory News

Hard-Look Policy Questioned

by David Hughes

Washington DC ... The Washington DC-based consulting engineering firm of duTreil-Rackley has asked the Commission to ease up on its "hard look" policy for processing FM and TV applications.

In 1985, the FCC toughened its standards on accepting applications in order to reduce the number of speculative filings and those that simply copied figures contained in other applications.

DuTreil-Rackley filed a petition in May requesting that the FCC "remove the requirement of Section 73.3564(a) of the rules that requires an engineer to be infallible," according to Louis duTreil.

Ron Rackley told **RW** that he wants the FCC to shift the "burden" of filing a proper application away from the engineer who prepared the application, and instead direct it toward the qualifications of the applicant.

Rules instituted

In 1985, the FCC amended its rules via docket MM 84-750, pertaining to the processing of FM and TV broadcast applications in an effort to reduce processing delays affecting applications for new stations.

The so-called "hard look" approach, the duTreil-Rackley petition claims, "was adopted at the tender stage review of applications in order to avoid accepting applications with fundamental errors," as well as to "promote expeditious processing and to discourage speculative applications."

While admitting that they are "sympathetic" with the FCC's efforts to improve the efficiency in processing applications, duTreil-Rackley add that "the system adopted has not functioned properly, is unduly harsh, and establishes an adversarial barrier between the engineering community and the Commission's staff."

The firm pointed out that the "hard look" rules subject engineers to "unreasonable consequences" they would face "if an application prepared by them is found to be unacceptable."

The FCC's tough policy also "results in substantially higher charges due to burdensome requirements for attempting absolute perfection," duTreil-Rackley added.

Consequences vary

Rackley told **RW** that the "hard look" policy came from the FCC's desire to deregulate, and ultimately simplify, its application procedures during the early years under former Chairman Mark Fowler.

However, Rackley maintained that the FCC feared it would become overwhelmed with applications when it opened up hundreds of new FM allocations with its Docket 80-90 policy.

The consulting firm said that the "hard look" policy has not only delayed the processing of applications, requiring as much as a year's time for a routine processing, but has also failed to significantly reduce the number of applications filed, including speculative filings.

Shift the burden

In order to remedy the situation, the FCC should shift the "burden" for applications from the engineer to the applicant, Rackley said. "The FCC should better screen the qualifications of applicants."

So-called "fly-by-night" applicants who file and then attempt to "extort" money from legitimate applicants by removing their roadblock applications could be easily uncovered, Rackley added.

The firm asked the FCC to soften its policy by allowing "at least one opportunity to correct an error, as is the case in other broadcast services."

"Engineering firms are no more capable of absolute perfection than is the FCC staff, which almost daily issues corrections to previously published news releases," the petition claimed.

Suits possible

While Rackley stated that his firm has had only a few petitions returned—and all were sent back because of FCC errors, not the fault of his firm—he said he is tired of "sitting on the hot seat. We could get sued."

"It is important to realize that the filing of an FM application is not a life threatening situation and should not be treated with the finality adopted by the Commission," duTreil-Rackley added.

Rackley said he is encouraging other engineers and attorneys to write to the FCC to criticize the "hard look" procedure.

As of mid-June the FCC had not acted on the petition. For more information, contact duTreil-Rackley Consulting Engineers at 202-659-3055.

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FCC Clips

Action on unpaid forfeitures

Licensees and permittees who refuse to pay forfeitures to the Commission will have their cases referred to the Department of Justice (DOJ) for collection, the FCC announced in early June.

When the DOJ takes a Commission referral, the forfeiture case is given to a US Attorney, who brings action in US District Court, unless a settlement is agreed upon.

An "unusually large number of unpaid broadcast forfeitures" have been passed on to the DOJ recently—six in the last three months, the Commission said. In the past, only three or four per year have been referred.

Although broadcasters have the right to contest forfeitures, the Commission acknowledged, they will be subject to collection action if they do not pay.

For more information, contact John Greenspan at 202-632-7112.

Attorney misconduct

Cases of believed misconduct by attorneys practicing before the FCC will be referred to the Commission's Office of General Counsel (OGC) for adjudication, following a 3 June FCC announcement.

The Commission has directed administrative law judges to refer such cases to the OGC, rather than adjudicating them in ongoing licensing proceedings.

Referrals, the FCC said, should include only those facts of the attorney's conduct which are relevant in the resolution of the applicant's qualifications or comparative status.

Actions by the OGC in misconduct cases may include disciplinary proceedings, referral of the case to the appropriate state bar, or, in cases of criminal conduct, referral to the Department of Justice.

Contact the FCC's news media office 202-632-5050.

Broadcast station count

As of 30 May, the FCC reported a total of 10,107 radio stations licensed in the US.

According to an announcement in mid-May, 4,872 of those stations are AM; 3,964 are commercial FM. The remaining 1,271 licensed stations fall into the category of FM educational.

Reregulation may harm broadcasting

In remarks made in early June, FCC Chairman Dennis Patrick warned that reregulation of broadcasting may adversely affect the industry's service to the public.

Patrick said deregulation has improved the market's responsiveness to public demands. "The conclusion that reliance on markets has well served the public interest is incontrovertible," he maintained.

He warned that requiring greater FCC involvement in analyzing the content of broadcast speech might harm freedom of the electronic press.

Phone Tariff Suit Set for Trial

by David Hughes

Tulsa OK ... An Oklahoma-based audio production firm which filed suit against Southwestern Bell in 1985 is scheduled to go to trial in September.

The suit, filed in the US District Court for the Northern District of Oklahoma by FirstTake Productions Inc., charges that the phone company excessively raised its broadcast line rates with no warning two years ago.

The trial could set the stage for a class action suit—which could include broadcasters—to determine whether customers nationwide were duly informed about phone tariff increases, according to Patrick Freeman, president of FirstTake Productions.

Freeman also told **RW** that before the trial takes place, a federal court magistrate studying a point of law may hand down a ruling as to whether Southwestern Bell acted improperly by failing to inform customers before the rate hike was imposed.

Steep increase

Located in Tulsa, FirstTake is an audio production firm that produces and then relays advertising spots to radio stations via phone lines.

Freeman maintained the rates for broadcast quality audio lines that Southwestern Bell charges, and therefore the prices he is forced to charge customers, have skyrocked as much as 1000% since April 1985.

According to court documents, FirstTake is asking the US District Court for $182,720—$100,000 in punitive damages and $82,720 in alleged lost profits.

Freeman is not alone in his complaints about the tariff hikes. Broadcasters across the country have complained about phone tariff hikes ever since the break-up of the Bell system several years ago.

In early 1985, many of the new regional telcos, such as Southwestern Bell, drastically raised their rates.

The NAB reported that rates for broadcast audio lines jumped an average of 300% to 800%, with some instances of hikes in excess of 2000% reported.

The NAB was joined by many broadcasters as well the SBE and the now defunct NRBA in complaining to the FCC about the new rates.

While Freeman concedes there is little his suit can do to reverse the nationwide trend of higher tariffs, he said he

> *"If I had been notified about the hike, I could have worked it out"*

is particularly upset over Southwestern Bell's failure to notify him about the hike in 1985.

This was, he said, in spite of an FCC regulation that common carriers must give advance notice of rate hikes.

According to FirstTake, the increased tariff rate took effect 1 April 1985. Freeman not only contends that Southwestern Bell did not notify him beforehand of the rate hike, he maintained that the telco did not even bill his firm at the new higher rate for three months.

In July of 1985, FirstTake received a single bill for three months, for more than $6000, he said.

Since no notice was provided by the phone company, FirstTake said that it was "not charging its customers a sufficient amount to pay the increased rate."

The audio production firm maintained that "the confusion and bad feelings resulting from" the subsequent "sudden increase" it was forced to charge its customers caused some to "terminate their business relationship" with him.

FirstTake had organized a Tulsa-area network that linked stations with the audio production facility via phone lines.

Freeman would produce an advertising spot, often on a rush basis for a local newspaper, and then send the spot via phone lines to several radio stations.

"We had some clients that were used to paying $200 a month. Then, we had to send them notices that effective immediately, their bill was going up to $2000," he said. Freeman claimed in the suit that FirstTake suffered $82,720 in lost profits.

"If I had been notified (in advance) about the hike, I could have worked it out," he said.

Southwestern Bell's case

Oklahoma City attorney G. Michael Bauer, who is representing Southwestern Bell in the case, did not dispute Freeman's charge that the phone company did not inform him or many of its other customers before the tariffs were hiked.

Bauer maintained that because of "administrative delays," the FCC did not get around to finally approving the tariff increase, which was scheduled to take place 1 April 1985, until mid-March.

He said that with such short notice, Southwestern Bell could not arrange for a mailing to inform its customers beforehand.

However, Southwestern Bell customers were notified in a mid-April mailing, Bauer said. The firm's records indicate that Freeman had contacted a Southwestern Bell official in early April to ask about the hike, he added.

In court documents, Missouri-based Southwestern Bell denied that it was required to give any notice different than the defendant gave under FCC Rule 61.58, which Freeman said requires that 45 days' advance notice be given.

The phone company maintained that it has "complied with every respect with FCC Rule 61.58 and therefore (the) plaintiff is not entitled to any other notice than what it received."

Claim out of line

While Bauer conceded that Freeman did not receive advance notice of the hike, he said his claim of $82,720 in lost business is way out of line. "He was not damaged as he says he was," Bauer said.

Southwestern Bell denied FirstTake's assertion that "conduct was grossly negligent." It maintained that FirstTake is not entitled to any punitive damages and added that the firm still owes it $4,829.

Southwestern Bell is asking the court to award it the sum of the unpaid balance plus court costs and attorney's fees.

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VOA Megabucks, Muck & Mire

by Judith Gross

Falls Church VA ... The deeper you dig ... the more interesting facts you uncover about the **VOA modernization**.

Here's a government agency with **$1.3 billion** to spend by the end of the decade, technical facilities which resemble a museum of radio broadcasting and it's taking more time and money to complete the job than any commercial radio group or network would ever have tolerated.

No wonder many reputable broadcast vendors shied away from the whole thing at the start.

An internal memo from the Inspector General's office which is being kept **top secret** was highly critical of the way the whole modernization plan has been handled, my sources say ... and the USIA, which runs the VOA, has come under congressional scrutiny for not expediently spending the appropriated funds.

Insiders confirm that portions of the renovation already completed are—to put it kindly—inadequate. Reportedly, four studios renovated in the past were delivered in "**inoperable condition**" and an elaborate automation system has yet to be used because no one can figure out the appropriate software programs.

We're keeping close watch on the project and things should get even more fascinating. Stay tuned ...

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Meanwhile, **Jullien Enterprises**, the company responsible for buying and installing equipment for the 19 main VOA studios, is a small contractor based in Chantilly VA (near Washington DC).

The company was formed when longtime friends Gil Jullien and Mike Hoover merged their two companies. Mike was president of ATS (see story, this issue) but Gil won out on the name change.

The two shared ownership of a Cessna, and Mike says it worked out so well that they agreed they could run a company together. Now they have one company and two Cessnas.

☆ ☆ ☆

Conflicting opinions on the health of the broadcast marketplace these days ...

Some firms, notably in the transmitter end of the business, have been complaining of slow sales.

That's the reason, according to Curt Kring of **Broadcast Electronics** in Quincy IL for a lay-off recently of 13 of the company's 168 employees, including, we're

sorry to say, Dave Evers, sales manager for automation.

Kring says that there's been a slowdown in orders, thus the layoffs, but no sooner had the word gotten out, than according to Kring, business started to pick up again.

In fact, he says June looked to be the "**best month ever.**" He says the laid-off employees might be hired back in the future, if the trend continues.

Some companies are nodding in agreement to the "business is slow" contention, pointing to the turmoil with mergers and acquisitions. They say investors are buying stations, but not putting capital into maintanence and upgrades.

The there are those telling me the opposite, that **business is steady**, if not downright good. Go figure.

It begins to look like more a case of market saturation: too many companies trying to sell the same things, and maybe too many small companies picking at the large ones.

It might mean good-bye to the days when a giant, do-it-all company could survive in this business.

At any rate, one company pushing into a new area is **Allied Broadcast Equipment**. Roy Ridge, Allied's president announced a new division: Allied Broadcast Systems.

Systems work is the new area. Allied already handles most of the manufacturers ... feels it's a natural for putting together integrated packages for studios.

The new division is in Bryan, TX. It's chief is Steve Sampson, who many remember from his 10 years with SonoMag.

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It's not often you hear from a **happy AM daytimer** ... So I was pleasantly suprised recently with a phone call from CE Fred Wilson of WCFB in Tupelo, MS.

Seems the station was the first in the state of Ole Miss to go with the new **NRSC standard**, and Fred was delighted with the results.

WCFB is Christian Contemporary, plays that well-produced soft-rock material known as "praise and worship" music. The station airs about a third of its music on CDs, and also has a full multitrack facility, so a good sound is top priority.

Fred says they have that sound with the new standard. He'll be telling us more, including how the station promoted the new standard on-air. Fred says the next step is to go stereo.

The NAB's Science and Technology department should offer a prize for the best **on-air NRSC standard promotion**, the way the NAB did for AM stereo last year.

Those on the NRSC subgroup have been overjoyed by the response from stations, but have been scratching their heads as to why CEs keep saying there's an immediate benefit from conversion.

You weren't supposed to notice anything except the improvement in second adjacent interference before the new radios get out in the marketplace. What gives?

Well, they talked it over, and finally figured out that the bandlimiting characteristic of the new standard was probably alleviating some of the **Intermodulation Distortion** which had been present at the high end, especially in older transmitters.

So AMers converting to NRSC might end up as pleased as Fred, even before the new radios are out.

AMers, the industry and the world of radio, meanwhile are still hanging on for a final verdict from the NTIA on **multichip technology**.

The crew in Boulder CO is looking to a July completion date for the 90-day testing period. As I write this it's Day 50 and counting ...

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News from Lake Wobegon ... "where all the men are good-looking, all the women are strong, and the children are above average."

And the days of **Prairie Home Companion** are over—at least as a live show.

Host Garrison Keillor, who really *is* a "shy person," by the way, called it quits after 13 years with the show in June.

But assistant technical director of the show **Preston Smith** wants everyone to know that the show will continue with reruns of old tapes in the same time slot, until the new **Minnesota Public Radio** program with Noah Adams debuts next year.

After that, the taped PHC's will be offered to stations for other time slots.

Preston chatted about his years on the show, lamenting the fact that there's so little live radio around.

"For those of us who really love radio, it isn't just a matter of finding another live show to work on—there aren't any," he says.

Preston was one of the show's audio mixers, and he says "there's an emptiness now on Saturday afternoons, which used to be incredibly arduous."

But aside from missing the crew, which got to be "like a family," Preston says he'll miss the fact that "each week the show threw out another technical and aesthetic challenge" which he'll also miss.

And what about the folks in Lake Wobegon? Well Preston says he thinks it's only fitting that Keillor would leave frozen in time "the little town that time forgot."

Heard something interesting? Spill your guts to **Earwaves**. *Write PO Box 1214, Falls Church VA 22041, or call me at 703-998-7600. Best tidbit of the month wins a coveted* **Radio World** *mug.*

Circle Reader Service 40 on Page 28

Opinion

Readers' Forum

Got something to say about *Radio World*? Any comments on articles? Call us at 800-336-3045 or send a letter to Readers' Forum (*Radio World*, Box 1214, Falls Church VA 22041 or MCI Mailbox #302-7776).

Blame Murphy's law

Dear RW:

Mark Person's article "Problems Come Three at a Time" (RW 15 May) asks if anyone can figure out how so many components could fail at once in a transmitter.

It is simply the application of Murphy's law—which states that a filament of a 4-500A will short to the grid only at modulation peaks.

One kilowatt transmitters usually don't have spark gaps, so when the plate current to the 4-500A's suddenly drops to zero during a modulation peak, the voltage at the PA tube end of the modulation choke will soar.

The secondary of the modulation transformer cold end (where the failed capacitor is connected) is wound on the inside, next to the core.

This is the location where the modulation transformer shorted, thereby providing an ever so low resistance for discharging the capacitor.

The internal leads of such a capacitor are only good for a couple of amps, and the discharge current of perhaps one kA burned them off the terminals.

Ted Schober
Radiotechniques
Haddon Heights, NJ

More time-sharing

Dear RW:

I work for an AM non-commercial station which shares time on the 770 kHz frequency with another non-commercial. KUOM is licensed to the University of Minnesota and WCAL to St. Olaf College.

Each maintains its own transmission plant—KUOM in the Twin Cities suburb of Falcon Heights and WCAL in Northfield, MN, about 30 miles away. Both operate at 5000 W and neither can currently operate during nighttime.

We do not share under a "specified hours" arrangement.

In practice, WCAL is on the air from sunrise until 10:30 AM Monday through Friday, from sunrise until noon on Saturday and all day Sunday.

KUOM operates from 10:30 AM until sunset Monday through Friday, noon until sunset on Saturday and not at all on Sunday, giving everyone at least one guaranteed day a week off.

At one time KUOM and WCAL shared time on the 760 kHz frequency with at least one and possibly two commercial stations.

Andrew Marlow
Program/Operations Manager
KUOM Radio
Minneapolis, MN

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Dial-up New Regs

Response to **RW**'s recent series on dial-up remote transmitter control has shown that there's a great deal of confusion among stations as to just what's legal under FCC rules.

There are rules on the books, but they can and apparently are being broken through the use of the latest in dial-up gear.

Broadcasters seem to be in a "Catch 22" situation, with the FCC saying "you can't do this" on one hand and "but we know you can (or are)" on the other.

A lot of confusion seems to stem from the days when certain broadcast related equipment was FCC type accepted.

But a situation exists today where stations can buy and use equipment which may actually "straddle" the rules.

The FCC can't hold back technology. As advances allow broadcasters to break new ground, the Commission has to keep pace with them by re-examining existing rules which may have outlived their usefulness.

If there are still good reasons to prevent engineers from making transmitter adjustments from the nearest phone, then the current rules may be obsolete or just confusing, and should at the very least be clarified in light of the latest technology.

But if the rules simply become one of those unenforceable laws on the books, then the FCC might want to think twice about keeping them.

Like so many other rules which have been deemed unnecessary and fallen in the era of deregulation, dial-up remote gear may be one of those cases where the responsibility for the consequences is ultimately best left in broadcaster's hands.

—RW

Arbitrons Ignore Car Listeners

by **Howard Anderson**

Los Angeles CA ... As old as the radio business is, and as old as burlesque is, it almost seems like most of us have never heard of the old theater sketch about the man who keeps losing money in the crooked poker game because "it's the only game in town."

Six years ago, I approached the Arbitron Ratings Company (ARB) and asked if they could provide ratings for KRXV, a station with an audience of 500,000 people weekly travelling on Interstate 15 between Las Vegas and Los Angeles.

After they quit laughing, they practically hung up on me. ARB made it clear that they didn't know of any way to place a diary in a car and then effectively retrieve it.

Because of this inability of the recognized rating services to measure in-car listening, the station went to a national research firm, Decision Making Information, and devised a method of doing intercept interviews of travellers along I-15.

Over the last five years, DMI has done over 4,000 in-person interviews based on scientifically accepted criteria. The interviews are done at rest stops, service stations and restaurants within the KRXV coverage area.

