

US Secretly Studying DBS

by Alan Carter

Washington DC While US broadcast interests are aggressively promoting a terrestrial-only delivery of digital audio broadcasting (DAB), behind the scenes the American government is quietly investigating a worldwide direct broadcast satellite (DBS) network and citing commercial viability.

The United States Information Agency (USIA), which oversees the Voice of America, has concluded that a satellite-based network is an effective way to deliver its programming.

At the urging of USIA, the Office of Space Commerce under the Department of Commerce has been gathering information for such a system and has held private meetings with selected officials

in the broadcast industry and the government. The action has the blessing of Commerce Secretary Robert Mosbacher, based on correspondences between him and USIA Director Bruce Gelb.

The secret activities surfaced in late

June when the Office of Space Commerce held a second meeting and kept it closed to the public and the press.

At the second meeting on 28 June, presentations were made on satellite proposals by Marcor President Martin

(continued on page 7)

NAB's Stand on DAB

by Alan Carter

Washington DC While efforts continue to experiment with satellite delivery for digital audio broadcasting (DAB), the NAB has come out against satellite delivery in favor of terrestrial methods.

The board of directors meeting here 19-22 June adopted a position that "prefers" terrestrial delivery, citing preservation of localism, cheaper transmission costs and a high fidelity equal to or better than CD.

Under pressure from an *ad hoc* group of engineers representing major radio groups, the board also appointed a task force composed of board members to

study DAB. The task force, however, does not include any representatives from the *ad hoc* group. (See related story this issue.)

Moving forward

Proponents of DAB satellite delivery that have filed at the FCC are not deterred by the NAB opposition.

"We would hope we would be able to reconcile NAB's position with ours," said Satellite CD Radio President Peter Dolan. He maintained that his company's proposal provides a window for local delivery and said "a good portion" of existing broadcasters would be accommodated.

(continued on page 8)



A Pretty Good Night at Carnegie Hall—simulcast for radio and TV with Sony gear. See p. 20 for details.

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High Court Upholds FCC Minority Policies

by Alan Carter

Washington DC The Supreme Court has upheld two FCC policies that guarantee minority preference in broadcast applications, citing a support for program diversity without giving the term a definition.

The Court ruled 5-4 on 27 June that the Commission can give extra credit to minority-owned firms in granting licenses, and that minority-owned firms can have the first opportunity to buy, at a reduced price, the licenses of radio or television stations whose owners risk losing the licenses.

Majority rules

In the majority opinion written by Justice William Brennan, the court said program diversity justified minority preference and continued that minority-owned stations would result in more di-

verse programming. He admitted non-minority firms could suffer based on the policies but said the burden would be "relatively light."

A dissenting opinion came from Justice Sandra Day O'Connor who argued the ruling renewed a "toleration of racial classifications" and "permits distinctions among citizens based on race and ethnicity which the Constitution clearly forbids."

One of the two cases from which the ruling stemmed is based on the FCC awarding a license in a distress sale to Astroline Communications, a partnership controlled by minority interest Richard Ramirez. An appeals court rejected the award, giving it to computer consultant Alan Shurberg, who had been trying to get a TV license in Hartford, CT since 1982. Astroline then appealed to the high court.

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NEWS BRIEFS

Spectrum Bill Clears, but Meets Opposition

Washington DC The House Commerce Committee has approved HR 2965, a bill that would reallocate 200 MHz of spectrum from the government to the private sector.

Introduced by Rep. John Dingell (D-MI), the bill calls for a Commerce Department report within two years that would identify and recommend reassignment of the spectrum, while meeting congressionally mandated criteria for reassign-

ment. The President would have six months to act on those recommendations.

The Commerce Department, however, has opposed the bill. According to Janice Obuchowski, head of the Commerce Department's National Telecommunications and Information Administration (NTIA), the department does not have the necessary tools to do the job.

"It has neither the desire nor the omniscience to do the job on its own," she said.

FCC Chairman Al Sikes has lent support to the bill, claiming that while dding out spectrum will be demanding, "the difficulty of the challenge should not discourage us from undertaking it, because the potential gains to the country are great."

