FCC Chairman, Commissioners Confirmed
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Radio World®

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NRSC Sparks Clipping Furor

by Alan Carter

Washington DC An NRSC FM working group discussion of composite clipping has resurrected a heated debate over its use and has led to one manufacturer filing a complaint questioning anti-competitive action.

Modulation Sciences, manufacturer of the CP803 composite processor, asked the Electronic Industries Association (EIA), which sponsors the National Radio Systems Committee (NRSC) with the NAB, in mid-July to investigate if proper procedures were followed in the acceptance of a paper critical of composite clipping, according to a letter from Modulation Sciences counsel Harry Cole.

"The point of the paper appears to be to "embarrass" the product (composite clippers) off the air, as stated in the report," said Modulation Sciences Engineering VP Eric Small. "What I'm concerned with is that it appears to be that the EIA and NAB may be hosting very serious anti-competitive action."

Controversial proposal

The paper, written by Chuck Adams of Circuit Research Labs (CRL), proposes an increase in total modulation limit to 110% with a composite baseband spectrum mask and class for rules allowing different amounts of total modulation based on peak duration. Peaks greater than .5ms in length are held to 110%; peaks shorter than .5ms are allowed to 130%, according to the paper.

The paper was submitted voluntarily to the an NRSC FM subgroup discussing the issue, and made available during a full NRSC meeting just prior to the NAB convention in Las Vegas.

Small said he was not contacted about the paper's distribution. Upon learning, he had his attorney draft a letter to EIA

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Tom Becker of Air Systems Technologies examines structural details of WAEB's antenna tower.

Compromise on DAT

by John Gatski

Washington DC The recording industry and audio manufacturers have agreed to a compromise technology that would allow consumer DAT recorders to finally make digital-to-digital recordings while at the same time making it difficult to pirate tape copies.

The agreement may at last allow widespread acceptance of the technology among consumers and professionals, which has been held up pending threats of litigation from the Recording Industry Association of America (RIAA).

Under the compromise, the Philips-developed Serial Copy Management System (SCMS) would enable owners of a consumer deck equipped with the technology to record DAT copies from the digital outputs of a compact disc player, other digital tape player or digital radio.

However, the technology would not allow the copy to be digitally copied. If someone wanted to make more than one copy of a CD or pre-recorded DAT, they would need to use a fresh tape each time.

Just as important, the SCMS circuit would allow only one DAT copy made from the original DAT copy of an analog source (tape, record, FM broadcast).

The agreement, was tentatively made at a 9-10 June meeting in Athens, Greece, officially announced 26 July, finally

(continued on page 13)

Multipath Tests Are Underway at WAEB

by Charles Taylor

Allentown PA No longer will Allentown be known solely as the title of a Billy Joel song or the home of Alpo dog food.

For the broadcasting industry, at least, the city now is prominent as the site of testing to explore ways to defeat multipath interference, judged as the foremost technical problem shared by FM stations nationwide.

In an unusual show of cooperation, broadcasters and representatives of transmitter and car receiver manufacturers joined together here, using the facilities of WAEB AM/FM for four days beginning 29 July to document practical, on-site data on overcoming multipath.

Three distinct facets

I spent the first day with the team, observing players from three distinct facets of the broadcasting industry, including staff from General Motors, Delco Electronics, Ford Audio and Continental Electronics.

Harry Simons, one of the primary initiators of the project and CE at WAEB, characterized the variety of participants. "We've all got different backgrounds, different industries and different motives for being here. That's the catalyst. Each of us has a particular discipline that can be applied to understanding why FM receivers pick up the signals that they do."

How exactly do a group of technical reps of various interests in the broadcast and consumer electronics field combine their efforts to get the massive project off the ground? I was about to find out.

A day of preparation

The day begins at 9:55 AM. When I join the group, the 11 men involved in the testing are just shaking hands and, for some, introducing themselves.

One prominent presence is Ted

(continued on page 8)

FCC Nominees Get Nod

by Charles Taylor

Washington DC FCC nominees Alfred Sikes, Sherrie Marshall and Andrew Barrett were confirmed by the Senate for FCC posts 4 August, the day before Congress adjourned until after Labor Day.

The late evening vote squashed speculation that confirmations would be delayed after an informal hold was placed on a Senate vote following nominee hearings 31 July.

In the hearing, the three nominees were questioned by the Senate Commerce, Science and Transportation Committee for 2½ hours on issues ranging from the Fairness Doctrine to indecency.

According to Rebecca Kojm, a staff member with the committee, Barrett rose the dander of some members of the committee when he said that a primary reason for the prominence of indecent programming on television is because there is a market for indecency and violence. He added that most programming on domestic television is "extremely disgusting."

In spite of the controversy, the committee voted 1 August 15-2 in favor of the nominees. Sens. Albert Gore (D-TN) and J.D. Rockefeller IV (D-WV) dissented.

On 2 August, committee chairman Sen. Ernest Hollings (D-SC) contacted Senate offices with a recommendation that the item be confirmed, however, an unnamed Democratic senator voiced disapproval, placing an informal hold on the proceedings, Kojm said.

When Hollings investigated the disapproval, no senator came forward as disapproving and the nominee confirmation proceeded to the Senate floor. Unanimous approval was passed late in the evening of August 4.

Meanwhile, FCC Mass Media Chief Alex Felker and Chief of Staff Peter Pitsch have announced their resignations as expected, according to the FCC. Chairman Sikes is expected to bring in his own staff. No dates of departure have been set.

And amid a standing room-only crowd, FCC Chairman Dennis Patrick bid farewell at his final Commission meeting 2 August.

Patrick told the audience and his fellow Commissioners that while his departure was an exciting occasion, he met it with mixed emotions.

His future plans remain uncertain.

News Briefs

No Action on FM DAs Until Fall

Washington DC An FCC spokesman said no action is expected on petitions for reconsideration against the use of FM directional antennas in short-space situtations until early fall.

Action apparently is being delayed until new commissioners are appointed.

The issue is under docket MM 87-121.

NAB Makes Appointments

Washington DC Douglas Williams, president and GM, KWOX-FM, Woodward, OK, was appointed to the NAB Radio Board of Directors.

Williams succeeds Don Chaney, president, Broadcasters Unlimited Inc., Tyler, TX, who resigned for medical reasons. Williams will complete Chaney's term that ends in June 1991.

Also at NAB, Rick Dobson has been named VP, exhibits and associate membership.

Dobson joined NAB in 1987 as director of exhibits to start up an in-house exhibit office. He oversees the sales and operations of the equipment exhibits at the association's annual spring convention and the fall radio convention. Dobson also is responsible for all NAB associate membership activities.

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SBE Cuts Exhibit Hours by Half

Exhibitors Question Usefulness of Reduced Trade Show Schedule

by John Gatski

Kansas City MO Having faced a poor turnout at the 1988 Society of Broadcast Engineers convention in Denver, exhibitors are none too happy about losing half of their exhibit hours at the 1989 show in Kansas City, 5-8 October.

The 20 hours of exhibit time that was spread out over Friday, Saturday and Sunday in 1988 is cut back to 10 hours over Friday and Saturday for 1989.

According to show organizers, Sunday exhibit hours (9 AM to noon) were eliminated because of lackluster floor traffic on the final day last year. The Friday and Saturday hours are scaled back from 10 AM-7 PM to 10 AM-3 PM.

Defending the decision

SBE defended the fewer exhibit hours on Friday and Saturday and pointed out there will be no technical sessions scheduled during that time.

"There won't be a problem. They (the hours) were set up on the basis of an exhibitor survey," after the 1988 show, SBE VP Bob Van Buhler said.

Several manufacturers, however, are not so sure the new hours will be cost effective for them. Although some agreed that Sunday may have been wasted time for exhibitors in most cases, they are worried about the much shorter hours on Friday and Saturday.

Exhibitors were notified about the time reduction in a letter from show organizer Eddie Barker and Associates in February, several months after exhibitors committed to the show.

Many admitted they disregarded the letter until recently when they received their registration packets and detailed schedules.

"Yes, it bothers us a bit," Circuit Research Labs (CRL) Radio/TV Marketing Manager Bill Ammons said. "It's going to make it tighter, as far as the number of people we are going to see. I'm a little worried."

Keep Sunday hours

QEI Chief Operating Officer Bill Hoelzel also does not agree with the decision to trim the hours from the Friday and Saturday schedule and eliminate Sunday.

He said the Sunday hours actually were profitable for his transmitter sales, and although 7 PM may be a little long for the other days, cutting the hours back to 3 PM is too drastic.

"I would like to see it go to 5 PM," he said.

Hoelzel said he chose the SBE show over the NAB's Radio '89 show because of its (lower) rates and its engineering emphasis.

"I would have liked to have known about the time changes back in the fall," he said, when he was deliberating which 1989 shows to attend.

"We would like to have those hours back."

Now, it will be a "wait-and-see thing" to see if the decision is the right one, Hoelzel added.

Pacific Recorders & Engineering Sales Manager Anders Madsen said maybe the change will work out for the best, but he is not overly confident.

"I can appreciate the fact that the times were changed not to conflict with the technical sessions . . . but historically they didn't interfere that much," he said.

"We would like to have those hours back," he added.

Gentner Electronics Broadcast Marketing and Sales Director Gary Crowder said the exhibit hours should run to 6 PM.

He noted, however, the decision not to schedule technical sessions during the exhibit hours may succeed in bringing a few more people into the exhibit hall.

Crucial year

Several companies said the 1989 SBE national show, which is in its fourth year, may be the pivotal year in whether the show will succeed or not.

Last year, there was general disappointment in the low attendance, which was attributed to switching locations from the Midwest to Denver. Over the next five years, the show is set for several cities in the Midwest and the East.

Show organizer Eddie Barker, president of Eddie Barker and Associates, said the shortened hours will not reduce the quality time for exhibitors at the Kansas City show.

"They (exhibit hours) will be very concentrated, straight exhibit hours without anything running up against it," Barker said.

For information on the show contact Eddie Barker and Associates at 214-720-1335 or SBE at 317-842-0836.

Loud, Clean, Clipped or What?

by Judith Gross

Falls Church VA Listeners in the **City of Angels** are sending a clear message to FM stations. According to Birch, Westwood One's **Pirate Radio**, KLQZ, has shot up to #2.

Okay, Arbitron has them at #5, but the message is the same: somebody out there likes the renegade sound.

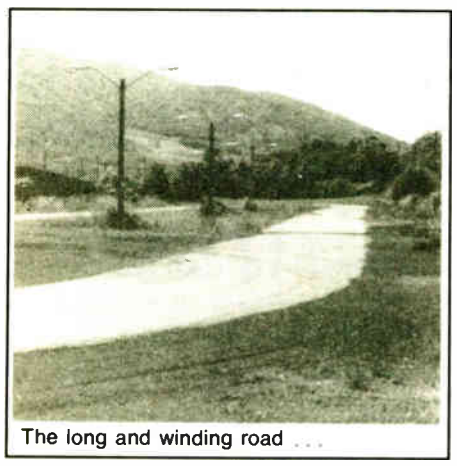
From the point of view of those concerned about the overuse of **processing** to get "that" sound, be it loud, full or whatever, the ratings pose some **interesting dilemmas**.

I remember the same phenomenon, from the point of view of a listener rather than a participant, back in the Big Apple several years back.

The inimitable **Scott Shannon** had the reins of the then fledgling **Z-100** (WHTZ) firmly in hand.

See, they were the new kids on the block, competing with such legendary powerhouses as the ABC-owned **WPLJ** and the much loved **WNEW-FM**, also the "Apple"—then **WAPP**—now **WQHT**, I think, or something, since the massive switcheroo that took place on the dial last year.

Anyway, I can recall the formula. The music was new, okay, but it was **that**



The long and winding road . . .

sound. *That* sound. Whenever you switched to the station, you knew it was the Z. Didn't know at the time (although I think I do now) what the heck it was they were using, but it was louder or more distinct than the other toys in use in the market.

I remember finding it hard to listen to. (I'm still convinced your ears can take less of that stuff as you age, or ripen, or whatever.) But I also remember my younger colleagues loved it. So did a lot of other Noo Yawkers. Result: **ratings success** for Z-100, a success which continues today.

So now Mr. Shannon takes control of **Pirate Radio** in L.A., and history shows every sign of repeating itself.

Meanwhile, back at the ranch the **debate rages** over whether processing, clipping and the like helps or hurts a station in the only way that really counts: ratings.

The only thing that's clear is that everyone becomes **very vocal** when technical interests and business interests collide.

Most engineers want their stations to have the best, cleanest quality signal possible.

To some, that means **backing off** the processing, while others tell me they are

clean and loud and legal and still use clipping—at least some clipping. And there are new filters out there that let you **crank up** the processor and still sound **clean**.

And then there's Modulation Sciences **FM ModMinder**, which says you can **back off** the processing and still sound **loud**.

No easy answers for now. But what isn't hard to figure out is that no station wants anyone actually *telling* them what they can or can't use. As long as they stay within the rules.

So what do you think, clipping or no, loud or what? Where is the road to **creative processing** leading us? Let me hear from you . . .

☆☆☆

Allentown, in Pennsylvania's Lehigh Valley, is a good choice for **multipath tests**. It's nice to see consumer electronics manufacturers and radio engineers getting together to solve a persistent problem.

The tests are at **WAEB**, and chief engineer **Harry Simons** got Radiotechnique's **Ted Schober**, Ford's **Sly Parambo** and **Rick Zerod**, Delco's **Jim Gotshall** and **Dick Kennedy**, CRB's **Dave Mackenzie**, Air System's **Ralph Chambers**

Dave, Ted, Harry, Sly and the multipath gang

and **Tom Becker** et al together for a group shot near the tower.

Okay, so one of the test sites is in a place where not too many folks listen, (it's in a cemetery), but the other sites, including this scenic stretch of highway, plus the readings from the air, should provide some **valuable info** to the NRSC about what might be done.

They'll be defining multipath first, looking at SCAs later, and a lot of vendors and experts have volunteered time and gear for the effort.

During the bus tour of the sites, Harry and gang decided some last minute widgets were needed and hopped out at the local Radio Shack.

It was like a free for all on shopping day with first one engineer then another, then a third remembering "a thing or two" he needed at the "shack." Gee—can't take you guys anywhere.

We'll keep you posted on the tests . . .

☆☆☆

It was great to be back **on the radio** again.

Tom Dantoni, who has a gig with the **American Radio Network** invited *JG* and **Radio World** up to Flite 3 studios in Baltimore for his late night (early morning?) talk show a coupla weeks back. The subject? Radio, of course.

Callers from the midwest and even a few insomniacs back east called in to chat about things technical and some not-so-technical.

Biggest beef is that there **aren't enough jobs** that pay engineers enough to live on. Also that the financial interests in control of station sales are at times bleeding the technical budgets dry in the whirlwind of wheeling and dealing.

Tom was interested in the efforts afoot to help AM radio, and amazed that **AM stereo** is still embroiled in a standards war after all these years (he's not alone).

Nice to see that radio is interesting to those outside the industry, and a good subject for a radio talk show. Thanks, Tom, for the chance to get back on the **other side** of the mic. (Anybody got an opening for a part-time voice? With experience?) And the Sip 'N' Bite *was* a good down-home choice for an early breakfast . . .

Whenever I get an envelope from **KKGO-FM** in Los Angeles, I always sniff it before opening. That's the only way I can tell if the jazz station is again sponsoring the West Hollywood **Garlic Festival**.

An envelope with a distinct air about it arrived the other day. Inside was the announcement and the prerequisite pieces of—what else?—**garlic**.

Not complaining, now, after all, it's great on pizza and all that. But I'm wondering, KKGO, if you couldn't start sponsoring a **chocolate festival** instead?

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 1989 edition* **Radio World** *mug.*

Montoya Speaks For Stronger SBE Future

by Paul Montoya

Denver CO The Society of Broadcast Engineers celebrates its 25th anniversary this year and as members I feel we have to reevaluate what we are all about.

Where do we expect our organization to be twenty-five years from now? What role will we take in seeing to our expectations? What should be our primary purpose as a professional society?

I was dragged to my first SBE meeting 13 years ago by my then chief engineer of the radio station I was working for here in Denver.

GUEST EDITORIAL

My first fear in going to this meeting was one of intimidation. Here I was, a green two-year broadcast assistant (2nd assistant at that!), going to a meeting of the minds. Some of these engineers locally had been in broadcasting for over twenty-five years. One of them was even a founding member of SBE.

I wondered, "Would they catch on that I knew very little about my craft?" "Would I say something to embarrass me or my boss?"

I sat near the back of the room just listening and not daring to say a word regarding broadcast engineering. To my surprise I found most engineers listening and learning rather than pontificating. Even the older, seasoned engineers seemed to be learning through listening to the stories, horrors and triumphs that different engineers had to share.

I was never made to feel an outcast because I didn't have a resume longer than my left arm or I wasn't wearing a tie. This was a mix of engineers just sharing many different ideas.

Sometimes within the SBE I think we tend to forget that the primary function of this group is education.

Sure it's nice if we can lobby or influence or further the positive perception of the broadcast engineer. But we must also remember the primary function of the SBE is, as the bylaws of the Society state, "the diffusion and increase of operational and scientific knowledge in broadcast engineering . . . ".

I feel that many members see the SBE as a select group. Many members see us as a protection group for broadcast engineers. I hope we don't turn into any of these, but rather continue to keep mindful that we are a group dedicated to the working engineer.

God only knows that there are few outside resources for the broadcast engineer to utilize in furthering his or her knowledge of this business.

The next few years within the SBE will be fun to watch as we continue to nurture our fall convention into a show that will be an education "must" for the engineer.

It will be interesting to see our certification program continue to show the non-technical broadcast community who the engineers of worth really are. I look forward to actively participating in this growth as we make hard decisions as to our future.

We are now a group of over 5000 members yet have little administrative structure to our organization. This may not always be bad, after all I am an advocate of smaller government.

But with a group of this size and if we are to be responsive to the needs of the members, we must have people to handle the execution.

We presently have an all voluntary board carrying most of the work load, (or in some cases not doing much of anything) while trying to maintain a working wage to feed the family. We have a convention director who is expected to maintain his regular job and still produce a national convention.

We have two full-time staff members who maintain the membership, working with dues collections and handling applications and certification paperwork, but have little time outside of this for developing the Society.

We must consider and hopefully take action as to handling the day-to-day business and continuing the growth of the Society. Growth not only in member count, but what we can further do to strengthen the management of the organization as we increase broadcast engineering knowledge. By not doing these things we are not being responsive to the memberships needs.

Finally, I hope that all of us now chief engineers will continue to drag those green, inexperienced engineers to their first chapter meetings. Some future old-time broadcast engineer will thank you.

■ ■ ■

Paul Montoya is Chief Engineer of KXXL AM-FM/Denver, a member of the SBE board, and currently running for SBE president. He can be reached at 303-832-5665.

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A Crucial Crossroad

For the first time in a long time, the SBE membership is faced with a clear choice in leadership as ballots for president of the organization arrive in the mail.

Voting members will see not one, but two candidates for president: one nominated by the current board and another emerging from a grass roots effort.

It's a crucial time for the SBE. With the numbers of new engineers being attracted to the radio broadcast field on the decline and the ranks among current station engineers diminishing through cost-cutting measures, strong leadership is needed.

The organization's national convention, threatened by poor turnout last year and by continuing changes in venue, is also at a critical crossroad.

Effective leadership is needed as well in two other important areas. Education and the exchange of ideas, which is the reason the SBE first came into existence, should be a priority with whomever takes over the helm of the organization.

And now more than ever is the time for the SBE to take some decisive action toward a national director and central management.

Voting for new leadership gives every SBE member a say in how to solve today's problems while building a more prosperous future.

In light of the pressing concerns of a changing broadcast engineering scene, it's the right time for the SBE membership to undertake some careful self-scrutiny and decide exactly what they want to be and what roads they will embark upon.

The decisions made today will decide how the organization, and the entire broadcast engineering profession, will be viewed in the future, and how effective an industry force they become.

—RW

READERS FORUM

Send comments to: Readers' Forum, Radio World, Box 1214, Falls Church VA 22041 or MCI Mailbox #302-7776; or call 800-336-3045.

Comments on closed meeting

Dear **RW**:

Regarding your article and column (26 July **RW**) on an NAB-EIA meeting to discuss the possibility of a service mark for marketing improved AM-FM radio receivers, I have five comments:

1) It's no surprise to radio broadcasters that NAB and the EIA are holding service mark discussions. See the April 3 and June 16 issues of *RadioWeek*;

2) The broadcasters who attended the meeting had received input in advance from a wide variety of other radio broadcasters, including 20 who attended NAB's AM Improvement Retreat this spring, at which EIA was also represented. The NAB Radio Board, which is elected to represent members, discussed the service mark and the meeting with EIA in June. On the day that meeting ended, each board member received a summary of their discussions, including the service mark, for use in reporting to his or her broadcaster constituency. The same summary was also distributed to the broadcasting trade press that day;

3) There is a specific reason why the NAB-EIA meeting was closed to the media. One of the basic rules of brainstorming is that no idea is too wild. Sometimes "ridiculous" ideas can spawn useful ones. However, when participants know whatever wild ideas they suggest will be reported and editorialized upon, they are inhibited. That inhibition destroys the very purpose of the meeting;

4) Although you were not allowed to sit in on the meeting for the reason just stated, NAB helped you by providing a list of the names and phone numbers of all participants, so that you could interview as many as you wished afterward;

5) Since the issue of the closed meeting appears to be very important to you and because we have had previous conversations on other matters, I find it strange that you did not phone me on the morning of the meeting—or ever—to complain about or discuss the matter. I had to call you.

Walter Wurfel, Senior VP Public Affairs
and Communications
NAB
Washington DC

Demand for IC durability

Dear **RW**:

In regards to the 12 July Sprague IC stereo decoder article ("Hot Smashing Triggers Blending"), these chips would appear to be half-baked defective designs if they can't handle all possible legal FM audio processing setups.

In highly competitive radio markets, engineers will be making endless efforts to "trick up" the audio presentation. The FM receiver OEMs who buy the new Sprague ICs will have to be assured that they have sufficient design margins to accommodate real conditions in the marketplace; otherwise their receiver products will confront a spray of *Consumer Reports* black circles and unhappy end users (who will notice that the new radios don't sound right on the most popular hit music stations).

Jim Duncan, CE
KWSS-FM
San Jose, CA

Next Issue RW
September 6

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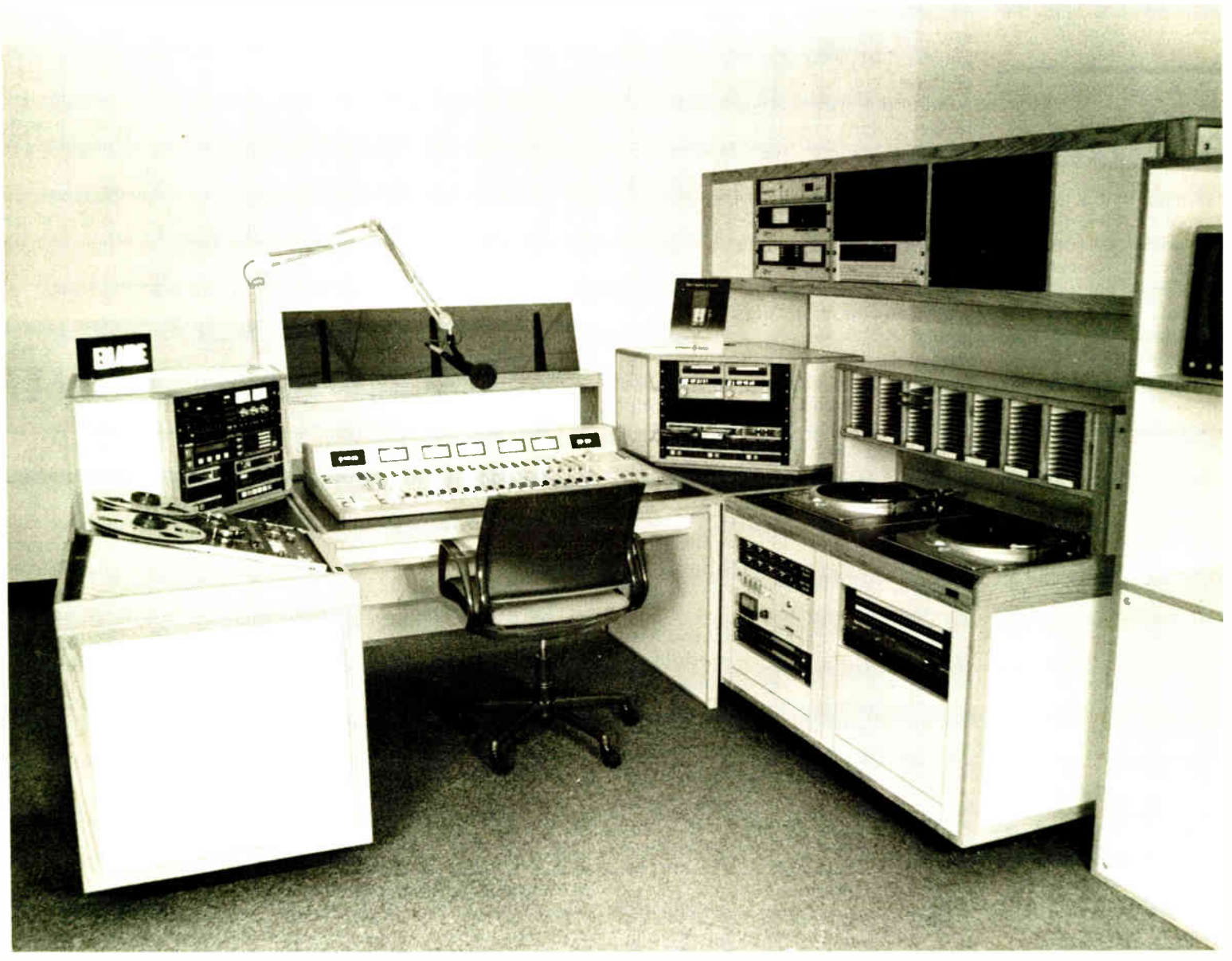

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VA FMs Go to Satellite Simulcast

by John Gatski

Petersburg VA Question: What does management of radio station A do when station B's signal overlaps its signal in a similar coverage area on the same frequency?