Using this research, and more importantly advertiser success, the station has built a base of loyal clients including not only Las Vegas hotels and establishments along I-15, but national advertisers in automotive, airline, financial, beverage and fast food categories, to name a few.

Howard Anderson, former Marketing Director for Howard Hughes' Summa Corporation is owner and president of KRXV Radio, which broadcasts over a 250 mile radius between Los Angeles and Las Vegas dubbed "The Mojave Metro." He can be reached at 213-820-4628.

Meanwhile, back in Los Angeles and in other major markets, the industry continues to suffer because we rely and sell not on results but on rating services that admittedly can't measure the most important segment of the listening audience.

To dramatize this point, all you have to do is look at the figures published by CALTRANS (California Department of Transportation) on highway usage for Los Angeles and Orange counties.

Guest Editorial

During any given quarter hour from 3-7 PM, CALTRANS says that there are two million trips being made. This data is based on data from magnetic "counters," not on estimates or projections.

Research done for KRXV by DMI shows that on an interstate highway, 55% of the cars use their radios.

In all probability, that figure would be higher in a metro area since people are much more conscious of and in need of traffic information and weather data.

If you assume that half the cars have their radios on and there was one occupant per car, this would mean that in the Los Angeles area there are at least one million listeners from 3-7 PM on any weekday.

Both ARB and Birch gave a total listening audience of only 1.2 million during these time periods.

It stretches the limits of credibility to assume that only 200,000 people are listening at the same time at home or at the office. Neither of the rating services can reconcile this difference.

Car surveys

After having successfully developed and proven the success of intercept interviews for KRXV, it seems that this same principal might be applied to any metro area.

Granted, the KRXV market is easier to isolate since it is confined to a 50-yard band of highway across the Mojave Desert, but there are places in Southern California where it is easy to locate people as they leave their cars.

Every morning, thousands of automobiles pour into Century City parking garages and similar locations in downtown Los Angeles, along the Miracle Mile, in Warner Center, in in office parks in Orange County.

Shopping malls have become the "downtown" of most cities, and everybody arrives by automobile.

Interviews could be easily conducted at these locations using a simple set of questions.

All you need to ask is: "Did you have your radio on when you arrived," and "What station were you listening to?"

This type of interviewing goes very rapidly because the audience is captive and readily available. It is also very accurate since it is virtually instant recall.

More accuracy

The data could then be projected against the CALTRANS car counts to give a far more accurate estimate of the size of the in-car audience.

ARB or Birch audience share figures for that market could be used to validate and corroborate audience share.

As long as the present diary or telephone recall systems are profitable for the research firms, it is not likely that they will change their methodology.

Unless the radio industry takes the initiative, and makes an effort to more accurately measure in-car listening, we will continue to be victimized, underpayed and undersold by a "crooked game."

Isn't it time we stopped wringing our hands and stopped saying "but it's the only game in town."

NAB-RAB: Mission But No Merger

by Alex Zavistovich

Washington DC ... Citing a proposed mission of enhancing the "perception and awareness of radio," the Radio Futures Committee, a joint group of the NAB and the Radio Advertising Bureau (RAB), has laid the groundwork for a national marketing campaign for the radio industry.

Despite this closer working relationship, however, both the NAB and the RAB continue to deny any possibilities of merger between their two associations, rumors which have been circulating in the industry for some time.

The Radio Futures Committee, which met 15 June at NAB headquarters in the nation's capital, was established following a meeting of members of the NAB Radio Executive Committee and the RAB Executive Committee in mid-May.

Piloting the committee are Bev Brown, NAB radio board chairman and Steve Berger, VP/Radio for Nationwide Communications and RAB finance committee chairman. Nine other representatives from broadcasting concerns around the US comprise the rest of the group.

Goals established

In addition to drafting a statement of mission for the joint project, the committee also established its goals, according to NAB spokesperson Susan Kraus.

The goals, Kraus said, are "to increase the public's consciousness of radio, to increase radio's revenue share, to increase understanding by public officials and opinion leaders of the radio industry and its service to its communities, and to increase the pride and professionalism of those in the industry."

Specific details of how these goals are to be achieved were not available at press time.

Merger rumors denied

The new joint radio marketing agreement has rekindled speculation in the industry that the NAB and RAB may be testing the water in preparation of a merger. Both associations, however, adamantly deny such rumors.

Following a meeting of the NAB Executive Committee in Washington on 13 May, Brown discarded any notion of a union between the two groups. After the official announcement of the radio marketing campaign in New York, Brown was even more emphatic.

"This joint project is in no way an indication that a merger or consolidation is even remotely under consideration," he said. "To the contrary, both organizations agreed to state publicly that they are not interested in merging."

RAB Chairman James Arcara, who is also president of Capital Cities/ABC Radio, also discounted talk of a possible uniting of the NAB and RAB, distinguishing between the functions of the two.

"The RAB is the radio industry's sales/marketing arm, and the NAB represents broadcasters before Congress, the FCC and other government agencies in Washington DC," Arcara said. "Each performs its separate mission effectively."

"From time to time, we cooperate on projects of importance to the entire industry," Arcara added, explaining the reasons behind the joint marketing campaign.

For additional information, contact Sue Kraus at 202-429-5350. Contact Jim Arcara at 212-887-5300 or Bev Brown at 214-693-6668.

Phone Suit Gets Sept. Trial Date

(continued from page 3)

In court documents, the phone company also said that Firsttake filed the suit before exhausting "its administrative remedies with the FCC, as it is required to do before filing suit."

Magistrate's ruling

While pretrial arguments are not set to get underway until August, with the trial tentatively scheduled for September, Freeman said that the legal ruling from a magistrate in the federal court may have an impact in the case.

He indicated that the magistrate will rule before the pretrial session starts whether the FCC regulations that a phone company must give at least 45 days advance notice to a customer before a rate hike is instituted is backed by law.

However, Bauer said that there is no guarantee that the magistate will rule on the point of law before the case goes to trial.

Regardless of any action by the magistrate, the case will still take place, Freeman said.

He also maintained that if FirstTake wins the case, the doors would be open for a broader, class action suit that could benefit other broadcasters and related companies that have been stung by the higher tariffs.

Freeman said that he "invites" broadcasters "who feel cheated by the unannounced increases to join us in a class action suit."

He added that the two firms have also engaged in negotiations to avoid the court suit. But, Freeman said, he rejected a phone company offer.

For more information about the suit contact Pat Freeman at FirstTake, 918-495-1135, or Southwestern Bell attorney G. Michael Bauer at 405-236-6754.

VOA Job Critics Not Contractors

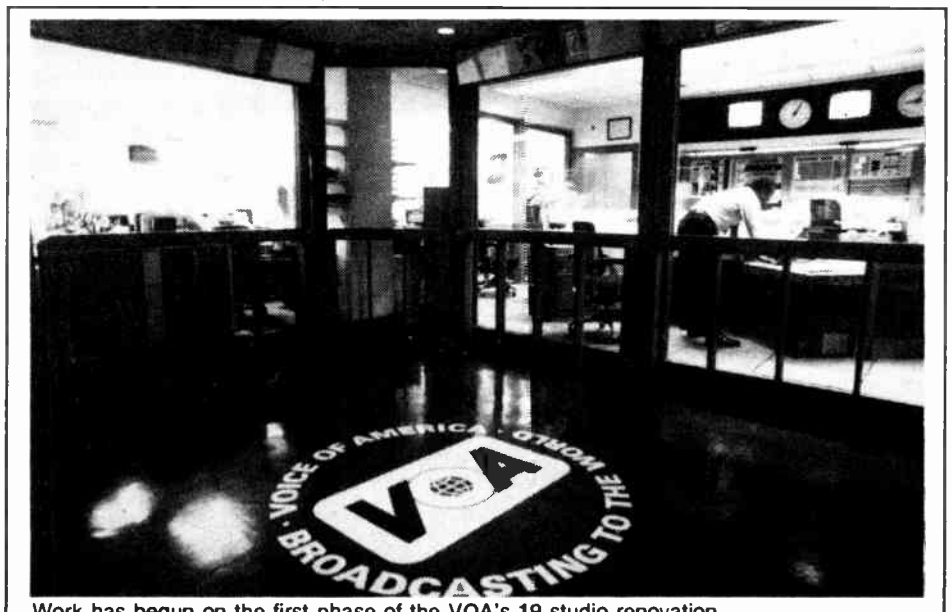
by Judith Gross

Washington DC ... Questions of underbidding raised by broadcast equipment vendors about the Voice of America's studio renovation stem from "a lack of understanding about government contracts."

That's according to Mike Hoover, VP of Jullien Enterprises, the firm responsible for buying and installing studio equipment for 19 studios under the current phase of the VOA's modernization plan.

Hoover, reacting to allegations that the $6.6 million dollar project awarded to general contractor Grunley-Walsh was too low to renovate and refurbish 19 radio studios, maintained, "It's not underbid, it's only underbid to people who don't know our business."

Hoover claimed emphatically not only that the project can be done for the amount of the bid, but that his company "will make a good profit" as well.



Work has begun on the first phase of the VOA's 19 studio renovation.

Contract criticized

Many broadcast equipment firms originally interested in bidding on the VOA project have questioned not only the amount of the bid, but the way the bid was let (See 15 June RW).

Some potential bidders felt that the project should have been bid as two contracts—a construction and a broadcast project—instead of the general construction contract awarded to Grunley-Walsh.

But Hoover said combining the work into one contract was deliberate on the VOA's part.

"The VOA chose not to have two contracts, but only one, because they wanted a single source of responsibility. Otherwise you pave the way for delays and cost overruns," Hoover said.

He added that because the project is a construction contract, it "takes someone skilled in this industry to do this job. And that's our work, and we do it well all over the country."

Studio experience

Jullien Enterprises, a Chantilly VA-based firm, got the $3.2 million dollar studio installation part of the contract as a sub-contractor to Dynalectric Co. of Vienna VA.

Dynalectric is handling the electrical part of the contract for a cost of $3.9, which includes the $3.2 Jullien will receive.

Dynalectric is under contract to Rockville MD-based Grunley-Walsh, which will handle the general construction and contract work.

Jullien Enterprises was formed by the merger of Audio Technical Services (ATS), Hoover's company, with a similar firm owned by Gil Jullien, on 1 April of this year. It was ATS which originally bid on the VOA project.

ATS has been in business for 15 years, and has built recording studios and sound re-inforcement systems for concert halls and performing arts centers, according to Hoover.

The company also maintained the studio system for American Forces Radio when it was based in Rosslyn VA, Hoover said.

Jullien has performed similar work, and also handled security systems for companies such as IBM.

Hoover said the newly-merged company has a 15,000 square-foot plant in Chantilly, a 4,000 cabinetry shop in Manassas VA, and offices in Austin TX, White Plains NY, and Los Angeles.

There are 45 full-time employees, and Hoover added, "We're currently hiring more."

Hoover maintains that the criticism about the contract, bid price and the company's ability to handle the studio work is mostly due to a lack of understanding about the way government contractors work.

"There are so many people who got involved in this without knowing about government contracts, who are not government contractors," Hoover said.

He says the ways broadcast equipment firms normally do business might result in higher bids on a project such as this, while a firm used to handling government contracts could keep costs lower.

"There's a large difference between professional suppliers and a contractor. For one thing, we don't inventory, we don't carry inventory, it's anathema to our type of business," Hoover explained.

Hoover maintained that "those who are saying it was underbid feel that way because they are not contractors."

Cost savings

Hoover also pointed out that Jullien's ability to build it's own studio cabinetry will help keep costs down.

And he added that the company's computerized scheduling, and the use of Critical Path Management—with construction schedules devised for the government—will bring the project to completion "ahead of schedule."

"Contractors know about these types of schedules, equipment suppliers don't," Hoover maintained.

The total 19-studio renovation is slated to take 20 months to complete, but Hoover expressed optimism that it could be finished in "18 to 19 months."

He cautioned that that estimate is based on there being no changes in the project order needed due to discoveries made during construction.

Hoover explained that if some unanticipated construction snags are discovered, because the actual physical set-up differs from the architectural drawings for instance, a change in order could be approved by the VOA which would let the project be completed in excess of 20 months and still come in at or under schedule.

Grunley-Walsh has already begun removing equipment from ten of the 19 VOA studios, and removing asbestos panels and PCB oils from the building.

VOA broadcasts are continuing in the remaining nine studios. Hoover explained that the first ten studios will be completed, tested and made operational before work will proceed on the remaining nine.

Hoover has already made contact with a number of broadcast equipment suppliers regarding the purchase of studio equipment, and he said that many have eagerly contacted him as well.

The original specs relating to studio equipment name a number of specific brands of equipment, including Fidelipac cart machines and Studer

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Remote Gear Series Readers' Response

Editor's note: In our last four issues, **RW** *has taken an in-depth look at dial-up remote transmitter control. Manufacturers sell this equipment legally, but confusion over FCC rules on dial-up gear has left open the possibility of it's improper use from any nearby phone.*

This series has received a great deal of reader response, including some clarification from manufacturers.

More in the market

Dear **RW**:

Although we recognize the merits of our competitors' units, we were disappointed to have been overlooked in your recent "Dial-Up Remote Gear Sales Up" article.

As noted in the series, we have also seen a considerable increase in interest in the use of our equipment with the current trend towards "deregulation."

After distilling the comments we have read and heard from engineers, consultants and the FCC, there seem to be two points worth noting.

First, the FCC appears to be attempting in a light-handed fashion to allow the industry to establish a new set of standards which will allow stations to take advantage of new technology while maintaining suitable operating standards and assuring minimum adjacent and co-channel interference.

Second, most of the dial-up equipment now being offered is capable of being operated either within the spirit, or grossly abusing the spirit, of the law, depending on the professional judgement of the user.

As new techniques are tried and tested, new standards will be established.

Monroe Electronics is currently marketing the new 6000 series DTMF remote control units to the broadcast industry. We are producing three basic models in the series.

The 6002 is a six or 12-channel unit designed for use on a standard telephone line.

The 6003 is essentially the same as the 6002 except that it works on a two-wire dedicated line or with a four-wire radio system.

And, the 6005 works on a standard telephone line or a two-wire dedicated line, has eight or 16 channels and includes a 60-event programmable timer and an autodial alarm capability.

In addition to the basic units, the 6006 central control unit soon will be available to provide operator interface with number 6005 remote units to collect, store, display and print data from those units.

And finally, the 6007 Remote Status Indicator may be connected to the operator's telephone to provide a LED display of the status of a remote unit control and input circuits.

These units have found a wide range of use in the broadcast industry both as stand alone units and as an economical means of providing supplemental control, sensor and alarm channels in larger and more sophisticated systems.

Eugene B. Fuller,
Mktg Mgr/Tone Signal Prods
Monroe Electronics, Inc.
Lyndonville, NY

Remote dial-up legal

Dear **RW**:

The most distinct comments that can be made about dial telephone broadcast transmitter remote control are:

- It's legal ...
- It works ...

These two short phrases summarize our point of view to the entire concept.

As the original, and to our knowledge still the only manufacturer of a unit designed specifically for operation on the dial telephone system, we have for the last two years presented this concept at many getherings: NAB, SBE, etc. around the country.

There still remain many in the industry who have not recognized that the concept is valid.

Yes, there are certain points that must be followed to do it and do it within an acceptable manner from the FCC's point of view.

As a manufacturer, we have and will always do our best to inform potential users on these points.

The overriding observations that must also be made are the contributions made from dial telephone remote control.

These are:

- It saves money ...
- It keeps you on the air ...

Our concept saves money in a number of ways. First, it uses some of the most, if not the most, inexpensive telephone service available.

In addition, the unit is the lowest per channel cost remote control available. The use of DTMF telephone as the studio or control point equipment is a major savings.

There's no studio end to buy. This also means that it has the capability of giving you access from any telephone, but totally controlled access.

For the contract engineer, it means checking on the problem before driving many miles. Being able to learn what the cause of a problem is from home can save hours of travel time, and thus air time.

And isn't the public also served by getting more air time?

Space does not permit a full presentation of all considerations, but the above to us are most important.

John E. Leonard, Jr. President
Gentner RF Products

More explanation needed

Dear **RW**:

I always enjoy my copy of **RW** and it usually gets read carefully before I lay it to one side.

I was glad to see David Hughes' article about dial-up remote control systems in the 15 May issue.

This is a subject that needs to be explored by our industry more fully. But the article had a couple of ideas that raised some more questions.

Is there a rule that says adjustments can only be made from a station's control point? And if so, how do we define control point?

Mr. Hughes pointed out that an authorized control point must provide the duty operator with a means of handling EBS broadcasts.

Many of our transmitter sites are located away from our studios and I dare say do not have facilities at them for decoding EBS alerts, much less provisions for broadcasting EBS announcements.

But most of us make daily or weekly adjustments to our transmitters from these locations. Granted, good engineering policy dictates that we call our duty operator and let them know what we're doing ... but on the other hand, I'm not sure where in the rules that is required either.

Like many engineers I find myself lost at times without the rules that once answered all of our questions.

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Vague On Obscenity

(continued from page 1)

vague.

The petitioners asked the FCC to consider several points including that news broadcasts should be outside the indecency standards, and that a particular time of day be set aside—such as 10 PM—after which more questionable material could be broadcast, provided warnings are given.

While the NAB did not add its support to the joint petition, on its own in early June it asked the FCC to "clarify" its indecency ruling which "raises serious questions of vagueness and overbreadth."

The NAB urged the FCC to use the criteria of whether a program has "serious literary, artistic, political or scientific value" in determining indecency.

It also asked the FCC to "explain elements of what may constitute 'patently offensive' programming and what comprises 'contemporary community standards for broadcasters.'"

Like the joint petition, the NAB also asked that a 10 PM "safe harbor" be established.

The association maintained that if the FCC fails to clarify its indecency ruling, the courts could throw out the ruling as being unconstitutional.

For more information on the FCC's indecency policy, contact the Mass Media Bureau at 202-632-6460.

McKinney

(continued from page 1)

name may be on the list as McKinney's permanent replacement. There has also been talk that another contender for the role might be Patrick's aide, Bradley Holmes, currently chief of the MMB Policy and Rules Division.

The bureau chief's career plans have been the focus of much industry speculation.

Previous industry rumors considered McKinney, who has worked at the FCC for 24 years, to be a candidate for the Commission opening created by the promotion of Dennis Patrick to chairman.

He was reported to have been recommended for the slot by Drew Lewis, former chairman of Warner Amex Cable and now president of Union Pacific Corp.

McKinney, however, pointed out, "My name had been raised at the White House for the commissioner's slot, but nothing was moving on that."

"In the case of the White House job," he continued, "Rhett Dawson (assistant to the President for operations and husband of FCC Commissioner Mimi Dawson) called me."

Clarification

Part 2 of our series on dial-up transmitter remote control, appearing in the 1 June issue of **RW**, paraphrased a quote by John Reiser of the FCC's Engineering Policy Branch indicating that the Commission had found *abuse* of dial up regulations at radio stations.

In fact, Reiser, who had not used the word *abuse* in his statement, had indicated that FCC officials had discovered several cases in which "damaged" dial-up gear had malfunctioned causing inaccurate readings.

Also, in the same article, a quote attributed to Bill Fink, VP/sales of Moseley Associates, should have been attributed to Fred Zimmermann, president of the firm.

VOA Critics Off-Base

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Revox reel-to-reel tape players.

But Hoover said such brand names are "listed for convenience only" and that other manufacturers whose equipment fulfills the specs are being considered.