Root Disbarred from FCC Practice

Washington DC As of 6 July, Thomas Root's days of practicing law before the FCC were to have come to an end.

The Washington attorney was disbarred from the Commission, it was decided 21 June, after he pleaded guilty to five felony counts for defrauding

broadcast license applicants. The effective date for Root's disbarment will arrive a month before his sentencing here with the United States District Court for the District of Columbia.

The disbarment follows a federal appeals court appeal of an earlier suspension imposed by the Commission. The court determined that the Commission broke its own rules when it banned Root from practicing communications law 25 May.

Following that action, Root filed an emergency request when the FCC would not allow him to take part in the proceeding. Because he was not given an opportunity to fight the FCC's allegations, the court

overturned the Commission's judgment.

Since then Root has been given the opportunity to fight his case, but to no avail. The FCC reaffirmed its suspension, which led to Root's current disbarment.

Digital Cable Radio to Debut in Select Markets

Carson CA Two companies are preparing to launch digital cable radio services this summer that they said could revolutionize the quality of radio broadcasts.

Digital Radio Labs in Carson, CA, will join General Instruments' recently founded Digital Cable Radio service in Pennsylvania and offer some cable television subscribers in San Diego and Los Angeles more than 24 channels of digital-quality sound for a monthly fee of between \$7 and \$12.

On its heels, International Cablecasting Technologies of New York will debut a similar service in Chicago, Los Angeles, San Francisco and Seattle.

Subscribers will receive the signal via their cable TV wire, plugging one wire into the television or VCR and the other into their stereo radio receiver. The systems differ from digital audio broadcasting (DAB) in that they are fed directly from a wire instead of over the air.

Barrett Sworn In

Washington DC FCC Commissioner Andrew Barrett was sworn in 21 June for a five-year term.

He was awarded the term in mid-May after Senate confirmation in mid-May. Barrett joined the Commission last September for what was slated a one-year term.

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AMs Divided Over Stereo Plan

by John Gatski

Washington DC AM stations appear divided on an NAB proposal that would ask the FCC to require AM stations to broadcast in stereo if Congress requires AM stereo reception on receivers.

At its board of directors meeting in mid-June, the NAB announced that it would petition the FCC to mandate AM stereo if Congress passes a law requiring AM stereo in receivers equipped with FM stereo. The AM stereo requirement is part of pending AM improvement legislation, known as HR 2714, which the NAB supports.

The NAB would condition its request to exempt AM stations that would suffer economic hardship because of the mandatory AM stereo requirement. The requirement would be effective within five years of FCC approval.

No mandate wanted

Even with the economic exemption, however, some stations disagreed with the NAB proposal. Several smaller stations said they should not be forced to convert to AM stereo.

Others stations, including larger market broadcasters already using stereo, said that mandating the technology could help stop AM's audience slide by prompting better quality radios from manufacturers.

The petition would not, however, ask the FCC to select an AM stereo broadcast standard, according to the NAB.

Opponents of the NAB proposal said they have reservations about the FCC



The NAB intends to ask the FCC to require AMs to go stereo if Congress mandates AM stereo receivers.

forcing AM stereo on stations when FM stations are not required to broadcast FM stereo.

"I really don't like mandates," said Laurel Thompson, station manager for KWPM, West Plains, MO. "If the receivers were there we would probably go stereo anyway."

Thompson said his station had no immediate plans to convert to stereo.

Mike Klandilas, program director for KBLL in Helena, MT, acknowledged the declining AM audience but said he is not

convinced that AM stereo will draw in more listeners.

"I do agree that AM stations are kind of hurting right now, but I don't think this is the answer," Klandilas said. "I don't think that stations should be forced to have AM stereo."

In contrast, Al Kirschner, CE for Westwood One and its station WNEW in New York, said he liked the idea of mandatory AM stereo. WNEW has transmitted in C-QUAM AM stereo for more than a year.