Answer: Station A buys station B and spends money to simulcast both stations via satellite.

In this case, station A happens to be Petersburg, VA-based WPLZ-FM (99.3), which purchased WYND-FM, a 3 kW light jazz station in Spotsylvania Courthouse, VA, in March and began transmitting a simulcast signal relayed by Westar IV satellite.

WYND is now WPLC and both stations broadcast WPLZ's urban contemporary format. The simulcast began 1 July.

"We are the only ones doing satellite on this small of a scale," WPLZ/WPLC CE Jimmy Stewart said.

A unique setup

WPLZ/WPLC is the only station in the country that is simulcasting via satellite on the same frequency, according to the NAB.

"It's a Class A station that has the range of a Class C station," said Glenn Mahone, president of Paco-Jon Broadcasting Inc., which owns the stations.

He said the simulcast transmits a clear signal for 120 miles, reaching as far north as Quantico, VA, about 30 miles south of Washington, DC, and as far south as the North Carolina border.

"We have to use a road map (to define our coverage area)," Stewart said jokingly.

Mahone said he began thinking about buying WYND and simulcasting almost as soon as it went on the air in March 1988 and began causing signal problems for WPLZ.

WYND created an overlap problem along a 20 mile area near Richmond, VA. WPLZ is about 35 miles southwest of Richmond while WPLC (WYND) is about 40 miles northeast of Richmond.

When they were separate stations, FM receivers in the problem area often had difficulty staying with the desired signal.

A worthy investment

WPLZ decided that it would be worth the money to buy the other station and simulcast the signal. In addition to solving a signal conflict, simulcasting presented a chance to increase the station's listener and economic base.

Paco-Jon Broadcasting sealed the deal on WYND for $1.2 million in September 1988 and took it over in March. The station was taken off the air until the conversion was completed.

Jim Stewart (left) and Glenn Mahone, of Paco-Jon Broadcasting

The station decided on the satellite relay method because of the distance between the two transmitters, Mahone said.

Although simulcasting by satellite is expensive—a price tag Mahone declined to reveal—he said it is less expensive than a direct phone link or a microwave link.

A microwave simulcast required an expensive relay somewhere between the two stations and a phone link all the way to Spotsylvania Courthouse was expensive because the towns are in different phone company zones, Mahone said.

Stewart said the simulcast system is not terribly complicated, consisting of two 3.5 meter Prodelin dishes and a telephone-to-satellite uplink to the Capitol Radio News Network satellite transmitter in Richmond.

"We have to use a road map (to define our coverage area)."

WPLZ's programming signal is fed over the phone line to the Capitol News Network dish, which beams the signal to Westar IV. Westar IV then beams the signal to both station dishes, which are connected straight to the transmitters.

WPLZ uses a Continental transmitter while WPLC is equipped with a Harris transmitter.

Extended coverage

The result is a much-extended coverage area for WPLZ and a 14 mile signal overlap reduction, down from 20, Stewart noted.

When driving within the remaining six miles of overlap area, "you never lose your stereo pilot, but it (a car receiver) switches back and forth between the two signals," Stewart said.

He noted, however, that even in the narrow overlap area, the signal switching is less noticeable because the programming is the same.

Stewart also has noticed a slight RF buzz at certain locations, but said he believes it is caused by WPLZ's AM transmitter. When it is turned off, the noise disappears, he added.

The station is considering a synchronous transmitter system to totally eliminate signal overlap, but Mahone is not sure it is worth the money to get rid of a six mile sliver of problem area.

Overall, Mahone said he believes the station made a wise investment in the simulcast system because it cleaned up a signal problem, doubled the coverage area and also allowed a larger advertising base.

He said it meets all FCC guidelines including serving the public interest of the communities in which stations are located.

"We are blazing new ground," Mahone said. "It is a unique situation."

For information, contact Glenn Mahone or Jimmy Stewart at 804-733-4567.

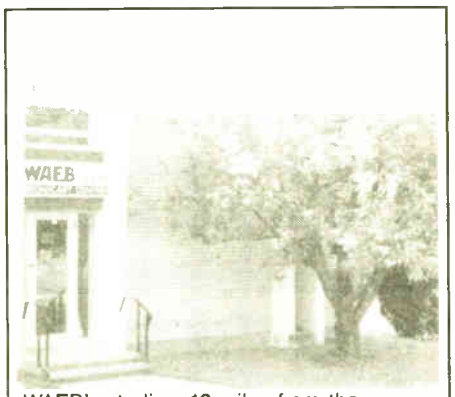
Multipath Tests Draw Engineers

(continued from page 1)

Schober of Radiotechniques, a recognized expert on multipath and its effects, who, like the others, volunteered his time for the project.

Other participants include Barry Koch from General Motors; Tom Cornell, Jim Gotshall and Dick Kennedy from Delco Systems; and Rick Zerod and Sly Porambo from Ford Audio.

Ken Branton is representing Continental Electronics; with Ralph Chambers and Tom Becker from Air Systems Technologies, a Miami company that's designed a computer program able to measure and draw a station's signal within a three-mile radius in real time—from a plane.



WAEB's studios, 12 miles from the antenna site

Dave Mackenzie, CE at WJRB in Wilmington, DE, is present on behalf of CRB Broadcasting, which also owns WAEB. The company generously agreed to donate the station's facilities, as well as Simons' time, to the project.

At 10:15 AM we divide up between Delco's test van, Schober's van and a van rented for the bulk of us (complete with driver Mary Ellen, a full-time high school bus driver) and follow Simons 12 miles to the station's transmitter and antenna site.

Four testing phases are planned over six months. The first phase, which began the weekend we gathered in Allentown, focused on taking measurements in a number of specific locations within the WAEB listening area.

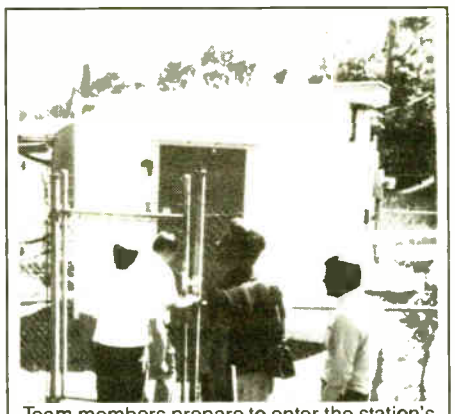
The results will be submitted to the National Radio Systems Committee (NRSC), in hopes of providing manufacturers with information to build better equipment.

Judging the ups and downs, twists and turns of the traveling we did in a day, I can vouch for the statement that Allentown, with its mountainous terrain, is among the worst multipath regions in the country.

When we arrive at the antenna site at 11, the 12 of us take turns squeezing in the miniscule transmitter building to scan Simons' set-up. Then, with little discussion, each man begins pursuing his own quest within the multipath mission.

Schober wastes no time in beginning to install an ACM-1 box from Radio Design Labs, which reads AM incidental noise.

Simons and Mackenzie tried in vain to repair the station's Electro Impulse water-cooled dummy load, first changing a resistor, then checking a teflon-coated tube for leaks. Within an hour, the pair had taken the piece apart, put it back together, and it still wouldn't work.


Team members prepare to enter the station's transmitter shack.

Becker with Air Systems Technologies evaluates WAEB's antenna formation, even climbing a third of the way up to check whether the paint on the tower was affecting its grounding. He then draws an intricate diagram, noting any changes in the antenna set-up he thinks might make the testing more universal.

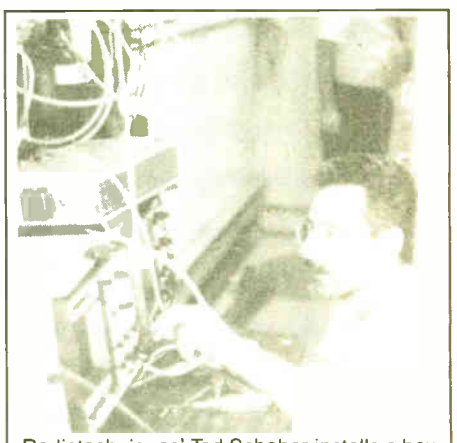
The Red Cross

12:45 PM . . . Leaving Schober with more preparation at the transmitter site, some of us head for the "Red Cross" of radio engineering—Radio Shack—for a host of equipment, including BNC connectors, adapters, coils, project boxes and diodes.


WAEB's signal was measured and drawn in real time from a plane.

The Delco folks and Continental's Branton, meanwhile, are working on connecting the equipment in the test van, and we end up crossing paths with them at Radio Shack as they buy adapters and wire. Branton buys the parts to build a circuit on-site that will allow the group to pulse the transmitter.

1:05 PM . . . Simons leads us in the van to see each of the four sites where testing will ensue. They were chosen by Simons because each characterizes noticeable multipath within WAEB's listening area.


Radiotechniques' Ted Schober installs a box to read AM incidental noise.

The first, however, isn't likely to draw a lot of complaints from listeners: it's in a cemetery.

When ready for testing later in the weekend, the Delco test van will drive through a strip on premises at 5 MPH, measuring with spectrum analyzers, chart recorders, distortion analyzers, field intensity meters and multipath analyzers.

We next stop by a site set low in the region's Lehigh Valley and shielded on one side by the Blue Ridge Mountains. The simple loop of paved road off of the road is the most palpable of the sites, Simons explains, because it allows the truck to circle continuously, which is essential for consistent test data.

That won't be as easily accomplished on the remaining two test spots. One heads three blocks from 10th Street to 7th Street through the center of downtown Allentown. The other makes a line through the parking lot of Parkway Shopping Center.

For these two sites, Simons secured permission from the Allentown mayor's office and police department to have the areas roped off for uninterrupted testing. For each, a police escort will accompany the test van.

(continued on next page)

FCC Cracks Down On Tower Light Violations

by John Gatski

San Francisco CA Making good on its "get-tough" policy for broadcasters without operational tower lights, the FCC has fined KIQI-AM $8000 for violating tower light requirements and $1000 for possible falsification of records.

KIQI-AM is a 25 kW Spanish format station located in the flight path of Oakland International Airport and the Navy base at Alameda. It was notified of the violation in May after San Francisco FCC inspectors saw the station's three directional towers operating without the required flashing beacons.

The inspectors also found that the inspection log indicated that despite the non-working beams, station personnel had logged in daily visual inspections of the tower lights.

Questionable log

Because daily inspections imply that the lights are properly functioning, inspectors suspected possible falsification of the log, FCC officials said.

The FCC has not yet determined whether the inaccurate log was filled out intentionally or not.

KIQI President and GM Rene De La Rosa said he has filed denial of charges with the FCC because the station has not been in violation of any rules.

San Francisco FCC field office engineer S. Marti-Volkoff said the lights on KIQI's 206' towers are critical to safe aircraft navigation.

(continued on page 15)

FM Testing

(continued from previous page)

3:25 PM . . . At the studios. I've never seen a CE's office look so plush. Or so orderly.

Simons explains that the station has just expanded its building and with it,

Engineers consult a manual at the transmitter site.

remodeled the studios and offices.

Simons calls the transmitter site, looking for Schober, but he apparently is at one of the test sites. Air System Technology's Chambers and Becker study Simon's topography maps of the area to plan their flight pattern for testing tomorrow.

The pair then heads for the airport to begin hooking up the gear necessary to

Dave Mackenzie (l) and Harry Simons work on WAEB's water-cooled dummy load.

take readings. They mention that they have another eight hours of work before they're done for the day.

5 PM . . . By now, the team has pretty well split up into factions. Delco, Ford and Continental's reps, along with Mackenzie, are working to set up the test equipment for tomorrow's initial measurements. Simons is headed back to the transmitter to meet with Schober.

The day has been active, despite few tangible results. Still, here in a forum aimed at improving FM reception for everyone, a rare teamwork between diverse parties who often talk but seldom agree, has had its debut.

Clipping Controversy Heats Up

(continued from page 1)

questioning areas of solicitation, industry notification and adherence to EIA Legal Guides, which place a burden of notification on the trade association when it engages in standards-setting activities.

The NRSC FM working group on composite spectrum occupancy was unaware the paper would be submitted until a meeting 5 April in St. Louis, said NAB Staff Engineer Stan Salek, NRSC coordinator.

Working group chairman Ed Anthony of Broadcast Electronics also said he did not know the paper was going to be submitted until he arrived for the meeting.

No promises made

Adams said he asked Salek, a former CRL employee before joining NAB last year, and Anthony if the working group would be interested in a paper but he never committed to the project. He said he wrote the paper several days before the meeting, during which he submitted it.

Anthony said that when the paper was submitted in April he initiated action to have manufacturers and engineers involved with clippers contacted, specifically Small at Modulation Sciences and Frank Foti of Cutting Edge Technologies, Cleveland, OH.

However, when questioned at the beginning of August, neither Small nor Foti, nor Jim Somich of Somich Engineering, another vendor of a composite clipper, had been contacted by NAB.

Salek said he was waiting until the next meeting of the working group could be scheduled, a meeting difficult to set up because of repeated conflicts during the summer.

The paper was available at the full NRSC meeting 27 April during the NAB convention in Las Vegas. In addition, it has been quoted in another trade publication in an article on processing.

"Not all composite clipping is bad."

NAB Science and Technology VP Michael Rau said the paper was distributed no differently than papers in the past. He said the letter to EIA was the first he'd heard of any questions about the paper and questioned why Small had not called him.

No problem seen

Anthony said he did not believe there was a problem with circulating the paper, which is identified as a "proposal" to the FM subgroup, to NRSC members and interested parties.

Anthony, however, noted that he did not believe it would be appropriate for CRL to distribute the paper.

Salek said he did not know whether the NRSC or CRL had the papers copied for circulation.

Adams said he thought the NRSC did because he gave the staff a master copy. He said the only distribution CRL made was approximately 50 copies, available at the company's booth during the NAB convention. He also said he presented a slide show on clipping at the Public Radio Conference in May.

Adams said the commentary on his findings are to stimulate discussion within the industry and to encourage action within NRSC.

Foti, designer of audio processing equipment and known for his engineering role in the FM loudness wars, said he agreed with the findings on the effects from composite clipping but disagreed with the conclusions. Foti said radio stations can use composite clippers but they need to be filtered. He is marketing a new filter called the "Dividend."

Foti said broadcasters want "technical tools" to compete in today's competitive FM market. "The broadcasters are worried and asking, 'What do you mean you are going to take this away from me?' "

He said he is convinced that composite clipping can exist in FM with protection to an SCA and upper composite spectrum.

Somich questioned the CRL testing with an old CRL clipper that isn't on the market anymore. Somich makes the DBE1000 clipper. He was not aware of the NRSC work.

"These people have to make a differentiation between clean and dirty composite clipping," Somich said. "Not all composite clipping is bad."

Somich said he would participate in NRSC testing if invited; otherwise not. He doesn't believe the FCC would make the changes required to meet the CRL proposal.

For information on the NRSC FM working group, contact Stan Salek at the NAB, 204-429-5391, or Ed Anthony, 217-224-9600.

New Hope for End to Loudness Wars

Modulation Monitoring Strives for Accuracy

by John Gatski

Brooklyn NY Following preliminary demonstration and testing, a new device to measure an FM station's modulation has generated high interest, a little controversy and diverse discussion about the future of heavy processing.

Modulation Science's FM ModMinder is receiving high marks for its ability to increase modulation and allow stations to cut back on limiting and other types of processing designed to increase loudness.

In these days of loudness wars among stations, the industry is so abuzz about the ModMinder that even the NAB is taking an active look at the product.

Change in rules

According to Eric Small, VP of engineering for Modulation Sciences, the ModMinder actually changes the way a station has been used to measuring modulation.

It is a modernized modulation monitor that Small said will more precisely measure modulation peaks based on the FCC's pre-1983 rule that required an FCC type-approved modulation monitor.

The use of an FCC approved modulation monitor rule was deleted during radio deregulation in 1983, but stations are still expected to refrain from overmodulating in order to avoid interference to adjacent stations.

Under old FCC ATS rules, a station was overmodulating if there were more than 10 peak flashes in an average minute.

FM ModMinder also counts peak flashes but uses a "rolling minute" in time and defines the peak differently.

Ignores the peaks

According to Small, a 1 to 4 dB modulation increase is possible with the ModMinder because unlike conventional monitors, the ModMinder ignores the very brief peaks that last less than one millisecond.

The conventional monitors do take these short peaks into account, which is why they indicate more modulation,

(continued on page 17)

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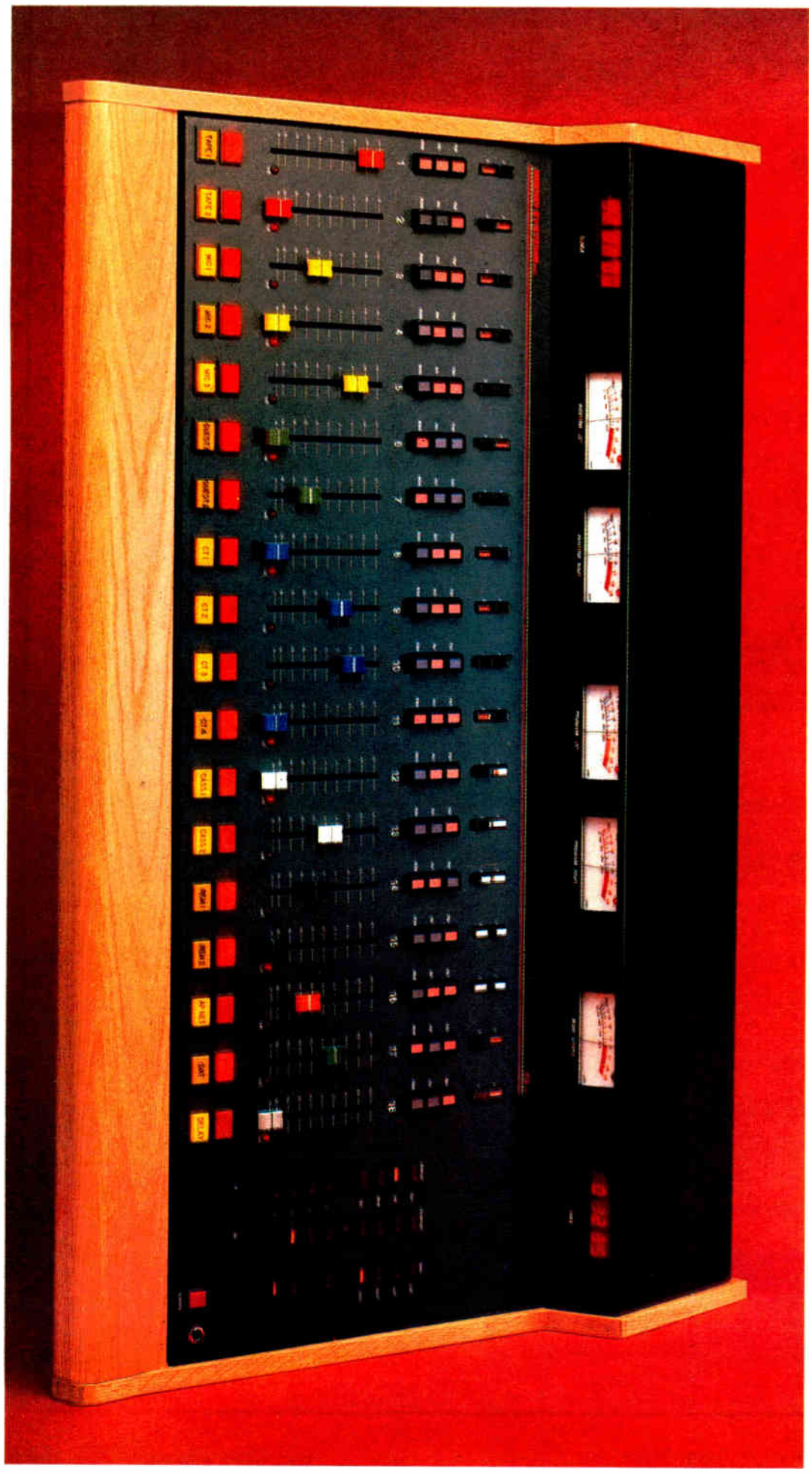

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"When we designed the RS Series Consoles we applied a lot of technology and experience to a simple concept — that all good broadcast consoles cost too much!

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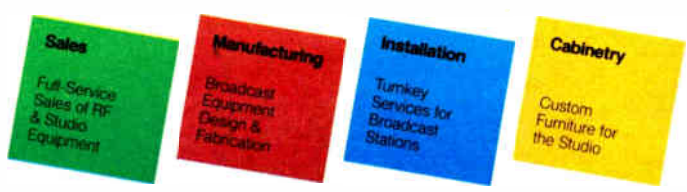

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Sides Reach DAT Copy Agreement

(continued from page 1)
may loosen the choking hold the copyright protection controversy has had on DAT for the past few years.

Professional DAT decks, which are very expensive, allow unlimited digital-to-digital copying, but sales of those units also have been affected by the controversy.

Many audio experts believe the SCMS technology will help the DAT market, although some fear that those with electronics know-how easily can defeat the SCMS circuitry.

Despite the potential tampering SCMS may encounter, the RIAA and the International Federation of the Phonographic Industry (IFPI) signed off on the agreement.

Lobby for SCMS standard

Also agreeing to the compromise were major hardware makers such as Sony and Philips, the developers of the compact disc. The agreement will push for legislative or administrative efforts to get the SCMS technology adopted worldwide.

"I am pleased that after years of struggle, we have reached this agreement compromise with hardware manufacturers regarding digital audio tape," RIAA President Jason Berman said. "The proposal for a technical restriction on unlimited DAT copying establishes an important precedent for the protection of intellectual property."

The copy limiting technology works by allowing the DAT machine to read and indentify the imput sources. It then assigns the tape a code based on whether the imput is copyright protected and digital or analog.

Copyrighted digital material, such as a compact disc or pre-recorded compact disc, would be identified as such by the DAT machine, which would then assign a "1,0" bit flag to the tape, which means it could not be copied digitally.

An extra copy

With an analog source, the DAT copy is digitally coded with a "1,1" bit flag which means it can be copied digitally one more time. If it is copied again, the the original DAT copy is then coded as "1,0" and cannot be copied any more.

Unlike the inhibiting frequency "notch" that was previously proposed for digital material, the SCMS will not affect the sound of a digital recording.

Since the information that cues the SCMS-equipped DAT player is located in the inaudible channels, it will not affect the musical quality whatsoever, according to the RIAA.

Audio equipment consultant and writer Leonard Feldman said the SCMS technology is a "good compromise" for the DAT controversy.

He said the agreement is significant because it finally allows digital-to-digital copying, which was opposed by the recording industry.

For information, contact Jason Burman at 202-775-0101 or Leonard Feldman at 516-482-5629.

Studer-IMS Marriage is Imminent

by Frank Beacham

Menlo Park CA Studer Revox, the Swiss manufacturer of precision professional tape recording equipment, is in final negotiations to purchase Integrated Media Systems (IMS), maker of the popular low-cost Dyaxis digital audio workstation, **RW** has learned.

It also may be the mating season for at least two other digital workstation manufacturers as industry speculation focused on the availability of WaveFrame Corp. of Boulder, CO, manufacturer of the AudioFrame workstation, and New England Digital (NED) of White River Junction, VT, manufacturer of the top-of-the-line Synclavier system.

"We are right now in negotiations. Yes, we've had negotiations," said Bruno Hochstrasser, chairman of Studer Revox America, refusing to name IMS as the acquisition target. "We'll have an announcement in about 10 days."