Hoover emphasized that purchasing equipment other than those brands specified by name would *not* constitute a substitution subject to VOA approval.

"If we have another manufacturer who meets the specs, that's not a substitution; we are not limited to those brands," Hoover said, adding that in government contracts, "you can't specify an item down to such detail that only one manufacturer can fulfill the specs."

Some broadcast equipment suppliers who requested anonymity have confirmed to **RW** that they have been contacted by Hoover.

All of the studio equipment for each of the 19 studios will be purchased by Jullien, including cart machines, microphones, turntables, consoles, intercoms and IFBs, tape decks, and even CD players.

Hoover said that many manufacturers are currently vying to supply those products, and that once the choices are made "you may have a lot of sour grapes."

"I can assure you there will be a number of unhappy manufacturers," Hoover maintained, " . . . but there will be many happy manufacturers as well."

Ampex Buyout is Refinanced

by **Alex Zavistovich**

Redwood City CA ... With its transfer of ownership from Allied-Signal to Lanesborough Corporation completed 28 May, California-based Ampex Corporation is now taking part in a change of financing arrangements made during the company's acquisition.

And, at the closing of the sale, Lanesborough changed its name to The Sherborne Group, Inc., although Ampex spokesperson Dave Jensen assured the change was in name only. The company's holdings have not been affected, he said.

According to Jensen, Ampex plans to raise approximately $250 million through the sale of "subordinated debentures"—high-yield bonds.

To that end, the electronics manufacturer made a filing with the Securities and Exchange Commission (SEC) on 17 June. The filing, routinely made before issuance of a company's securities, is expected to be reviewed by the SEC in late July or early August, Jensen commented.

Company representatives in August will be "making presentations to the investment banking community to arrange long-term financing," he said. Other details were not disclosed.

On 6 April, The Sherborne Group, then Lanesborough Corporation, purchased Ampex from Allied-Signal for $479 million. The exchange also included the assumption by Lanesborough of approximately $40 million in debts and tax liabilities incurred by Ampex.

Fraction of cost

Although the price tag for Ampex approached a half-billion dollars, Sherborne, which made its offer for Ampex just prior to the 31 March deadline, paid only a fraction of that cost itself—$50 million.

Business News

The bulk of the purchase price was financed by Chase Manhattan Bank, in an arrangement reported to include a nine-month "bridge loan" of $225 million and an 8-year loan of $250 million.

Financial experts say such transactions are not unusual, but Sherborne CEO Edward Bramson told **RW** in May that he planned to refinance the purchase after the change in ownership had been completed.

At the time, Bramson would not discuss refinancing options, saying they would "quickly become non-options." However, he noted that a straight public offering of Ampex stock, as had been rumored in the industry, was not being seriously considered.

Besides the change of ownership and the subsequent maneuverings by Sherborne and Ampex, the transaction has had "no appreciable impact" on Ampex's day-to-day operations, Jensen said.

"(The Sherborne Group) is not an operating company; it is a privately-held investment company," he explained earlier. "It saw Ampex as an opportunity for an excellent long-term investment."

Ups and downs

Despite its attractiveness as an investment, Ampex has seen some ups and downs over the past year.

In November 1986, the company announced a 10% staff reduction at its Audio-Video Systems Division facility at Colorado Springs, CO. At the time, Ampex Audio-Video Systems Division VP Donald Bogue attributed the cutbacks to "consolidation in the US television broadcast industry."

At the 1987 NAB exhibit, however, the company was "swamped" by booth traffic on all four show days, according to Ampex spokesperson Dave Detmers. Ampex exceeded last year's show sales by over $1 million, Detmers noted.

Jensen added that sales orders throughout the divestiture remained strong.

Still, he acknowledged, since changing hands, Ampex has been looking at "production efficiencies" and "cost-trimming." As a result, he admitted, "a few people have been let go by attrition."

The cutbacks have been minor, Jensen said—less than 10 in an organization of 6500—and have been made around the company, not from a single division.

Long-term investment

Bramson, who described his firm as a "private industrial holding company," said the investment in Ampex is long-term, and stressed Sherborne has no plans to turn over the electronics firm in the near future.

"We (Sherborne) have bought a lot of companies over the last 10 to 12 years, and with only one exception, we have all of them," he said. "We don't buy things with a view to selling them; we buy things we'd like to keep."

Still, Bramson stressed, the Ampex purchase does not mean increased involvement in electronics for Sherborne.

"If Ampex came up with things they would like to pursue in electronics, I'd be inclined to look at them," he said. "But we would not lead them in that process."

Bramson also commented that The Sherborne Group would not make any sweeping administrative changes in Ampex, noting "we run our businesses on a free-standing basis."

New Ampex chairman selected

In other Ampex-related news, Charles A. Steinberg has been appointed the company's chairman of the board. Stein-

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No Action on Proximity Factor

by Alex Zavistovich

Washington DC ... Although anticipated, no action has yet been taken by an ad hoc committee of the Association of Federal Communications Consulting Engineers (AFCCE) on the use of proximity correction coefficients for AM array field strengths.

The committee was expected to present its findings at the AFCCE's annual meeting, which was held 14-17 May in Honolulu, Hawaii.

Despite the apparent lack of developments from the commmittee on this controversial issue, the AFCCE meeting did yield a number of other actions, including discussion of FCC FM allocations, concerns about FAA FM interference requirements, inauguration of new AFCCE officers and adoption by the group of a revised code of ethics.

The ad hoc committee was established in early May by the AFCCE to study the use of proximity correction coefficients. Debate over the issue was sparked by a feature in the 15 January issue of RW.

Counter near-field effects

In the article, Washington DC-based engineering consultant Frank Colligan proposed proximity correction to counter the near-field parallax effects close in to an array during field strength measurements.

Several other engineers questioned Colligan's methods in subsequent articles and letters.

AFCCE spokesperson John Lundin said that the presentation on the proximity coefficient from the ad hoc committee "did not materialize" as had been expected.

Some months before the meeting, AFCCE officers were told some presentation would be made, and provided to the executive committee, Lundin said. At press time, however, the problem was still under study, with no indication of where things stand so far.

Incoming association President Ron Rackley acknowledged that "the committee hasn't done a whole lot" about the proximity coefficient issue.

Committee Chairman Ogden Prestholdt has promised a report on the matter, Rackley said, possibly to be available this fall.

Rackley, however, commented that the report was "not the highest priority item with the AFCCE." The group is much more concerned about a current FCC rulemaking regarding FM allocation standards, he said.

FM allocations

According to Rackley, the AFCCE has established a committee to study and file comments on FCC Docket 87-121, in which the FCC proposed to reevaluate its method of channel allocations.

The Commission has been allocating stations based on spacing between adjacent stations and assumption of omnidirectional antennas and uniform average terrain in all directions of a station, Rackley said.

Changes to the method, he stressed, "could have a far-reaching impact on FM radio service."

Former AFCCE President Charles Gallagher acknowledged that the docket was a "major proposed rulemaking for the FCC."

Gallagher said the Commission's proposed modifications to allocation methods involve "wholesale changes in separation requirements," and address a directional antenna provision and educational FM contour protection methods.

Gallagher noted that the AFCCE's Rules and Standards Committee is reviewing the FCC's rules for comment by the association.

Besides Docket 87-121, said Gallagher, the AFCCE is concerned about some aspects of Docket 86-144, which would reallocate the use of 20 of the 80 FM channels which had been reserved for

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No AFCCE Action On Factors

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Class A stations.

"The FCC is definitely looking into allocation changes," Gallagher commented. Whether those changes come to pass, however, remains to be seen, he added.

"Anything to get more stations on the air would be good for the little guy," Gallagher acknowledged. However, he said, "I'm not sure it would sit well with those who are already on."

FAA concerns

In addition to the FM allocation issue, the association meeting generated some "lively discussion" on a number of other matters, including problems of FM interference with the Federal Aviation Administration (FAA).

Lundin noted a great deal of emphasis during the meeting about increased communication between the FAA and the FCC. A number of consultants have had "electromagnetic compatibility problems" with the FAA, he said.

As an example, Lundin suggested the FAA may complain about problems due to having a UHF station on a frequency 600 MHz from an FAA facility.

The administration often has much more stringent attenuation requirements for spurious emissions than does the FCC, Lundin said.

No decision was reached during the meeting about a course of action regarding the FAA situation. Lundin, however, said the problem was under study.

Cannon of ethics adopted

In other action at the annual meeting, the AFCCE membership voted to adopt the cannon of ethics of the National Society of Professional Engineers (NSPE), which Gallagher called a "major change in the association bylaws."

According to Gallagher, the AFCCE had based its code of ethics on NSPE's as early as the 1940s. Since then, however, a number of the NSPE tenets were challenged in court, particularly those relating to advertising and competitive billing.

NSPE changed its code to accommodate those challenges, said Gallagher; AFCCE, however, had not. This year, however, the revised NSPE code of ethics was fully accepted by AFCCE.

The AFCCE also installed new officers in its administration. In addition to the establishment of Rackley as president, Alan Gearing has been named VP, with Richard Biby and Russell Harbaugh taking on the duties of secretary and treasurer, respectively.

Gallagher remains on the executive committee as recent past president.

For additional information, contact Ron Rackley at 202-659-3055 or Charles Gallagher at 301-577-2636. Contact John Lundin at 202-223-6700.

New Owner Refinances Ampex Buy

(continued from page 10)

berg, formerly Ampex's president and CEO, succeeds Arthur Hausman, who has retired after 27 years with the firm.

Replacing Steinberg in the role of president and CEO is Max Mitchell, who had been executive vice-president.

The changes in executive structure were due to Hausman's retirement, Jensen stressed, and were not related to the corporation's transfer of ownership.

Ampex also announced in June that its Magnetic Tape Division will provide a reel of Ampex Grand Master 456 audio mastering tape for packaging with the Studer-Revox ¼" Studer A807 recorder.

Through a six-year-old "pack-out program" with Studer-Revox America, the 456 tape has already been packaged with every ¼", ½" and 1" Studer A80 and A800 analog recorders, Ampex noted.

For additional information on Ampex's acquisition by Sherborne, contact David Jensen at 415-367-4150.

Key to Success is Hard Work

by John M. Cummuta

Downers Grove IL ... Why do I call most average people failures?

Just ask the average person whether they consider themselves successful.

Better yet, ask them if they feel that they're making as much money as they'd like, or whether they have all the things in life they want and need.

By those definitions, very few people would describe themselves as successful—and there's only one alternative to success: *failure.*

Don't get me wrong. I'm not putting people down. In many ways I count myself among the failures—according to the above definitions.

I'm simply saying that most of us are victims of human nature; and to *truly* succeed we must work to overcome our basic natures. We must conquer the obstacles within, before we can ever hope to conquer the obstacles without.

Failure is as predictable as success. Economists say that the primary predictor of economic failure in life is the *inability to delay gratification.*

Engineering-Manager

Dennis Waitley, one of America's leading motivational writers and speakers, says, "Losers do what is tension relieving rather than what is goal achieving."

As I write this article I can see a beautiful day outside. I'd rather be out there lying in the sun or golfing or picnicking, anything besides sitting in front of a word-processor tearing words from my brain.

It would be easy to rationalize that my business is doing okay now, so I could afford to coast a little.

John Cummuta, a regular RW *columnist is president of Marketline, a broadcast management consulting firm. He can be reached at 312-960-5999.*

It would be easy to give in to the tendency to find something *fun* to do rather that doing the work necessary now to have unlimited fun time later.

There have been many nights when I would much rather have sat in front of the TV or gone to a movie than to be sending out mailings, or following up with phone calls, or doing the other promotional activities that help a business succeed.

But that would have been giving in to the human inability to delay gratification. It would have given me a short-term gain resulting in long-term pain.

Instead, with some admitted failures, I did what *had* to be done rather than what would have been comfortable to do. As a result, my business is doing very well.

These were one-by-one decisions to give up the TV time, recreation time, hobby time and personal leisure time in order to work late or to study my profession or to research the competition.

In other words, we'd all prefer to operate in our comfort zone rather than in our success zone. Doing what is *comfortable* becomes a habit, and we'd rather give in to our habits—even if that guarantees our economic failure.

Ralph Waldo Emerson said, "Sow a thought and you reap an act. Sow an act and you reap a habit. Sow a habit and you reap a character. Sow a character and you reap a destiny."

The key to controlling our individual destinies is self-knowledge and self-awareness. We must learn to recognize the behaviors that lead to failure and modify them.

We must learn to overcome the inertia of bad habits and develop the self-discipline to incorporate new habits; habits that lead inevitably to success.

In order to better understand what makes us tick and leads us down the "easy" way to the "hard" road of failure, we must understand the foundational elements of our nature.

Humans nearly always choose the easier way to do things.

If there is a hard way and an easy way to accomplish a certain job, even if the quality of the results will not be the same, human nature always leads us to prefer the easy way.

The harder the "hard" way is, the rarer the human who has the discipline to choose it.

> *"Losers do what is tension relieving rather that what is goal achieving."*

We always want to get the most for the least expenditure.

There is nothing inherently wrong with this proposition, but it has led to many failures, because it is a tendency to not be willing to pay the necessary price for things we want.

It tends to make consumers "price" rather than "value" conscious, frequently resulting in the purchase of cheap junk rather than more expensive quality products.

This tendency is the opposite of one of the basic laws of success, which says: "You always must pay full price for success, and you always must pay in *advance.*"

We all act, primarily, from our own point of view. Humans are, by nature, selfish and self-centered. Even when we do something for others, we generally are considering the gratifying returns, even if they are only from within our own self-satisfaction.

We all tend to act on incomplete information. No human knows everything, so whenever we act it is on incomplete information. So, to a certain extent, we each are ignorant of many of the facts that bear on decisions we make every day.

All humans have an ego. We think highly of ourselves. So to a greater or lesser extent all humans are vain.

It's no small wonder that there are problems in the world with so many lazy, greedy, ambitious, selfish, ignorant and vain people running around.

And what are these people after? They're all seeking security, comfort, leisure, love, respect and fulfullment.

In other words, we're all seeking the good things in life, but our human natures are too lazy, greedy, selfish and so on to let us marshal the necessary virtues and activities to be successful in our quest for those good things.

If we want to defy the odds and find

(continued on page 22)

CRL's DX-2 Quiets Production

by Tyree S. Ford

Baltimore MD ... This month, the march of the black boxes continues with the Dynafex DX-2 Noise Reduction System, from CRL.

The Dynafex DX-2 is a single-ended stereo (or two-channel) device which according to its manual offers up to 30 dB of noise reduction.

Single-ended, in case you're not familiar with the term, simply means that the DX-2 does not operate by using an encode/decode system.

Audio passes through the circuit, is processed, and goes on to the next stage of your audio chain.

At the heart of the DX-2 is a variable bandwidth filter which automatically adjusts to pass only the bandwidth of the program material.

Noise outside the bandwidth as detected by the bandwidth filter is eliminated.

Open window

Think of the operation as a constantly moving open window which opens just wide enough to allow the audio you want, while appearing closed to unwanted noise.

Ty Ford, a radio audio production consultant, helps stations optimize their use of production equipment and airstaff skills. He can be reached at 301-889-6201.

If this is starting to sound familiar to you, you may have had some experience with the Berwyn Noise Filter, after which this circuit is patterned.

In addition to the dynamic filter, the DX-2 also uses a downward expander which "turns down" when the level of the audio is below the user adjustable threshold.

In my experience, what gets turned down is circuit noise and tape hiss. If the nominal SNR of your system is 65 dB, a DX-2 at the right place could increase that to almost 90 dB. The difference is definitely audible.

Producer's File

CRL gets high marks for the DX-2 manual.

Engineers will like it because of its detailed information for installation, set-up, operation, schematics, systems configurations, board lay-outs, parts list and trouble-shooting sections.

Non-technical operators will like the DX-2 because it's easy to operate.

The DX-2 at work

The DX-2 arrived in the middle of a particularly busy week.

After all sessions had been completed and logged out, I was ready to open the crate.

Ray Updike, Director of Marketing for Circuit Research Labs, Inc., had kindly forwarded a copy of the manual, which I read prior to the arrival of the box.

After a quick review of the hook-up section I put the unit to work.

Because the majority of my sessions result in two-track stereo or mono masters, I inserted the DX-2 between the input faders and the master output fader, in-line with the two main output busses.

In this position, any input used would eventually pass audio through the DX-2, and into the stereo output busses.

Product details

Inputs and outputs for the DX-2 are via Canon-type connectors. The active balanced (differential) stereo inputs are 600 ohm terminated balanced bridging, or 10K ohm unbalanced.

CRL gets more high marks for switchable input levels of −10, 0, +4 and +8, with a maximum input level of +20 dBm.

Like the inputs, the outputs are also active balanced. Output impedance is 50 ohms unbalanced, and 100 ohms balanced.

Four independent internal jumpers allow either balanced or unbalanced operation of both inputs and outputs.

The only set-up adjustments are a pair of unity gain trim pots (internal) for constant levels during in/out operation.

Finding the right test didn't take long. Within 24 hours I was contacted by a medical research organization.

At some previous point they had recorded (on ¼" four-track) a series of lessons on normal and abnormal heart sounds.

Gotta have heart

The narrations were at various places on three of the four tracks, and the heart sounds were on the remaining track.

Because no noise reduction or music had been used, the unmasked tape noise was considerable.

Since I had been asked to put all narration on one track, and all heart sounds on the other, I switched the DX-2 to independent two-channel operation instead of stereo.

Checking to be sure the levels of each narration track were as equal as possible, I fed the two-channel "split" through an Aphex Studio Dominator for peak protection, and followed it with the DX-2.

The DX-2 fed the final gain stage of the console which was routed to a Revox PR-99 where I recorded a new 15 ips two-track master.

The expander did a great job of keeping the tracks clean and quiet. The client was thrilled; I was impressed.

Good-bye hiss

The next challenge came from a beautiful music FM whose engineer wished to reduce tape hiss on their programmed music tapes, as well as some air-

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The Days of Field Inspection

by Floyd Hall

Crestline CA ... Did You Know That ... ?

Up until just a few years ago, it was necessary when about to complete construction of a radio station on a CP to do two important things:

1) Before turning on the transmitter it was required you notify the FCC in Washington and the engineer-in-charge that you would begin "equipment tests" on a certain date.

You could then operate and adjust the transmitter during the "experimental period," i.e. midnight to 0600 local time.

2) At least three days in advance, you called the local field office and requested inspection.

You would make a date with them, for a certain day, and a specified time in that day.

As arranged a "Field Engineer" would meet you, and take the station through inspection. (There have been no "radio inspectors" since WWII!)

Probationary period

Until a "satisfactory" inspection report was received in the proper department in Washington, the FCC would not accept for filing your Form 302, the application for license and "program test" authority.

When the latter was received, you could then begin regular operation, but you were on "probation."

If your 302 was deficient in any way they could, and sometimes did, shut you down pending further consideration of your application.

These formalities were very strictly and formally observed. Inspection was thorough, and included some measurements and careful perusal of your measurement data, which in turn must be complete and in proper form.

Old Timer

Of course, some of us were more readily accepted. I had worked in this district for many years, and knew most everyone, not only in the Los Angeles office, but in San Francisco as well. All of this is leading up to a reminiscence!

Familiar face

I had completed construction of a little daytime AM station in the then tiny, dirty little desert town of Victorville, CA.