"I think it is good to have AM stereo so we can get wideband stereo radios out there to show listeners that AM can sound just as good as FM," Kirschner said.

Adding AM stereo to a mono station will not be cheap, according to manufacturers.

Joe Novak, VP of marketing for Delta Electronics, a manufacturer of AM stereo equipment, estimated that stations would pay at least \$15,000 to convert to AM stereo if they had no stereo transmission equipment.

The \$15,000 would cover an AM stereo generator, exciter and stereo processor and installation, he explained.

But that does not include stereo sources, a stereo board and installation, Novak added.

Hardship exemption

NAB Science and Technology Senior VP Michael Rau said the NAB realizes many small stations can not raise \$15,000 dollars, which prompted proposal of the economic hardship exemption.

The NAB has not established criteria for qualifying stations under the hardship exemption, Rau added. He said it would be premature to establish criteria because Congress has not passed the AM improvements bill.

Bill sponsor Rep. Matthew Rinaldo (R-NJ) said the bill has picked up support since an amendment was proposed to tackle non-technical issues, such as codification of the FCC's license renewal abuse process.

Other technical AM improvements contained in the bill include restriction of FM translators, moving stations to the expanded band (1605 kHz to 1705 kHz) and allowing them to remain on their old frequency for up to five years.

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No Time for Summertime Blues

by Judith Gross

Falls Church VA D'ja ever have one of those slow, easy summers? You know the kind, everything slides to a **gentle crawl** and everybody's mellow and every task or **problem** before you seems to **just fade** with that sultry afternoon breeze?

Well if you ever find one of those, would ya send it **my way**? Things have been **hoppin'** pretty fast in the world of radio and I haven't even had a spare moment to stop the **Good Humor** man and get myself a toasted almond crunch.

Things certainly haven't slowed down on the **DAB front**. Now comes word that a fourth company, **Mercury Communications**, has a system of its own, a proprietary terrestrial system available for licensing.



Unlike the others there's been no **fil-ing** on this one. Least, not yet. How many more might be out there?

Meanwhile the **US Commerce Department** had another one of those "secret" meetings on plans for a **global satellite radio system**. It seems to be aimed mostly at improving **VOA's** reach, initially, although a few of the things being kicked about may have far-reaching implications.

F'r instance: If other countries have to accept **our broadcasts** via satellite, will the US have to accept satellite radio from **other countries**? OK, you say, but how will they tell me if **Walnut Street** is backed up during rush hour?

Well, right, that's what the **NAB** objects to, the loss of **localism**.

Still, it makes sense for **US stations** to start factoring in all that's happening so

quickly. So what I'd like to know is, couldn't the **DAB Task Force**, recently assembled by the **NAB**, have included **just one engineer** or group chief? Maybe one of those who has been meeting as part of the **Advanced Radio Committee**? Just one?

And as you read this, tests of the **Eureka** system are continuing in **Canada**. I'm on my way up there to see for myself and I'll tell ya all about it when I return.

☆☆☆

Mighty curious about the **SBE** hiring a part-time **executive director**. Not that **Steve Ingram** isn't eminently qualified and all. It's just that the Society has been kicking around the idea of a full-time, paid director based in DC for the last few years.

Now they hire a part-time director but **not in DC**. Where did this come from? SBE is being mum on what the job's **salary** is. **Andy Butler**, meanwhile, running for SBE president against incumbent **Brad Dick**, more or less served as executive director for the past several years before he was unceremoniously **fired** in January. His salary was **one dollar**.

The folks over at the **M Street Journal** tell me that **AM-FM simulcasting** is at an all time high. Some 625 AMs, or 21% of all AMs with a sister station are carrying their **FMs' programming**. And this doesn't include those who carry it for only part of the day.

In the **Department of Nostalgia**, a few interesting tidbits. **Bob Paine**, based out of **Chesapeake Beach**, Maryland, where you can get the tastiest smoked bluefish ever at Calvin Tyler's fish store, is a radio and TV history buff.