Studer's Los Angeles sales office was less evasive. "It's in the works," said Studer's Vince Welles, who referred questions to the company's American headquarters in Nashville. The Nashville office had no comment.

Announcement soon

Lee Cochran, CEO of IMS, based in Menlo Park, refused comment on a Studer acquisition but did not deny that a sale is imminent.

Public relations spokesmen returned calls to chief executives at both WaveFrame and New England Digital.

(continued on page 15)

FROM THE TRENCHES

by Alan Peterson

Dear *JG*,

I'm happy to report that next month I'll be the newest voice at WSBS, Great Barrington, Massachusetts. A couple of years ago this was the last 250-watter in the state and now boasts a cleaner, more powerful signal, a new FM side and a building which has been expanded every way possible.

When I get to Massachusetts I'll send you a lobstah.

Sometimes, even a part-time job can be an incredible eye-opener. I recently landed a two-week dinner theater gig playing banjo (not a lot of call for that sucker nowadays) in Auburn, New York.

While in town I happened across WPCX-WMBO and inquired about covering for anybody who'd be vacationing. Since my last job got locked in the bathroom, I *was* available and was given some fill work almost immediately.

These stations exemplify criteria outlined in last month's letter: satellite integration during certain hours and studio equipment that most *definitely* holds your attention. All of that, a jock lounge, offices and a reception area are all tucked into 15 square inches of office building.

A good station, but one bursting at the seams . . . almost like a bird that decided things were too good in the nest to fly away. Got any more worms, Mom?

Anyway, without sounding too pompous, you know my background, Jude. I've been fortunate enough to run the finest gear made today; I've worked for legendary people and legendary stations; I'm MIDI-literate and my idea of roughing it is a production studio with "only" four tracks.

Nothing on earth could have prepared me for what awaited me behind the six-pot Ampro *main studio console* (snicker) of "Country 106.9."

Would you believe I loved it? I had a blast. It was almost like trying out an ultralite aircraft.

Somewhere through the haze I've created for myself, through digital doodads, hard disks, endless formatic contradictions and samplers 'n' synths, the very essence of fly-by-the-seat-of-your-pants radio came back in a loving rush of long-forgotten technique.

And the ambience! Network back-timing without a shot-clock! Unsynched clocks all over the building! *Real* 45s—with adapters!!—and not a single CD anywhere in sight. Permanent coffee rings everywhere!!!

My tenure at WPCX lasted only as long as the theater gig, but I had a marvelous time.

This is my prescription for anybody in any top market: get away on vacation whenever you can and as far away as you can, to someplace where nobody has heard of you.

Ask a local (and I do mean *local*) station if you can take a shift one weekend, just to help out. The rest of the vacation is yours, but give the guy four hours just for yuks. Do this at least once every three years.

My favorite part is where a listener calls up—no matter *how* great you sound—to ask "Where's Jay Scott this week?"

Those two weeks reminded me of something I haven't thought of since I was a kid. Having the hi-tech killer zap raygun is fun, but a simple box of plain wooden blocks will keep me absorbed for hours.

My thanks to Bob Paris, formerly of WPCX (*somebody* give this guy a job), and thanks again, JG.

Pickin' and grinnin',

—Al

■ ■ ■

Alan Peterson has found himself face-to-face with both sides of the mic, every conceivable piece of radio gear and some not-so-conceivable in a colorful radio career. You can reach him in the foxhole by writing: RW, PO Box 1214, Falls Church, VA 22041.

San Francisco Tower Light Violator Fined

(continued from page 9)

"We happened to be driving by and noticed the lights were not working," Marti-Volkoff said.

He added that station workers told the FCC that the FAA was notified of the non-working lights (even though the log said everything was fine) and they believed that action fulfilled the legal requirements.

Under FCC guidelines, the FAA has to be notified if tower lights are off for more than 30 minutes and again when the lights are operational. However, the FCC also should be notified if there is any long-term changes in a tower's light status, which was not done in KIQI's case, according to the FCC.

90 days to respond

KIQI has not officially responded to the charges, according to FCC Enforcement Attorney Wayne McKee.

It has 90 days to respond to the charges before the FCC can take other action, which, in its severest form, includes possible license revocation if the lights are not fixed.

The FCC recently released a notice to broadcasters warning that unlighted towers are punishable by fines up to $10,000 and in extreme cases, license revocation.

The warning was the result of a fatal helicopter collision with an unlit cellular telephone tower in North Carolina last spring, and other aircraft/tower mishaps and near misses.

Marti-Volkoff said KIQI may have tried to get its lights working on several occasions, but reportedly could not get anybody to climb the towers because of their deteriorating condition.

KIQI went on the air in 1957 and two of the towers have been there from the beginning, according to the FCC.

Although the FCC did not cite KIQI for violations regarding the towers' paint condition, the structures are in need of a paint job, Marti-Volkoff said.

De La Rosa said the station is in compliance with FCC rules because it notified the FAA in 1984 that its lights did not work.

He said the unlit towers do not cause a safety hazard because two other nearby AM stations with taller towers have operational lights.

For information at the FCC, contact Wayne McKee at 202-632-7059 or S. Marti-Volkoff at 415-556-7702.

Studer Revox to Buy IMS

(continued from page 13)

Both denied their respective companies are for sale and said they were speaking on behalf of top management.

"I certainly would understand Studer's move given the fact they have money and are in an acquistion mode," said Doug Sheer, a broadcast analyst and consultant with Sheer & Chaskelson of New York. "It certainly makes sense and I can see the fit." Sheer said IMS has had other suitors in recent months, some not in the pro audio industry.

Sales are slow

"These direct-to-disk editing systems have been attracting a lot of attention but they haven't been selling that well. I'm not talking about IMS specifically, but the whole genre," Sheer said. "At the same time this group of equipment represents a potential threat to all of the digital reel-to-reel machines and to multitrack digital recording (in which Studer is a major player).

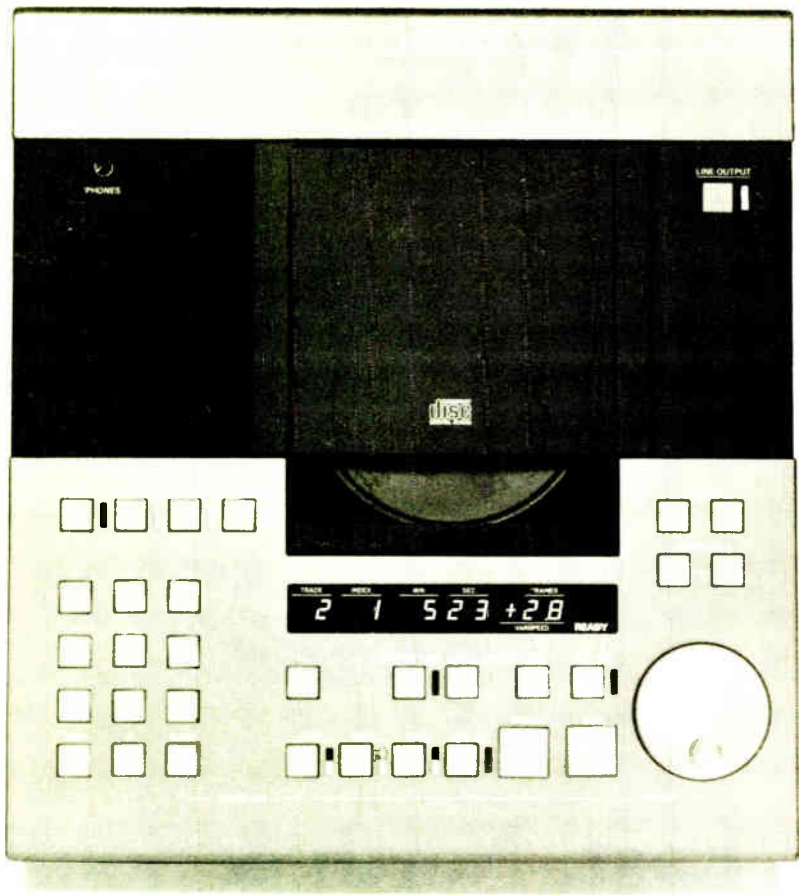
"Take a company like New England Digital, who has the oldest and most expensive system. In my view, they have been between a rock and a hard place," Sheer said. "Because with their existing base of customers they'd be hard pressed to bring in a much lower-priced system without offending their existing base of customers and yet every other system that's shown up in the market has been less expensive and therefore competitive."

Sheer noted that a new system which will sell for as low as $30,000 will enter the market later this year, setting a new low price position for such workstation technology. He would not name the manufacturer.

"What I'm suggesting is," Sheer said, "all of the players who are in the market now are aware of the potential of this technology and also aware of the pressure to push the price down.

"For a company like NED, it's very difficult. For the smaller guys like IMS, who have been around a while, developed their product and sold some systems, the need is probably cash—the proper war chest to make it happen."

Beat the high cost of low priced CD players.



Studer can save you the high cost of finding out why low priced CD players aren't worth the money....

Say you were to buy 3 or 4 of those "less expensive" CD players. You spend time modifying them for remote use—and void your warranty (for whatever that's worth)—and a few months of hard use later, they fail. You can't get them serviced, let alone fixed. So you end up having to pitch those machines and buy 3 or 4 more.

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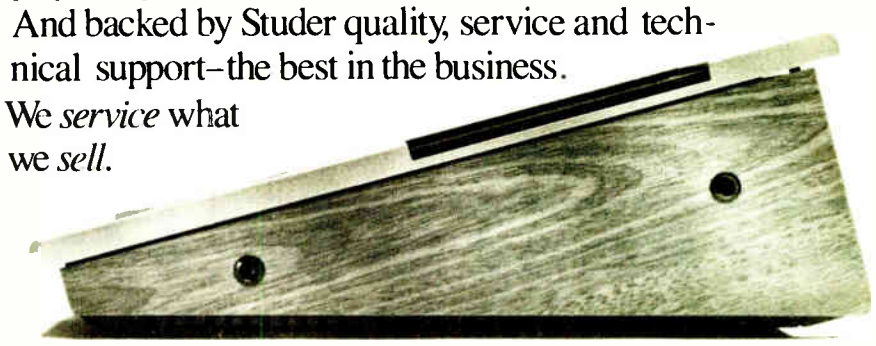

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Circle 68 On Reader Service Card

New Hope in Loudness Wars

(continued from page 10)

Small contended. Small said these "overshoot" peaks do not have a significant effect on occupied bandwidth or adjacent channel interference.

Another issue is the accuracy of the monitors: ±5% on conventional monitors compared with ±1% Small cites for ModMinder.

"Traditional monitors have typically allowed 5% error because the FCC didn't require anything better. With the 10% error window allowed by the Commission, a station's modulation could be off as much as 1 dB," Small said.

In the field

The CEs who tried the ModMinder said they were astonished at the displays which digitally show the one second peak level and indicate overmodulation via a peak indicator.

New York WNCN's CE Richard Koziol said that with SCAs his minimally processed classical station normally modulates at 105% on a conventional monitor. With the ModMinder, he noted, the modulation was only 90%.

Several stations that Modulation Sciences used for demonstration purposes have placed orders for the ModMinder, which is installed at the transmitter, according to the company.

"It's the most important product for broadcasters brought out in 1989," said Jim Stagnitto, CE at New York's WNSR.

"I don't know why someone didn't think of it before," WNCN Assistant Engineer Sydney Feldman of New York said.

Station engineers noted a possible 1 dB to 3 dB increase in modulation when using the ModMinder to measure up to their maximum level.

Stagnitto, whose station broadcasts a moderately processed light rock format, heaped high praise upon the ModMinder. He said it will enable stations to reduce processing and enhance quality.

With the ModMinder, Stagnitto said he hopes stations can finally put an end to the loudness wars that have raged among many pop FM stations in larger markets.

"It's the most important product for broadcasters brought out in 1989."

"I hope this will finally start a quality war. The audience is starting to know what good is," he said. "Being the loudest station on the dial just isn't it."

Generating questions

Because of the ambiguity of current FCC rules regarding modulation, there is some question that ModMinder may allow a station to go beyond the FCC's own "working definition" (not made public) of overmodulation. Small dismissed the concern.

"Because ModMinder complies with the pre-1983 rules, which are much more specific than the current rules, we're sure it falls within any reasonable interpretation by the FCC," Small explained. "In fact, Harry Cole (with Bectel, Borsari, Cole & Paxson), a communications attorney who is well-versed on FCC rules has provided us with an opinion of counsel to that effect."

John Reiser, an FCC engineer and CCIR specialist, was present at an SBE Chapter meeting in Washington, DC, where Small introduced the FM ModMinder.

Reiser confirmed that he has been contacted with questions about ModMinder from broadcasters and the NAB. He told RW that he would not speak on behalf of the FCC about the product.

But Reiser said that in his personal opinion, "When the Commission deleted the rules it said the station could provide any way of monitoring modulation that allowed it to comply with the rules prohibiting overmodulation.

"The intent of deregulating the rules was not to make them more stringent than before. If a station can operate legally by using this device, there should be absolutely no problem."

"I think he (Eric) is using the most liberal aspect of the rules," Reiser also said, "If the device permits operation similar to that with a previous monitor and ATS rules, I see no problem."

A question also has been raised about whether the ModMinder measures modulation on just one channel as opposed to both on FM stereo, according to Reiser.

Small said ModMinder indicates correct modulation "under all conditions."

Because of the newness of the product, NAB Science and Technology VP Michael Rau said the association is also looking into the ModMinder for "informational" purposes.

"We'd like to understand, the best we can, how the product works," he said.

Impressed the critics

Leonard Feldman, an industry consultant who reviews consumer audio equipment for *Audio* magazine, agreed that the ModMinder can increase loudness for lightly processed stations and quality for heavily processed stations.

Feldman witnessed a recent demonstration at WNYC a classical station in New York.

"I was vey impressed. I think it is going to make a difference," Feldman said.

For more information, contact Eric Small at 415-625-7333, Richard Koziol at 212-730-9626, Jim Stagnitto at 212-752-3322, Leonard Feldman at 516-482-5629 or Michael Rau at 202-429-5346.

Symetrix: Ear Candy and More

by Ty Ford

Baltimore MD In this month's *Producer's File* we'll lay aside the preoccupation with dazzling spots, promos and other "ear candy" to examine the soft white underbelly of NSA (Nasty Source Audio), and how the Symetrix 501 Peak-RMS Compressor/Limiter can be used to maintain the quality of your audio.

Not that the 501 can't be used in the manufacture of confectionery audio, it can. It's just that sometimes production rats have a tendency to deal only with problems that occur in the immediate domain of the production studio.

PRODUCER'S FILE

The art of sharing your knowledge without coming off as a know-it-all takes a bit of practice for some, but the gains can be worth it. Applying what you've learned about gain reduction, for example, can be a great way to improve the sound of the station other than in the production studio.

Failsafe mode

The Symetrix 501, like all of the Symetrix units I've seen so far, is well thought out, well built and well documented. According to Marketing Director Doug Shauer, the basic circuit has been in use at Symetrix for eight years with periodic upgrades including faster chips.

The front panel layout is easy to understand. There are, however, a few more controls than on the venerable dbx compressor/limiter. The addition of variable attack and release time adjustments allows you to tweak to your heart's content.

Per the manual, the Automatic Mode provides "program-controlled automatic attack and release times (which) make the 501 very easy to use in situations where the nature of the signals is unpredictable, or the operator is unable to make changes manually."

This means that even if you screw up the settings so the audio sounds really horrible, you can hit the automatic switch and save yourself.

The Automatic Mode is a great feature if you're not comfortable yet with attack and release time settings. In this mode, when the 501 senses more transient peaks in the signal, it reacts more quickly to control them.

Its ability to change attack and release times based on changing transient response means the Symetrix 501, in the automatic mode, is perfect for radio program content, which is a mix of high transient audio (music), and voice (relatively fewer transients).

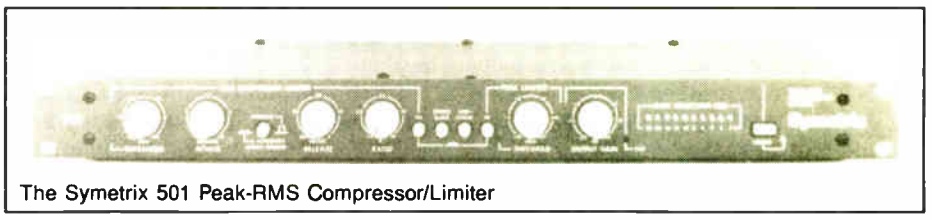
The inputs for the Symetrix 501 are balanced female XLR or quarter-inch 3-conductor TRS (Tip-Ring-Sleeve). Outputs are balanced male XLR or quarter-inch TRS.

Compression attack times are variable from .25 dB/msec to 12 dB/msec. The compression ratio is adjustable from 1.4:1 to infinity:1.

The peak limiter attack time is preset to 2000/msec with an infinity:1 ratio. Minimum load impedance is 600 ohms, with a 51 ohm output impedance.

The theory

As stated in the manual, "The gain reduction of (this) dynamic range processor derives from one of the amplifier circuits inside the unit, whose gain is controlled by a DC voltage. That part of the circuit is called a voltage controlled amplifier, or VCA. Inside the 501, a separate buffered audio signal is sent to a group of circuits that comprise the peak and RMS detectors.



The Symetrix 501 Peak-RMS Compressor/Limiter

"The detectors turn the (buffered) AC audio signal into DC control voltages, which are sent to the VCA under the direction of the front panel controls. The VCA then, is actually governed by signals that are derived from the audio signal, and placed under operator control via the front panel controls."

Put another way, the 501 measures the changes in dynamics and peak content of the audio which passes through it. Based on those variations and the way you set the front panel controls, it applies the gain reduction needed to provide the required output.

If the features sound nice but your application requires stereo, two 501s can be "stereo-linked." One unit then becomes a master and the other a slave, so you only need to adjust the master.

Sidechain operation

Even though the Symetrix 501 is not a multiband processor, the fact that it has a sidechain may come in handy. By putting an equalizer in the sidechain you can modify the 501 to perform frequency selective compression.

Say you have a spot on which the music is mixed too loud. If you adjust the equalizer in the sidechain to increase the 100 Hz and over 6 kHz ranges so that they cross the compression threshold, the voice (and music) frequencies between 100 Hz and 6 kHz will increase. Actually what's happening is that you have forced gain reduction to occur at other than those frequencies.

Sidechain EQ also works well in applications where there is too much low frequency noise. In this case the EQ in the sidechain is rolled off on the bottom.

Another mix phenomenon which occurs, regardless of sidechain, is the change in relative voice and music levels when the release and attack times of the gain reduction are varied. With a simple broadband compressor/limiter circuit, when the attack time is set quickly and the release time slowly during moderate amounts of gain reduction, the voice track will be louder.

This is primarily due to the fact that most music has more transients than most voices. The music, therefore, triggers the gain reduction and is reduced in gain relative to the voice.

The 501 at work

Obvious good uses for this kind of circuit are mono production, newsroom phone feeds and mono AM transmitter line and STL feeds. According to Shauer, the attack time of the peak limiter is quick enough to allow the 501 to be used to provide up to 40 dB of very safe gain reduction for legal modulation control.

For a few dollars more, the 501-01 optional version has a transformer output with which you can drive a phone line. If your station does "budget remotes" by clipping a simple mic mixer onto telco lines at the remote site, the Symetrix 501 can do a nice job of keeping the enthusiasm that often happens at these kinds of events from driving the line into distortion.

If the remote site has standard 60 Hz 120 VAC or 50 Hz 240 VAC power, you can put the 501 after the mixer and before the phone line. For those "deep space" remotes, where getting good AC is a problem, simply put the 501 between the phone line at the studio and the line input to the console.

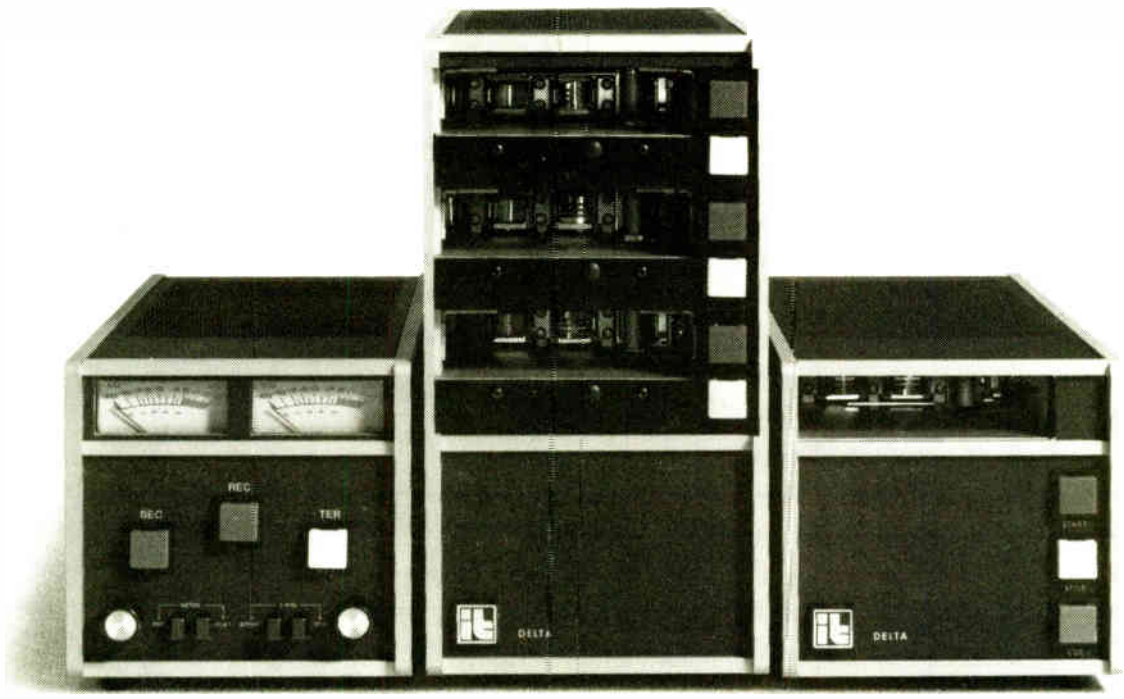
So far, these uses are pretty basic. You'll need a clear head for the next few minutes, so make sure the top to the head cleaner is screwed on tight.

MOTO O'Brien

The "Master Of The Obvious" kudos for this rig go to Bernie O'Brien, now with SCMS, a broadcast/recording

(continued on page 25)

Here's another reason we sell more cart machines than anyone else.



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Circle 78 On Reader Service Card

Assessing Personality Profiles

by John Cummuta

Downers Grove IL I'm frequently asked to suggest management books that would be helpful for present and aspiring managers. There are some good ones out there, but I regularly suggest a different reading diet, at least on occasion—sales books.

Why sales books for non-sales managers?

Because, whenever you're trying to get someone to do something, you're selling. It's that simple. And understanding the techniques that sales people use to effectively interact with prospects can be extremely helpful in relating to subordinates.

Social styles

There are a variety of grid concepts in the sales training world, all designed to divide people into different types. These classifications then become the basis for how to approach each different personality style.

ENGINEERING MANAGER

They are all variations on the same theme, so I'll present the approach that makes the most sense to me. See if it doesn't help you understand some of your employees a little better.

People fall somewhere on a grid (see Figure 1), the quadrants of which represent four different poles of primary personality traits: Driver, Analytic, Amiable and Expressive. Each category labels a kind of personality that reacts differently to outside information and influence.

While no one is completely in one quadrant or another, everyone has a dominant style. And it is critical to our analysis to understand one fact. People are many times more likely to accept and act on information presented to them in harmony with their own social style. Let's see how that works.