I knew that my old friend "Pop" Linden, the LA engineer-in-charge was about to retire (he by the way was 80-some when he finally did retire), so when I called down I was connected with the new E-in-C, Mr. J. Lee Smith.

I requested he send a field engineer to give me my initial inspection, whereupon he said, "I believe I will come out myself."

We agreed on a date and time and I gave him detailed directions, and described a meeting place.

About the time agreed upon, I watched the parking lot, and when I saw a car with US government license plates drive in, I walked out to meet him.

Before he got to me, he said, "You're Floyd Hall."

I said, "Yes, and you're Lee Smith, and I know you from somewhere," and he followed that up with "And I know you from somewhere."

During inspection and all through the morning we occasionally asked each other questions as to times and places, and finally I got a glimmer of an inspiration.

I asked him, "Were you ever on Marine radio inspection?"

His face lit up and he said, "I was in charge of the San Pedro marine office for years," and almost immediately we both said, "The kid with the dynamotor bearings!"

Smokey bearings

I had repaired a large TC RF ammeter off a Navy 2 kW spark transmitter off a large freighter at the dock in Wilmington, and was about to turn on the trans-

(continued on page 16)

Floyd Hall is a regular **RW** *columnist and an engineering consultant at Consulting Radio Engineers, Crestline, CA. Call him at 714-338-3338.*

56 Years Ago in RW

Editor's note: The **RW** *of today and the* **RW** *of old fortuitously share the same name. The* **RW** *of old was printed for a period of time in the 1920s and 1930s, when radio was first becoming popular.*

The current version of **RW** *that you hold in your hands has been around (in various forms and names) for nearly ten years.*

SEPARATE SET PREDICTED FOR EACH LISTENER

An individual receiver for every member of the family is predicted by Joy Elmer Morgan. He said:

"This development will come about gradually as wealth increases, as the cost of receivers decreases, and as school radio teaches to the masses of the people the art of discriminating listening.

"Just as the school, by its use of books, has done more to spread reading habits among the people than any other agency, the school by its use of radio teaching will do more to spread creative listening among the people than any other single agency.

"This is especially true in the rural home and school for there radio means much more than it does in the city, bringing to the remotest home a living contact with the world at large.

"The radio industry will eventually realize that free and independent educational broadcasting is its best friend and will cease its shortsighted policy of trying to kill off stations associated with educational institutions."

Reprinted from Radio World, July, 1931.

A Friend in the Field Inspector

(continued from page 15)
mitter and test it, when the "Marine Radio Inspector"—Lee Smith—walked into the shack.

He introduced himself to the young kid who had just signed on as the radio operator, and to me. I explained my presence there and that I was about to find out if it worked and he said, "Fine, let's fire it up."

This kid, whose second telegraph license still had wet ink on it, threw the switch to start up the high voltage dynamotor.

I remember well it was a big Crocker-Wheeler—and as it came up to speed I told the kid to hold the key down, and I adjusted the load on the transmitter to give the required RF amps, when about that time the dyno ground to a screaming stop!

I yanked out the main switch and Lee Smith and I stood there watching the smoke boiling up out of the bearings!

This poor kid, who looked as if he was about to faint, stammered out how he had cleaned up the machine, and oiled the bearings, et cetera, et cetera.

By now the thing had cooled off enough for me to open the covers on the bearings and oil sumps, and look in.

They were bone dry! Now, these machines had bronze sleeve bearings which were lubricated by a large brass ring which revolved around the shaft, and picked up oil from a sump which contained about a pint of engine oil.

With tears streaming down his cheeks, the kid said, "Those things were full of dirty old oil, and I took that out and put oil on the bearings."

Well, Lee looked at me, and I looked at him, and we both rolled up our sleeves and went to work.

We took that thing down, scraped the bearings and cleaned off the shafts, and put the damn thing back together again!

I then went down to the engine room and got me a can of 30-weight engine oil and filled the bearing sumps.

> *Lee Smith and I stood there watching the smoke boiling up out of the bearings!*

We fired the thing up and adjusted the transmitter, signed the kid's log, and went home feeling like two Boy Scouts who had just done their good deed for the day.

After the Victorville inspection Lee and I renewed our friendship for the next several years while he was the Los Angeles E-in-C.

Lee is retired now, and lives on a hill in San Pedro with a beautiful view of the sea. He and his wife are both active Hams, and she is the brasspounder of the family, with a fist like a Western Union cable operator!

I could tell you a million stories about those days—about ship to shore telegraph stations; about early radio direction finders; about US Navy communication stations on our coasts.

While I was in school, and during the summers, I shipped out on Dollar steamship boats.

My cousin was born and raised in Grey's Harbor, WA, and by the time he was sixteen years old he shipped on Dollar lumber schooners.

When he got his pilot's ticket he was berthed as Chief Quartermaster on Dollar's "President Grant."

He helped me to a berth on this vessel as third radio operator.

I remember one amusing incident on the "Grant." They carried several Cadets (kids in training for pilot's licenses), and they, together with the Quartermasters, bunked in the foc'sle.

We were on our way through the Gulf, and it was cold. The foc'sle was heated by steam radiators and one of these was a little loose, so every time the ship rolled it would clank and hiss a little steam.

Everyone was sitting around in their skivies, some playing cards and others reading or sleeping in their bunks.

When the ship gave one good roll this steam radiator came loose from the bulkhead, and fell down to the deck.

In doing so it unscrewed the pipe a quarter turn, and in nothing flat, the foc'sle was filled with high pressure steam.

I think I was nearest the door, for I remember flying up the companionway ladder in about two steps, and turning around to see who else was coming, I was bowled over by the rest of the gang.

A deck officer ran up, and we counted noses, but the Kansas farm boy was missing.

One of the big kids volunteered to go down after him, but the deck Mate stopped him, and about that time here he came—stark naked and carrying his suitcase!

He was a little red, but didn't seem to be burned too badly, so somebody opened his suitcase to see what he had in it. It was empty except for his Life Boat Ticket!

This was a little certificate you had to have to ship at any rate on a passenger vessel, which was about like a Third Class Operators permit in our business today.

Everybody called these things a Life Boat Ticket. The only thing they had to do with a life boat was to certify you knew what it was and where your station was.

Kansas thought he had to have it to be able to actually get on a life boat!

Next month I am going back a long way—to WWI and wireless telegraph, my small part in it and some of the *really* Old Timers I knew. See you then.

Next Step in Backup Controller

by **Frederick Baumgartner**

Part II

Englewood CO ... The idea behind an emergency controller is to develop a device that "buys time" by switching auxiliary equipment on line when the main (power or transmitter) fails.

As I mentioned previously, the unit must survive great abuse, so components that are close to indestructable are selected.

Also, it is better for the device do nothing, than to do the wrong thing. And third, each command must be based on two separate detectors.

This means that we avoid easily damaged semiconductors and that we look at two monitors to verify that the transmitter is really off the air.

Most monitors have either a normally open or normally closed set of contacts to indicate that the carrier has failed. Most stations have one, so we may need to construct another.

Figure 1 is an RF detector. The version I built lives in the phasor cabinet. I built it in a 6"×4"×2" plastic "project case" with the pickup coil (eight turns) wound around the outside.

Picking a place in the phasor where it works on all patterns and power reductions is an interesting experiment in itself.

I found a place away from most power-handling gear where the detector would work as long as 500 W was going out in the day, night and auxiliary antenna mode.

The detector "floats" in the phasor cabinet as it finds its ground and power and delivers its information back to the controller chassis.

It is *not* tied electrically to the phasor in any way, not even the ground.

For FM, parts are chosen for the power level and frequency involved, and the diodes need to be fairly heavy duty and suitable for the frequency (power diodes won't do).

The transistor and relay are generic, the capacitor near a 0.001, the resistor around 15K.

A variation of the same circuit is the audio detector in Figure 2. Obviously, if you have long pauses or the audio comes from the same monitor as the carrier fail signal, this is not a good idea for your station.

The transformer is chosen to match the audio line you have, the capacitor to provide a long time delay before tripping. Values are determined by experimenting.

A separate radio tuned to the station is what is needed, but beware. In FM systems the exciter can be enough to keep the radio working even when the transmitter fails.

In AM systems the co-channel may be enough (especially at 2 AM) to keep the audio detector up, and adjacent channels are always a concern.

An off-the-shelf receiver needs to have its AGC removed and made only sensitive enough to trip with your station.

Of course you can use the AGC line

(continued on page 22)

Figure 1.

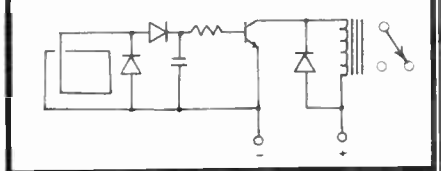


Figure 2.

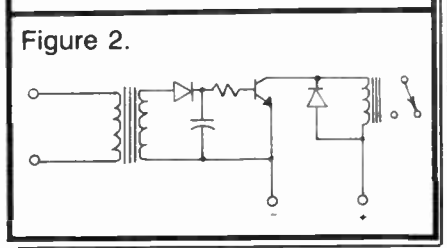
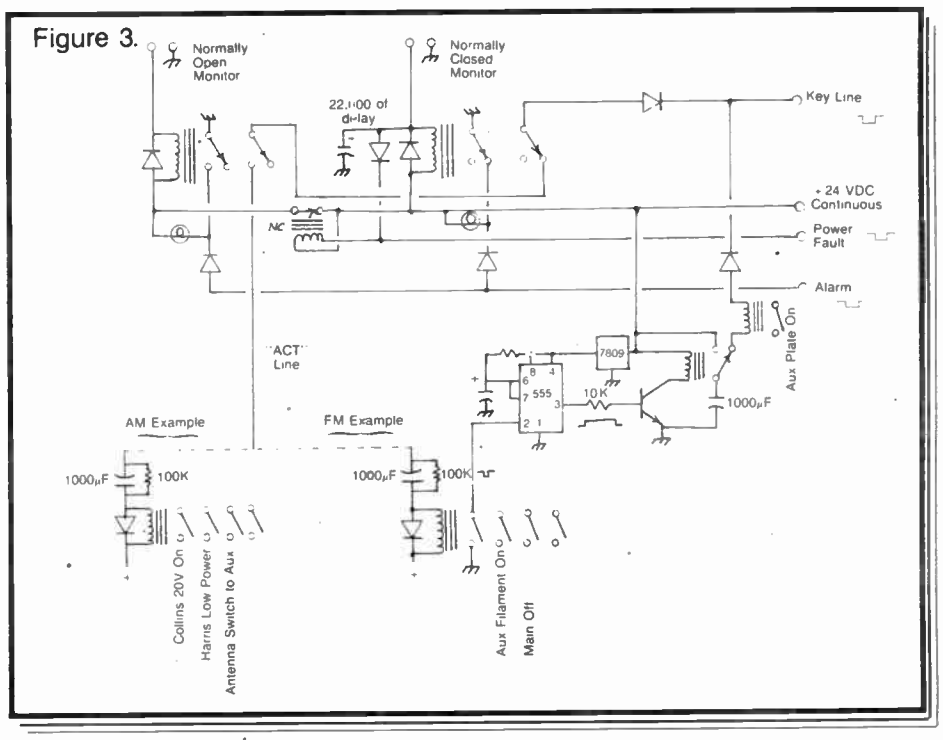


Figure 3.



Frederick Baumgartner, assistant CE at KWGN-TV and former CE of WIBA, Madison, WI, is a frequent contributor to **RW**. *He can be reached at 303-740-2883.*

Radio '87 Has Engineering Plus

by Michael C. Rau and Janet Elliot

Washington DC ... Engineers trying to choose which of this year's fall engineering conferences or conventions to attend should consider NAB's Radio '87 with a progam that is engineering ... *plus!*

There are ten technical sessions planned just for radio engineers on everything from audio processing and RF maintenance to improving communication skills.

We've also added something special—three seminars on AM directional antennas, RF radiation regulation and the development and implementation of the new NRSC AM standard.

All about DAs

If you choose to go to Radio '87, then take a closer look at all the engineering events taking place in Anaheim, California.

The program begins with a reception Tuesday evening, 8 September for NAB's 19th Annual AM Directional Antenna Seminar.

This is the most comprehensive AM DA program offered in the US.

Programmed by AM antenna expert Carl Smith, the two-day seminar covers directional antenna theory, updates on the latest techniques of feeder and monitoring systems, DA operation, maintenance and applicable FCC policy and rules.

Plan on discussing your individual DA problems with the country's leading authorities on antennas.

Participating instructors will be: John Sadler, FCC Mass Media Bureau; Al Gearing, Jules Cohen & Associates; Karl Lahm, A.D. Ring & Associates; Steve Kramer, Sellmeyer & Kramer Consulting Engineers; and Ron Rackley, du Treil-Rackley, Consulting Engineers.

Any broadcast engineer responsible for the proper installation, maintenance and operation of an AM directional antenna system will find this seminar to be invaluable.

Where else can you learn how to adjust and maintain directional antennas?

AM's latest standard

On Friday experts from the NRSC committee, broadcast engineers, receiver designers and augio processing experts will present a history of the development of the standard and the rationale for its implementation.

Participating engineers will also advise you on the adoption of the standard for your station.

You'll learn how industry-wide, voluntary compliance results in increased AM sound quality.

The NRSC will also present its proposal for a new RF emission "mask"—designed to help reduce spurious AM emissions.

Back by demand

Last year's RF Radiation Regulation Compliance Seminar was so well received that we are offering it again on Saturday morning.

You will learn about the current RF radiation regulations and how to demonstrate compliance with the new FCC regulations.

Presentations will be made by six speakers experienced in dealing with FCC regulations, facility design and modifications, RF radiation measurements, and the legal aspects of compliance.

Participating are John F.X. Browne, John F.X. Browne & Associates, P.C.; Dr. Robert Cleveland, FCC Office of Engineering and Technology; Dane Erickson, Hammett & Edison; Robert A. Surette, Shively Laboratories; from the law firm of Wilner & Scheiner, Ken Keane; and Barry Umansky, NAB's Deputy General Counsel.

Ten technical sessions

The Radio '87 technical sessions, ten in all, feature the latest information on everything from general station operation to the newest high-tech equipment.

Leading the list of technical sessions is an FCC Town Meeting.

This is your opportunity for a one-on-one with the FCC's Mass Media Bureau Chief.

This is your best chance to ask some tough questions and obtain the answers.

We will also have a short tutorial on the use of AM synchronous transmitters and a report from experimental AM synchronous operations.

Another of the technical sessions will compare the latest cart machine technology: digital, companded, floppy discs, DAT's or RAM.

Emil Torick, co-inventor of FMX™, will report on implementation of FMX with receiver manufacturers and broadcasters.

Celebrate radio

Our "Celebration of Radio" Exhibit Hall presents every radio product and service imaginable including all the newest sound equipment available.

While in the exhibit hall plan to stop at the NAB Engineering booth. There will be demonstrations of FMX and the NRSC standard manned by NAB engineers.

Each demonstration will enable you to listen and compare, first-hand, the merits of these new technologies.

The NRSC exhibit will include a minimum five prototype NRSC AM receivers.

Additionally, of course, NAB engineers can help you with any of your technical concerns.

We've also planned a special "Just for Engineers" Reception on Thursday evening, September 10 at the Anaheim Hilton.

If you are an NAB member, your station has already received information on how to register for Radio '87 and the three seminars.

You must register by August 7 to take advantage of the Radio '87 engineer's rate of $150 (seminars extra).

Ask your GM. If you need more information or have questions, please call NAB Science and Technology.

Michael Rau is NAB Science and Technology's director of spectrum engineering and regulatory affairs. Janet Elliot is NAB's special projects manager. For more information on Radio '87 engineering sessions, call 202-429-5346.

RADIO '87

Engineering Special Events At-A-Glance

Tuesday, September 8, 1987	
2:00-7:00 pm	Engineers' Registration/Hilton Hotel
5:00-9:00 pm	Directional Antenna Seminar/Hilton Hotel
Wednesday, September 9, 1987	
7:30-8:00 am	Continental Breakfast/Hilton Hotel
7:30 am-12:00 pm	Directional Antenna Seminar (continued)/ Hilton Hotel
12:00-1:00 pm	Engineering Luncheon/Hilton Hotel
1:00-5:00 pm	Directional Antenna Seminar (continued)/ Hilton Hotel
Thursday, September 10, 1987	
7:30-8:00 am	Continental Breakfast/Convention Center
7:30 am-12:00 pm	Directional Antenna Seminar (continued)/ Convention Center
6:00 pm	Engineers' Reception/Hilton Hotel
Friday, September 11, 1987	
7:30-8:00 am	Continental Breakfast/Convention Center
7:30 am-12:00 pm	NRSC Seminar/Convention Center
Saturday, September 12, 1987	
7:30-8:00 am	Continental Breakfast/Convention Center
7:30-10:15 am	RF Seminar/Convention Center
10:15-11:15 am	Coffee Break/Exhibit Hall/Convention Center
11:15 am-1:45 pm	RF Seminar (continued)/Convention Center

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DX-2 Quiets Production Noise

(continued from page 14)

conditioning noise in the air studio.

No time seemed like the right time to get together so I decided to perform the experiment without him.

I fed our tuner into the console and waited for the next song to end. As it did I could hear some tape hiss, not much really, but enough to upset a perfectionist.

During the next newscast I heard the air-conditioner blower plainly. I punched in the DX-2, adjusted the threshold level so that it wasn't clipping off the beginning sounds of the newscasters words, and listened.

As in the earlier tests, the DX-2 was pulling a lot of noise out of the signal during unmodulated moments. Even during talk and music passages it seemed that the noise was decreased.

Difference in perception

Noticing subtle changes in the high frequency content of the music, I wondered if the filter was removing some of the upper harmonics and called Ray Updike to ask him about it.

He'd obviously been asked this question before and stated that the removal of noise did effect the listener's perception of the audio, but that to his knowledge the filters had been designed to pass the lower amplitude harmonics.

According to the manual, the Brilliance controls (one for each channel) reinsert frequencies from 3 kHz to 20 kHz to compensate for the perceived loss of highs.

Although I didn't have a spectrum analyzer to inspect the before/after harmonic content, adding Brilliance came very close to reinstating what we thought was missing.

Better voiceovers

Another good use for the DX-2 is during voice recording, especially narration and commercial delivery.

Not only will production houses spend less time splicing out breaths (which can be made inaudible with a little practice on the part of the narrator), but they will also get SNR ratios up to 90 dB during full downward expansion . . . digital quiet!

One final use came while running a series of real-time radio dubs.

While setting up the levels, it seemed the audio could use a bit more bite. Adding just a touch of Brilliance gave the audio just the right edge.

The downward expansion eliminated the need for post leadering my copies.

Untapped need

The Dynafex DX-2, like many other well thought out devices, falls into the "microwave oven" category. If you don't have one, you think you don't need one.

After you've used one, however, you begin to wonder how you ever got along without it.

The list price for the DX-2 is $800. As I have mentioned many times before, it's a good idea to ask your local distributor for cash-in-advance, COD and net 30 prices.

Submit the facts to whoever signs the checks. This shows that you've done your homework.

It also plays to an important part of human nature. People like choices. Presenting one price only gives you a 50% chance. Three prices raise that to 75%.

For more details on the Dynafex DX-2 call Ray Updike at CRL 1-800-535-7648.

If you have already had experience with the DX-2, I'd appreciate hearing from you.