He does research and even **videotapes** old station studios and transmitters. He's also interested in old recordings, all in the hope of **preserving this bit of history** before it's lost forever. He'd like to get in touch with anyone who does similar research. Write: c/o Broadcast History, PO Box 376, Chesapeake Beach MD 20732, or call 301-855-9276.

OK, I don't have an answer for **this one**. Two books, quoted to me by three

different sources, seem to differ on whether or not the great **Noo Yawk AM**, **WNEW's** call letters stood for the late actor **Ed Wynn**, who owned a network briefly, or not.

Where *The Melody Lingers On*, WNEW's definitive biography, says it's a **common mistake**, but, no. A book called *I Looked and Listened* by Ben Gross (no relation) says yes. Since Ben's book was subtitled "Informal Recollections of Radio and TV" I would incline toward the other book, which was written by former station owners.

But if anybody out there gets at the truth, let me know and settle a **friendly argument**.

Thinking of **nostalgia**, there I was, cozy and comfy on the porch of a **remote inn** on the Chesapeake Bay one summer evening, with some new-found friends, one of whom was a musician who traveled with some of the greats, including **Benny Goodman**. And what were we doing on a **peaceful Saturday night**?

We were all gathered 'round **listening to the radio!** OK, it was a Japanese-made mini boom-box, and not an **Emerson** or **Philco**. But the concept was the same. The music was **Big Band**. Some things don't have to change.

☆☆☆

They arrived in the mail and I had no idea what they were. They actually resembled **Mickey Mouseketeer** ears, but the package told me they were **Ear Lenzes™** from National Market Makers in (you guessed it), **Venice, CA**.

You wear them like headphones, but they're designed to reflect, focus and **amplify sound**, especially at a concert or performance. I did an informal survey around the office and only **about half** of those who tried them said they made a difference.

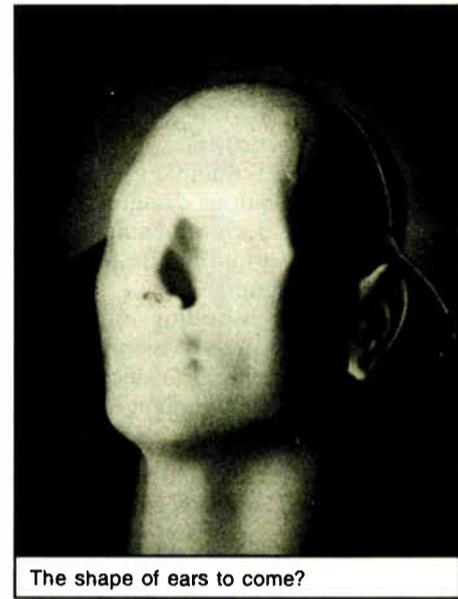
Inventor **Mike Riley** says the effect is a 7-8 dB gain in the 3-8 kHz region. He says it depends on what your ear is **shaped like**. OK. I asked about **designer colors**, thinking that opera-goers would shun the flat black plastic cups. Mike says he's considering day-glo colors, glitter and neon. Very inventive of him.

Out west, in **Phoenix**, where temperatures hitting 122° F and higher have threatened lives and even closed the airport, appropriately named **KOOL-FM** did its part by cruising the city giving away **mineral water**. Like that spirit.

Charles Geer, news and PD at **WGNU** in St. Louis, MO, helped me out with my confusion over the **love of pigs**, as station mascots for **Pirate Radio** and **Tampa's Power Pig**.

He suggested it dates back to a 1967 **format change** at St. Louis' **KSHE** where a pig was used to symbolize the underground appeal of **AOR** music. Also that some stations hope it will "bring home the bacon."

And on the subject of **pork**, a petition



The shape of ears to come?

has been filed with the **FCC** by the **Society for the Promotion of Amplitude Modulation**, or **SPAM**. The petition wants to do away with the sunset provision in the rule on transmitter power of amateur stations using **AM**.

In other words, the petition from **SPAM** is for **hams**.