Driver, Analytic

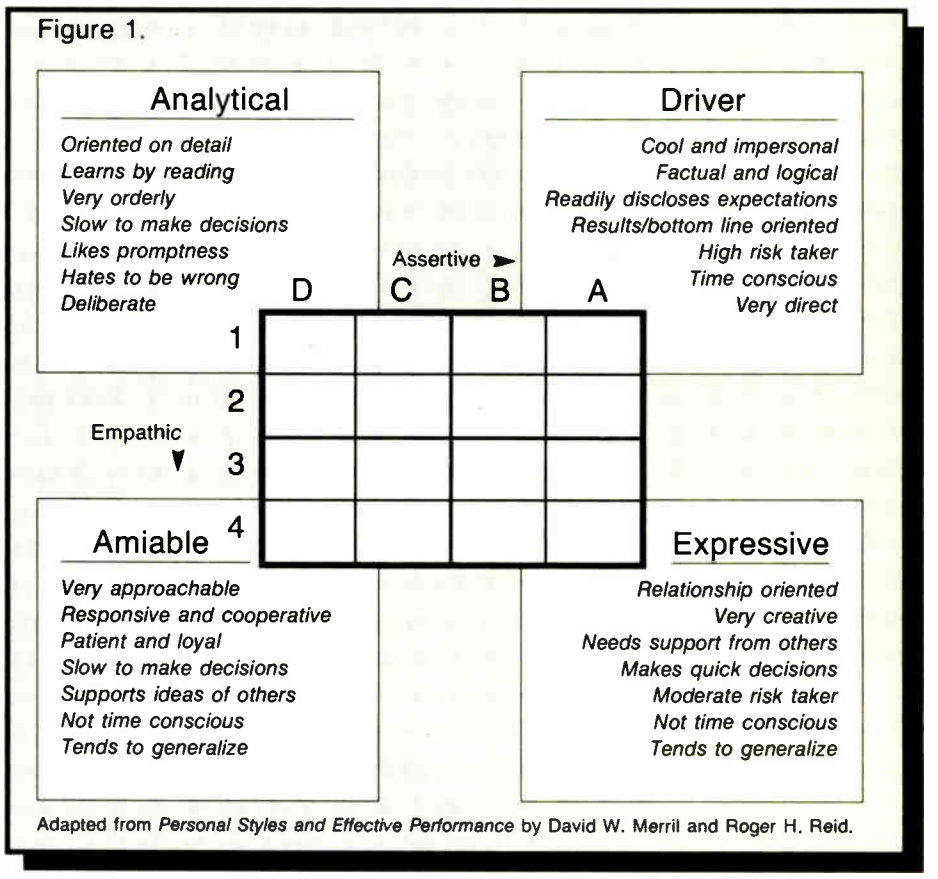
The Driver personality is General George Patton: "We'll accomplish our goals no matter how many lives must be sacrificed in the effort. Don't talk to me about people, or obstacles or problems, we're going to get this thing done no matter what."

We've all seen the Driver type. These people are extremely goal directed, not very sensitive to the people side of the equation and they tend to talk and think in terms of achievement and accomplishment.

They are not very good communicators, if communications is described as "two-way" sharing of information; and they are not prone to be moved by flowery, visionary motivational pulp.

The stereotypical Analytic, on the other hand, would be the bookworm accountant. Don't talk to them about personal relationships or great visions of accomplished dreams. Just tell them the numbers and let them crunch awhile. Many engineers fall into this category, where they'd rather hang out with a spectrum analyzer than a group of friends.

Figure 1.



Adapted from *Personal Styles and Effective Performance* by David W. Merril and Roger H. Reid.

Analytics want only facts, figures and quantifiable objectives. Don't cloud the issue with emotions or hype. I think Sergeant Friday on *Dragnet* was an Analytic.

Amiable, Expressive

The Amiable is a "people" person. Amiable personalities like the social aspects of a job, a party, a political action committee or anything else they're involved in, more than any other aspect.

They're not really interested in conquering an enemy or winning in a business deal, they just want to be friends. They're not moved by expressive projections of future success or rewards, they just want to make sure that no one will be offended or feel left out.

Amiables make great den mothers or golf partners.

The Expressive is Mr. or Ms. "Showbiz." These people don't just come into a room—they make an *entrance*. Expressives want reaction to everything they do. They want you to tell them that it's the best, most colorful, most impressive "whatever" that you've ever seen.

Expressives are outgoing to the max and they tend to talk in enlarged or exaggerated terms. They don't lie. They just paint Cinemascopic pictures with their words. They respond to big visions of projects, and they couldn't care less about the numbers. They willingly leave the facts to the Analytics.

Oil and water

Now that you have a basic understanding of these different personality types, I'm sure you recognize some of the traits. You might even see some of them in yourself. But I also hope that you see the potential for conflict if these different kinds of people are mixed in a manager-subordinate relationship.

If a Driver is managing an Amiable, for instance, the potential for disaster is high. The Driver is going to talk in terms that sound devoid of any concern for the human race. He or she might say things like, "We'll beat that other station even if we have to sneak over there at night and put poison in their water cooler."

When an Amiable—who wants to be friends with the guys and gals at the other station—hears that, he or she has an emotional seizure. And when the Driver gives management direction to an Amiable in a Driver's standard do-or-die terms, the result is a total lack of connection.

The Amiable cannot possibly feel committed to such a project. It's completely out of harmony with the Amiable view of how things work.

Another example of a mismatch would be an Expressive boss with an Analytic subordinate.

The boss lays out plans and goals in great sweeping terms, without much quantitative substance. No facts, figures or target dates, just destinations painted in bright emotional colors.

The Analytic, on the other hand, can-

(continued on page 25)

Rack up twice the performance in the same amount of space.

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Repairing Ailing AM Sampling Systems

by Steve Crowley

Washington DC AM directional array sampling systems eventually require repair or replacement due to damage or age. Sometimes, input components of the antenna monitor can be damaged by lightning or excessive RF voltage.

Old air-dielectric sampling lines can take on moisture, also causing unstable readings. Fluctuating antenna monitor readings, unaccompanied by corresponding fluctuations in base current or monitor point readings, are a sign of a defective sampling system.

Because antenna monitor readings are a primary indicator of a properly functioning antenna system, several FCC rules apply when any sampling system modifications are to be made. Applicable rules differ depending on whether modifications or repairs are being made as a response to a breakdown, or if they are part of a planned construction project.

If your sampling system fails, you may operate for a period not to exceed 120 days without further authority from the FCC, if all other operating parameters and monitor point values are within the limits specified on the station license. During that time, if repairs result in antenna monitor parameters being restored to within licensed tolerances, no further action is necessary.

Beyond restoration

Sometimes restoration is not possible. Perhaps a sampling loop was replaced with one of a different type, or the orientation of the loop is slightly different, resulting in changed current pickup from the tower. (Some older loops are designed so that they produce a current sample 180 degrees out of phase to those loops being sold today).

Replacement of transmission line to a loop can change the input impedance of that tower, also causing a change in parameters (and actual field radiated).

If parameters remain out of tolerance, a request must be made to the FCC for permission to operate with parameters at variance. Their response will likely be a telegram allowing such operation for ninety days. This can usually be extended upon request, especially if progress toward repair can be shown.

CONSULTANT'S CORNER

While you are operating under special authority, you can troubleshoot the antenna system to determine why the parameters have shifted. Field strength measurements should be performed to verify that the pattern is still within the standard pattern envelope. If not, the antenna must be adjusted.

Whether or not adjustments are made, a partial proof of performance must be made and filed with FCC Form 302 to support the new parameters. A modified license will then be issued.

Replacement or modification

If you are fortunate, you will be able to plan replacement or modification of your sampling system. The first step is to request permission from the FCC to operate with parameters at variance from licensed values.

In changes made off the tower (sampling transformer, antenna monitor, sampling lines not on the tower), you must record transmitter and antenna parameters, and the monitor point values before and after any such changes.

The monitor point and base current readings should remain within licensed tolerances after the changes. If changes are made on the towers, a partial proof must be made to verify radiation is within the limits authorized.

A request for modification of license (to reflect the new parameters) must be submitted within 30 days of the date of sampling system modification or replacement. If the changes were made off the tower, this request can be made in the form of an informal letter to the FCC. If the changes are on the tower, FCC Form 302 must be submitted with the partial proof.

"Approved" sampling

Perhaps you are building a new station or have a construction permit to modify an existing directional array. You will have to install what the FCC refers to as an "approved" sampling system.

In 1985, the FCC eliminated construction requirements for sampling systems—the intent being to allow stations to use alternative technology to monitor directional arrays. You can still construct a sampling system according to rules in effect before 1 January 1986. If you do, it will be considered approved.

If you do not comply with the former rules, approval will come after submission of a year-long stability showing, consisting of a detailed description of the sampling system, monthly monitor point readings and other data.

Most engineers follow the guidelines of the former rules. They state, in part, that sampling lines must have a solid outer conductor. Sampling loops must be unshielded, of rigid construction, firmly positioned and mounted near the point of maximum tower current.

Shielded transformers at the tower base may be used in lieu of loops (a stability showing must be submitted if the tower is taller than 110 electrical degrees).

The former rules also state that all sampling lines for a critical array must be of the same electrical length. For other arrays, lines of different length may be used if the difference is not so great that predicted phase errors due to phase variation exceed 0.5 degree.

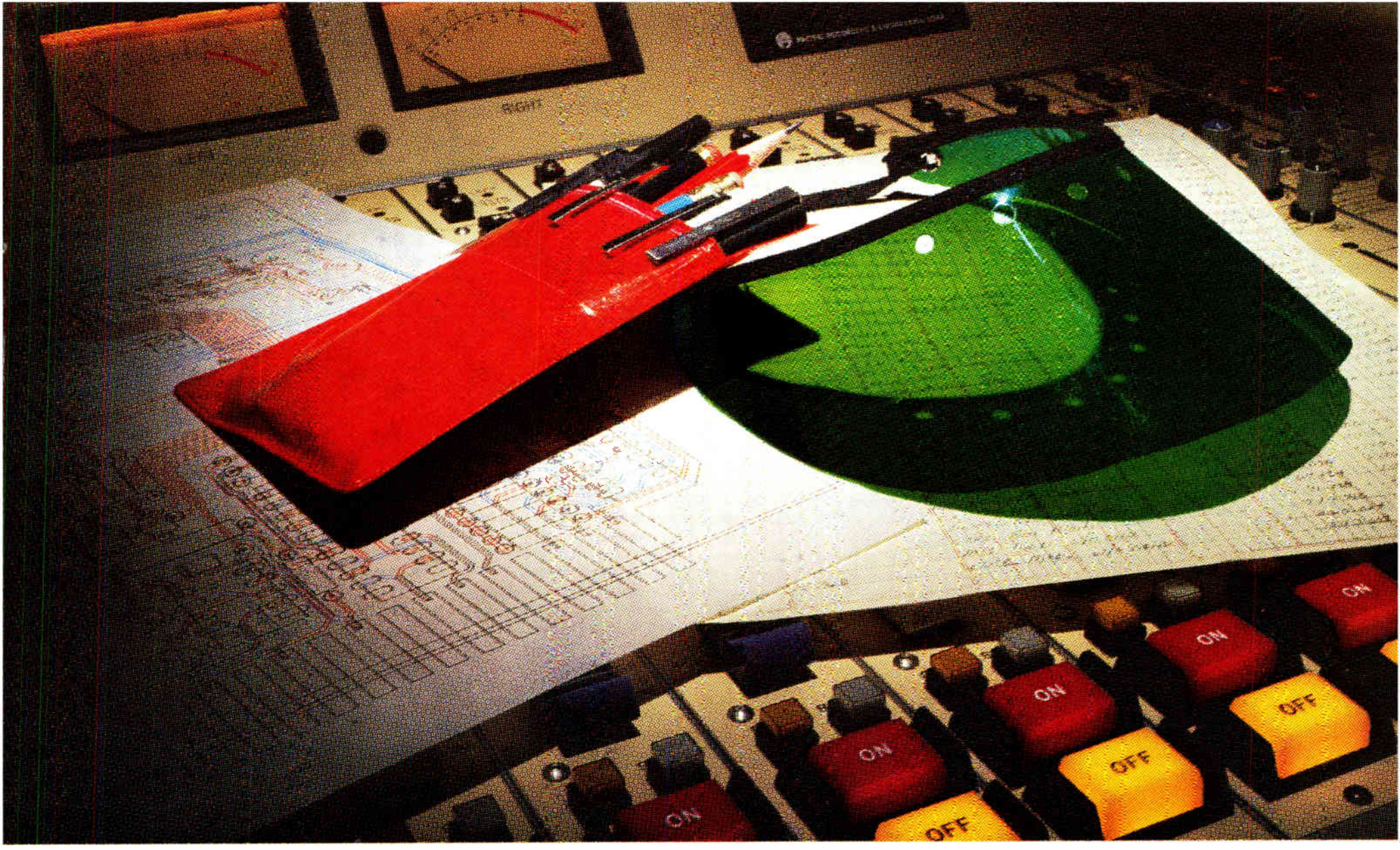
Following good engineering practice during sampling system installation will greatly reduce the chance of future problems. All lines on the tower should be electrically bonded at regular intervals. At the base of the tower, on the ground side of any isolation network, the outer conductor should be securely grounded.

Sampling loop hardware should be securely tightened to prevent loop movement by wind or climbers. Any extra transmission line at the base of the tower should be coiled and fastened down.

If you would like to review the FCC's sampling system rules, the applicable sections are 73.68 and 73.69.

■ ■ ■

Steve Crowley is an engineer with the Washington, DC-based firm of du Treil, Lundin & Rackley. He can be reached at 202-223-6700.



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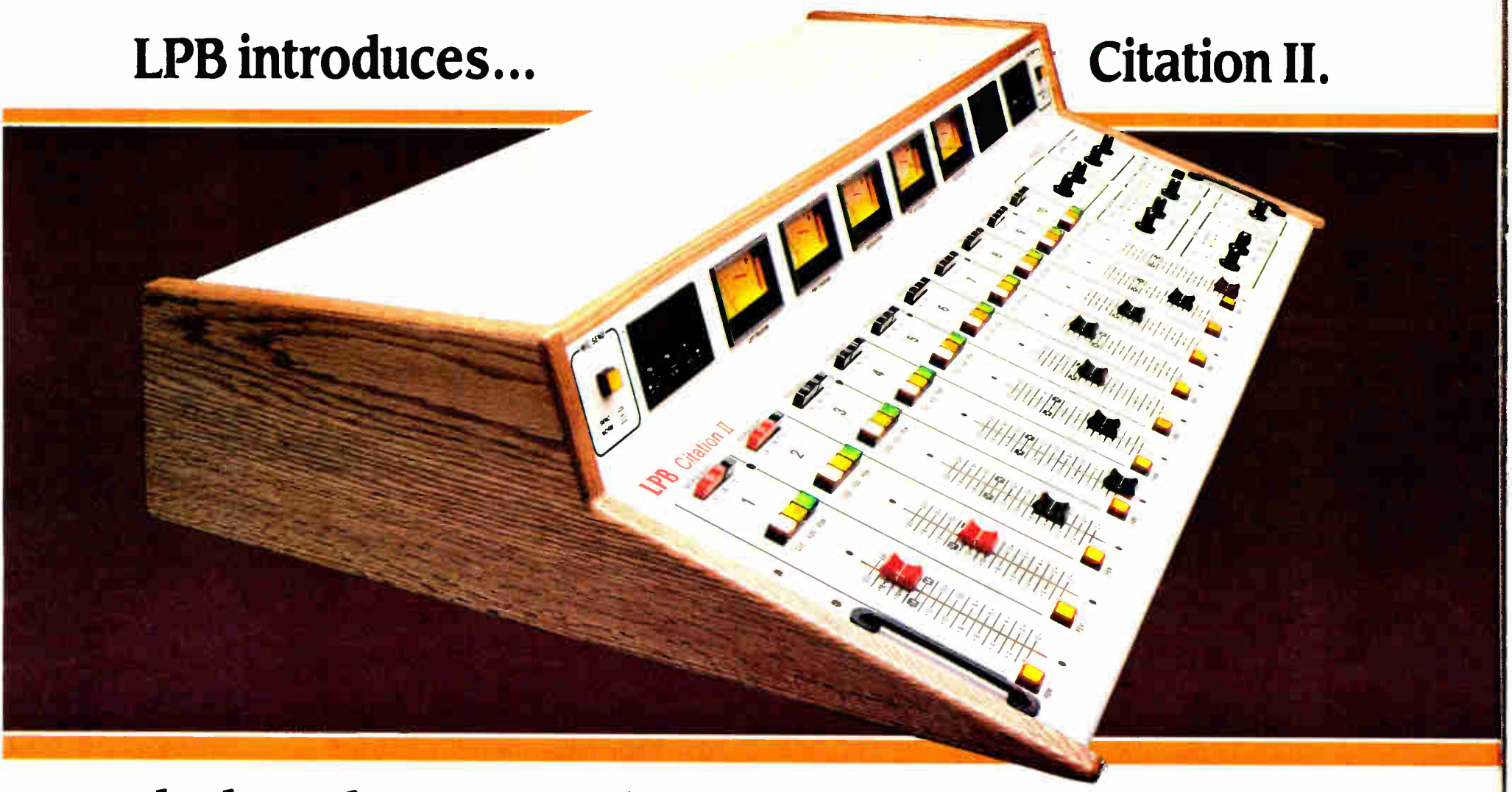

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Start with one of the longest-running success stories in the radio console business: the LPB Citation I. Then add the combined wisdom of ten years of user feedback and make that "wish list" of features standard. Now you've got the idea behind LPB's new low profile Citation II console.

Not just a change for change's sake, Citation II represents the "real world" of radio today. For today's fast-paced air shifts, we placed all essential controls — and *only* the essential controls — directly in front of the operator. Lesser-used controls are logically grouped together on the right.

For flexibility, the ten-mixer Citation II features three inputs per mixer with lock-out switching, two stereo output busses, mix-minus capability, mono mixdown with independent VU, two user configurable four position auxiliary selectors and programmable monitor and cue muting for the first five mixers.

For convenience, a digital clock and a separate event/cumulative timer are standard, and every input has a remote start button which follows the input selected.

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Circle 9 On Reader Service Card

How to Identify Personalities

(continued from page 20)
not grasp this Utopian vision of the future and can't even begin moving towards it without some facts against which to measure progress.

A personal example

Are you beginning to see how these personality misconnections can cause tremendous friction within any organization?

How about an Analytic boss with a Driver subordinate? Not what you might think to be a common situation, but I was in one just like this.

I have Driver tendencies. I pride myself in being able to maintain a balance of the four styles in my personality, but I know that if I start to get out of balance I will always tip towards Driver.

Well, I was in a situation where I was the new Operations Manager of a station that had been the dog of the market since its signal first left the antenna. I took over after its AM sister station started slipping and could no longer provide foreign aid to balance the books.

In four months, I drove the station to the top of its marketplace and was even competing with nearby major-market heavy hitters. Two months later I was fired!

How in the world did that happen?

I didn't keep all the paperwork in order, in a timely fashion. No kidding. I was working twelve to sixteen hour days, making friends with advertisers, setting up concerts, doing PR work. I was building the profile of a winning station in the marketplace, but various pieces of internal management paperwork were piling up on my desk.

Problem: My Analytic boss was evaluating my performance on facts, figures and whether all the proper pieces of information were orderly and in place. I, on the other hand, was the Driver. "Don't tell me about Equal Opportunity Employment forms and time sheets, I'm conquering a market out here." We totally missed each other.

The point is that if you want people to respond favorably to instruction, direction or persuasion, you must present the information in *their* social style, not yours.

If you're developing quarterly goals with your Analytic subordinate, do it with numbers and other identifiable facts. If it's an Expressive subordinate, the same goals should be more visionary. That's not to say that you can't quantify them. Just paint the big picture at the same time.

To sum it all up, keep these personality differences in mind the next time you're giving direction, and try to approach the situation as if you're making a sale—because you are.

■ ■ ■

John Cummuta is president of Advanced Marketing Concepts, Inc., a broadcast management and marketing consulting firm, and a regular **RW** *columnist. He can be reached at 312-969-4400.*

Symetrix's Many Uses

(continued from page 18)
equipment firm, who came up with this masterful use for the 501.

Say your studio and transmitter are at different locations. The remote broadcast you want to do is too far from the studio to "Marti" back (to use a company as a verb), but it will make the trip to a Marti antenna on top of your tower.

The obvious best place for the 501 would be after the remote mixer and before the Marti transmitter. If you're at a remote site with only battery power, try putting the 501 between the audio output of the Marti and the SCA input.

You Marti from the remote site to the tower. You receive the remote Marti signal at the transmitter site, demodulate it and then transmit the remote audio via SCA back to the studio. From there you bring it up on the board and fire it back out to the transmitter for broadcast.

If you have SCAs available, you can do two simultaneous remotes, providing you've worked out the cues. A more conservative approach would be to use one SCA channel for a program link and the other for talkback cues.

PDs like this kind of thinking because more remote sites mean more visibility. Sales managers and GMs like it because more sites mean more remotes and more revenue. Engineers like it because it gives them a chance to create new systems and secure their futures by keeping them running.

To the selfless production rat, passing on this kind of information requires tact. If the engineer can't figure out how to rig it, he (or she) will probably reject it.

If the GM or sales manager figures the cost of the rig will outweigh the revenue possibilities, the idea is also doomed. If you have any questions about this specific setup, call Bernie at 800-874-7267.

■ ■ ■

Ty Ford, audio production consultant and voice talent, can be reached at 301-889-6201 or by MCI mail #347-6635.

Using Transistors in Voltage Regulation

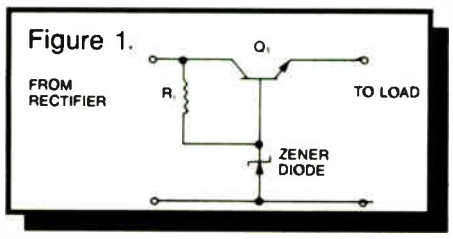
This is the tenth installment in a 12-part series called An Introduction to Active Devices. *Readers who have registered with Northern Virginia Community College can receive continuing education credits from the college upon successful completion of an examination administered at the end of this series. To register, contact the Director of Continuing Education, Annandale Campus, 8333 Little River Turnpike, Annandale, VA 22003, or call 703-323-3159. The fee for the course is $20.*

by Ed Montgomery

Part X of XII

Annandale VA Bipolar and field effect transistors (FETs) can be operated in both linear and non-linear manners. Linear operation would allow the device to conduct current continuously with the output current being controlled by the small changes of current to the base or voltage to the gate of an FET.

Figure 1.



Non-linear operation includes most digital operations. In this operating mode the device is usually conducting at its maximum amount of current (operating in saturation) or it is not conducting at all (cut-off). Transmitters employing pulse-duration modulation apply this method of solid state operation.

Voltage regulation

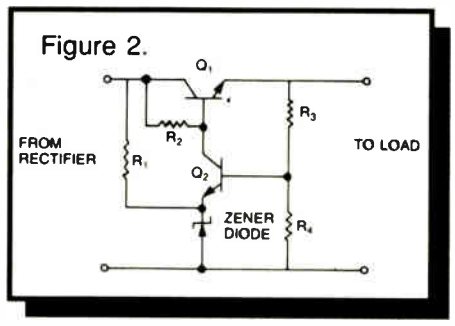
An area where active devices often are used to sense electronic variations in a system is in the voltage regulation section of a power supply. Often times power supplies must deliver a specific amount of voltage and current to various components with different operating parameters.

An example would be a power supply feeding an audio amplifier. When operated at high volume levels, the final amplifiers may demand a large amount of current for peak audio signals. This instantaneous demand can cause momentary drops in voltage and current to the final amplifier as well as all the preceding driver and preamp stages, resulting in audio distortion.

Figure 1 illustrates a series regulator circuit consisting of an NPN transistor and a zener diode. Two important factors must be honored when employing this type of circuit: the power rating of the zener diode should not be exceeded, and—under the worst loading condition—the zener must draw some current.

The unregulated voltage must be least 1 volt above the required regulated voltage. The zener diode sets the voltage output for the regulator circuit.

Figure 2.



Essentially the zener is connected in parallel with the load. Current supplied to the load is essentially the same as the current passing out of the collector of the transistor. The transistor is operating in its linear or active region, thus when the load requires more current, the base current I_B will change. The biasing of the transistor is changed to allow more current to flow through the load.

A new variation

An improved version of this is illustrated in Figure 2. In this arrangement, transistor Q_2 acts as a sensor to voltage changes. The Q_2 transistor forces the series transistor (Q_1) to adjust to the varied requirements of the load.

Changes in line voltage or load requirements are detected by Q_2, which then adjusts the current flow through Q_1. R_4 is the resistor used to detect voltage changes forcing Q_2 to adjust its operating level.

Figure 3 illustrates how a transistor can be used as a switch. This type of a circuit is also known as a logic inverter.

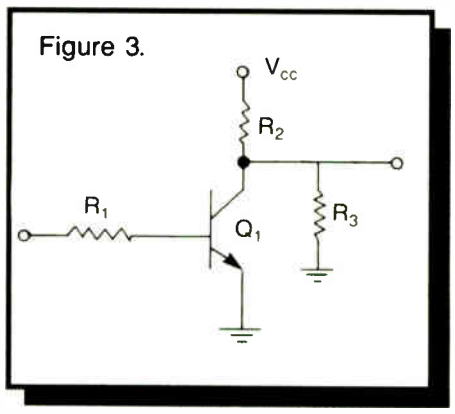
When the input voltage is at 0 volts, or ground potential, there is no biasing of the transistor. No base current will flow and the device is cut off. The output voltage on R_3 will equal whatever V_{cc} equals. If a voltage sufficient enough to forward bias the emitter-base junction is applied to the input of the transistor through R_1, the transistor will conduct.

Q_1 is in parallel with R_3. When Q_1 conducts, it exhibits an extremely low resistance resulting in a very low output across R_3. Conversely, when Q_1 is cut off, it has a very high resistance permitting current to flow through R_3, developing a voltage.