In closing, I am happy to announce that, after discussions with David Parnigoni, Senior VP Radio NAB, I will be running a session at Radio '87 on how to produce your radio station.

It is scheduled for Saturday, 12 September, 9 AM to 10:15 AM. Hope to see you there.

Dial-Up Series Response

(continued from page 8)

And, like many, I occasionally fall into the trap of adding rules to the rule book that really aren't there (nor should they be).

But in the case of dial-up remote control . . . or any new and creative form of remote control . . . there are only three criteria that must be met according to what I see written.

1. An operator must be on duty
2. The transmitter must operate properly
3. The FCC must be able to contact station personnel during hours of operation.

There was considerable explanation of the Commission's stance on deregulated remote control in MM Docket 84-110, RM-3046, dated 21 November 1984.

Unfortunately this notice did not enjoy very wide publication among those of us who make remote control decisions.

I would recommend that anyone interested in this issue get a copy of that paper and read it thoroughly.

It seems to me that there may be FCC employees who interpret that rule-making in many different ways, but the bottom line is "where is it written?"

I agree that more information needs to be brought forward concerning this topic.

The FCC has gone as far as it intends to for now, and it is up to our industry to sort out what we have.

Thankfully we have publications such as this one where we can all learn together. But, before we add new rules, let's figure out the ones we've already got.

Carl E. Gluck, CE
KYFR Radio
Shenandoah, IA

Editor's note: **RW** *will begin a regular series of articles clarifying FCC rules on this and other technical regulatory concerns in the 1 August issue.*

Auditronics announces linear fader console performance at rotary knob prices.

Only one company has the technological know-how and experience to give you big-board linear fader console performance in an economical, easy-to-use rotary knob configuration.

That company is Auditronics, a recognized leader in linear fader broadcast consoles. And the product is our new Stationmaster 1000 Series. This family of state-of-the-art broadcast consoles lets you upgrade your station's performance without revising your equipment layout or blowing your budget.

Take our Stationmaster 1008, for example. It packs more performance into a yard than you ever thought possible.

Its performance begins with superior sonic quality, and continues through advanced ergonomic design with eye-level copyboard, plug-in circuit board construction, illuminated push-button switching, all VCA level controls, simple instant mono to stereo upgrade, and more.

The Stationmaster 1008 is the 8-channel member of our family of rotary knob consoles offering from 6 to 12 mixing positions, and from 18 to 36 inputs.

Learn how the Stationmaster 1000 Series can give you big board console performance at rotary knob prices. Call Auditronics today, toll-free at 800-638-0977 for complete information, or circle reader service number.

auditronics, inc.

3750 Old Getwell Road, Memphis, TN 38118 • 901-362-1350

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SBE Show Plans Top Last Year's

by Alex Zavistovich

St. Louis MO ... "All's well" to date with plans for the Society of Broadcast Engineers (SBE) 1987 National Convention, which now has a tentative schedule of sessions and trade show booth sales exceeding those set last year.

That's the opinion of SBE Executive Director Andy Butler who, with the rest of the society's convention committee, met on 29 May in St. Louis, to discuss convention plan status.

The event will be held 10-12 November at the Cervantes Convention Center in St. Louis.

Butler noted at press time that two-thirds of the total floor space allocated for the convention trade show has already been sold. A number of major manufacturers have purchased multiple-booth units, he said, including Ampex, Sony, Audio-Technica, and other companies.

The committee also reviewed several concerns regarding the exhibit area, in particular improved lighting, badges and the need for professional show management.

The St. Louis convention committee, which had been handling show management, has "expressed a desire to end its management efforts with the 1987 convention," Butler noted.

Convention schedule

Additional show details were addressed in a convention schedule approved at the meeting, Butler said. According to the timetable, exhibitor set-up will begin with selected companies on Sunday, 8 November, and will continue through mid-afternoon on the 10th, when the show opens.

Seminars and technical sessions are also slated to begin on the 10th, Butler commented.

Among the decisions reached regarding technical sessions was the establishment of special "early bird" presentations during the convention—seminars held early in the day, on subjects of specific interest.

The early sessions, which at press time had not been finalized, were arranged to make additional room in the convention schedule for presentations with a broader, more general base, Butler said.

Highlights planned

Butler noted there were several highlights planned for the convention, as well as meetings concurrent with the event.

On 10 November, a maintenance seminar will be conducted, featuring short papers followed by open discussion and a question period, Butler indicated. Topics include RF system maintenance and care of tape cartridge transport systems.

A panel discussion on audio processing is scheduled later that same day, with processor manufacturers and radio station representatives comprising the panel.

In other radio-related areas, papers on surge protection and grounding for AM transmitter sites, as well as automation in the application of direct-to-air CD's will be presented.

Electronic broadbanding of AM antennas and dial telephone remote control will also be covered.

NAB Director of Spectrum Engineering and Regulatory Affairs Michael Rau, a member of the National Radio Systems Committee (NRSC) is scheduled to present an NRSC progress report, Butler commented.

The NRSC has selected a guideline for AM radio preemphasis and deemphasis, and is working on a standard for RF emissions from broadcast antennas.

Other activities

Beyond the seminars and exhibits, the convention committee is planning a number of other activities, for both engineers in general and SBE members in particular.

An informal "Nuts and Bolts" session is planned for the evening of 11 November, Butler added. The session is designed to give engineers a chance to exchange information and tricks of the trade, he said.

The SBE executive committee will meet on the 9th, and a general SBE membership meeting will be held on the 10th.

New executive officers for the society are to assume responsibility that day, Butler noted.

The convention committee is also looking into providing continuing education (CE) accreditation for the technical sessions.

Last year, Butler noted, John Woods College offered three CE units for those who attended all the sessions.

At press time, John Woods College was again contacted to offer the credit, but had not yet given a commitment.

For additional information, contact Andy Butler at 718-706-7690.

Emergency Backup

(continued from page 17)

as a carrier fail detector, or use the audio detector on a second monitor that has no carrier fail function.

The actual controller receives continuous DC (24 V), power failure, and key lock information from the generator control section and returns alarm information.

The upper left relay sees a normally open monitor and the right a normally closed.

They can be both the same if desired. A monitor indicating failure will light the associated lamp and pull the alarm line low.

If both agree that there is a problem, the "act" line is pulled low.

If the key line is not pulled to ground (through a string of key switches, see Part 1 in 1 July **RW**) the act line will not activate.

If the power failed line is low, the monitor relays are preempted (until power is returned—see Part 1).

I show two relays for the act line to work on. The left is for a typical AM plant.

The contacts shut down the main transmitter (in this case a Harris SX-5D is shut down to 250 W, which the dummy can handle forever).

Switch the antenna and dummy to see the auxiliary transmitter, and start the auxiliary. In the case of our auxiliary (a Collins 20-V) a plate on command is enough to bring it up.

The 20-V has been modified to a "jump start rig" with solid state rectifiers, oscillator and controls. This allows it to come up from cold in 20 seconds.

The right act relay is for FM. The FM is designed for a split plant, where the main is via STL and the auxiliary is at the studio. There is no antenna switching.

The relay disables the main and starts the filaments on the auxiliary.

The 555 is a pulse stretcher set for the 35 seconds needed for the heaters and fans to come up on the auxiliary FM (the exciter stays on).

The 555 pulls in a relay that charges a capacitor. While not as abuse proof as the relays, at least it will fail in the "do nothing" state.

When the 35 seconds are up the relay drops and the capacitor pulls in a relay that punches the plate on function. If at any point the key line is opened, the process stops.

Both AM and FM controllers share the lines from the power controller (power, alarm, key and power failure).

Capacitors in series with the momentary contact relays set the length of time the relay is pulled in. Parallel capacitors hold the relay up so as to avoid short term glitches.

The device needs to wait long enough to see that the main transmitter doesn't come back on its own. It also makes only one attempt to start the auxiliary.

When you are done, it is fun to pull the station's mains, hear the generator come up, then shut down the transmitters and see their auxiliarys hop on line . . . and know that you can sleep better.

All It Takes is Hard Work to Succeed

(continued from page 13)

within ourselves the character necessary to achieve success, we need to recognize the flags that tell us we're on the average person's road to failure, so we can get off.

The number-one indicator of imminent failure is the "E" Factor.

The "E" factor is the human tendency towards "Expedience." Once again, it is the inability to delay gratification.

It's the "E" factor that makes the young man drop out of school, so he can work to save up money for a car, so he can impress the girls.

This expedience or short-term gain results in long-term pain—a lifetime of low wages and frustrations.

People quit their jobs to live off unemployment or welfare, in return for a lifetime of diminished self-image. The allure of the "E" factor.

People everywhere do what is fun and easy rather than what is important, at the expense of their future.

They condemn themselves to lives of underfulfillment, just so they can indulge themselves a little "right now."

The one human quality that must be developed for success is self-discipline: the ability to make ourselves do what we must do to succeed, whether we want to do it or not.

Successful people are the ones who make a habit of doing the things that unsuccessful people don't like to do.

And what are these things? They're the same things that successful people don't like to do *but* they do them anyway!

Whenever we think of great men and women, we think of people who were able to do what was right, under the circumstances, rather than what was expedient.

They had strength of character, which is nothing more than the ability to resist acting in a lazy, selfish, greedy, ignorant and vain way.

Persistence is that enormously valuable characteristic that successful people find somewhere within themselves, which allows them to not give up when the average person (failure) would.

Persistence in action is also a good definition for the word "success."

Your true beliefs are always and only expressed in your actions. If you believe in your potential for success; if you believe in the better life that achievement in your chosen career can provide, then it *must* be expressed in your actions.

If you practice the same actions as unsuccessful people, you become and believe exactly like them.

However, if you practice the same actions as successful people, you will become and believe exactly like them. Now doesn't that sound like more fun?

Efficiency Modulation is Rare

by Thomas L. Vernon

Harrisburg PA ... With the renaissance of AM radio that's been taking place recently, there's been a lot written on AM transmission systems.

Modulation schemes such as Amplphase, PDM, modified Doherty, and of course, high-level plate have been described in many trade publications.

Comparatively little has been written about efficiency modulation since this system was used only briefly in the 1950s. This month Station Sketches explores this somewhat forgotten topic.

Because high-level plate modulation is so all-pervasive, we sometimes forget that AM can also be created by modulating any of the other elements in the PA tube.

When the modulating voltage is applied to the suppressor, screen, or control grids of the PA tube, it is known as efficiency modulation. Figures 1, 2, and 3 present simplified schematics.

While it's theoretically possible to modulate any of the grids, in the real world control and screen circuits are most common, and we'll focus on screen grid modulation here.

Suppressor grid circuits are seldom seen in practical applications.

This is because there are few power pentodes with the suppressor grid isolated from the cathode and brought out to a separate pin.

Also suppressor grid characteristics usually aren't that well controlled by tube manufacturers.

Figure 1. Simplified schematic of screen grid modulated transmitter.

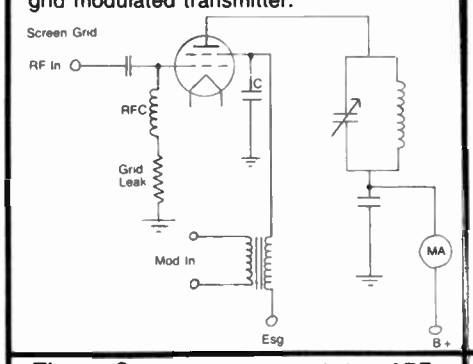


Figure 2. Supressor grid modulation of pentode type RF amplifier.

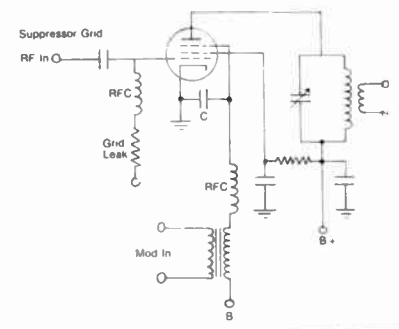


Figure 3. Control grid modulation of RF amplifier. The grid bias is varied with modulation. High percentages of modulation aren't possible with this type of circuit.

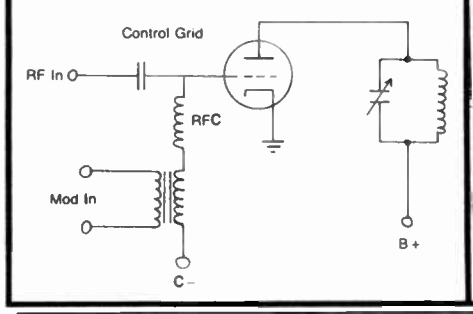
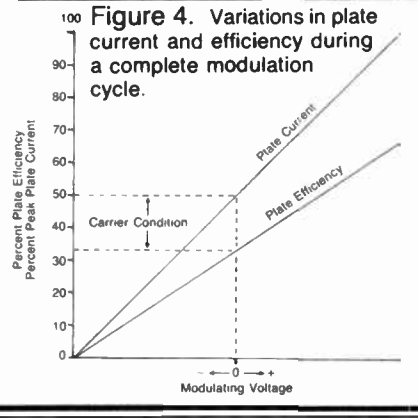


Figure 4. Variations in plate current and efficiency during a complete modulation cycle.



From a practical standpoint, efficiency modulation had many advantages over high-level plate modulation.

Most of these stem from the elimination of the modulation transformer and reactor.

Without the modulation iron, overall feedback may be utilized, where RF is sampled, rectified and returned to the first audio stage as negative feedback.

Because the mod transformer is a non-linear device, such overall feedback is not possible with plate modulated transmitters.

Overall feedback results in improved performance specs.

Distortion is lower because the feedback loop now includes the PA stage, and any non-linearities there are cancelled out.

Noise and hum are reduced by the amount of feedback employed.

Frequency response is improved by the elimination of the mod transformer with its attendant leakage reactance and shunt capacity at higher audio frequencies.

Overall feedback also controls gain over the full audio range.

This is in contrast to plate modulated transmitters which do not have this, again owing to the non-linearity of the mod components.

Efficiency modulation was usually achieved with simpler circuitry than used in high-level plate. Sounds hard to believe?

Consider that plate modulated tetrodes must also have a means to modulate the screen grid to at least 70% modulation, and many times the RF driver stage is modulated as well, adding to circuit complexity.

The modulator power required in this type of transmitter is very low.

This is because the RF output is being controlled by a relatively small screen grid potential, requiring a relatively small modulator.

Thus the ubiquitous Class B modulator, with its huge power consumption, is eliminated.

In its place, a 1 kW transmitter could be easily modulated by a single 807 tube.

Since peak plate voltages are much lower with efficiency modulation, smaller values of plate blockers and tank components may be employed, resulting in reduced size and cost.

Densely processed audio can be a problem for plate modulated transmitters because of the increased temperatures incurred, particularly in the mod transformer.

Requirements for neutralization are reduced since the screen grid is grounded with respect to RF, and acts as a shield between the control grid and plate. See Figure 1.

Historically, the use of efficiency modulation of Class C amplifiers by broadcasters is fairly limited.

In the mid-late '50s, Continental Electronics manufactured 1, 5, and 10 kW transmitters utilizing screen grid modulation of Class C RF amplifiers.

These were the 314-D, 315 and 316 models respectively.

Currently, the Continental 317-C2 utilizes screen grid modulation of a Weldon grounded grid amplifier, resulting in much greater overall efficiency than was possible with the earlier system.

Grid modulated transmitters were also popular with carrier current broadcasters during the pre-LPB days, when most carrier current transmitters were home made.

The motivating force here was cost, since college stations on a shoestring budget could not afford UTC CVM or LS series audio transmitters.

The elimination of modulation transformers and reactors was heralded as a great advance by the proponents of "high-tech" AM modulation techniques.

Few people realize that the elimination of these components was realized with technology in existence 40 years ago!

For those desirous of more information on efficiency modulation, including design considerations and schematics, the best source is an old copy of *The Radio Amateur's Handbook*.

Station Sketches

Thus a suppressor grid circuit would require considerable readjustment each time a PA tube was changed. Highly undesirable.

Regardless of which grid is modulated, the principle is the same.

Since the plate voltage must remain constant the increase in power with modulation is achieved by varying the plate current and efficiency.

To reach 100% modulation both plate current and efficiency must be doubled from their unmodulated values.

Optimum efficiency is realized at 100% modulation. This is illustrated graphically in figure 4.

When optimized for good linearity peak efficiency will be around 66%. With no modulation, efficiency will be about half this figure, or 33%.

In screen grid circuits, it's usually necessary to drive the screen grid slightly negative, since complete cutoff of plate current doesn't quite occur at 0 volts.

Power output of this configuration is about ⅓ that available by plate modulating a given tube.

Here the relationship between screen voltage and current is non-linear, which means that the modulator load varies as a function of modulating frequency.

This problem may be largely remedied by the application of overall feedback.

Tom Vernon, a regular RW *Columnist, divides his time among broadcast consulting, computers and instructional technology. He can be reached at 717-249-1230.*

Quick, Cheap Count-up Timer

by Barry Mishkind

Tucson AZ ... Here is a quick and dirty way to provide your station with a decent count-up timer, and make yourself a hero at the same time.

This project came about when one of my stations needed a timer for carted music but was unwilling to spend $150 to buy a clock for the production room and another $150 for the control room unit.

I started looking around for alternatives. One of the first items I found was an alarm clock on sale at Radio Shack that not only had a nice-sized LED display that was easy to read, but also had a switch that displayed minutes and seconds.

It seemed a great buy at $10, but could it be useful in the studio?

Well, a little time in thought and solder provided a pair of wires that when closed would reset the clock.

Once set up, the unit served the station well. It was not accurate to 0.001 of a second, but it did well at its assigned task.

Unfortunately, you can no longer buy that clock at Radio Shack. In fact, when a similar project came up recently, I couldn't find a clock anywhere that had a similar switch for displaying seconds.

Likely, some marketing whiz must have decided that most people who didn't work in radio didn't care about the seconds, as long as the clock was easy to set up.

Thus, the manufacturer was able to save about 10¢ per unit. Now the solution to my need is not so easy. But, it can be done.

The key came to me one day after trying about a billion stores in an unfruitful search for a clock that had the needed switch.

Why couldn't I find the chip used in the original clock and build a display?

Surely if Radio Shack could sell the whole clock for $10, the chip ought to be cheap. We might even be able to build up enough of them to sell to others.

Greater than the sum of parts

The reality of life is that getting good prices on such parts requires dealing in large volumes. Not quite what I had in mind.

But I did discover that among the various chips used in the clocks sold around town, one chip seemed to turn up quite often.

This chip was even cross referenced in my ECG book, and the pin out considerately listed a "seconds display input" feature.

All one had to do was to connect that pin to the Vss, and the clock was locked into minutes and seconds mode!

The chip that is does this is the LM8361, or ECG 2060. I found it used in a Micronta clock from Radio Shack, #63-828, which was on sale for $13.95 at the time.

I bought a half dozen of them for future use, but any clock with the LM8361 will do.

Cart interface

Resetting the clock was not too hard on its own.

A combination of the "fast" and "slow" buttons normally used for setting the minutes caused the display to reset to 0:00, and a lead could be attached easily to remote this "function."

However, in this application, I needed to interface the clock with six cart players, and not have them interact.

The answer is a bunch of diodes, which allow a momentary close push button to both start the machine and reset the clock without interaction between the two, or any of the other machines.

Since both functions essentially consist of a voltage being pulled to ground by the momentary closure, a pair of small signal diodes for each cart player was sufficient.