Heard a juicy tidbit? *Spill your guts to Earwaves by faxing JG at 703-998-2966, writing to PO Box 1214, Falls Church VA 22041, or calling 703-998-7600. Who knows, you could win a coveted RW pound of bacon.*

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Problems contractors face

Dear RW:

A few comments on Tim McCartney's "Facing Facts About Contracting" (13 June RW).

In a sense we are all "contract" engineers. That is, all of us work for a company as long as they believe they need and can afford our services. In the past that generally meant we had a big brother (our full time employer) who took care of us and looked over the business aspects. Deregulation and the marketplace have changed most of that.

Most stations have made the complete transition. Many engineers have not. Situations where engineers with full time jobs at larger stations do contract work evenings, weekends and holidays are a good example. I know, I did it for a number of years. It was easy extra money, so it seemed. But in retrospect there are a number of pitfalls.

You are not covered under workman's compensation while going to, from or working at another job. That means should you be laid up for some time you have an angry employer denied of your services. Insurance would probably apply but that could still leave you with no

income. Liability is also a problem most freelancers ignore. And of course there's the obvious problem of questions about what you're doing out of town in the middle of the week.

Most managers don't really know what the engineer does anyway so if he knows you're freelancing he or she will wonder if you're shorting him/her.

Probably the biggest problem is that most part-timers haven't really figured the real cost of doing business when Big Brother isn't paying the insurance, taxes and cost of vehicles and equipment. And by the way would you like to retire someday? This is bad for people who really do contracting seriously and for engineering in general.

I suggest sharing the extra business with your present employer. You'll still get a nice slice of the pie and let the real business people worry about collections and all the other myriad of details (managers should have more expertise in the business end).

I personally don't serve anyone on a case-by-case hourly situation. Your costs go on even if you haven't done any work for that station this month. A monthly flat fee for labor and on call services only give the station manager something to budget for and gives you a predictable income. This would be for maintenance only. Special projects (studio construction, transmitter install etc.) are handled separately as they occur.

With this scenario your present employer has no reason to be jealous and the stations you serve are no longer weekend and evening "backburner" projects.

Jerry A. Miller, CE
ST Broadcasting
Dodge City, KS

More on ground systems

Dear RW:

Good article from Thomas Vernon on ground systems! His emphasis on removing the old wire is well taken. The old radials may not have been laid straight and snagging may result. In a directional rebuild or redesign new radials may be at right angles to the old.

Our DoE Marvin Fiedler used a tractor and a disc to remove old wires when he rebuilt KCOR, San Antonio. He directed the driver to drive circles over the site and collect the small lengths that resulted. The scrap was sold and the proceeds used to buy equipment for engineering.

When we relocated KBNA-AM here in El Paso, we used a temporary ground consisting of four 50-foot radials.

This worked acceptably until the system could be completed. The soil at our site becomes extremely hard when dry and it took superior effort to plant a ground system. At one tower we used an earth mover dragging a hook to leave a furrow for the wire plow to follow. It was slow and expensive, but you can't argue with what works!

David Stewart, CE
KBNA-AM/FM
El Paso, TX

The Bush administration's desire to make TV Marti an ongoing part of our country's anti-communist propaganda efforts has US radio broadcasters alarmed over possible retaliation in the form of jamming.

The fact that this type of broadcasting serves our country's interests is clearly evident given the current situation in Eastern Europe, where the Voice of America and Radio Free Europe have been active.

But the US already has a powerful tool in Radio Marti, which was free of purposeful Cuban jamming up until the test launch of its TV counterpart.

And reports from foreign policy observers indicate that too forceful a propaganda effort in a country so close to our borders may actually hinder US efforts to undermine the Castro regime.

In addition, the technology used for TV Marti is considerably more expensive than that of Radio Marti, with \$7.5 million allocated just for testing and another \$16 million proposed to continue the service.

TV Marti: A Costly Overkill

And if the jamming of US AM stations in retaliation for TV Marti continues, it could cost the US taxpayer considerably more in compensatory claims from those stations—in addition to the harm it does to those stations' signals and listenership.