Normally, this type of circuit would have Q_1 operate in either of two modes: cut-off or saturation. It is known as an inverter because whatever is done on the input results in the opposite action taking place on the output. Placing Q_1 into saturation shuts off the voltage on R_3.

Other circuits can be designed that will not invert the output. For example, if R_3 were connected between the emitter and ground, the output would not be inverted. It is often more practical, however, to use the inverter circuit because it is more efficient than other designs.

Figure 3.



If this circuit is employed in a linear manner with a varying signal on the base, creating a varying signal on R_3, Q_1 will be operating in the manner of an analog amplifier. A very small variation of base current will produce a much larger output on R_3.

■ ■ ■

Ed Montgomery currently is an electronics teacher at Thomas A. Edison High School in Fairfax County, VA. He has taught broadcast engineering at Northern Virginia Community College and worked as a broadcast engineer for several radio stations.

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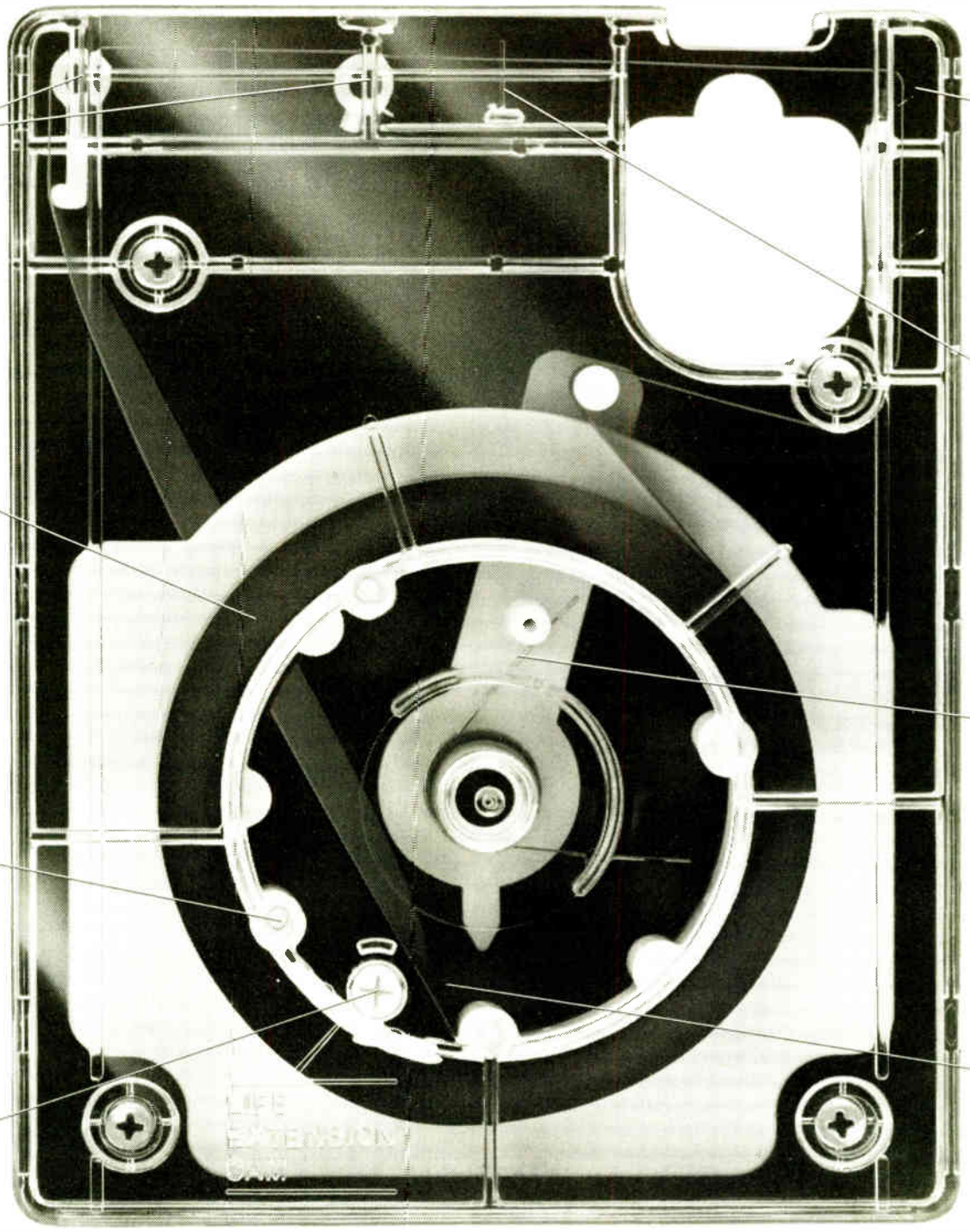

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Circle 63 On Reader Service Card

ABC Studios Take Fast Track

Editor's note: Last month, in our first part of "Fast Track Studios," two Mayflower vans carrying Cap Cities/ABC's new studio equipment and furniture had taken off, headed for the Big Apple.

New York stations WABC-AM and WPLJ-FM, uprooted from their high-rise complex on the Avenue of the Americas, were being relocated to 2 Penn Plaza, requiring a totally new fitting of cabinets and equipment, and some 60 miles of wire and cable.

by Dee McVicker

Part II of II

New York NY On the 17th floor at 2 Penn Plaza, eight studio centers for WABC-AM and six studio centers for WPLJ-FM were being readied for installation crews. The cabinetry and equipment, after surviving the trek across country and passing rigid system tests by Pacific Recorders & Engineering, were ready to be assembled.

The Cap Cities/ABC relocation meant new studios and plush offices, like this one.

Since there was little time for review considerations, studios that were suspect for last-minute changes were put at the end of the installation schedule.

The stations' two main air control rooms (WABC, with an associated studio) were assembled first. The other studios followed: a secondary air studio for WABC (also with associated studio) and a secondary air studio that also alternates as a stereo production studio for WPLJ.

Other facilities in the complex included a stereo production studio for WABC, a multitrack production studio for each station, a news control room (WABC), two news workstations, three edit booths (one for WABC and two for WPLJ), and a voice booth for WPLJ.

Between the first and second studio shipments, ABC Director of Engineering Al Resnick and Chief Engineer Bill Krause—along with PR&E's Jack Williams—took the opportunity to review studio layouts and functions. It became evident that the AM edit booth, intended for dubbing transfers and occasional voicing, would not accommodate the station's news/talk workload.

The team, weighing the benefits of a more capable AM edit booth against the impact a change might have on the schedule, decided to redesign.

The cabinetry, midway through construction at PR&E's factory and slated for delivery with the second shipment, was redesigned to integrate a BMX Series III console with 14 inputs instead of the 8-input Stereomixer control console originally intended.

Williams feels the change was well worth the extra effort given the variety of tasks the AM edit booth would be called upon to do. In fact, he wouldn't hesitate to say that the extra effort put in by all paid off in every studio center.

Air studios

In both stations' on-air and backup air studios, PR&E's BMX-26 Series III consoles serve at the helm of operations with Technics SP-15 turntables, Studer A807 tape recorders, Micromax stereo cart players and recorders, Tascam 122 MKII cassette recorders, Studer CD players and three to five mic positions.

FACILITIES SHOWCASE

To facilitate automatic recordings of live microphones, PR&E installed cassette skimmer controllers that interface to the remote control inputs of the Tascam cassette recorders and the logic control of consoles.

The skimmers, switch selectable for bypass or function, exit from record function with a time delay to capture the first few seconds of program following the turn-off of live mics. All cassette and cart recorders also have a pre-selector.

WPLJ-FM's air studios, designed for the dynamics of a Top 40 playlist with stand-up operator control, were equipped with the PR&E broadcast Dolby SR system for all cartridge and reel-to-reel equipment. To capture talent personality, PR&E microphone processing module frames are connected to BMX-26 input patch facilities for gate, de-essing, compression and equalization characteristics on each mic.

In addition to several guest positions, WPLJ's main air studio is equipped with a Stereomixer, cartridge tape players and a clock and timer panel to facilitate an in-studio news position.

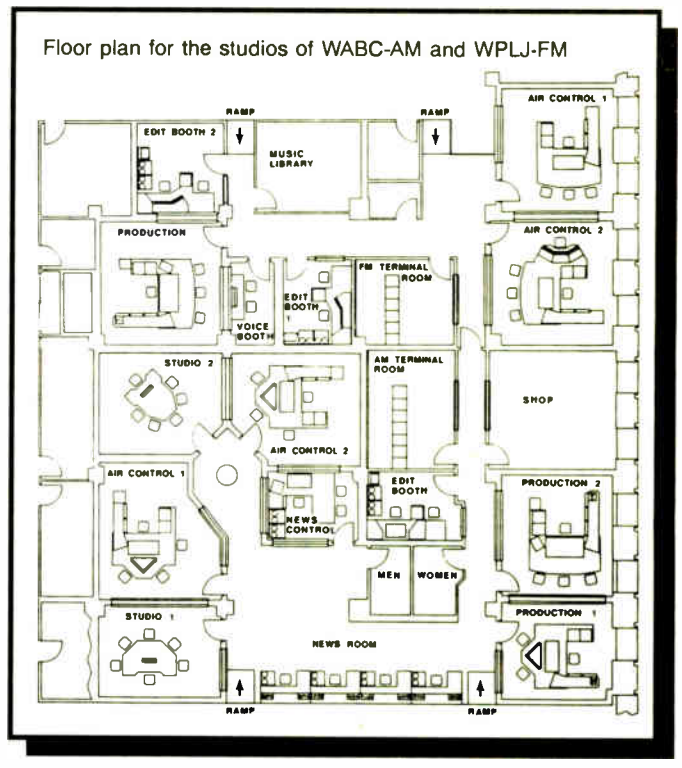
WABC's air control rooms, designed in sit-down fashion to facilitate its news/talk format, accommodate a producer's turret and a dual guest turret each with clock and timer; as well as full technical talkback between board operator, producer and studio. A host turret with microphone, monitor and headphone control also is provided in the associated on-air and alternate air studios along with six microphone positions.

Because WABC feeds its program to not only the station's transmitter, but to the ABC Radio Network and Yankee Baseball Network as well, air studios have a dedicated delay system. In addition, Eventide BD980s serve delay functions through a PR&E delay controller for remote control of the units from the producer, guest and host turrets.

Given WABC's many call-in and contest events, the group elected to equip the AM air studios with console-mounted Telos 100/1A2 telephone hybrid systems to call up 30 telephone lines on split faders. This intuitive keypad control of all 30 lines can be found in the AM's associated studio host turrets as well.

The air studios, as well as other studios and booths in the facility, also have Crown power amplifiers with JBL 4425, 4412 or 4408 monitor and/or cue speakers.

Floor plan for the studios of WABC-AM and WPLJ-FM



Production and news studios

Both the AM and FM take advantage of BMX-26 Series III consoles for their stereo production studios, and ABX-34 consoles for their multitrack studios. For full compatibility between production and on-air functions, the production studios were equipped with much the same equipment and number of mic positions as on-air studios.

However, for the variety of tasks that demand special effects production, stereo production studios were also outfitted with Eventide SP2016 effects processors (with Vocoder ROM) and Eventide H3000-B Ultra-Harmonizers, along with Orban 642B equalizer/filters and Orban 464A co-operators.

The AM and FM multitrack studios were given these units as well, along with Otari MX-70 8-track recorders with

(continued on page 32)

Built for Business.

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Circle 70 On Reader Service Card

Touring VOA's Relay Station

by Thomas L. Vernon

Greenville NC Although most of us have worked in radio for a good number of years, many are unaware of the scale of international broadcasting taking place in this country.

In June I toured the Voice of America's Greenville, NC relay station. I was taken by the size and professionalism of the operation, and I'll take you inside and outside the massive facility in this and upcoming installments of *Station Sketches*.

A plant overview

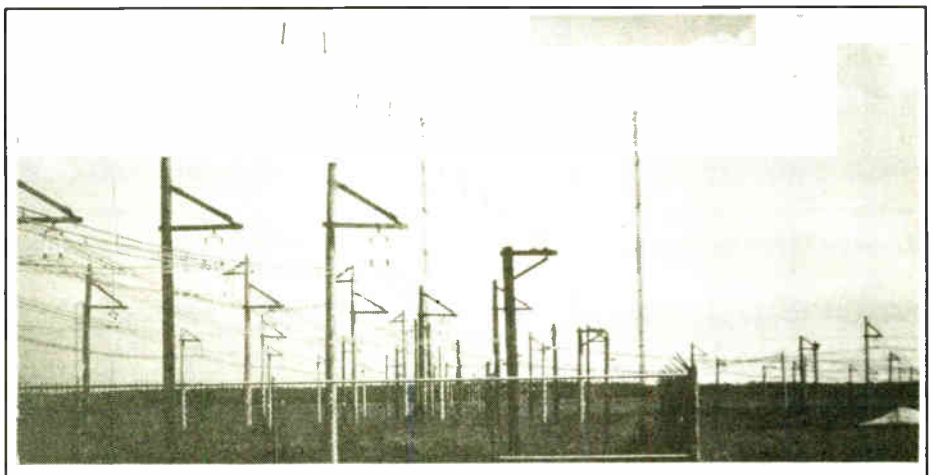
The VOA's Greenville facility is the largest relay station in its worldwide network and one of three transmitting sites in the United States.

The plant is made up of three sites, each about 20 miles apart, surrounding the city of Greenville. Site C houses administrative offices, the receiving plant, and master control facilities.

Sites A and B are identical transmitting facilities, each having five 500 kW and three 250 kW transmitters for VOA programming, as well as one 50 kW and two 40 kW communications transmitters for teletype and program relay service.

Our tour begins at site C. All VOA programming from the Washington, DC studios is relayed to Greenville for distribution worldwide. The primary feed is via satellite, although the original microwave system is preserved for backup.

Programs not aired at Greenville are uplinked via the extensive C-band uplink facilities to other relay stations worldwide.



Open wire lines are supported on telephone poles. Shown here, a group leaving one side of the RF switching unit leads off to distant curtain and rhombic transmitting antennas.

Within this 644 acre site are 21 rhombic and two log periodic receiving antennas. These are connected to broadband RF amplifiers and then to a patch panel, where they are fed to diversity HF receivers.

Eight of these are 1960s' vintage RCA units custom built for VOA, although several state-of-the-art units have also been installed recently.

These receivers are used to monitor foreign shortwave broadcasters. Their signals are relayed to the Washington studios, where they are used by VOA newswriters to gain an insight on how news stories are being covered by other international broadcasters.

Program switching

Next to the receiver room is the master control center, housing a large crescent-shaped console, where programming from Washington is routed to either of the transmitter sites. The console operator has a large computer printout listing times, program duration and transmitter location, and this operator manually assigns feeds and adjusts outgoing levels.

When the VOA's modernization is complete, all program switching will be automated.

In the unlikely event that both the satellite and microwave feeds from Washington are lost, a row of Otari reel-to-reel recorders stand ready in the back of the room. They contain foreign language filler programs that can be aired until problems are corrected.

As the modernization begins to take shape, the contrast between old and new is striking, as this is the first major equipment upgrade since the plant was built in the early '60s.

At one end of the control room are the equipment racks housing line amps. These are gray Langevin plug-in units with 6V6s. In their midst sits a Sound Technology test set.

Transmitter site B

It is about a 20 minute drive from site C to site B where our tour continues. There's no elevator, so it's a long climb to the observation deck atop the transmitter building. From here we enjoy a panoramic view of of the 2715 acre site.

This is about as large a transmitting site as one can build, without encountering physical limitations. For example, some of the transmission lines are over a mile long and losses would become significant if they were much longer.

Beyond the transmitter building is the RF switching unit, which can connect any of the 11 transmitters to the 37 antennas on the site. Open wire transmission lines lead off in all directions from the switching unit.

In the distance, curtain and rhombic antennas can also be seen in all directions. Each transmitter site has about 400 towers.

Descending from the observation deck, we enter a large room with a myriad of large ventillation ducts and blowers. In addition to air cooling for transmitter cabinets, all high power tubes are either water- or vapor-cooled. Not suprisingly, much of the space in the transmitter building is devoted to air conditioning, ducts, plumbing, and water reservoir tanks.

Descending from the HVAC level, we come to the transmitter area. The control room contains equipment racks with

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WABC, WPLJ Relocate Studios

(continued from page 28)

auto-locators, variable speed Studer A730 CD players, and Studer A721 cassette recorders for quality dubbing of advertising demos.

WPLJ-FM's multitrack studio also required Dolby Spectral Recording, which the group outfitted with the Dolby XP-8-SR system for multitrack and the PR&E Dolby SR for stereo production.

A small voice booth for WPLJ, comprised of a control turret with microphone, monitor and headphone controls with clock and timer, is located next to the multitrack studio for announce capability.

The twin FM edit booths, Stereomixer-based with PR&E Dolby SR systems, supply full editing support of the studios with Technics SP-15 turntables, Studer A727 CD players, Micromax recorders, Tascam 122 MKII cassette recorders, and Studer A807 tape recorders. Panel-mounted Telos hybrids offer editing of incoming telephone events.

The AM edit booth, changed from a Stereomixer-based to a BMX-based facility during planning, has a BMX-14 Series III console along with the same editing facilities as the twin FM edit booths for turntables, cassettes and recorders.

For WABC's news actualities, two news workstations were outfitted with Stereomixer control consoles, Micromax stereo cart players and recorders, Tascam 122 MKII cassette recorders, and Studer A807 tape recorders.

With full access to source lines, the news workstations incorporate the Telos hybrid system as well as an LS-10 line selector. Pre-wiring was installed for two additional workstations at a future time.

The news control room, designated an air-capable studio, has the BMX-18 Series III console on line with most of the amenities available to other studios, including a dedicated delay system and Telos hybrid system.

To keep an eye on the news—and competition—the group also installed an AM/FM band monitoring system with some six to eight car receivers that news personnel, as well as others in the radio complex, can tune into at workstations.

"... WABC ... has three or more potentially different destinations for programming."

The system is "a multipair cable with audio coming across it," according to CE Bill Krause. "It feeds part of the distribution system so rather than give everyone a radio, this is a lot easier."

Logic control systems, pioneered and designed by PR&E, orchestrate operator control at every studio center in the facility. Said Williams, "if you're at a turntable, you can put the console into cue without having to go to the console and then back to the turntable."

Station studios and booths also facilitate intercom communication through the microprocessor-controlled Stentofon central exchange system.

Line and program feeds

Fifty-four SDA-8A stereo distribution amplifiers reside in station terminal rooms to fan out the wealth of audio lines needed for each studio on a continuous line basis. In addition, the DAs marry to a 64×64 master switcher for a secondary distribution system.

The DAs, with front panel VU meters showing true input and output levels, have buffer capability to make up approximately 40 dB of gain—a plus for WABC's long-distance lines coming from events staged at sports stadiums.

In the inter-wiring room, where the wiring from the two terminal rooms meet, 52-pair and 78-pair Molex blocks and Molex block wiring harnessing serve as a permanent, yet versatile interconnection system.

Instead of interconnecting between punch blocks, where wires can become frayed and lose their reliability, the group's engineers now interconnect between Molex blocks with prefabricated connector-to-connector plug harnesses.

"It's an interconnect system based on connectors instead of hard contact," said Williams, asserting that Molex blocks fit the same footprint and have the same density as a typical punch block but are more flexible, reliable and can be restored faster.

While the FM feeds program directly to its transmitter via a PR&E 8×2 stereo program switcher, with only one delay system intercepting program from air studios, the AM requires a more sophisticated delay network. "You have to look at WABC with an eye that it has three or more potentially different destinations for programming," Williams said.

The ABC Network, Yankee Baseball Network and, of course, the transmitter can simultaneously vie for program from four air-capable AM studios: the two air studios, the news control studio and the stereo production studio.

To deliver delayed program feeds to all three at the same time, separate Eventide BD980s with SDA-8A distribution amplifiers occupy the air control studios and the news control studio and, of course, the AM terminal room.

To log program, the group borrowed technology from the consumer market with the purchase of five VHS Hi-Fi cassette machines. "We record AM on one channel and FM on one channel," said Krause.

Krause also plans to make use of the video channel via security cameras throughout the facility, and by storing the recordings on the same cassettes as program logs.

He also has several other ingenious ideas for the new facility, now that all on-air lights are go. His list of projects, which range from an annunciator system to an in-office audio and video monitoring system, suggests that WABC-AM and WPLJ-FM will indeed need every mile of its some 60 miles of wire and cable.

■ ■ ■

Dee McVicker is a free-lance writer and regular contributor to **RW**. *To inquire about her writing service, call 602-899-8916.*

Inside VOA Greenville

(continued from page 31)

VFOs for the GE and Continental transmitters, Gates Solid Statesman limiters for audio processing, and modified Belar AMM-3 modulation monitors. These monitors were built by Belar to operate in the 2-30 Mc range and modified to drive the old remote modulation meters in the control console.

In one rack is a panel with numerous key lock switches, each corresponding to one of the transmitting antennas. Before tower riggers do maintenance on an antenna, they remove its key from the panel. This opens an interlock that prevents RF from being accidentally switched to an antenna undergoing maintenance.

In the center of the room is a control console where all transmitters may be controlled and monitored. The operator has a computer printout listing times, programs, transmitters, and antennas.

In another area are the control consoles for the Continental 420-A, 500 kW transmitters. Remote tuning of these units is by servo control and the console includes an oscilloscope to assist in tuning.

Next time, we'll continue our tour with a look at the transmitters, antennas, support services, and training.

■ ■ ■

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

Radio World®

BUYERS GUIDE

Audio Consoles

WAVA Applauds Auditronics

by Chip Fetrow, CE
WAVA-FM

Washington DC Roughly two years ago we began to put an entire production room together under a slightly tight, but reasonable budget. The most important and difficult decision in selecting equipment was finding the console.

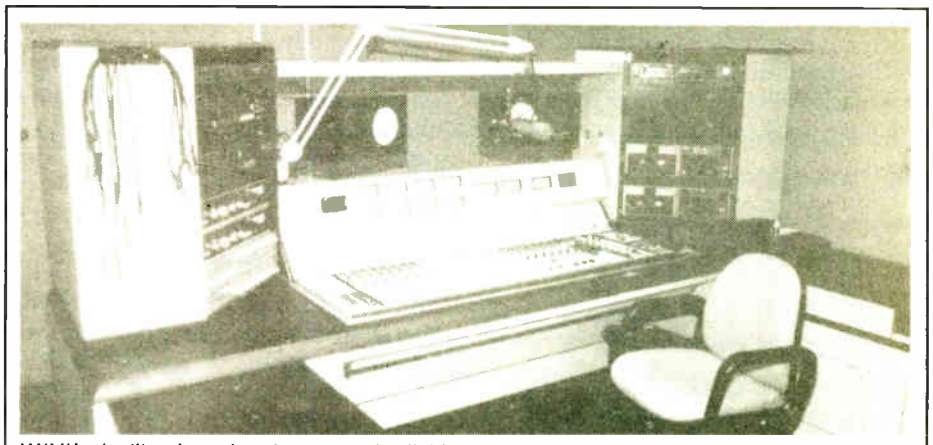
USER REPORT

Our wish list originally narrowed to the 24-input Auditronics 310 console for several reasons. We have had favorable experience with our Auditronics 218 on-air console—its specifications are very good, it is user-friendly and has been very reliable.

Keith Arnett of Broadcast Services discovered that a 310 was just not possible given our budget and all of the other things we wanted in the room. He suggested the new 400 Series, which had recently been announced, although none had been delivered.

The console seemed perfect. It had eight output busses (plus two mono auxiliary) and had an optional 16-track fold back module, which adds tracks 9-16 to the standard 8-track fold back module (included on the 4- and 8-track consoles).

While we are now pleased with the console, this was not always the case. Although it can be expected with any new product, delivery was delayed on several occasions.



WAVA's Auditronics mixer has proved reliable.

Protecting against RF

Since we have a very high RF field here in our studios and offices, RFI immunity in equipment is of major importance. Having worked in high RF environments for many years, I made certain the console was installed with single point grounding.

The ground bus to the studio is a six-inch strap that goes out through the wall to six-inch strap running around the building. This is connected, again with six-inch strap, to the strap surrounding the bank next door, the post office down the street and the transmitter building 100 feet away.

All of this connects to a grounded tower, a nearby AT&T tower, and the co-located AM station's ground system..

Installation went fairly well. There was some very low level RF detection throughout the console. This was solved over time by bypassing the power supply sense leads, scraping paint and grounding module face plates by means

(continued on page 36)

Wheatstone Handles WEEI's Diverse Tasks

by Larry S. Vidoli, VP Tech Ops
WEEI-AM

Boston MA When I was told that Newsradio WEEI in Boston was going to move to a new facility, my design philosophy was this: keep it straightforward, functional and simple to operate.

The Wheatstone A-20 console lives up to its reputation for being a straightforward on-air broadcast console.