For six machines, each with a start button, the 12 diodes arranged in a network took very little space.

In one control room they were simply attached to a barrier strip which was, in turn, attached close to the clock.

In the other case, I laid them out in a spare punch block that made attaching the cart machine remote leads much easier. Do whatever is best for your situation.

Some variations

Two minor modifications you might wish to add are clipping the lead to the dot on the display for battery sentinel, and disabling the auto dimmer feature.

Just replace the LDR in the auto dimmer circuit with a 270 Ω resistor. That will keep the display on at its full brightness.

There is one last thing you might want to watch out for: there may be a slight problem with the resets.

It seems the clock is not properly designed to react to the split second contact closures provided by a DJ with lightning fingers.

Thus, sometimes the clock may fail to reset, or may reset the seconds only.

The solution for you may be to add a small additional circuit to hold the closure a bit longer. It doesn't take much, only 100 ms or so. The clock then will always reset properly.

> *Why couldn't I find the chip used in the original clock and build a display?*

As you can imagine, it doesn't take long to make all this come together. You can be up and running the same day. All in all, you have saved big bucks and are a hero! And, isn't that your true goal in life?

Barry Mishkind, aka **RW**'s *"Eclectic Engineer," is a consultant and contract engineer in Tucson. He can be reached at 602-296-3797.*

Note: **RW** *does not guarantee the workability or safety of the projects printed here. Build them at your own risk and contact the author for more details.*

If you have a build-it-yourself project, send it to "Project File" and earn $25 if we publish it. Send to **Radio World**, *PO Box 1214, Falls Church VA 22041.*

Typical Low-Cost Studio Set-up

by W.C. Alexander

Part II

Dallas TX ... In the last installment, the various pieces of equipment that make up a broadcast production studio were discussed.

In this installment, a typical low-cost multitrack studio will be examined.

For the purpose of discussion, let's examine a production room that consists of a Ramsa WR-8210A console, an Otari MX5050B MKIII-8 eight-track ½" format recorder, an Otari MX5050B MKIII-2 two-track ¼" format recorder, and a Technics SL-1200 MKII direct drive turntable.

Other peripheral equipment consists of a Crown D-75 power amplifier, JBL 4312 loudspeakers, a Nakamichi MR-2 cassette deck, and a Fidelipac CTR-124 cart deck.

Total cost of this room: $18,225. That is little more than the cost of a typical "broadcast" console alone.

The Ramsa console uses RCA phono-type input connections. All line inputs are 20K unbalanced, and outputs are 10K unbalanced.

Each source is connected to the console inputs with shielded audio cable.

A patch panel is optional, and in most cases unnecessary, as the console offers a great deal of flexibility within itself.

Auxiliary outputs 1 and 2 are provided specifically for the purpose of feeding a mix-down two-track recorder, and a second set of such outputs are provided for feeding a cassette machine.

There are likewise two additional line outputs for outputs 1 and 2 that can be used to feed the cart recorder, which has a 10K balanced input.

Outputs 1 through 4 are split and fed to alternate channel inputs of the eight-track recorder.

For example, output 1 feeds channels 1 and 5, output 2 feeds channels 2 and 6, output 3 feeds channels 3 and 7, and output 4 feeds channels 4 and 8.

Such splitting is most easily accomplished by using commercially made phono "Y" connectors.

Splitting pads made of 200 ohm resistors can also be used, and this is a convenient way to bridge the outputs if a patch panel is used.

Audio distribution blues

Some station engineers will argue that such output splitting is taboo, and that distribution amplifiers must be used.

That may well have been true in the days of the 600 ohm balanced circuit, but it is not necessary with unbalanced, high impedance wiring as long as the driving source is not loaded with too low a terminating impedance.

In this case, the Ramsa console's outputs are rated at +4 dB with a source impedence of 10K ohms.

The Otari machines' channel inputs have an impedence of 50K ohms requiring anywhere from −18 to +4 dB.

In this particular case, the outputs are split two ways into 50K ohm terminations, and the resulting load impedance on the source is 25K ohms, which is still more than double the 10K source impedance.

This arrangement works very nicely and there is no measurable loss of frequency response or increase in distortion or noise as a result.

Re-mix connections

The outputs of the eight-track recorder are fed into the sub inputs of each of the first eight input modules.

The sub inputs are specifically provided for this purpose, and when ready to re-mix, each of the input modules are switched into the remix mode and the eight-track outputs replace the normal input sources on these modules without moving a wire.

The sub input load impedance is 20K ohm, which interfaces nicely with the Otari's output.

In the next installment, we will discuss efficient operational techniques for this system and how stations can triple their production output with less equipment in the same amount of time.

W.C. Alexander is Director of Engineering for Crawford Broadcasting Company, and an aspiring horror-fiction novelist. He can be reached at 214-445-1713.

Circle Reader Service 34 on Page 28

Digital Domain

While Waiting for R-DAT. . .

by Stephen Waldee

San Jose CA ... In the beginning of May KBOQ in Marina-Monterey began broadcasting my digitally-taped *Master's Concert* program each weekday evening from 8 to 10 PM.

The program has had a ten-year gestation period, but only when the home digital cassette medium became available in 1985 with the introduction of the 8mm video/PCM audio recorder had I reached the breakthrough that would make it practical and affordable.

A two-hour program on conventional audio tape at 7.5 ips on open reel would require two 10" reels of tape, and at quantity prices, the expense would be at least $30 per show.

On the 8mm digital cassette I can tape *six* shows for a total cost of $9, for a savings of $171 in tape!

To insure compatibility with typical radio station equipment, it would be impossible to employ dbx or Dolby noise reduction on the open-reel tape; a maximum SNR ratio of only 55 to 60 dB could be obtained.

With the 8mm cassette the rated SNR is 88 dB, and for all practical, audible purposes there is absolutely no noise whatsoever.

Of course the entire enterprise hinges on the presence of 8mm playback equipment at the stations.

Steve Waldee is CE of KOFY Radio, San Mateo, and a technical consultant. He has been engineer and PD of four classical music stations in northern California. He can be reached at 408-723-1048.

My solution to that problem is to make trade or advertising arrangements to obtain the equipment, which is available by mail-order dealers for under $800, a fraction of the cost of a studio-quality open-reel tape recorder.

I use a Sony EVS-700U, a consumer-type video recorder, with six available stereo audio channels for a maximum time at the slow speed of 24 hours per tape!

From the service manuals I learned that the PCM audio recording system uses a sampling rate of double the TV horizontal sweep frequency, or 31.5 kHz.

According to Nyquist theory this permits reconstruction of 15.75 kHz as the highest possible audio frequency.

To avoid aliasing, an audio lowpass filter is incorporated, putting the maximum response ceiling between 14 and 15 kHz.

A perfectly-adjusted machine will be absolutely flat to 14 kHz, and will exhibit a sharp rolloff just where the lowpass filters in FM stereo generators cut off.

There is no apparent loss of high frequencies from the tape playback when a compact disc and its 8mm recorded dub are compared off the air after the stereo generation process.

The sound over the air of an 8mm tape is precisely like the live program, warts and all, without noticeable artifacts. Mono compatibility is excellent, with no loss of highs or "phasiness."

Digital opponents will be shocked to learn that the system uses only 8 bits resolution, but it is cleverly companded in both the analog audio and digital domain to preserve almost all of the available dynamic range of natural sound.

Thanks, I suspect, to the dbx 2:1 compression before encoding, I have never encountered the "crunch" of the digital brick-wall overload point when recording at any level indicated on the Sony meters.

In blind tests I conducted when evaluating the machine, experienced listeners could tell no difference between the source material on CD and a playback dub on about 95% of the music used.

There were two exceptions to this. A solo piano exhibited a very tiny amount of noise-breathing, typical of dbx encoding.

And one rock CD used for testing, the *Flashdance* soundtrack, had occasional very slight sibiliance distortion, probably due to aliasing or pre-emphasis overload.

When there is a steady noise platform, as provided by FM stereo reception which at best rarely exceeds about 60 dB, the noise-breathing is totally masked.

Subjectively the sibilance distortion was about half as objectionable as record tracking distortion on typical album cuts, and without the A-B testing went undetected.

Even the reviewer of England's prestigious *Gramophone* magazine reported that the sound quality of the machine was on a par with the CD players he had tested.

Overall, I would rank it as miles ahead of VHS or Beta Hi-Fi, and one tiny notch below the finest possible CD or digital tape playback.

In order to establish a situation permitting combo-DJ operation for the digital program, which calls for local announcer spot and ID insertion, and tags over the opening and closing themes, the Sony machine needed some changes in its remote control.

The local pushbuttons on the machine —which is itself quite small—are tiny and labeled only with small symbols.

The hand-held infrared remote con-

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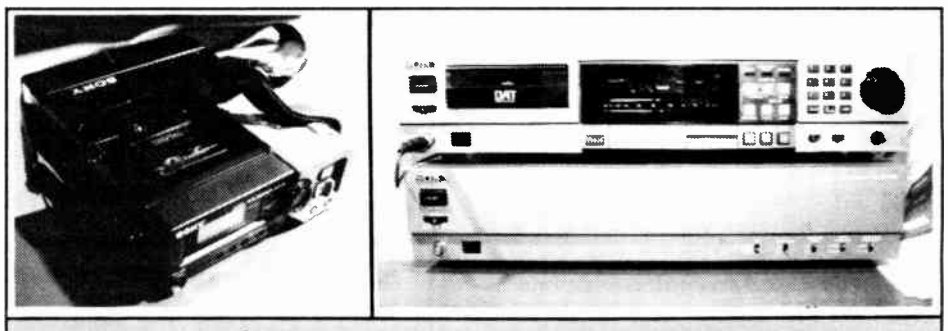

R-DAT At Montreux

Two professional R-DAT products were shown by Sony at the 15th International Television Symposium & Technical Exhibition in Montreux, Switzerland.

On the left is the PCM-2000 portable cassette recorder, and on the right is the studio recorder.

These are actual products, previously shown in prototype form in the US. They will appear in the US at the fall shows and will be available for sale shortly thereafter.

8 Millimeter is Already Here

(continued from previous page)
trol, with tiny rubber buttons with no positive "give," would probably not stand up under heavy use, or be practical for combo operations.

I voided the warranty on the remote control by taking its tiny circuit board out of the plastic box, wiring up nearly indestructable pushbuttons for the needed features, adding a dual D-cell battery holder, and mounting the whole assembly in a sloping-front cabinet.

I placed the infrared LED at the end of a long shielded cable, with the drain connected only to the chassis of the machine, mounting the diode near the infrared sensor on the Sony, and aimed it carefully so as not to overload the sensing circuitry but always to provide positive response to any command.

I was lucky to discover in tests prior to starting the program that the Sony unit operated very hot.

In fact, when recording for over six hours on an 85° day in my studio, I found that the last hour on the tape was blank—the machine had stopped encoding good data!

Placing a whisper fan over the power supply and transformer, plus elevating the bottom of the machine an inch off the counter increased airflow enough to make it withstand long periods of operation at unpleasant temperatures.

I have recorded about 150 hours of material with the Sony machine and have experienced the digital dropout: it is absolute silence!

Three things minimize or eliminate the problem altogether:

1) Keep the machine relatively cool.

2) Keep it clean and occasionally use the Sony head cleaning cassette for a few seconds. I also blow a bit of filtered compressed air around the tape transport from time to time, using spray cans from a camera supply store.

3) Try different types of tape if one brand or lot seems prone to dropouts.

The metal particle 8mm tape is so delicate that I frankly don't see how it can be manufactured as consistently as it apparently is.

The design of the Sony machine incorporates a mute circuit in case the machine's error correction code cannot restore enough words to recreate proper audio, and there is a tiny bit of hysteresis in the muting, which trails the dropout by a number of milliseconds.

Average dropouts will be, I would guess, about a 20th of a second, and there might be one every six to 12 hours of program material recorded.

I hope this frequency drops to virtually none as tapes improve; at the moment, it seems to be just a little worse than the frequency of defects encountered in compact discs on my very reliable Philips/Magnavox CD player.

As I said above, the 8mm PCM system records very accurate, clean audio, warts and all, thus it reveals shortcomings in your analog audio equipment with devastating honesty.

For example, I quickly learned that my mic preamps, quiet enough for taping on my Revox machines, were too noisy for digital audio and new amplifiers were needed.

Room tone in my studio that would be masked by tape hiss now became apparent, as was −60 dB crosstalk from my turntable cue amp.

Even self-noise in my condenser mike was noticeable, but I suspect that a little analog noise helps reduce digital tape distortion by providing added "dither" signal.

This may be why CD reissues of analog tapes sometimes sound a lot better than new all-digital discs!

In order to produce a program worthy of the performance of the Sony machine, I had to upgrade my electronics and lower the noise platforms.

To insure adequate headroom, I employ Inovonics "Gordon Headroom" peak-reading meters. These track very well with the fluoroscan digital meters on the Sony, but give me the "feel" I need for riding gain on sound levels.

One of the most difficult aspects of working out the details of my program has nothing intrinsic to do with the digital format, but has been somewhat affected by the wide dynamic range available.

Voice levels must be peaked lower than music to prevent the announcer from "blasting in" after a lovely, quiet musical ending

WFMT engineers generally peak their voices about 6 dB lower than music on their syndicated analog audio classical tapes.

Since KBOQ Radio uses a small amount of slow compression in its Optimod to maximize coverage of its Class-A FM signal, I chose to peak my voice about 10 dB lower than music, somewhat under the Optimod compression threshold.

Thus if the Optimod has "released" at the end of a soft selection, my voice does not jump out at an annoying level.

I found that absolutely unprocessed mic signals would occasionally cause a bit of sibilance distortion on the 8mm playback, probably due to aliasing or companding overshoots.

I eliminated these altogether with a bit of mic limiting/de-essing from a custom processor.

If my experiences with the digital "Master's Concert" hold true for other broadcasters, the digital cassette medium has a glorious future ahead in quality-conscious radio programming.

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Radio World Marketplace

If your company has a new product you wish us to consider in *Radio World Marketplace*, please send a press release and black and white photograph to Radio World Marketplace, P.O. Box 1214, Falls Church, VA 22041

Cassette deck

Tascam's new 112 cassette deck features a two-head configuration coupled with high slew rate IC's and bi-polar power supplies to provide extended dynamic range and frequency response.

Dolby HX Pro noise reduction and pitch control complements Dolby B and Dolby C circuitry.

The result is improved signal-to-noise performance, according to the company.

Die-cast transport components are precision machined to provide steady tape speed. Audible Cue and Review functions allow monitoring of program material in fast forward and rewind modes.

For more information, call **David Ellis at 213-384-7979**, or circle **Reader Service 82.**

Tower strobe

Broadcast Communications Systems, Inc.'s new tower strobe, SH-2001 operates as a strobe/day and strobe/night medium-low intensity unit. It provides approximately one-half the windload of a full-size beacon housing.

For more information, call **Jeffrey Crooks at 608-833-3977**, or circle **Reader Service 87.**

Modulation meter

CT Systems recently introduced Model 4101, a fully automatic modulation meter designed to simplify AM and FM modulation testing.

Automatic measurements can be made from 1.5 MHz to 2.0 GHz of FM deviation to 100 kHz and AM modulation to 100%. Input levels from 3 mv to 1 V, selectable de-emphasis of 50, 75 or 750μsec., and both IF and AF outputs are standard.

For more information, call **Steve Smith at 317-787-5721**, or circle **Reader Service 84.**

Combining amp

Henry Engineering's Mix-Minus Plus is a specialized combining amplifier designed to add a "Mix-Minus" output to broadcast audio consoles that lack this feature.

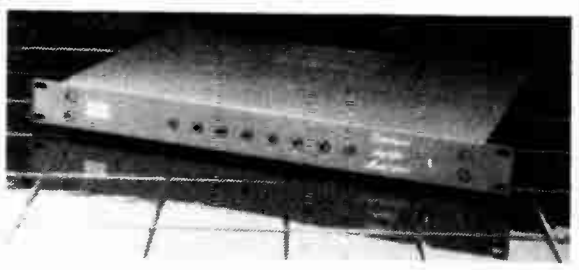
The unit subtracts the on-air telephone audio from the program bus audio to provide a program mix *minus* caller audio, which is then fed back down the line to the caller. The unit can achieve a 40 dB null.

For more information, call **Hank Landsberg at 818-355-3656**, or circle **Reader Service 81.**

CD cart player

Allied Broadcast Equipment and Denon America, Inc. recently introduced the CD Cart™ Player, Denon DN950F. It functions like a tape cartridge player, and plays CDs mounted in special plastic cartridges.

For more information, contact your regional **Allied Broadcast Equipment representative**, or circle **Reader Service 80.**



Distribution amp

BGW Systems' Model 2242 Distribution Amplifier features eight independent discrete output stages, +27 dBm output capability, a 50 ohm load capability, an ultra high damping factor of 4000 and low noise (–88 dBm).

It utilizes a high performance and impedance differential input circuit.

The input impedance to ground at both input terminals is 10 kohms. Two low noise operational amplifiers with both DC and high frequency trimmers are used to optimize common mode rejection.

For more information, call **Brian Gary Wachner at 213-973-8090**, or circle **Reader Service 89.**

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Circle Reader Service 27 on Page 28

Buyers Guide

Studio Audio Equipment

Harmonizer Adds Versatility

by **Joe Davis**
WBMW

Washington DC ... The Eventide H969 Harmonizer is a very flexible and useful piece of production gear. A "special effects" device, it boasts many features in one smart package.

User Report

It would be easy to fill an entire **RW** issue with possible uses of the H969 Harmonizer, so I will only touch on the main points.

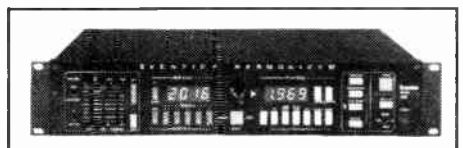
Most production folks are familiar with the pitch change capabilities of the older H949 Harmonizer. Eventide's H969 is even better.

Pitch change is generally used to alter the length of (usually shorten) a recorded commercial or other program. Typically, a variable-speed tape player's audio output is fed through the Harmonizer.

Pitch change

For example, if the tape speed is increased five percent, the Harmonizer is set to change the pitch of the audio down five percent. The end result is that a 63-second spot turns into 60 seconds with the pitch of the announcer's voice sounding normal.

Downward pitch change alone can also be used to make a voice sound deeper, like Darth Vader. Upward pitch change by itself can create a "Chipmunk" voice out of anyone.


Eventide H969 Harmonizer

The H969 has twelve fixed preset pitch change ratios, ten of which represent commonly used fractions of an octave. You can easily set the pitch change ratio manually anywhere between one octave up, and more than three octaves down.

But pitch change is just one of many features of the H969. It has a versatile digital delay as well.

Digital delay and flange

You can delay full 16 kHz audio (monaural) any amount up to 1.53 seconds, with resolution down to 1 ms. A double mode feature gives twice as much delay with half bandwidth audio. There are five user-programmable delay presets available.

The H969 will also flange. The user can vary the flanger's oscillator rate and "hold" it in any position. Additionally, the flanger can be started from any point.

Other uses include reverse and repeat. In the reverse mode, short segments of the input are heard backwards. The repeat function will repeat a segment of audio, up to 1.53 seconds long, indefinitely.