TV Marti's value to our country's interests has yet to be proven against a country where radios outnumber TV sets. The technology itself has yet to be proven in the face of criticism from engineers who claim it just won't work.

If our country is investing in TV Marti simply as a form of harassment to Cuba, Congress should reconsider the harm to our own stations before authorizing additional funding.

TV Marti is a costly overkill that only promises long-term damage to many already-struggling AM stations with little or no gain towards furthering the interests of the free world.

—RW

NRSC's role in studies

Dear RW:

There seems to be two stories to the circumstances described in your article discussing the resignation of WAEB from NAB and NRSC, and the work being done by Harry Simons of that same station regarding multipath studies.

The first story:

Clearly the responsibility of the NAB is to represent the broadcast industry as a lobbyist before Congress and the FCC. Other than that, it may well only run the convention (which is obviously no small task).

I doubt that it has ever been the charge of the NAB to operate a science research organization, other than by default when other "agencies" have no capability to do so either from lack of perceived need, or from lack of funding.

Correctly, the research community should be funded by the manufacturers of equipment. This is their chance to give back to the industry which supports them. In addition to this there is the large number of researchers in that community which opens the channel of legitimacy further. Naturally there will be dissent within this community and differing opinions as to the correct methodology for addressing problem/solutions. It is here that the FCC might well function as arbiter (and in my opinion, rightly so.)

It would seem that the NRSC is an industry organization in place not to solve problems, but to provide a nexus through which investigators can communicate. As a collection point and a correlator and disseminator of information, research is encouraged. Should either the collection or the dissemination function fail, the NRSC becomes useless.

The second story:

There is at this time some very serious work in the literature on the vast subject of multipath.

I think it important to remember that

our methods of antenna structure have changed in the past decade to support not only "farmed antennas" on common multi-use towers, but shared antennas fed by combiner systems.

The idea of external signals causing AM modulation of other signals is certainly a real problem. Edward Schober of Radiotechniques has done work in this area and has determined that even with a properly tuned transmitter (assume a single end transmitter) the problems of component variation over time is uncertain, even over a matter of days. He correctly declines speculation on those installations which operate on towers with heavily farmed radiators, or with combined transmitters into common antennas. There is some work by antenna manufacturers in this area which discusses this apparent effect.

It may be seen that any variation which causes an apparent variation in the gain of the final stage, external or internal, will produce the effect of Amplitude Modulation.

Certainly we all know the effect of anode—screen interaction producing this result.

It may prove that the passband of the various combiner components causes a similar effect.

Becker and Chambers of Air System Technologies of Miami would appear to have determined that there may be an effect on the position of the field in H-V antennas caused by the degree of processing, particularly at higher modulating frequencies. This movement of the field can be interpolated by the receive antenna-receiver combination as AM since, again, it produces an effect of varying gain. Personally, I question the varying gain argument in this example and lean more toward the varying path length argument (which can be shown to be the same in some cases.)

Multipath seems to be affected by considerations such as terrain, standing

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Radio World
Vol 14, No 14 July 25, 1990

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Radio World (ISSN: 0274-8541) is published semimonthly (except February, which has 3 issues) by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates is paid at Falls Church VA 22041 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. Copyright 1990 by Industrial Marketing Advisory Services, Inc. All rights reserved.

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Next Issue
Radio World
August 8, 1990

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TV Marti Test Period Extended

by John Gatski

Washington DC TV Marti test broadcasts were extended 30 days to late July as President Bush prepared to decide whether to continue the much-debated service, according to the United States Information Agency's Voice of America (VOA).

The additional 30 days of testing were authorized in the original TV funding bill that allotted \$7.5 million for testing and \$16

million to fund the service through 1991, if Bush gives the final go-ahead.

The President was scheduled to issue a report to Congress and then make a decision based on information furnished by VOA, according to VOA spokesman Joe O'Connell.

TV Marti began broadcasting its daily 3 AM to 6 AM pro-Western news and entertainment programming to Havana in late March.