WEEI morning drive is a dual anchor, fast-paced combo operation. We use a special rack mounted version of the A-20 alongside our Media Touch automation/live assist system.

BUYERS GUIDE INDEX

USER REPORT

After looking at several other console manufacturers, I found that most were limited in the number of input channels available in a rack mount configuration. Wheatstone, however, gave me no less than nine input channels in a 19" rack mount.

Input uses

Input modules 1-4 are used for mics, inputs 5 and 6 are used for two banks of cart machines, and number 7 input is for MTS. Inputs 8 and 9 are for two reel-to-reel tape recorders and an alternate digital audio routing switcher.

The tenth slot houses the two channel program and audition amps and the eleventh slot is the control room monitor and cue amps for associated speakers.

I also purchased two other standard mount A-20 consoles. In a studio we call Tape Ops, where the operator is constantly moving audio around from numerous satellite and land line serv-

(continued on page 46)

No Need For Digital Consoles

by Richard Farrell

Falls Church VA Competition in today's broadcast audio console market is fierce, with a full field of players offering a wide range of models to radio engineers. And as talk of digital-this and digital-that enters many an industry catch phrase, the audio console marketplace seems to be saying "no digital need apply." At least, not yet . . .

"From a user point of view, there is zilch interest in digital consoles," claims Pacific Recorders & Engineering President Jack Williams. "In all of the systems we have done, not once has the topic of digital come up from the customer's point of view," he says.

Users, according to Williams, are currently more concerned with getting as many operational features as possible out of present analog consoles. "Features, features, features—that is what we are being asked for," says Williams.

Dynamic range unimpressive

Williams downplays digital console technology for the same kinds of reasons that most others believe it is not ready for radio use on-air (most commonly heard is that a digital console's 16-bit architecture limits its dynamic range to not much more than 90 dB or so, which "even moderately priced consoles can beat," according to Williams).

He views the console market as one being currently driven by applications and pricing, not technology. He feels that there is no present dollar incentive for manufacturers to create such digital equipment.

"We are talking about a huge investment of R & D dollars," notes Williams of any attempts to develop digital consoles—dollars that the radio industry does not have.

"It is not like CDs, where they are going to build three or four million of them a year, making the seven or eight million they spend on development of a chip seem like nothing," he says.

Does nothing new

Wheatstone President Gary Snow sees "no compelling reason" for digital consoles. "To go digital in any area, you have to do something that was not possible before. And digital consoles cannot even nearly approach the performance of analog consoles."

Snow mentions that digital consoles are more beneficial to the recording industry, but that "even there it is all digitally controlled analog. Why is that? Why are the newest tape recorders on the market analog? How is it that when the digital cart machine came out nobody cared?"

For Snow, even thinking about digital consoles would not make any sense until everything else in the radio station is ready to go digital as well.

"There is no advantage to converting digital source material to analog *after* the console," Snow said.

INDUSTRY ROUNDUP

Snow also wonders how a hypothetical digital console could be marketed to radio. "If I were to build a digital console," he says, "how would I run an advertising campaign that displayed its benefits? How could I persuade the radio engineer? I could not."

Meanwhile, Auditronics President Steve Sage also sees digital's use or non-use in primarily economic terms. "Digital could be done right now—we have the technology—but is anybody out there willing to pay for it?" he says. "And if they were, would listeners notice it?" he adds.

Never say never

But while it may be true that there is nearly "zilch" interest in digital consoles among users, manufacturers will not go so far as to say there will *never* be a digital audio console suitable and affordable enough for on-air radio use.

Snow, for one, feels that in three to five years the cost of digital console technology may approach that of analog. "Not that it will *replace* analog in five years," he hastens to add. "I mean that the technology will become more and more digital and less and less analog. But there will still be analog consoles around until God knows when."

As for his company, does Wheatstone plan to attempt the development of a digital console? "We would be crazy if we did not try to develop some type of digital line," says Snow.

Arrakis Systems President Mike Palmer feels that analog is at its theoretical limits, and that "there are no real improvements left to be achieved in analog, unless we go in the direction of superconducting or super-cooled equipment.

"Eventually digital will replace analog, but it is strictly a function of price," Palmer says. He believes that in the end whatever audible superiority analog demonstrates will not be enough to sway people from going digital.

"When digital is cost-comparable to analog," says Palmer. "then it will all go digital, just because of the control capabilities. If we can make digitally controlled analog now, why continue to do that if we can be digitally controlled digital?"

Palmer ventures a guess at about ten years before the cost of the two technologies becomes comparable. "In ten years," says Palmer, "prices will toggle over, and in the interim people will start to spend the money when digital is, for example, $30,000 and analog is $10,000."

Another voice urging caution with regard to digital consoles comes from one of the current advocates of DAT technology, Radio Systems President Dan Braverman.

"I think broadcast today is an analog medium," says Braverman, whose company manufactures cost-effective analog consoles.

"When you talk about changing over your entire operation for digital, radio is just not ready. And you are not going to see tens of thousands of dollars being expended on a console until the rest of the technology catches up with it."

Braverman also feels that, in a general industry sense, analog consoles are still not nearly as good as they could be. "Manufacturers are still doing far from as well as they can in some very basic analog considerations like noise and separation," says Braverman.

One of the lesser-raised notions when talk of digital equipment comes up is that of standards. Certainly no clear standard for a possible digital future has emerged, a troubling sign to some.

Standards should not be ignored

"I see a dangerous lack of digital systems and standards in the industry, and I am a little worried by the possibility of somebody spending big money on early digital equipment that will be worthless down the road," says Broadcast Electronics Audio Sales Manager Bob Arnold.

Arnold's concern is that manufacturers, in their understandable zeal to release the hottest new digital equipment in the future, might leave behind those users whose digital education may be lacking.

"We need to learn more before any complete conversion takes place," Arnold argues. "The emphasis now should be on the standards and not installing the equipment. There needs to be a greater addressing of compatibility and personnel training."

"Education is the key; at the SBE level, or perhaps the NAB," says Arnold.

But even when those discussions begin, Arnold is predicting the usual controversy surrounding the introduction of any new technology to the radio industry. He promises, "the AM stereo war will be nothing compared to what lies ahead in digital standards."

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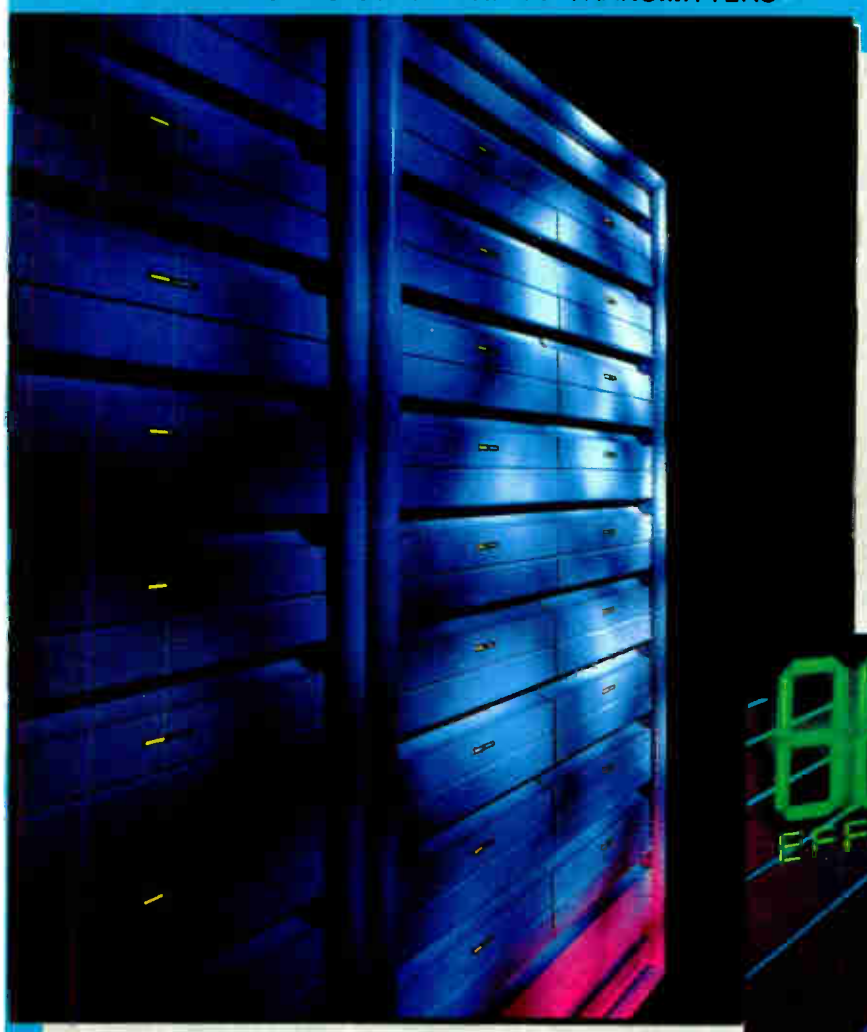

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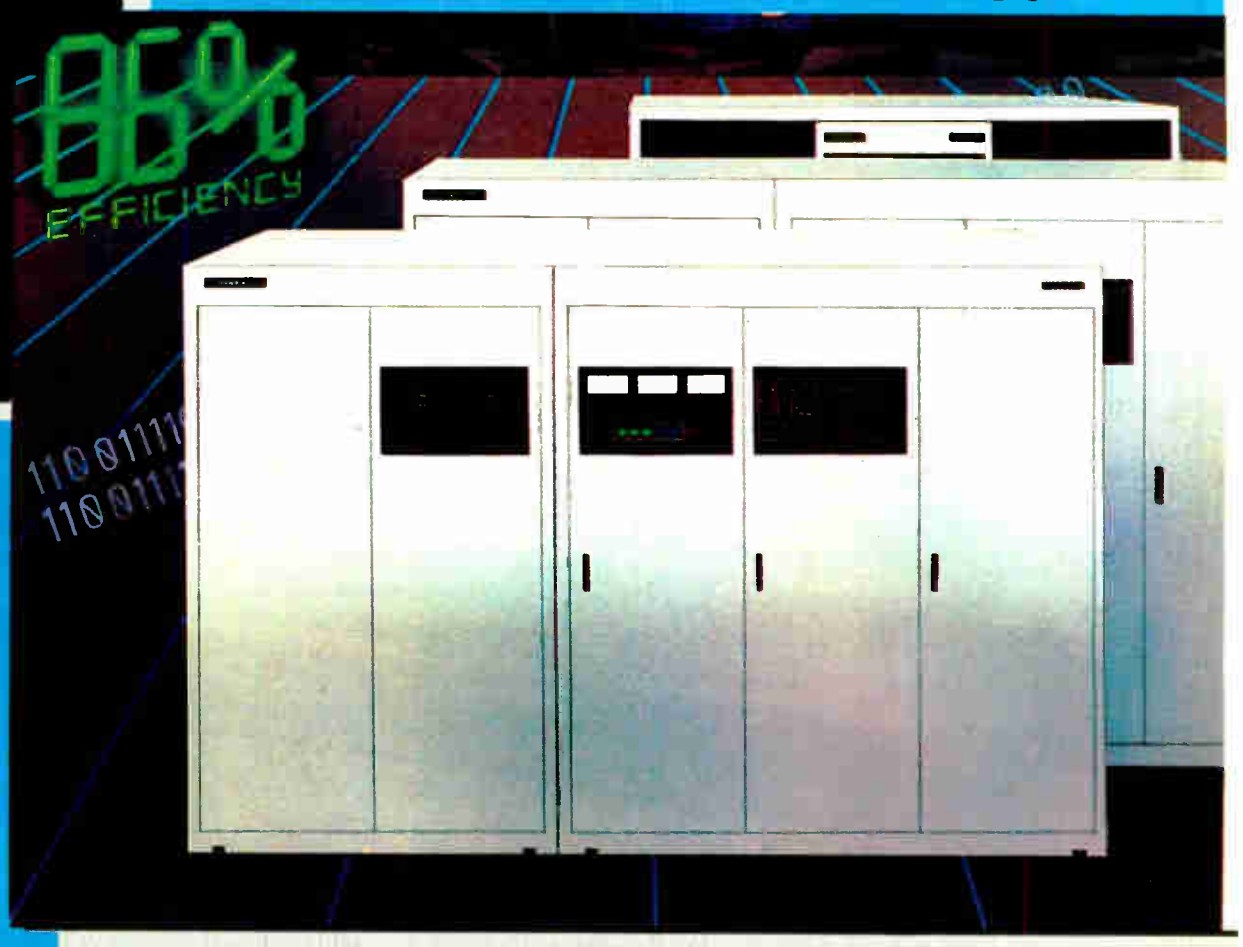

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Circle 37 On Reader Service Card

Auditronics Gets OK from WAVA

(continued from page 33)
of a ground lug on a control shaft to a ground trace. Other simple typical RFI fixes helped set things right.

Preamp chip problem

But there was a major problem. It was with a mic preamp chip—made by another manufacturer, used by Auditronics in the early 400 Series.

Although many 400 Series users have this preamp chip and experience no problems, due in large part to the extremely high RF level at our studio these preamps were more like radios than preamps. Our station, as well as others nearby and not so nearby, were heard in the monitor speakers and console outputs.

We tried all kinds of bypassing, shielding, common mode chokes and even input transformers. We could make it work, we found, but bandwidth was limited to just above 20 kHz. Neither Auditronics nor I were satisfied with the results.

Auditronics made up two sets of modified modules for me to try. One had a mic preamp similar to my 200 with transformer inputs. The other had the mic preamp daughter board from the 310 console. Both of these worked well.

I preferred not to have transformers, and Auditronics agreed. They allowed me to keep the modified modules until they had the new modules in production. They then provided me with the new modules. (By the way, the 200 now uses these same mic preamps.)

Bob Greenwald, senior design engineer at Auditronics, was instrumental in all of this work. He was cooperative and understanding, especially when I was exasperated and, I am sure, at times, unreasonable. Also, Keith Arnett of Broadcast Services should be given a gold star for his help.

On several occasions Auditronics had more than just a simple modification to install. Rather than shipping the box of modules to me, they shipped to Keith. Keith then drove here and helped with the installation.

Now the good news. The console has been operating perfectly since the modifications. The normal air staff, with few exceptions, has been able to operate the console with very little training.

The console has eight program outputs. From the stereo modules in the normal (non-reversed) stereo mode, the even numbered outputs feed the right channel and the odd feed the left.

Production made easy

Each of these busses feeds a sub master mixing module which also pans left and right. Buttons 1 and 2 are red, as is a button on the sub master module, which allows people who do simple production to "push the red buttons" and do normal stereo production. Each module has two auxiliary bus outputs.

These busses are both mono and can be pre- and post-fader. This can be useful for mono effects like pre H-3000 Harmonizers or setting up mix-minuses for satellite remotes or telephone hybrid feeds.

There is not extensive switching for outboard processors, so if you want them assignable to any input module, an external patch bay or switching matrix must be used. Each module also has cue and solo.

The reason solo is used is to hear small parts of mixes or single items, usually with effects. It is more useful in live recording sessions when you might want to hear the way the whole drum kit is mixed than in a radio production setup.

The console has extensive logic inputs and outputs. The module can start and stop an external device or the external device can turn on and off the module.

Each module has a switchable external processing loop, which may be used for processing dedicated to that module, for instance switchable mic processing. The optional EQ modules, which fit in the "dashboard" area under the meter bridge used yet another processing loop that is not switchable.

EQ modules

The EQ module has I/O switching built into it. Speaking of the EQ modules, they are pretty interesting. They use the controls on the front panel to adjust VCAs that change the EQ rather than just the resistance in an RC circuit.

We opted for analog metering for cost reasons. Bar graph meters are available.

After all of our problems, we were often asked if we would do it again. Frankly, I would never want to go through the process we went through again, but I would buy another 400.

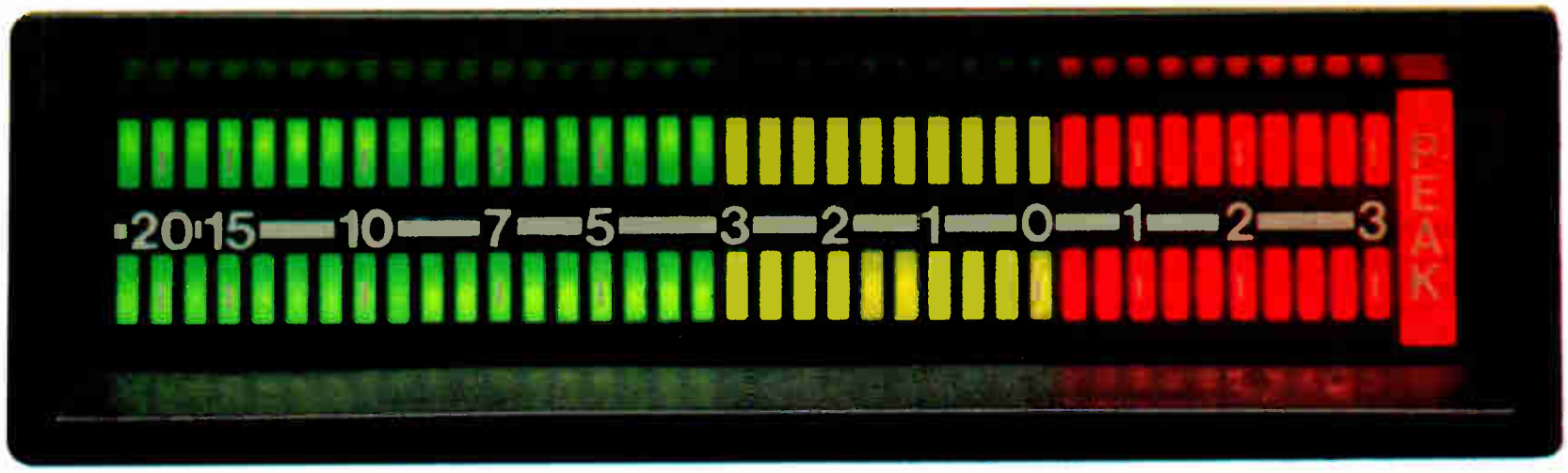
It is how problems are handled that marks a superior company, and it is because of this experience with both Broadcast Services and Auditronics and my previous experience with our 218 that my positive opinion is reinforced. Both companies worked together to provide us with a great console.

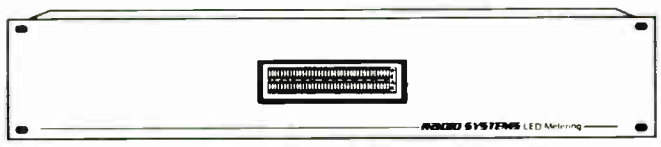
■ ■ ■

Chip Fetrow is a radio amateur, private pilot and avid scuba diver. He is also chairman of SBE Chapter 37 in Washington, DC. He may be reached at: 703-534-0320.

For more information on the Auditronics 400 Series console, contact Murray Shields at Auditronics: 901-362-1350, or circle Reader Service 99.

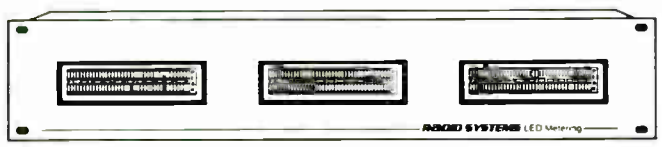
LED METERING



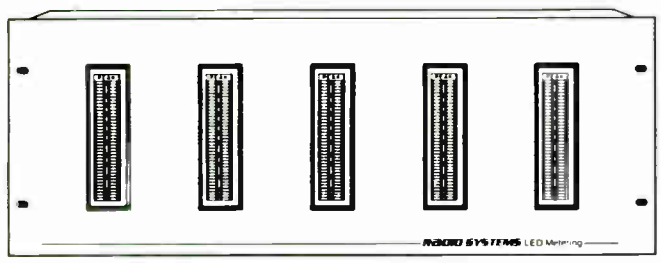


DM-R1 Single Meter Rack Mount

DM-R2 Dual Meter Rack Mount



DM-R3 Three Meter Rack Mount



DM-R5 Five Meter Rack Mount

Famous Radio Systems stereo LED meters, previously only available on our console line, are now packaged for stand-alone use.

These beautiful, high definition meters are tri-colored and switchable for peak level or VU indication. One double sized segment lights and holds to display audio peaks. Internal, independent level sets are provided for left, right and peak-hold channels.

The meters are available in a counter top box, or rack mounted in groups of 1, 2, 3, or 5 meters. The meter can also be purchased with a bracket and bezel for custom mounting. Every meter is provided with a companion power supply/amplifier board that provides all operating voltages and balanced audio inputs.

SPECIFICATIONS

TYPE: Stereo, LED

SEGMENTS: 18 x 2 green to −3 VU, 10 x 2 yellow to 0 VU, 10 x 2 red to +3 VU, 1 peak hold, 73 total.

RESPONSE: Peak or VU (switchable)

AUDIO INPUT: Balanced/Bridging (40K ohms)

SENSITIVITY: −24 dbm (50 mv)

MAXIMUM INPUT LEVEL: +10 dbm (2.5 v)

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Circle 76 On Reader Service Card

Radiomixer: Economical Quality

by Anders Madsen, Mktg & Sales Mgr Pacific Recorders & Engineering Corp.

Carlsbad CA In designing Radiomixer, we first established that its control surface and appearance would be similar to our BMX line of consoles and then generated a list of features that we felt would be the necessary ingredients to this design.

TECHNOLOGY UPDATE

These included: Input modules with two selectable inputs, control logic, the ability to be assignable to two stereo program busses and an Off-Line Mix System. Mic modules equipped with transformerless preamplifiers, pan pots and phantom powering capability were also desired.

Other ingredients included stereo line modules equipped with instrumentation input preamplifiers, an input mode selector and an electronic latching cue.

Logic control systems that would be compatible with existing interfaces, cables and remote control panels, as well as with our other consoles and mixers, were seen as necessary.

And finally, we wanted the following: two stereo program outputs and one monaural output, all equipped with distribution amplifiers; telco system outputs for hybrid #1, hybrid #2; composite and split-track mixes for taping; a telco mix monitor; and a meter panel fully equipped with true VU meters, clock and timer.

Construction begins

We limited the number of mainframe sizes we would manufacture, utilized simpler construction techniques, incorporated new technology and previously proven components, combined module functions and standardized additional features.

We elected to produce only two mainframe sizes: 12- and 20-input module capacity. This allowed us to build more of each size, and minimize the variety of inventory required to support more sizes.

We decided to retain the ¼" thick anodized aluminum end panels and trim rails for the perimeter of the mainframe. The computer-milled end panels yield precisely located assembly holes and supply the stiffness required for structural integrity.

But the mainframe area which houses the plug-in modules (the "bucket") would be different from the card frames of our BMX, AMX and ABX consoles, which are built with aluminum panels, struts, trusses, rivets and other techniques appropriate to a more complex and physically large assembly.

One-piece card frame

The Radiomixer card frame is a formed one-piece unit. Into this card frame is placed the Radiomixer mother board, which carries the connectors for the module printed circuit cards on the top side and the console I/O Molex connectors on the bottom side.

This provided a considerable savings over the construction style of the BMX, AMX and ABX series, which use a long linear shielded mother board for power, logic and signal bussing and discreet wiring of audio and logic signals to a rear-mounted user connector panel.

The module panels for BMX, AMX and ABX consoles are constructed using a brushed anodized aluminum extrusion with a laminated aluminum inlay.

Radiomixer input modules use the new Aphex differential VCA to control mix level in place of the expensive stereo audio faders and associated buffer amplifiers used in our other consoles.

VCA restraints

The use of any VCA imposes several constraints not experienced by passive fader designs. Dynamic range, noise, headroom and distortion are not constant factors but change under the various signal and control conditions normally experienced by a fader.

We established the fader in-hand attenuation at −10 dB, in contrast to our passive fader designs of −15 dB, to optimize the Dynamic Range = Signal + Operating Headroom equation for the VCA. The input modules maintain our standard input headroom specification of 30 dB, with a VCA SNR of 82 dB.

Additional technology and components were borrowed liberally from other consoles, including: the transformerless microphone preamp function module from Stereomixer; the instrumentation line input preamplifier and line output power amplifier function modules from BMX, AMX and ABX; and a power supply derived from the BMX Series II.

While combining multiple functions into one module does not reduce the cost of electronic components, it does reduce assembly time and hardware cost in terms of front panels, printed circuit boards and connectors.

For example, Radiomixer's stereo output module combines both stereo program amplifiers and their four VU meter buffer/drivers onto one printed circuit assembly.

It is less expensive to manufacture a greater quantity of a standard configuration than a smaller quantity of optional equipment. With Radiomixer we elected to limit options to Input, Studio Monitor and Remote Line Selector modules and tape remote control panels.

Radiomixer is supplied with the Telco Mix & Mono Output module, clock and timer. Its control panel is standard. This is in addition to the power supply, connector kit, tool kit, spare parts kit and manual, which are also standard with all our consoles.