The feature that really puts the icing on the cake is that many of the above functions may be used in combination with others. For example, you can do a delay with pitch change. All modes feature variable input/output recirculation.

The front panel has two large digital

(continued on page 39)

Joe Davis is a SBE-certified engineer who has been in broadcasting for more than 12 years. He may be reached at 703-691-1900.

Digital Effects Entice Listeners

by **Marlene Petska Lane**

Falls Church VA ... Stations looking for a distinct sound that entices listeners to tune in can no longer rely on just loudness to get the job done.

Getting one up on the competition now requires the creative use of digital effects processing. And it seems that, at least for some formats, the music demands it.

"There are so many effects used in the music stations play," says Joe Shapiro, marketing services director for Eventide, "that if stations don't get into creative effects production, they sound boring by comparison."

Derrick Pilkington, technical operations manager for AKG Acoustics, says he already sees a widespread use of effects. "Broadcasters are tending to use more effects, almost entirely just effects, to get the competitive edge."

Stations attempting to assert their individuality also appear to be returning to "personality radio," according to Shapiro.

Industry Roundup

Personality-oriented radio, he says, encourages the use of effects, "whether it be the outrageous Howard Stern or the DJ who plays records and injects life into the program."

Not a passing thing

Sid Goldstein, Orban Associates' marketing and sales manager for pro audio products, believes this new emphasis on processing and effects is more than just a passing phenomenon.

"I think we're seeing an evolution of processing of all on air aural material, not just the final air sound," he says. He points to the increasing use of mic channel processing as just one indication of this evolution.

"Now stations are using things like reverb and other kinds of delay line effects on the mic channel," he says. "And certainly a variety of other effects is used for production purposes for station IDs and promos," he adds.

One thing that has encouraged this trend is the wealth of processing and effects gear on the market. There's the well known Eventide Harmonizer, AKG's ADR-68K, Orban's Co-Operator and Mic Processor, and many others, including pro and semi-pro gear like the Yamaha SPX 90II.

The Harmonizer, which Shapiro says is the most commonly found effects box in radio stations today, is capable of

(continued on page 36)

BUYERS GUIDE INDEX

Buyers Guide

Co-Operator Earns KZAP Respect

by **Kent Randles, CE**
KZAP-FM

Sacramento CA ... I was intrigued when I heard that Orban Associates was coming out with a piece of equipment that they were going to call the "Co-Operator" (464A). "A friendly, automatic assistant operator ... versatility without confusion," they said.

Kent Randles decided at the age of 14 that he wanted to be a broadcast engineer. He has worked as an automation watcher, disc jockey, production engineer, sold pro audio equipment, and now is a broadcast engineer. He may be reached at 916-925-3700.

I have developed great respect for just about everything Orban makes. Their products are always well thought-out, extremely well documented (even if it takes a while for the final manual to come out), jock and/or bozo-proof and EMI resistant.

I fiddled with a 464A in the Orban booth at this year's NAB and I ordered a trial unit as soon as I got home.

This dual channel unit takes up only one rack space. All of the controls and indicators are on the front.

The unit has two 10-segment horizontal LED meters per channel; one for gain

Orban's new Co-Operator

reduction and one for relative peak output.

There are knobs for input attenuation, gate threshold and release time, and Shadow switches for release shape, leveling in/out, compress in/out, high frequency limit in/out, system bypass, power and stereo/dual mode.

Concealed behind an easily removable cover (no tools are needed to remove it) are screwdriver-adjustable controls for output meter calibration, output level and high frequency limiting/pre-emphasis curve selection.

On the back are input/output barrier strips with separate chassis and circuit grounds. The 464A comes with ¼" TRS phone jacks and the chassis is pre-punched for XLR connectors.

Whenever I try out any piece of equipment, I look for any and all limitations. To this end, I put the "Co-Operator" into three different situations.

Testing it out

The first one was at the local Radio Reading Service (Audio Vision). They put a lot of programs on reel-to-reel at 3.75 ips and use all-volunteer board operators.

As a result they have a big problem with sibilance and inconsistant levels. The leveling, compress and gating functions took care of the level problems.

With the six high frequency/pre-emphasis curve selections, I just kept dialing in more high frequency limiting until the problem went away and all of the highs did not.

User Report

The advantage in using an intelligent high frequency limiter after a compressor for sibilance control/de-essing is that it doesn't punch holes in the audio, it just momentarily rolls off the offending high end stuff.

The second situation involved putting the 464A on the air (very early one Monday morning) by itself. I fed it the program output of the air console, enabled the pre-emphasis and peak clipper and fed it into the stereo test jacks of our Orban 8100A.

More testing

I can only say that it worked okay. The manual warns that with a fast release time dialed in, there will be audible side effects. There are.

Since one cannot adjust attack and release times separately, like on the 424A, it is hard to tailor the action for least objectionable sound in this use.

It works fine as a "big-hand-on-the-dial" level controller. It would do fine on the air at a non-commercial or classical station, although the peak clipper is after the pre-emphasis and high frequency limiting. It is really for protection and not loudness.

My third intended and now permanent use for the 464A is on the output of our newsroom. The news person's studio is stereo and they play stereo traffic, sports and feature sounders as well as voicers and actualities.

I needed a versatile, two channel compressor with de-essing capability and balanced inputs and outputs. The Orban 464A "Co-Operator" fit that need perfectly. I put my stamp of approval on it by buying it.

Editor's note: For more information, contact Sid Goldstein at Orban Associates: 415-957-1067.

CE Hooks Up with Matchmaker

by Ted Miofsky, Eng Mgr
WHVE-FM

Sarasota FL ... First of all, let me assure you that I'm not talking about a dating service, or I'd be first in line.

The Matchmaker I'm talking about is just the ticket to interface low and high impedance differences between equipment and provide proper gain with precise level control.

The need for a Matchmaker

The standard for broadcast equipment is a unit that has a 600 ohm output capable of driving any 0 dB to +8 dB level you want. Broadcast equipment generally uses balanced lines and XLR jacks.

There is, of course, another very large group of "home," or consumer type units. These units generally have RCA phono jacks and an unbalanced high-Z output, for example 15K ohms.

With today's improving technology, the quality of consumer equipment is getting fairly good. And, because consumer equipment is a lot cheaper than broadcast equipment, it is no wonder you see more and more of it appearing in the broadcast studio.

When I came to Sarasota in 1979, I had a lot of good Technics high-Z equipment to tie in. This included cassette machines, equalizers and later CD players.

With a few exceptions, almost every CD player available today is in this class of high-Z unbalanced output.

Making do

At first, our station was on a slim budget and I had to "make do." Sound familiar? I tried it all: If I put a resistor in series to unload it, I lost even more level and all the highs; if I bypassed it with a cap, I had a very poor nonlinear high/low pass response.

And if I bought an audio matching transformer for 10K to 600 ohms, I'd lose gain again transforming down and the transformer would clip the highs off.

We use Broadcast Audio boards, so I was able to put the cart decks on a −10 dB input and my high-Z unit on a +10 dB input so I had 20 dB gain difference, but the highs were still lost in the matching transformer.

Not many of us have a lot of spare time to develop a pro opamp circuit and build it while trying to run a radio station, too. But before the mid-1980s, there were no Matchmaker-type units available for purchase!

Doing it right

Then along came the "professional" unit that I had been looking for. It was manufactured by ATI, Audio Technologies, Inc. They offered an attractive brushed aluminum rack panel that holds two units in only ¾" of rack space.

There are four holes in the front of the unit so you have easy, quick access for setting up the levels.

The stereo unit is good for a CD or phono preamp. The two-way unit has dual stereo amps for use with equalizers and cassettes to match and amplify both ways for input and output.

User Report

All units come in both direct coupled output for maximum frequency response and a transformer balanced output with a super frequency response.

This latter unit is recommended if you think you may run into ground loop hum problems. It is a must if you are in an RF field.

Check it out

When I say pro, it's because the specs were so good that I could hardly believe it.

I decided that since the NAB convention was coming up, I would corner these guys at ATI and really check out their equipment before I bought anything.

I was amazed at the construction, component quality, circuit design and end results—the specs. But the ability of the output transformers to pass the high frequencies is what amazed me most.

For the next few years, I have budgeted for one Matchmaker after another and have lost count of how many I have already purchased.

Editor's note: For more information, contact Ed Mullen at ATI: 215-443-0330. The author may be reached at 813-355-7131.

Ted Miofsky is an engineering graduate of Purdue University and has 24 years of experience in broadcast. His interest in radio began in the sixth grade, when he joined a radio club to get out of study hall.

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Here it is! The sale that everyone waits for. The Audio Broadcast Group's Year End Clearance Sale is your once-a-year opportunity to take advantage of some of the industry's most tremendous equipment bargains.

Choose from among dozens and dozens of items in demand. We are cleaning out the Audio warehouse, and by acting now, you can save hundreds, even thousands of dollars on new equipment that your facility needs and wants most.

Many of these items are new "in the box". Some are demos, displays and sample inventories. All are like new and ready to ship today. Every item must be sold "as is", cash with order, FOB Grand Rapids. This gear must go! Orders will be handled on a first come, first served basis.

Hurry and call now to buy those pieces of equipment you've been longing for at these unheard-of low prices ... before your competition does!

Tape, Cart and Cassette Machines

	Model	Mgfr	Item/Description	Was Priced	Sale Now
1	A-810-2	Studer	Truly a state-of-the-art analog mastering recorder. 4-speed and loaded with features. Console mounted with SMPTE center track time code included.	$10850	$7050
1	PR-99	Revox	Stereo playback-only tape machine for use in automation systems and live-assist applications.	$1950	$1385
1	ARS-1000	Otari	Stereo playback-only tape machine, for use in automation systems and live-assist applications.	$1850	$1369
1	B-710	Revox	Studio cassette deck for mastering applications	$1995	$1000
4	PMD-430	Marantz	Professional quality stereo portable cassette recorder with 3 heads and dolby or dbx noise reduction.	$550	$395
1	AG-350-2	Ampex	Console-mounted 2-track stereo recorder with Invonics electronics. Rebuilt to factory specs.	$3750	$1995
1	AG-440-B	Ampex	2-track stereo recorder mounted in heavy duty portable case.	$4500	$2195

Microphones

	Model	Mgfr	Item/Description	Was Priced	Sale Now
1	D-222	AKG	High quality microphone suitable for all around use	$325	$150
1	AT-803R	Audio-Technica	Sub-miniature omnidirectional electret condenser microphone	$210	$149
1	AT-831A	Audio-Technica	Battery/phantom powered lavalier microphone	$150	$99
1	PCC-160	Crown	Low profile directional boundary microphone	$275	$175
1	CO-15E	Electro-Voice	Phantom power condenser omni-directional microphone	$320	$150
1	RE-85	Electro-Voice	Dynamic omni-directional lavalier microphone	$166	$99
1	647CLS	Electro-Voice	Dynamic lavalier microphone	$125	$83
1	RE-55	Electro-Voice	Professional dynamic omni-directional microphone	$274	$182
2	DO-54	Electro-Voice	Wide frequency response dynamic omni-directional microphone	$164	$93
1	KM-83	Neumann	German quality wide frequency response condenser microphone - omnidirectional pattern.	$449	$278
1	KM-84	Neumann	German quality wide frequency response condenser microphone - cardioid pattern.	$449	$278
2	EC-33S	Marantz	Stereo microphone for use with PMD-430 recorder. May be used together or separated for better stereo.	$69	$20
1	MKE-10-3	Sennheiser	Small lavalier microphone for quality sound.	$200	$104
3	MD-441	Sennheiser	Big brother to the industry standard MD-421. Boosts performance standards even higher.	$499	$329
1	SM-5B	Shure	Dynamic cardioid microphone. One of the very best on-air announce mics available.	$586	$379
1	PH-20	Telex	Light weight headworn microphone	$210	$120
1	F-115A	Sony	Dynamic cardioid microphone designed for news gathering and field production work. Very heavy duty construction.	$110	$50
1	ECM-50PS	Sony	Miniature lavalier microphone for use on-camera or instrument pickup. Electret condenser type.	$205	$115
1	SM78EB	Shure	Microphone	$136	$82

Processors, Amplifiers and Mixers

	Model	Mgfr	Item/Description	Was Priced	Sale Now
1	Compellor	Aphex	Professional quality compressor/limiter	$1195	$956
1	H969	Eventide	State-of-the-art Harmonizer for audio production	$4500	$3300
1	Type B	Aphex	Aural Exciter. Helps restore lost brightness and add clarity to recorded music, voices and production.	$495	$250
1	Broadcast II	Aphex	Aural Exciter. Designed to be put on line in the broadcast chain for improved signal quality.	$2495	$1870
1	2100	EV-Tapco	10 band per channel rack-mounted equalizer	$395	$260
1	526A	Orban	Dynamic sibilance controller (de-esser)	$499	$365
1	674A	Orban	Most flexible equalizer on the market. Both a true parametric and graphic in the same unit, with high and low pass filters built in.	$1299	$1015
1	418A	Orban	Stereo compressor/limiter for production and recording applications. Uses famous "Optimod" circuitry adapted to recording standards.	$799	$600
1	511	Symetrix	Noise reduction system for removing hiss from tape and carts. Requires no encoding.	$499	$346
1	Dyna-Mic	Valley People	Dual Dyna-Mic processing system for use on your on-air mic or in production.	$559	$356
1	PE-40	Tascam	4-channel parametric equalizer for recording and and production work. Rack mounted.	$549	$325
1	MA-1000-1	A.T.I.	10 watt stereo monitor amplifier - compact size	$385	$319
1	WP-9055	Ramsa	50-watt per channel stereo rack-mounted power amplifier. Single rack space.	$510	$325
2	P-2100	Yamaha	100-watt per channel rack-mounted stereo amplifier with both 1/4" input plugs and 3-pin XLR input connectors.	$650	$457
1	AT-4462	Audio-Technica	Portable stereo mixer built to meet all of the requirements for top quality field production.	$1595	$1095
1	C-279	Revox	Highest quality 6x2 production mixer for those who insist on Studer-Revox craftsmanship.	$2699	$2395
1	M-68A	Shure	Super little 4-input microphone mixer for remote use or inside production.	$205	$149

Other Great Buys Now

	Model	Mgfr	Item/Description	Was Priced	Sale Now
1	NNA-1	ABG	Custom built record-to-cartridge Dubbing Center.	—	$4000
2	NNA-2	ABG	Roll-around wood cabinet for Ampex ATR-700 or Otari MX-5050B recorders.	$250	$100
1	ESC20721	Elgin	Phone coupler for interfacing a cart machine to an incoming telephone line, for repeated playback.	$300	$175
1	IE-17A	Ivie	Microprocessor controlled acoustics analyzer. Companion to the IE-30A.	$1999	$1200
2	RM-5	Nakamichi	Remote control for use with MR-1 or MR-2 cassette recorders.	$45	$30
1	MZS-815	Sennheiser	Shock mount for MKH-816 microphone	$150	$104
1	CS-607B	Tascam	Roll-around stand for use with standard 19-inch rack-mounted equipment. 11 rack spaces.	$349	$185
1	ST-S8	Technics	An outstanding AM/FM tuner. Digital tuning.	$495	$297
1	77-C	Vega	Wireless transmitter for use with Vega 58 Receiver.	$985	$720
1	BD-980	Eventide	Automatic Digital Delay for talk shows.	$5495	$4095
1	ST-6000	Shure	Teleconferencing System. Includes mixer, microphones, speakers, connecting cables & accessories.	$8985	$5000

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Synchrostart True to Its Name

by David C. Kephart, PE
Drake-Chenault Inc.

Woodland Hills CA ... Have you ever tried to use a cue-burned record? In many cases the record would be perfectly usable, except for all that noise and "grunge" at the start of modulation.

The only way you could eliminate the grunge was to dub the disc to reel-to-reel tape, then splice leader tape right up to the beginning of the tune—a time consuming hassle!

Even if you're dubbing records to cart, you still need to use the "dub and leader" trick to get rid of that "sssSS" at the start of the cart.

And speaking of carting records ... have you noticed that carts recorded by various station personnel seem to have slightly different "tightness?" Some are dead-on and some are a bit loose. We discovered an easier way to deal with the problem.

At Drake-Chenault, we've installed a device called a Synchrostart, a product from Henry Engineering.

Synchrostart has two basic functions: it mutes turntable audio during the start-up of a turntable, and it provides a synchronized start command to a cart (or reel) recorder. Cue-burn and wow-in are eliminated, and carting records is a snap.

The muting function is a real time-saver and a powerful production tool. Records that were previously unusable due to cue-burn can be used again.

Just cue the record in the usual way. When the turntable starts, there is silence, not noise. At the exact moment the tune begins, the audio turns on smoothly, sounding like a rapid fade-up.

This automatic muting has more dramatic uses than just stripping off noise. Let's say you are producing a music bed for a promo and you want to "pick up" a tune somewhere in the middle of the song.

This used to be another hassle of "dubbing and leadering." Not anymore. All you have to do is carefully cue the record so the beat is at the stylus, then back up the disc as usual. Now you start the turntable.

You'll hear silence and then, just as that beat is directly beneath the stylus, you'll hear it! No start-up wow, no splicing, no wasted time.

Another function I've found useful is the ability to have an Audio On-Off manual override button. This is simply a pushbutton that turns the turntable audio on and off. It is useful if you have a problem with excessive vibration or mechanical noise in the studio.

User Report

After cueing a record, the audio can be manually turned off. It stays off until the turntable is started.

The synchronized cart-start feature is most useful when transferring records to cart. You simply cue the record as usual and put a cart in the machine. When the turntable is started, the audio mutes and a timer within the Synchrostart begins counting.

A split-second before audio comes back on, the cart machine starts rolling. This makes carting records a one-button operation with no guesswork.

No matter whether carts are dubbed by experienced staffers or by the part-time college kid, they'll all be tight and consistent.

Incidently, the cart-start delay time can be adjusted so the machine starts before audio-on, in case you need to produce carts with a specific "deadroll," i.e., silent tape before audio.

Synchrostart handles audio muting for two turntables and auto-starting for one cart machine. It can be programmed so that either TT1 or TT2 or both turntables will start the machine.

The unit is a "black box" that can be mounted beneath the turntables, where the preamps are usually located. It has three multi-pin D-connectors on the front panel: one for each turntable's audio and one for connection to the cart machine.

There are three trimpots, one for each TT audio muting time and one for the cart-start delay. The muting and start delays are independent of each other and can be set anywhere from 0 to 1.5 seconds.

We use Synchrostart with Technics SP15 and SL1200 turntables, which have different roll-up times. The adjustment range of the Synchrostart permits the fine-tuning of each turntable's audio muting time. The cart-start delay is similarly adjustable.

Also, there is a "start-enable" feature that senses the "Record Ready" mode of the cart recorder. If it's not preset to record, it won't automatically start.

We have used the Synchrostart at Drake-Chenault for several months, and I admit to becoming "spoiled" by it!

It is a time-saver in the production studio. Using a turntable without the automatic muting seems archaic by comparison ... why didn't someone think of this 15 years ago?

Editor's note: For more information, contact Hank Landsberg at Henry Engineering: 818-355-3656. The author may be reached at 213-204-5000.

David Kephart has been a senior production engineer with Drake-Chenault for nearly 10 years, producing programs such as "The History of Rock and Roll," and "Weekly Music Magazine." He recently joined the staff of Westwood One.