In the final analysis, Radiomixer incorporates years of console design experience and the latest in audio technology. Its performance and features—particularly its Off-Line Telco Mix System—should compare favorably with much larger consoles while retaining its affordability.

■ ■ ■

For more information on the Radiomixer, contact the author at: 619-438-3911, or circle Reader Service 85.

MT 90 Meets Needs of WMUS

Broadcast Electronics' Console Features an 18-Channel Mainframe

by Mike Maciejewski, CE
WMUS-AM/FM

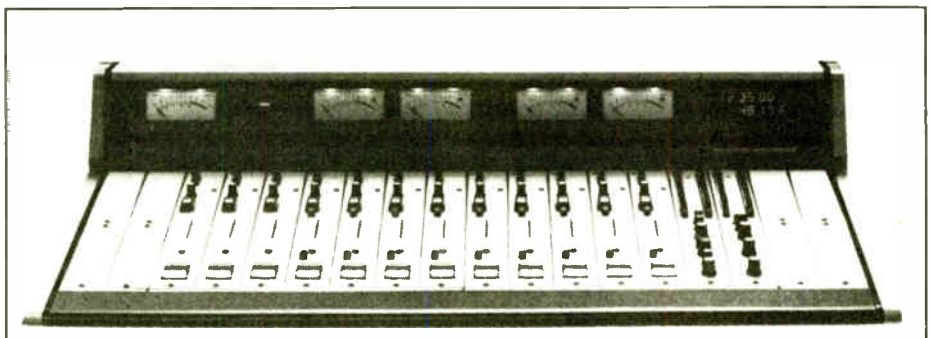
Muskegon-Grand Rapids MI When shopping for a new audio console you look for features that will fulfill your facility's current needs and, hopefully, any anticipated (or perhaps unanticipated) future needs. The Broadcast Electronics Mix Trak 90 (MT 90) console was designed to accomplish these things.

Aside from many of the standard features one would expect in an audio console, the MT 90 has a few unique qualities that set it apart from other consoles.

USER REPORT

Its 18-channel mainframe measures 4' wide and 25" deep. The large size allows for modules that are two inches wide, giving the console a very uncrowded, comfortable feel, which definitely helps to eliminate operator fatigue.

All I/O connectors enter on the bottom of the console and the entire chassis remains stationary. Not having hinged (vertical) access to the connectors presents no problem if all the console connections are brought out to punch blocks. (Maybe BE could sell a pre-wired punch block harness for the console as an option.)



BE's Mix Trak 90 gives WMUS room to grow.

The meter bridge is hinged and allows access to the summing, output and remote control circuit boards and permits the input modules to be removed.

Many options available

All of the input modules are user programmable, via circuit board jumpers, for a variety of options. One of the more interesting options is separate mix busses for program speech and program music. The ability to separately process speech and music sources gives greater flexibility in audio processing choices.

An example of this would be using reverb or stereo enhancement on music sources that would be undesirable to have on all sources. The outputs of the external processing devices are then returned to the console and summed to create a composite program output.

There are also jumpers on the input modules for assignment to any of three auxiliary mix busses, providing great mix-minus facilities.

The source remote control functions are opto-isolated transistor outputs. This eases the difficulty of interfacing the differing command polarities found in various types of gear. It also eliminates the ground loop problems created by the common non- opto-isolated transistor switching found in other consoles.

Source sequencer

When equipped with source remote cards, the Mix Trak 90 has the ability to function as a source sequencer. Great for live assist operation, the input modules have an "arm" button that readies the source on that channel to be started by an end of message signal input from the previous source (easier to watch than to put into words!).

Another innovative feature is the capability of synchronizing the built-in digital clock to network audio. Here is how it works: the audio is input to the clock and the clock jogs the time plus or minus a tenth of a second at the top of the hour (depending on whether the clock leads or lags the audio.)

This correction seems to work effectively, but the clock needs to be initially set accurately.

Thorough documentation

The technical manual for the Mix Trak 90 is superb. All the features in the world cannot make up for a lack of documentation, and there is no shortage of information here.

The manual is indexed into sections. The installation section thoroughly describes all of the set-up and options, including many pictorials of the modules and circuit boards that offer detailed notes on option jumper placement.

It is certainly easier to look at a drawing than to dig through text to find the information you are looking for. Each module and circuit board has its own section in the manual that includes theory of operation and yet more pictorials (certainly nice for troubleshooting).

As with any complex piece of equipment, you might expect an overlooked problem or two. An apparent wiring error had the microphone phantom power supply polarity reversed. This was corrected by reversing two wires in the cable from the power supply chassis to the mainframe.

The other difficulty we have encountered is the design of the studio talkback module. It was designed to function for a control room to announce booth situation, and was not suitable for talkback operation between two MT 90 consoles. But rest assured: BE is working on this one.

■ ■ ■

Mike Maciejewski may be reached at: 616-798-1149.

For more information on the Mix Trak 90, contact Bob Arnold at Broadcast Electronics: 217-224-9600, or circle Reader Service 97.

BUYERS BRIEF

Recent upgrades have been announced to **ATI's** Vanguard Series eight- and twelve-mixer consoles.

A new modular front panel design has been developed for easier service and assembly. The panel accepts a new drop-in flat panel switching array featuring sealed, snap-action switches that are completely impervious to airborne and liquid pollutants.

Additional inputs to both the headphone and monitoring amplifiers are also provided. Stylistic changes include a subdued, more mainstream color scheme with rich oak trim.

Vanguard consoles are all dual-bus stereo boards with extra mono sum outputs from both program channels. All input and output switching is digitally controlled and all level adjustments use DC-controlled dbx™ VCAs.

For more information on the Vanguard Series upgrades, contact Sam Wenzel at ATI: 215-443-0330, or circle Reader Service 95.

LPB's Signature Makes Its Mark

by Dave Schmidt, CE
WAMS-AM

Wilmington DE Searching for the words that best describe LPB Signature consoles, those that come to mind are: "No problems!"

We have been involved with LPB Signature consoles for many years. Our company has always made them our first choice for any station that asked for a good, dependable console.

Its selectable inputs for each of the channels make source selection easy, and gives the operator the pleasure of smooth operation. If a change has to be made, it can generally be done in a matter of minutes.

How well do the Signature consoles hold up under tough operating conditions? We have installed them in private schools and universities, which we feel really puts any piece of equipment to its maximum test of durability. The results? No problems after years of hard use.

Smooth hook-ups possible

The layout inside the consoles is an engineering dream. The large barrier strip terminals, clearly marked, make for a smooth hook-up (unlike the very tough wedge-in-the-small-hole-and-screw-down terminals).

After you have done a few installations of the Signature consoles, you can generally do 75% of the hook-up without even looking at the detailed instruction book.

USER REPORT

In the event of a problem, LPB has always given us full support with needed parts and has always answered our technical questions (as few as need to be asked).

If a pot needs to be changed or a switch needs servicing, there is plenty of room in which to work and the problem can usually be corrected in a few minutes.

Have they always worked when turned on for the first time? Yes. In most cases, the console is on for good from that moment.

Built to last

Construction of the console makes it look like it is built to last—we have not been let down in that department.

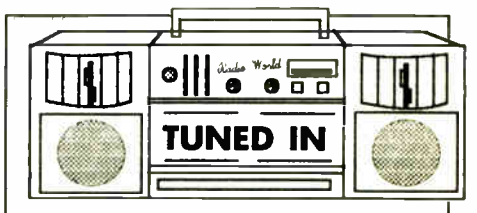
And in high RF fields we have found the console to be RF-free (even in the immediate area of a 10,000 W AM transmitter, RF is not present).

The movie guy gives "thumbs up" for a good movie review; we can do the same with the Signature consoles.

■ ■ ■

Dave Schmidt works as a contract engineer for Mid-Atlantic Radio Service. He may be reached at: 302-654-8881.

For more information on Signature Series consoles, contact John Tiedeck at LPB: 215-644-1123, or circle Reader Service 81.



People ... Harris Corp. has appointed Harvey Baker to the post of vice president of manufacturing for the company's broadcast division headquartered in Quincy, IL.

He will be responsible for assembly, testing, metal fabrication and machining, materials management and manufacturing engineering. Baker comes to the broadcast division after 11 years with the **Harris Graphics Corporation** in Dover, NH.

Meanwhile, Jorgen Ravn has been named to the newly created position of sales director for **Valley International**. Ravn joins the company from **dbx**, where he was regional sales manager.

Microwave Radio Corp. has recently appointed Sal Coraccio operations manager, with responsibilities for manufacturing, purchasing and manufacturing services. The 30-year microwave industry veteran will report directly to Microwave Radio President and CEO Robert Morrill.

Lands Olympics contract ... The largest single order yet for its remote pickup links (RPL) has been received by **Moseley Associates** from Radio Nacional España. Ordering 50 RPL 4000 units, Spanish National Radio will use the equipment in conjunction with its current effort to establish a new network for the 1992 Olympic Games in Barcelona, Spain.

What's in a name ... The NAB's new nationwide awards recognizing outstanding stations and personalities in the radio industry will be named the **Marconi Radio Awards**, it was announced recently.

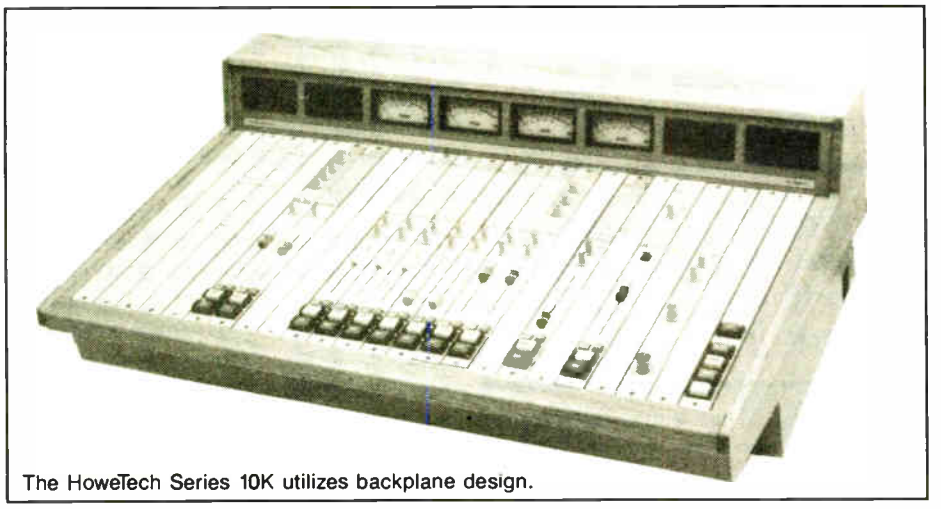
The awards, which will be presented at the Radio '89 convention in New Orleans September 13-16, will be presented for: stations outstanding in their format, air personality (or team) of the year, network/syndicated personalilty of the year and legendary station.

Howe Design Goes "Wireless"

by Bill Laletin, VP Eng
Howe Technologies Corp.

Boulder CO In a departure from conventional console wisdom (taking a 50% electronics, 50% copper wire approach), the HoweTech Series 10K "Wireless" console utilizes a multi-layer backplane containing all the audio, logic and power circuits required in the mainframe.

Outboard connections to the console are made at the remotely located User Interface Panel (UIP) via quick-connect cables and 37-pin DB connectors mounted directly underneath the backplane.



The HoweTech Series 10K utilizes backplane design.

TECHNOLOGY UPDATE

Console installation often requires hours of "on-your-back" wiring and assembly. But with the 10K, by separating it into two parts—the mainframe and the UIP—installation time is reduced to a few hours. All user connections are located in the UIP, which communicates with the mainframe through a set of quick-connect cables.

Remote interface card, cable

Each mainframe module is supplied with its own remote interface card and cable. These can be mounted in any order in the UIP. Small personality boards plug into the back of the interface cards to provide various machine interfaces and special I/O functions.

All connections to the UIP are from the front. Thus, installation should be both faster and easier, and any subsequent wiring modifications can be made without disturbing the console or the operator.

In a modular console, the internal connection scheme is the prime factor governing the flexibility and user-friendliness of the complete system. HoweTech chose a passive backplane design for the 10K, which incorporates many parallel circuits.

The multi-layered backplane provides 192 separate circuit connections at each module position across the width of the mainframe, allowing modules to be located in virtually any order. The modules connect through gold-plated, 96-pin Euroconnectors (DIN41612), providing both self-aligning connection and environmental protection.

Audio signals differentiated

To reduce crosstalk and RFI, every audio signal in the backplane is fully differential. In addition, the foil patterns on the backplane have been designed to simulate actual co-axial cable: each audio circuit pair is completely surrounded by ground plane, just as it would be inside of foil-shielded coax.

This Virtual Coax™ design provides all of the shielding required, without the problems associated with point-to-point wiring.

The 10K uses a proprietary dual bus architecture, which completely eliminates inter-module wiring. A differential sum bus is provided for each basic audio signal (four primary stereo busses, stereo Cue and Solo and a mono talkback bus).

A bus summing module converts these "virtual ground" signals into the differential voltage mode signals of the line bus, available via the parallel backplane at every module position. These line level signals can be utilized by any number of monitor and output modules, without any special connections.

High slew rate amps

Throughout the console, conventional circuits have been replaced with minimum feedback designs. By using high slew rate amplifiers in symmetric circuits, flat frequency response and wide phase margin are built in from the beginning.

Thus, THD approaches the limits of measurement, and troublesome dynamic errors such as asymmetric slew rates, poor overload recovery, local stage saturation and other transient distortions are minimized.

The usual proliferation of electrolytic capacitors (with their attendant phase shift and dielectric absorption problems) has also been eliminated in the 10K; an active DC servo design guarantees proper operation throughout the life of the console.

Most critical in any audio console is the input preamplifier. The 10K's mic preamp employs eight ultra-low noise PNP transistors, symmetrically connected to two high-speed amplifiers in an instrumentation amp topology.

By operating the transistors in the current mode, non-linear distortion products are considerably reduced while symmetric design cancels the residual distortion. Passive RFI filtering and dual DC servos make the preamp sonically transparent to the most demanding transients.

VCAs were chosen for level control. Since commercially available VCA mod-

(continued on page 44)

RAM SX Blends Ease Of Use, Performance

by John Bortowski, CE
WVAZ-FM

Oak Park IL When new ownership came to our station last year they looked at the air studio and asked: how can we get a better sound, make the jocks happy and not spend a great deal of money?

We decided that a new console was in order, one that could meet some stringent requirements. It had to sound great in a high RF environment (we have an AM tower on the roof, 50' from the studio), be easy for talent to operate and not cost an arm and a leg.

USER REPORT

After searching through stacks of catalogs from various manufacturers, we found that the RAM/McCurdy SX Series hybrid console fulfilled our needs most accurately. The SLI and MMI modules come from the venerable McCurdy Radio of Toronto.

McCurdy has been making consoles for 40 years, and these modules have the best specs yet. Their published SNR of greater than 90 dB is, in fact, very conservative.

The hybrid works this way: RAM takes the McCurdy modules, adds a few of their own, puts them in a rock-solid case and calls the console the SX Series.

Better than original

The SX offers an advantage over the original series S because it has in-line utility bays that allow you to place equalizers, compressors, or an assortment of input select modules in line with each input module. We ordered the stereo 2×1 and 6×1 selectors.

The console does not have a mother board. This design eliminates those pesky edge connector problems and lessens the precision necessary to insert a module when the console is hot.

The audio inputs and logic hook directly to the module on Molex mini-fit junior connectors. The audio busses and power supply are connected by a ribbon cable with lockdown levers that prevent accidental disconnection.

With the mother-boardless design, the true audiophile or logicphile has the option to configure the console exactly as he or she wishes. Mic and line modules can be mixed and matched in the standard frame sizes of 12-, 18- and 26-input

(continued on page 45)

Series VI Wins Over WRNQ-FM

by Bill Draper, CE
WRNQ-FM

Poughkeepsie NY It took eight years of studies, applications, changes in location, hearings and delays before WRNQ-FM was able to go on the air. When the owners asked me to go ahead and choose the equipment to build their new FM, I was faced with an array of choices.

Choosing a console used to be easy. The first time I had the chance to build a new station some 30 years ago there were three manufacturers offering one or two boards. Now, more than a dozen

USER REPORT

companies vie for a station's attention with a mind boggling assortment of styles, sizes and prices.

That is why Program Director Joe Ryan and I spent a lot of time in the exhibit hall at Radio '88 looking over all of the console offerings. WRNQ was planned as a satellite-delivered music format, totally automated except for weekday morning drive.

Therefore the console had to be versatile enough to handle the live show and double as a production facility for the rest of the day.

After sliding all the pots, pushing all the buttons and watching lots of blinking lights at all of the convention booths, the PD and the CE came to the same conclusion (how often does *that* happen?): we both wanted the Broadcast Audio (BA) Series VI console.

The most attractive feature of the Broadcast Audio line is its modular construction . . .

Joe liked the layout, simplicity of operation and features such as its built-in event timer and headphone EQ.

Having installed and operated BA Series IV boards at two other stations, I was impressed with the fact that the new series retains the best of that earlier design while adding many new features. I also knew that the console could handle production tasks.

More channels in smaller frame

The most attractive feature of the Broadcast Audio line is its modular construction, which uses one basic mixer for either mic or line inputs. Each of the line outputs as well as cue and headphone use the same universal amplifier card, and all of these modules can be removed or inserted with the power on.

At first glance the Series VI looks the same as the Series IV until you realize that David Evans and his crew at Broadcast Audio have produced a more narrow mixer, one that allows 16 channels in the same frame space as did the old 12-channel board. Also, the unit's profile has been lowered by allowing the chassis to be recessed 2½" into the desk.

The basic System 16 configuration that we selected has 10 mixers plus the headphone/monitor control module. The rest of the space is occupied by blank filler panels. We rearranged these to provide space between the three mic mixers and three cart mixers, with another blank to separate the remaining pots.

This helps give the operator a quick visual reference without having to look for numbers or labels. The remaining blank spaces provide a handy writing surface or a place to install your own accessory switches, buttons,, lamps, bells and whistles.

WRNQ's Van Ritchie mans the station's Broadcast Audio Series VI console.

Among other improvements are DB-25 connectors, which bring the three inputs to each mixer. Earlier boards used a turret terminal arrangement that was not too popular with those of us who had to wire them up.

Simplified interfacing

Interfacing the remote control of tape machines and CD players has also been simplified in the Series VI with the addition of 17 open collector outputs, which can be strapped to the logic from the selected input of any mixer. Four relays are also provided for speaker muting and machine control where open collectors cannot be used.

Other nice touches are LED indicators for the input and output selector switches and the cue bus. A peak flasher is also built into each of the seven VU meters. (There are separate L-R meters for Program, Audition, Utility and Mono output.)

Broadcast Audio has also thoughtfully included two sheets of color-matched labels for every input/output you could ever conceive of. (Well, almost; EBS and RPU labels are among the missing.)

Despite a 72-hour burn-in at the factory, a couple of problems developed right after we powered up the console. A resistor in the 30 V supply line of one mixer went up in smoke immediately and a short time later one of the output amps quit putting out.

However, both problems were promptly repaired by the factory and the equipment has been running flawlessly since.

RF held in check

Since the studio would be located at the studio/transmitter facility of WKIP-AM, RFI immunity was a major consideration. I am pleased to report that a 3" ground strap bolted to the console frame, along with careful shielding, have kept the RF gremlins at bay.

Performance tests met or exceeded all the specs. We were looking for response of ±.5 dB from 20-20,000 Hz, but the meter on our VU never moved in that range. It finally rolled off to −1 at 60,000 Hz. The input headroom of 30 dB should foil all but the most determined efforts to produce distortion.

At noon on a Friday, the start of the July 4th weekend, flashguns flashed, TV recorders rolled and the Broadcast Audio console was the center of attention. Rockin' Easy Q-92 was finally on the air!

■ ■ ■

Following a tour as base communications officer at Dharan Air Force Base in Saudi Arabia, Bill Draper inexplicably decided to begin a 32 year career in broadcast engineering. At last count he has done work for 18 radio stations in the Hudson Valley, from A to Y (Albany to Yonkers).

For more information on the Broadcast Audio Series VI console, contact David Evans at: 916-635-1048, or circle Reader Service 94.

BUYERS BRIEF

Arrakis Systems has introduced the 12,000 Series audio console. Available in three mainframe sizes (8-, 18- and 28- channel), the console offers such design features as Penny & Giles 3000 Series slide faders, ITT Schadow switches and gold connectors.

The totally modular console also offers VCA controlled faders, three stereo output busses and a universal mainframe design that allows any module to be placed anywhere desired.

Optional modules for mono mix down, stereo output DAs and remote selector are also available. For more information on the 12,000 Series, contact Greg Friedman at Arrakis: 303-224-2248, or circle Reader Service 88.

Pacemaker Leads Way at KBSG

by Clay Freinwald, CE
KBSG-AM/FM

Seattle WA When KBSG's new owners, Viacom, recently decided to move the station from Tacoma to Seattle, the first items on the new equipment list were the mixing consoles that would be the heart of the four new studios.

USER REPORT

We chose 2-track and multitrack consoles from Auditronics for the air, but it was in the selection of the news studio console that the process became bogged down.

KBSG, an oldies format, does a limited amount of news. Therefore I could not justify another large console. I wanted a board that would operate in a manner similar to the others in order to maintain a degree of uniformity (slide pots, start and stop buttons, built-in timers, stereo-capable, built-in machine controls, etc). The console also had to be small.

My search through the catalogs and conversations with vendors turned up units that were either nothing more than glorified rack-mounted mixers or units with questionable track records.

A new console shown

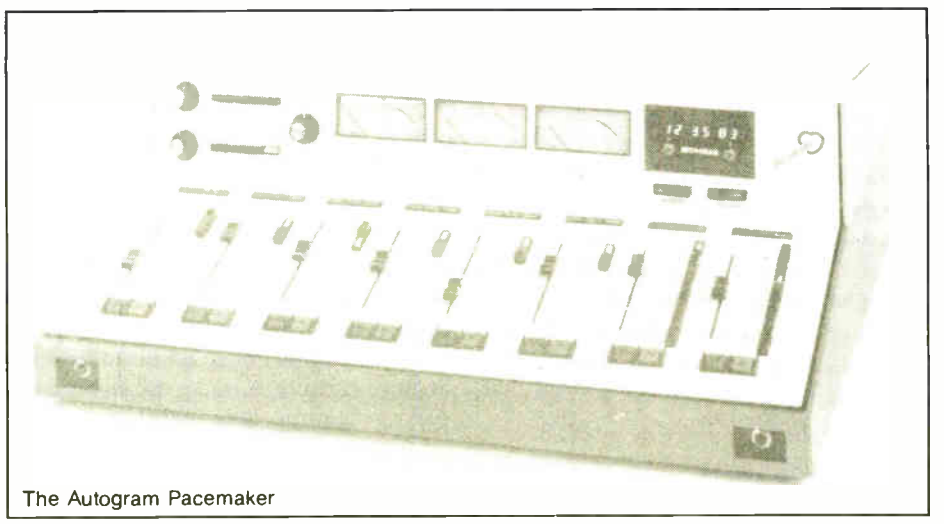
This was until I met Matt Meaney of Broadcast Supply West (BSW), who told me of a new product from Autogram that was being introduced at the 1989 NAB show.

The company was going to introduce a new line of consoles with 6, 8 and 10 channels. It would be called the Pacemaker line, an outgrowth of the R/TV-20 line.

I had installed several Autogram AC-8 and IC-10 consoles over the years. In fact, we had been using two of the IC-10s for the last 10 to 15 years at the station, and even though they are not as elaborate as the new units that are replacing them, they were built like the famous outback and never seem to fail. So I asked for more information on the Pacemaker.

Autogram sent me pictures and preliminary information about the 6- and 8-channel models. The 6-channel is unique, with eight inputs for each of its channels.

The 8-channel Model 828 featured two inputs for the first six channels and eight inputs on channels seven and eight. A nice touch was that each of the inputs had its own machine controls.



The Autogram Pacemaker

Each console has six output channels: Program (L & R) Audition (L & R) Mono (from either Program or Audition) and Mix-Minus (a mono mix from each of the mix channels).

Console fits needs

It was only a little over two feet wide, which was perfect. Sight unseen, I placed my order for the 8-channel Model 828.

A couple of days after NAB, I went over to BSW to pick up my new news room console and bring it to the shop and here is what I found.

The rig is a typical Autogram—a Texas Whiteface with engraved panel, easy to read labels, three VU meters and the usual Autogram "understand-at-a-glance" panel layout.

Other nice touches are its colored Schadow™ selector switchers that permit the operator to see which buttons are pushed and also offer provisions to label the input selector bottoms without having to resort to impression labels.

And the mentality of operators was obviously in mind when Autogram colored the Start buttons green and the Stop buttons red, a system that I fail to understand why other console makers do not adopt.

Impressive construction

Inside the console are some real treats. The entire console, except for the power supply, is based on mother/daughter construction, using nice glass boards. Each of the two-input channels (1 through 6) have two machine controls per board while channels 7 and 8 (the ones with eight inputs) have audio inputs and controls on separate boards.

The remaining boards are used for Program, Audition, Mono and Mix-Minus monitor and headphone functions. A feature I particularly like is the way they handle mic preamps. The console can be equipped with two mic preamp boards, each containing four mic preamps. You can then wire the mic preamps where you want them.

A word on the Pacemaker's method of

(continued on page 46)

RS Series Features Flexibility

by Clyde Plunkett, CE
KYMG-FM

Anchorage AK When Anchorage's Comco Broadcasting began broadcasting as KYMG on 1 January, 1989, three Radio Systems RS-18 consoles took to the air as well.

In shopping for consoles, I had to choose carefully; KYMG required a board that could both support our all-CD Century 21 A/C format, and work equally well in Control, Production and News.

USER REPORT

I also wanted a console that was easy to install, because I was cramped for time. (In October, we were still shopping for consoles and a transmitter; sign-on was set for midnight of New Year's Eve and we could not wait for a console that took several days to install.)

Design impressed

The RS Series boards turned out to be a superb choice. This is an affordable console. But it impressed me with capabilities and flexibility that I found elsewhere only on consoles that cost literally two or three times more.

Flexibility is the important word here; the RS-18 and its sisters, the RS-6 and RS-12, are built intelligently. Open collector logic is provided for remote starting of cart decks and most other sources.

The connection is made on a push-on, five-pin connector for each channel and can be jumper-selected for holding or pulsed operation. (Jumpers are used throughout the console to make programming of input level, muting, timer start and so forth quite simple.)

Most equipment hooks right up to the console, but for unusual interface applications, Radio Systems offers a menu of optional interface cards. The cards mount inside the RS-18 against the rear bulkhead and connect to the input control cards with ribbon cable.

Included are basic interface cards,

. . . the RS-18 and its sisters, the RS-6 and RS-12, are built intelligently.

which provide dry relay closures to start our Otari open reel decks, Technics CD players and any other equipment that needs such closures.

Interface to carts

The cart machine interface cards cause the channel on/off bulbs of the RS-18 to emulate the flash sequences of our nine BE Phase Trak 90 cart decks.

(These cards also allow automatic cart sequencing and provide remote channel on/off, lamp voltages and logic functions.)

Turntable synchronizers are included to keep Technics turntables in step with the on/off instruction from the console.

The RS Series provides linear Penny & Giles faders, controlling dbx 2150-A VCAs. SNR figures run 88 dB or better for line level sources and distortion is nominally .02% through the audio spectrum.

Wiring is straightforward. A handy feature of the RS Series board is its input architecture; the gain of any *input* (not just any *channel*) may be changed with a simple combination of plug-in jumpers and color-coded Input Attenuator DIP carriers. Any input accepts any level from −60 to +10 dBm.

Easy setup

The input architecture, in addition to the jumper-settable logic, help setup to go smoothly. For example, you may choose to set input 1-A as a mic-level, speaker-muting input, while 1-B is set to accept a consumer-grade, unbalanced CD player—non-muting—with timer start.

Our fleet of Technics SL-P1200 CD players are interfaced this way. What a treat, not worrying about $200 matching boxes or homemade amps with mystery parts!

Audio inputs are via differentially balanced instrumentation amplifiers. Outputs are active balanced, adjustable from 0 to +10 dBm, with maximum rated at +22 dBm. Headphone and cue amps are nice and beefy. You will need to order a monitor amp separately.

Input and output wiring is easy, using push-on connectors, but for real convenience we chose optional wiring harnesses, which bring all audio ins, outs and patch points to punchblocks. This sped our installation along nicely and should make future wiring changes simple.

Our application is not a good test of the console's RF performance, but it seems well designed in that regard, with virtually no audio on ribbon cable and the console guts are surrounded by metal, with oak only for trim.

Convention talk

One reason I chose the console traces to an anecdote I heard at the Denver SBE convention. A college user told me he had accidentally wired AC into the console and damaged it. Radio Systems promptly and graciously provided parts and service under warranty.

The factory also offers around-the-clock technical support and Federal Express warranty parts delivery, although I have not had to use it.

As I mentioned, Radio Systems RS Series consoles are available in 6-, 12-, and 18-channel versions. Given the design and interface capabilities of the console, and with a price range of $4000 to $9000, they are an excellent investment.

■ ■ ■

Clyde Plunkett is a certified AM and FM engineer and senior member of the SBE and Class 1 NARTE. He has worked as KYMG's chief engineer since fall of 1988. He may be reached at: 907-272-5945.

For more information on the Radio Systems RS Series consoles, contact Paul McLane at: 800-523-2133, or circle Reader Service 87.

Howe Takes New Tack

(continued from page 41)

ules did not meet the distortion and headroom requirements, a new class-A VCA was developed in house.

Once again, high slew rate symmetric design provided an elegant solution: for normal signal levels, the overall distortion of the VCA (at all fader positions) runs below .002%. An eight-breakpoint mapping circuit translates fader position into audio level control using the longest effective mixing range possible.

Low-resistance JFET switches are employed in a new circuit design that incorporates controlled switching speed and special charge balancing techniques to virtually eliminate static DC errors and transient charge injection.

Audio consoles are often required to drive substantial lengths of cable, terminated with difficult loads. Anticipating this situation, the 10K output amplifiers have been designed to supply over 60 V peak-to-peak into 600 ohms.

Eliminates external DAs

With a full power bandwidth in excess of 100 kHz (slew rate greater than 80 V per μs), these amplifiers can drive the standard console lamps to full brilliance at less than .003% THD. This output capability should eliminate the need for external distribution amplifiers in most applications.

The external power supply provides well-regulated DC to the backplane, with a substantial brown-out margin. In addition, each module has an on-card secondary regulation for its power supplies, with up to 20,000 μF of on-card charge storage.

The universal backplane also allows the 10K to be set up as a production console, with four stereo or eight mono outputs, plus cue, solo and talkback.

Each input module features two selectable inputs, with full logic-follow-audio capability. Four stereo busses, cue, solo and talkback are standard, with crosspoint switches for noise-free operation; LEDs adjacent to the buttons provide complete status information.

Additional logic

Additional logic includes multiple mic mute busses and selectable "NEXT" sequencing on all line modules. Each input module is provided with a space for the installation of optional functions, and a multiband equalizer and compressor/noise gate are also available.

An automatic mix-minus function in each Telco interface module eliminates the need for a dedicated mix-minus bus. Instead, echo-cancelling logic in the Telco module performs the mix-minus function directly for each incoming phone line (two per module), accommodating any number of telephone lines.

With a full selection of standard configurations, modules and metering available, the Howe Tech 10K is equally at home on the air or in production.

■ ■ ■

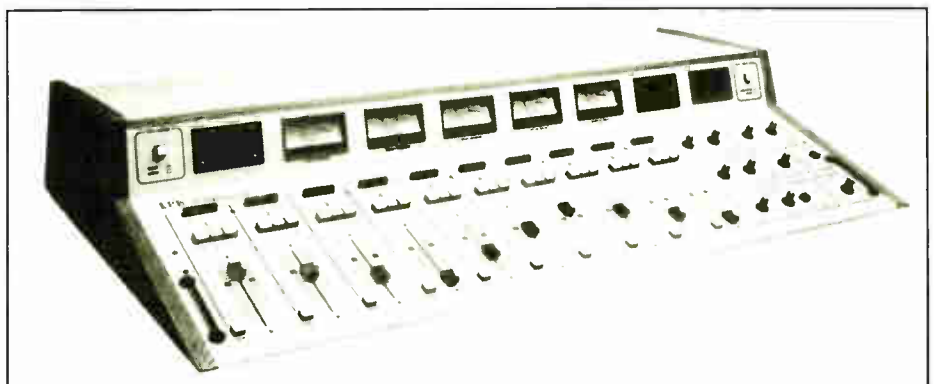
For more information on the Series 10K console, contact the author at: 303-444-4693, or circle Reader Service 90.

Citation II Surpasses Original

by John Tiedeck
Applications Eng Mgr
LPB, Incorporated

Frazer PA Over the past ten years, LPB's Citation I audio console has built a track record for clean audio performance, reliability and longevity.

The major design goal for our new Citation II console was to bring the same qualities of the Citation I to a "low profile" design. We also wanted to incorporate as much as possible of the long "wish list" of features we had compiled over ten years of user feedback.



The Citation II from LPB puts high performance in a low profile console.

TECHNOLOGY UPDATE

After extensive development and testing, the 10-channel Citation II was introduced at 1989 NAB. At the show, the first feature engineers and DJs alike mentioned was the logical, uncluttered layout.

Most-used controls within reach

All of the essential controls are located in front of the operator, with no non-essential buttons, faders or pots to distract the eye or confuse the fingers. Less-often-used controls are grouped separately on the right.

Looking at the channel strip, each channel has three inputs with lock-out switching, two stereo output busses, mix-minus capability and mono mix down.

Every channel has a remote start momentary pushbutton that follows the input selected by the operator. The first five channels also offer programmable monitor and cue muting.

Plug-in stereo preamps for each mixing channel have switches to select mono or stereo input. The mic preamps can also select high, mid or low gain and an external processing loop.

For convenience, a digital clock and an improved event/cumulative timer are standard equipment. Five illuminated VU meters with LED peak indicators monitor levels on the two stereo output busses as well as the mono mix-down bus.

Auxiliary selectors

On the right are the metering select controls, as well as other operating status controls, including two user-configurable four-position auxiliary selectors.

These can function as additional inputs, output directors or external inputs to the studio monitor, headphones and even the VU meters (for setting levels of external signals). Engineers should appreciate that the Program and Audition Masters are switchable to "DJ-proof" internal level control.

The Citation II's front panel is protected by a tough Lexan$_{TM}$ overlay, while Penny & Giles linear faders are used throughout.

Also, the entire front panel opens to provide easy access to the console's interior. There, you will find clearly identified barrier strip terminals that make it easy to install a Citation II, add new input sources or alter the internal configuration.

The extremely high quality of today's audio sources demands exceptional audio performance from every link in the broadcast signal chain. The Citation II's signal path is engineered to do justice to everything from CDs to DAT to new high-performance cart machines.

■ ■ ■

For more information, contact the author at: 215-644-1123, or circle Reader Service 92.

RAM Console is Operator-Friendly

(continued from page 41)

modules. Logic may also be arranged to suit your specific needs.

We have our cart machines wired so that the voltage required to drive the on/off lamps is derived from the cart machine. This provides a positive visual indication on the console of exactly what function the cart is in (e.g., ready, run, cue). When the cart is finished, a secondary tone turns the module off, which helps prevent operator error and tightens up the show.

Use with CD player

On the CD players, we hooked up the pause and ran open collectors to also give indication of machine functions. When the CD loads and cues up it goes into pause mode, thus activating the module off lamp. When the talent sees the off lamp lit up, they know the CD is ready to air. This feature has prevented many potential on-air errors.

Let's face it, the days of engineers running consoles is pretty much over. These days, the console not only has to sound great, but must also be very easy to use.

Talent is frequently afraid of new technology. But this console induces no such fear. When a source is on the air, a bright "On Air" LED indicator lights. It is very easy to figure out what is on the air and what is not. The modules are simple and friendly. The headphone and monitor level controls are easy to find, rugged and unencumbered by a multitude of buttons.

This console has the features you would find on a console costing twice as much.

Such features include Penny & Giles conductive plastic faders, VCA monitor control and balanced inputs, outputs and patch points. Internal jumpering provides solid state switching of the audio busses.

Dual utility busses are useful for mix-minus applications. The busses may be set up with jumpers so that no talent interaction is necessary.

And since the audition module is identical to the program module (except for jumpers), it is easy to swap in an emergency. And speaking of emergencies, RAM has a very efficient module replacement program; all modules are kept in stock, ready for delivery.

The RAM SX Series console gave us the features we were looking for and more.

■ ■ ■

John Bortowski has been an engineer in Chicago radio for over 20 years. When not behind the desk, he enjoys swinging golf clubs in parts unknown. He may be reached at: 312-524-3200.

For more information on the SX Series, contact Ron Mitchell at: 312-358-3330, or circle Reader Service 93.

Autogram Sets Pace at KBSG

(continued from page 43)
I/O connections. Autogram has used Buchanan connectors throughout. These make connections to the console a breeze. You simply grab your "Greenie," put the wires in the holes of the connector, tighten and push onto the desired location.

Inputs can be moved from channel to channel in seconds—nice, for those working in places where console layouts can change as often as the jocks do.

Easy access

How often have you felt like you were working under the dash of a car as you tried to change a pot on a console? That is not the case here. All of the items on the front panel—pots, switches, etc—are plugged in. So you simply unplug the defective pot, take it to the shop and solder away, right side up!

The power supply is on the inside (no wall warts here). In fact, the only things you have to add are a cue speaker and monitor amplifier and you are ready to go.

The Model 828 Pacemaker met or exceeded all of Autogram's claims, using state of the art chips and transformerless design. Its performance is bound to be great.

Future suggestions

But, OK, what about the gripes? (I have the first Pacemaker console.)

For starters, the push buttons need additional illumination. They are too dim for bright locations. The console needs to be supplied with an extender board for ease of service.

And the technical manual needs to include board layouts, parts lists, typical voltages and waveforms, etc. (I wish broadcast equipment makers would read a couple of Motorola or GE land mobile technical manuals . . . they might learn a lot.)

All in all, the Autogram Pacemaker console is a great little unit that ushers Autogram into the 1990s. The 10-channel version is certainly going to put the old workhorse IC-10 out to pasture.

So if you are in a small to medium market station and are in the market for a new board and you do not take a look at the Autogram Pacemaker, you are making a serious mistake. The pricing, too, will surprise you.

If you are ever in Seattle, come take a look.

■ ■ ■

Clay Freinwald has been in AM/FM and TV broadcasting in the Seattle/Tacoma area for 30 years and writes for his local SBE chapter's monthly newsletter, the Waveguide. His hobby is Amateur Radio (K7CR), where he is chairman of the Western Washington frequency coordinating organization. He may be reached at: 206-624-9797.

For more information on the Pacemaker console line, contact Ernie Ankele at: 214-424-8585, or circle Reader Service 82.

Wheatstone Suits WEEI

(continued from page 33)
ices, the A-20 is a perfect solution.

The audio is recorded raw on four different reel-to-reels, and then edited to carts or cassettes as needed. There are no mic inputs in this A-20, only high level inputs. The program and audition channels and associated metering, as well as the on-board timer, are indispensable since some of our audio is turned around immediately for on-air use.

In the news studio

The third A-20 is used in Record Booth #3. This is a full all-news production studio for doing one-on-one interviews, wraps, telephone interviews, etc. The A-20 is so straightforward that little or no operator training was required when we built our new studio.

Noise and distortion figures are excellent, with total separation between channels and a flat frequency response.

The logic control of audio assures absolutely noiseless switching with sealed relays. Starting and stopping of cart machines or reel-to-reels is handled with isolated contact closures. Another plus is the multiturn pots for program and audition level control.

The control room module is designed for external inputs as well as on board monitoring. Studio speaker muting with mic on is programmable with a dip switch.

In our on-air rack-mounted unit we accomplished a mix-minus modification with relative ease. In this case we rerouted the mic audio around the monitor module to keep it out at the speaker system.

The power supply is an external 3½" rack mounted version and can be placed virtually anywhere.

The concept of using no mother board is new, and ribbon cables with crimp-on connectors are certainly hi-tech, however, I might be concerned about their longevity.

The DB-25 connectors underneath are standard and can be purchased anywhere. The use of #327 bulbs for the channel ON and OFF switches gives a bright indication of which condition you are in. But the newer, high intensity LEDs would have been a better choice.

All in all, for a well-designed, easy to operate and maintain console that costs under $10,000, the Wheatstone A-20, in my opinion, cannot be beat.

■ ■ ■

Larry Vidoli may be reached at: 617-242-5900.

For more information on the A-20 console, contact Pattye Bagshaw at Wheatstone: 315-455-7740, or circle Reader Service 84.

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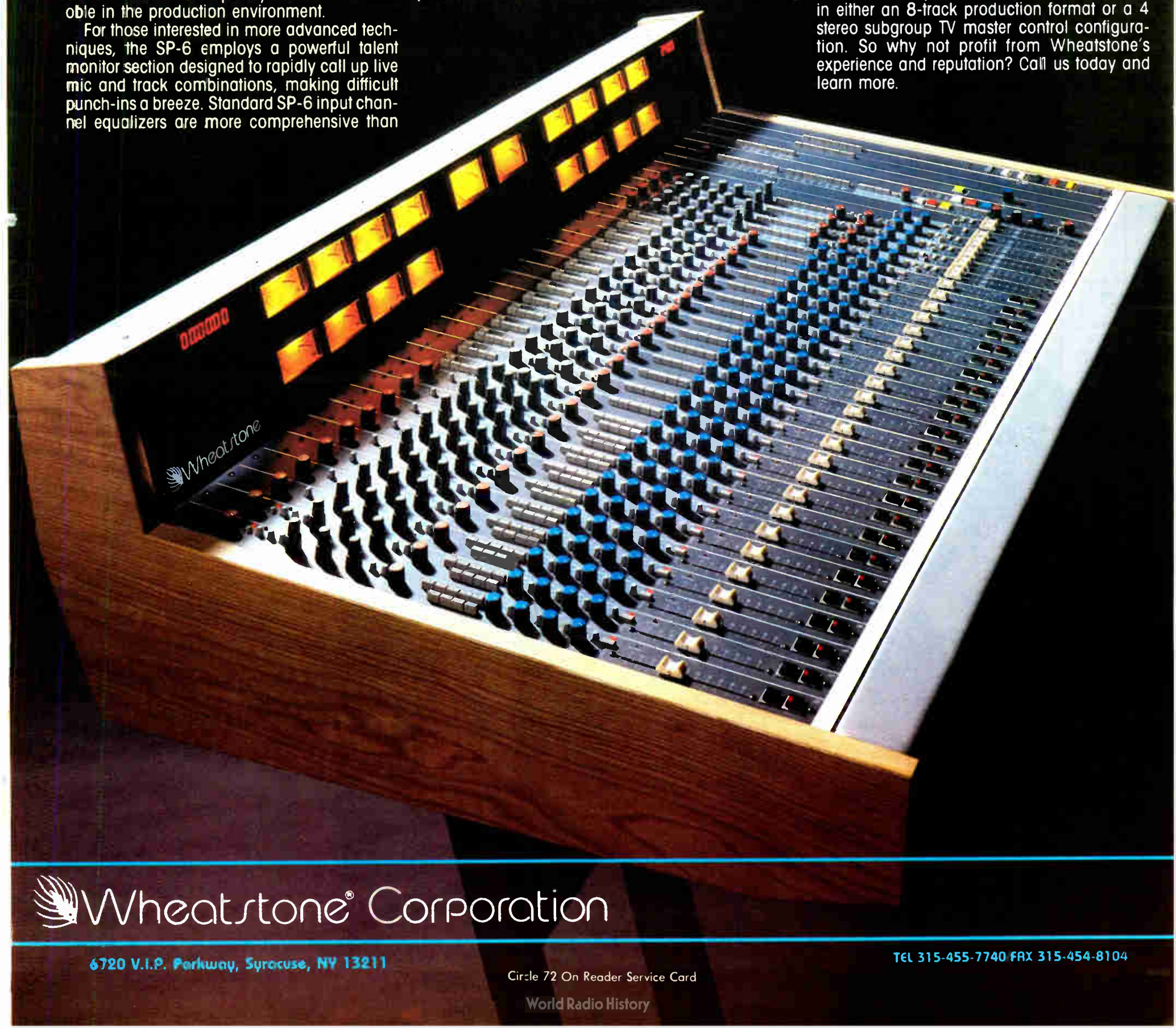
For those interested in more advanced techniques, the SP-6 employs a powerful talent monitor section designed to rapidly call up live mic and track combinations, making difficult punch-ins a breeze. Standard SP-6 input channel equalizers are more comprehensive than those supplied as optional items on competing products, allowing much greater creative freedom. Input channel auxiliary send sections are designed to be the most versatile in the industry, providing 4 different auxiliary buses to allow digital delay, reverb, talent foldback, and mix-minus feeds. Stereo input channels can provide either mono or stereo effects sends. Even more, the SP-6 has 4 auxiliary effects return inputs that allow effects to be recorded onto the multitrack or sent to the monitor buses.

The SP-6 provides independent headphone, control room and studio monitor feeds, as well as stereo cue/solo. Control room and studio mute and tally functions are independently dipswitch selectable on individual input channels. Additional studio modules may be ordered to accommodate larger, multi-studio installations. The SP-6 may be configured with any combination of mono and stereo input modules, in mainframe sizes ranging from 16 to 32 or more inputs. The console is available in either an 8-track production format or a 4 stereo subgroup TV master control configuration. So why not profit from Wheatstone's experience and reputation? Call us today and learn more.



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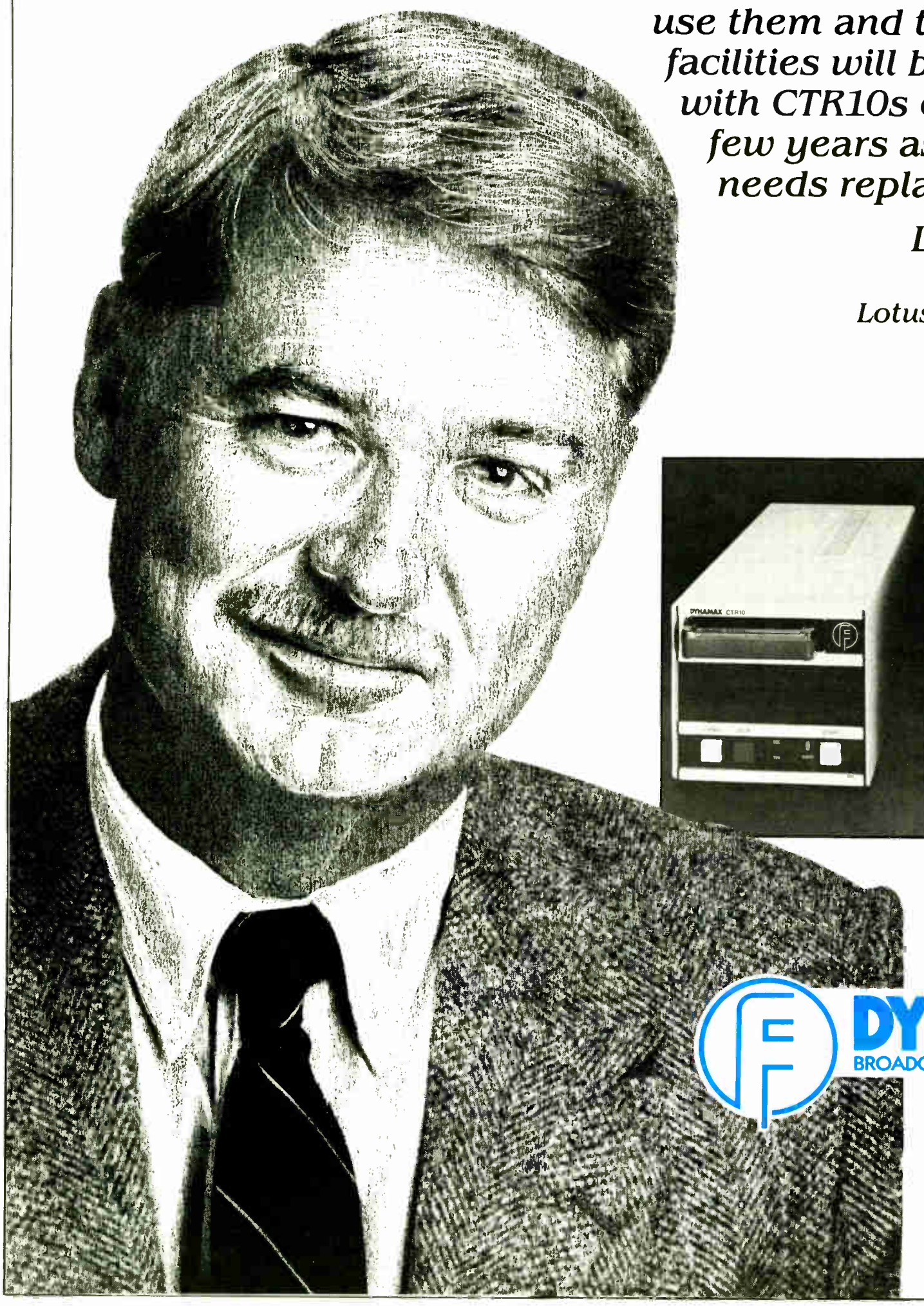

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