SPX 90II Test Driven

by Geary Morrill, Corp Dir Eng
Mid-West Family Stations

Lansing MI ... WITL recently added multitrack capability to enhance the creativity and versatility of our local production. With the amount of money involved in a project like this, we were looking for the maximum "bang" for the buck.

User Report

When it came down to effects devices, a test drive of the Yamaha SPX 90II Digital Multi-Effects Processor was arranged, and the results were impressive.

Once again, broadcasters are the indirect beneficiaries of technology developed for another discipline.

Designed initially for the performing musician, the SPX 90II is right at home in the production studio. Packed into its one rack unit of space is a fully MIDI (Musical Instrument Digital Interface) compatible device capable of creating some of the wildest effects.

Thirty preset effects are in ROM, with as many as nine adjustable parameters for each. In addition, there is room to store 60 personalized programs which are retrievable from non-volatile memory at the push of a button.

Programs available include reverb, early reflection, delay, echo, modulation, auto pan, vibrato, freeze (digital sampling), flanging and pitch change. In addition, compression and parametric EQ are stored.

The unit uses linear 16-bit quantization at a 31.25 kHz sampling frequency with a 12 kHz effect bandwidth to provide superior audio performance.

Dynamic range in the effect mode exceeds 75 dB with distortion less than 0.03—great numbers for effects devices.

While the unit is controllable from a MIDI-equipped keyboard, it is fully controllable from the front panel or an optional remote control panel as well.

Setting up the program parameters is straightforward, using an alphanumeric LCD display showing the program name, parameter name and the value of the parameter.

All you do is just push and hold the increment/decrement button until the value you want appears, then let up. Even a relative neophyte can get professional results when the unit is used in conjunction with a console equipped with effect busses.

One of the nicest features, available for the asking from any Yamaha dealer, is the Applications Guidebook. It features programs developed by Phil Ramone, Billy Gibbons, Eric Clapton, Phil Collins and others.

The book walks you through some of the effects these individuals have created for their albums using the SPX 90II, and can be a jumping off point for your experimentation.

If you can't believe this is all available in one unit at a price tag under $1,000, arrange to test drive one yourself through your friendly Yamaha dealer.

You may have a bit of a wait, since most of the demo units don't come back.

Editor's note: For more information, call Yamaha at 714-522-9011. The author may be reached at 517-373-1010.

Geary Morrill's 15 years of experience in broadcast serve him well at Mid-West Family Stations, where he is responsible for the technical operations of 18 stations. He also recently served as Chairman of the SBE Central Michigan Chapter 91, 1986-1987.

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Buyers Guide

Engineer Sold on Valley Mic Proc

by Rob Meuser
Int'l Bdcst Support Services

Ontario Canada ... What do you get when you take a Valley People low noise mic preamp, wire it up to their Gain Brain, then throw in their Kepex noise gate/expander and finally, add their parametric equalizer?

Besides a big bill, you get some of the best known state-of-the-art studio processing devices in your mic chain. Now, what if you could get all that in one box?

User Report

You can get that and more, for less than $600 in the Valley People Model 400 mic processor.

The transformerless low noise input mic stage has a provision for phantom powering (you supply the actual DC). The preamp has a gain set on the front panel; very low output ribbon mics as well as condenser mics can be used without any internal changes or pads.

The preamp section is followed by a specially contoured parametric equalizer. The break points of each of the three bands are contoured for speech, not music.

The equalizer is followed by some unbalanced in-out patch points in case you need an un-compressed mic out or wish to feed and then receive reverb.

After that there is a compressor and either an expander or gate circuit (such as the Kepex).

Valley People uses its TA series monolithic blocks for both gain and preamplification. The TA 101 gain block replaces the large ECG 101 that was found in the earlier Gain Brain.

After compression and expansion the signal, now at line level, drives either a direct output or a reduced mic level feed.

The mic level feed is excellent for use in an existing set-up where it would be difficult to totally remove an existing preamp. One example is in a console where the preamp is a part of a module that you do not wish to chop up.

In all, this unit has almost everything one could desire for microphone preprocessing.

One warning: the integration of functions in this unit, as well as its intended design criteria of microphone preprocessing makes it brutal when used on music sources.

The high frequency section of the parametric equalizer is active below 3 kHz, which is too mid-sounding for music.

The attack and release sections of the compressor are fixed and optimized for voice characteristics (around 200 ms average release). The expander has a fixed threshold, an adjustable quiescent gain reduction.

This unit also allows you to forego compression and use a gating function that is more adjustable. The controls and displays are logically arranged and functional.

From left to right they are: input sensitivity for the preamp, low, mid and high frequency EQ, output drive to the compressor, gate threshold, gate/expander quiescent gain and finally output level.

Two LED displays are included. The first shows gain reduction and the second can be switched to indicate the level of the preamp output or the unit output. An input overload LED is also included.

Using the Model 400 is very straightforward. One negative factor is that there is a tremendous amount of EQ and compression in hand, in fact too much for a normal microphone at any sanely run station.

The unit can be easily set for a smooth solid sound, but watch how far you go—there is a lot of fire power here.

One option I have yet to explore with this equipment is the bypassing of all other processing except the peak limiter. The unit has everything needed to directly drive a line, except for some form of On/Off switching.

The processing provided for speech is such that multiband processing does not make a major further contribution to the overall sound.

In any event, I believe in standards. The Valley People Model 400 Mic Processor is my standard, based on performance and company reputation.

I have four units in service to date, and plan several more in a new studio now being planned. You can't argue with something that works—and works well.

Rob Meuser specializes in various modulation systems and associated equipment. He may be reached via MCI Mail #325-3672, or by calling 416-526-8200.

Editor's note: Valley People recently changed its name to Valley International. For more information on the Model 400 Mic Processor, contact Tom Irby at 615-383-4737.

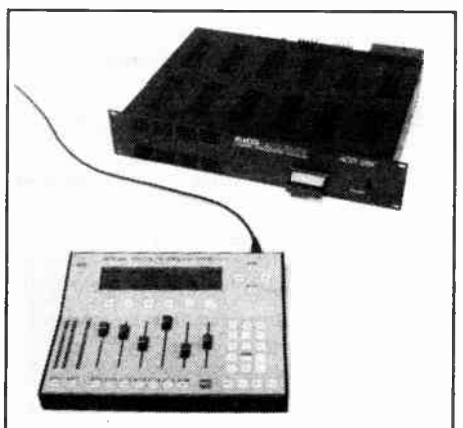
ADR 68K Boasts MIDI, 16 Bits

by Dave Ogden, Sales Mgr
AKG Acoustics, Inc.

Stamford CT ... The ADR 68K from AKG Acoustics is a multi-function digital audio processor, with several different processing modes useful for broadcast production.

It is a full 16-bit machine and provides various simulations of plate, room and hall reverb, as well as multi-sampling and a variety of special effects. It is based on the 6800 microprocessor, which is used in such computers as the Apple MacIntosh.

The two inputs and four outputs on the mainframe provide an architecture that may be split into two separate mono in/stereo out programs.



AKG's ADR 68K

A data cartridge stores 50 user program presets. There are another 50 preset locations in the machine at all times, as well as more than 100 factory program presets.

Full MIDI (Musical Instrument Digital Interface) implementation provides silent program change crossfades, notes data triggering of samples, and provides dynamic parameter changes.

The remote control offers a "user friendly" interface to the programs, and connects to the mainframe via a 50' cable. (Lengths of 200' or more are possible.)

The 160-character display is back lit and adjustable for optimum viewing angle. An internal Help function brings text into view, explaining the program parameters at the touch of a button.

Another Help mode brings more than one dozen operating system information pages into view.

Completely software based, ADR 68K upgrades are made on a regular basis. In its current Version 3 software, the ADR provides such programs as plate, chamber, room, hall, plate/hall split and reverse reverb.

It also features eight seconds of sampling, which may be broken up into four sections and triggered simultaneously, plus four seconds of stereo sampling and various effects programs such as six voice polychorus, flanger and dual two-second delay lines.

A multi-effect mode furnishes two delay lines, gate, EQ, stereo chorus, multitap delay and stereo hall reverb, all in the signal path with mixing control.

Also of interest for broadcast applications is an operating mode which offers two independent mono to stereo processors, with five processing modes each.

Mono to stereo conversion via time delay, comb filters and combinations of delay and filters is included, as well as a Haas effect stereo panner which shifts the stereo image via time delay while maintaining equal amplitude in each channel.

All mono to stereo effects combine back into mono with flat frequency response.

Editor's note: For more information, call S. Richard Ravich at AKG: 203-348-2121.

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Custom Furniture Gives an Edge

by William A. Wohl, Bdct Sales Mgr Radio Systems

Edgemont PA ... *Laminates, MCP, MDF*—these are not the typical technical terms normally heard at a radio station.

The terms refer to furniture—specifically, custom cabinetry for radio and production studios. At this year's NAB, attendees realized the importance of these terms.

Over the years, radio stations have focused on things like processing, big name personalities, syndicated programming and local remote productions.

Because little, if any, planning has gone into the construction of studio furniture, there usually is a shortage of rack mounting, countertop space, and room for guests in the studio.

There is almost never any provision for the safe and orderly routing of studio wiring.

Fortunately, the tide is changing. Broadcasters are beginning to realize the benefits afforded by an efficient, professional and attractive studio environment.

These benefits not only translate into a productive staff, but into increased advertising revenues; management no longer need be "embarrassed" about bringing a potential client in to visit.

At Radio Systems, the design, construction and installation of custom studio furniture encompasses an entire division of the company. With four full-time cabinetry craftsman and an 8,000 square foot workshop, studio cabinetry is serious business.

Operators can configure studio layouts tailored to meet their size requirements, finish and color.

Consider some of the typical complaints raised about "stock" (versus custom) studio furniture purchased by engineers and station owners:

• *Our furniture became chipped right away.* Radio Systems uses cabinetry grade MDF (medium density fiber) lumber, not chip-prone particle board for cabinet construction. MDF provides a clean, sure edge on cuts.

Another innovation that prevents chipping is our use of MCP (melamine component products) as leg and undercounter material.

MCP is a factory hot-pressed laminate that is much more resistant to the wear and tear that cabinet sides and legs undergo (chairs banging, feet rubbing and vacuum cleaners slamming).

• *The tabletops warp over time.* Rather than rely solely on MDF lumber for furniture construction, we use 2×2" poplar stringers to frame up countertops, providing a rigid, high strength frame to support today's heavy equipment.

And, as an added measure against warping, the undersides and backs of surfaces are also laminated to prevent the damaging intrusion of water and humidity, which, over time, weaken furniture and lead to warping.

Some of the "stock" broadcast furniture suppliers have begun to respond to the some of these complaints. But they remain locked into a particular style or design. Deviation from that stock configuration often means delayed delivery and added cost.

Radio Systems incorporates the innovations and features of ultra-custom furniture into the design and construction of even simple cabinetry products as standard features.

While innovations mean cabinetry that truly is designed for radio and production, they don't make the furniture any more expensive than the stock, off-the-shelf variety.

In addition to a customized approach incorporated into the construction of moderately-priced furniture, ultra-custom furniture needs can also be met.

This calibre of furniture includes custom overbridges, complete wood framing, storage spaces for cart, tape and CD storage, and oak and tambour style wood trims.

Today, some radio stations are turning to custom furniture for special requirements—like space for two operators at an on-air news format console.

One customer has ordered nine custom rooms, each fully featured, with trim and finish to meet the design and finish of a new station building.

Another New York City customer shipped his custom console for a large ultra-custom cabinet, complete console harnessing to punchblocks and then on-site installation.

With studio renovations being planned at an ever-increasing pace, station owners and engineers are seeking furniture built by people who know radio.

Custom makes sense—not only for long-term durability and beauty, but as an investment that protects valuable and expensive electronic equipment and creates the kind of studio environment that helps stations remain competitive.

Editors note: For more information, contact Bill Wohl at 800-523-2133 (800-423-2133 in PA).

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Buyers Guide

RPG Diffuses Sound

by Peter D'Antonio, Pres.
RPG Diffusor Systems, Inc.

Largo MD ... The introduction of stereo TV, stereo AM radio, digital recording, compact discs, recent advances in 3D stereo image processing and emphasis on quality audio in general, has placed new importance on the acoustic design of recording and broadcast facilities.

The sound that we hear in a room is a combination of the direct sound emitted by a source and the indirect reflected sounds from the room boundaries, which arrive at discrete times related to their travel paths.

Because the magnitude, direction and arrival time of the indirect room reflections determine how we perceive the actual sound source, control of room reflections is a central consideration in acoustical design.

It is becoming increasingly important to be confident that what is heard in the studio is actually going on the air.

Room reflections can be manipulated by absorption and diffusion.

Regardless of how electronically sophisticated a broadcast production facility is, sound must eventually travel the acoustic paths from the speakers to our ears via direct sound and indirect reflections from surface boundaries.

Intense specular reflections from the room boundaries can cause false localization of the stereo images, corruption of spatial textures, frequency coloration, resonances, and confusing slap and flutter echoes.

An optimum listening environment can easily be created to minimize these problems through an appropriate combination of absorptive and diffusive surfaces.

Absorptive surfaces are in widespread use, but essential diffusive surfaces have not been commercially available.

Hence the acoustical design of broadcast facilities has relied heavily on absorption to control interfering reflections, with the accompanying side effect of creating a "dead" sounding space.

Typical broadcast facilities lack adequate sound diffusion because of their small size and the presence of excessive absorption.

In fact a defeatist attitude gave rise to the slogans "deader is better" and "no acoustics are better than bad acoustics."

But now with the discovery of broadbandwidth, wide-angle sound diffusors we no longer have to settle for an acoustically impoverished work space.

Design goals for a pleasant ambient monitoring environment in which we can accurately perceive stereo images, frequency balance, signal processing and signal quality are routinely being met.

RPG Diffusor Systems, Inc. has developed a new and unique approach to providing sound diffusion using a reflection phase-grating.

The RPG consists of a periodic grouping of an array of wells of equal width but different depths, separated by thin dividers. The depths are based on mathematical number-theory sequences.

The RPG behaves like an ideal sound diffusor in that the complex computer-designed surface scatters sound arriving from any direction uniformly in all directions over a broad range of frequencies—up to five musical octaves.

The sound scattered by the RPG is also attenuated, thereby minimizing frequency coloration and "comb filtering." Acoustical problems are eliminated without destroying the ambiance of the room.

In fact, the RPG psychoacoustically creates the "open" impression of a large room in a physically small space. Treated walls seem to "disappear."

Voiceover booths, usually relegated to the size of a closet, can be substantially improved.

Incorporating the system into a broadcast facility is very simple; application notes are available on request.

In most instances the RPG is simply wall mounted on the rear wall of a production, on-air or combo studio at ear level.

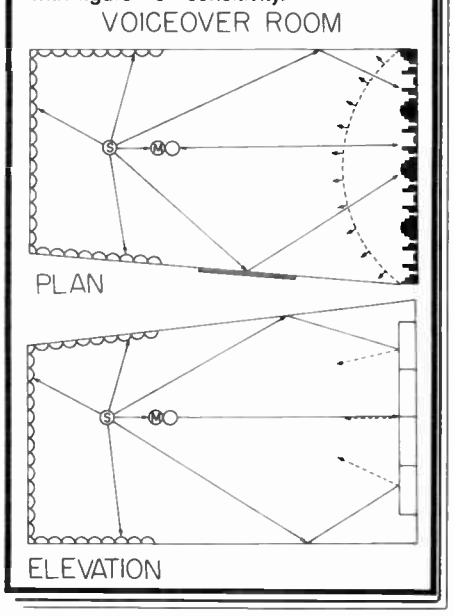
To enhance stereo imaging a new broad-bandwidth absorption panel called an ABFFUSOR™, because it both absorbs and diffuses sound, can be mounted on the front side walls and ceiling.

The RPG can also be conveniently mounted in standard suspended ceiling grid systems, so that existing and new facilities can easily be treated.

Figure 1 shows an effective design to create the impression of a large space in a physically small room such as a voice-over booth.

In the three years the RPG Diffusor System has been available it is quickly becoming an acoustical standard. The company has recently set up worldwide distribution. Numerous radio stations have already incorporated the RPG in production control rooms and in voice-over booths.

Figure 1. Absorptive treatment indicated by semicircles; diffusor cross section is indicated on wall at right. Solid lines indicate direct sound; dashed lines diffuse sound. S is source and M is microphone with figure "8" sensitivity.



Editor's note: For more information, contact the author at RPG Diffusor Systems, Inc.: 301-249-5647.

Digital Effects Entice New Listeners

(continued from page 29)

myriad effects, including pitch change, delays, echo, flanging, time compression and time reversal. It is the box used to produce the "voice" of TV's computer-age phenomenon Max Headroom.

Always something new

"Just when you think everybody's done everything, somebody discovers a new sound," says Shapiro. Shapiro says he has noticed that people seem to be experimenting more with the units than in the past.

Dave Ogden, sales manager for AKG, describes his company's ADR-68K as "a multi-purpose signal processor developed for the facility that wants to purchase one very good quality multi-effects device."

The ADR-68K delivers reverb, digital delay, sampling and other effects. It is not currently capable of pitch control, although Ogden says that feature will be incorporated in future software. (The next software update is due out in October.)

The unit is MIDI (Musical Instrument Digital Interface) compatible.

Orban's Co-Operator is primarily a "hands-off" level control device designed for use in either the production room or on the mic channel.

"Its main design criteria was to offer a lot of flexibility in terms of stages of processing available in the unit," says Goldstein.

Mic processing

Orban's new mic processor, which will be introduced later this year for under $2000, is described by Goldstein as "an arsenal of multifunction processing that will allow a station to preprogram a whole series of DJ mic settings so each jock will have a customized, preset character."

The processor includes a three-band parametric equalizer, a compressor, de-esser, noise gate and compressor gate.

It incorporates an effects send and return leveler that allows one to integrate external processing such as reverb within the processing of the Orban device.

It is also MIDI controllable, and can be preset in any of 32 different memories.

The Yamaha SPX 90II has gained an increasing amount of attention from broadcasters, according to the company's product manager, Jerry Tschepter.

The SPX 90II is programmed with more than 30 different effects, including reverb, echoes and delays, modulated programs, special effects programs and signal processing functions. It is MIDI compatible as well.

"Its use in broadcast is an interesting application," says Tschepter. "We're waiting to hear some more interesting uses of these kinds of effects on the radio."

MIDI trend in broadcasting

The fact that many of these processing and effects devices are MIDI controllable indicates a clear trend manufacturers—including those dedicated to broadcast products—see toward its increased use.

Goldstein, Tschepter and Ogden believe MIDI is gaining a foothold in broadcast, although all see its acceptance as slow.

"The main problem with MIDI right now (in broadcast) is that it is seen as a device used by synthesizer musicians," says Goldstein. "It has yet to be taken completely seriously by (radio) production facilities."

Ogden believes that "a maturing trend" must take place before MIDI products become totally appropriate for professional use in broadcast.

Broadcasters are, however, now integrating MIDI into their studios. Its current application is for making event-controlled program changes and parameter changes in effects devices.

But, whether MIDI controllable or not, processing and effects device use has increased dramatically, and prices have decreased just as dramatically.

Because of competition in the marketplace, and especially because of the quantum leaps made in digital technology, first rate production facilities are now within the reach of even smaller market stations.

Goldstein perhaps sums it up best: "More and more, the broadcast production room is becoming a mini recording studio."