The Cuban government immediately

began jamming the signal and within weeks started jamming Radio Marti. Radio Marti, which offers similar programming, had not been bothered by Cuba since it went on the air in 1985.

AM broadcasters and the NAB oppose the controversial service because they fear increased Cuban retaliation against US AM stations, which have been recipients of intermittent interference over the last five years.

The NAB also questioned the use of

the TV Marti transmission system, which consists of a satellite-beamed up-link from Washington to a balloon-mounted transmitter 10,000' above the Florida Keys.

Some legislators and other opponents said continuation of TV Marti is a waste of money because the Cuban government has blocked the signal to about 80% of Havana residents.

Efforts to stop TV Marti have been mounted in Congress, but have failed so far.

A House amendment was introduced in June to reduce the TV Marti funding by 50%, but failed by a three-to-one margin.

US Working Secretly on DBS

(continued from page 1)

Rothblatt on his Satellite CD Radio of Washington, DC, and by Radio Satellite Corp. President Gary Noreen of California.

According to minutes of the first meeting on 17 April that Space Commerce refused to release to the public, VOA and NASA, which will conduct DBS radio tests next summer, already have a set of objectives.

First is to enable a domestic satellite sound broadcasting industry and in concert with VOA, an international satellite sound broadcasting service.

Also, the agencies will work with US industry to provide technology for service to fixed, portable and vehicular receivers.

Space Commerce Acting Director Richard DalBello, the minutes stated, said that the VOA approach is only one option. It would be possible to do a satellite US domestic system only, "which might be more commercially viable," he continued.

The documents further noted that the government will work toward necessary spectrum allocations at the World Ad-

ministrative Radio Conference (WARC) scheduled for Seville, Spain, in 1992.

As referenced in the documents, the concept for the system includes individual service areas "as small as France, Poland and Texas," and up to 100 radio program channels per individual service area.

Some of those attending the meetings questioned why they are closed to the public and commented that they heard no proprietary information that proponents of satellite systems would not want released.

More importantly, opponents of plans to promote direct satellite broadcasting of radio signals are concerned about its potential harm to current US broadcast services. Leading the opposition to DBS radio within the closed group is the NAB.

Science and Technology Senior VP Michael Rau said NAB, in accordance with board policy adopted in early June, said broadcasters would oppose a satellite radio delivery plan because it operates contrary to US terrestrial broadcasting that is based on localism.

Rau also said NAB may not participate in future Commerce Department meetings. "I'm concerned that our presence is being perceived as a tacit endorsement

for the government's proposal and that's simply not the case," he said.

Rau said he expected that broadcasters will not be pleased to learn the US government is looking at a DBS program. "I think broadcasters are going to be disturbed . . . to wake up and learn their government is working on something contrary to their interests," he said.

Several others who attended the meetings were less adamant but raised additional concerns.

"I don't understand all of the motivations involved," said National Public Radio Senior Engineer Mike Starling.

He said he suspected VOA developed an interest in DBS because of activities on the technology in Europe, Canada, the Soviet Union and India.

Starling, however, noted he suspected Space Commerce was more interested in an "informational exchange" than poised to take any swift action.

Communications attorney Bob Mazer, who has been a proponent of satellite DAB, said the meetings were "nothing more or less" than for gathering information. "I don't think there is any thought by anyone in the US government to put up a system."

FCC Wins in High Court

(continued from page 1)

Communications attorney Harry Cole, who argued for Shurberg before the high court, said he was "surprised and disappointed" with the ruling. The ruling "abandoned years of case law" opposing the FCC's distress sale policy, he said.

Minorities, women favored

The second case involved an appeal from Metro Broadcasting that lost a new license in Orlando, FL, in a case where Hispanic-owned Rainbow Broadcasting won out on the policy of preference to minorities and women.

This was the first time the Supreme Court has upheld minority programs for reasons other than correcting past discrimination. Civil Rights groups were surprised at the ruling because the court recently rejected a minority set-aside program for city contracts—a move that limited the power of states and localities to adopt affirmative action programs.

The court made a distinction between Congress and state powers, citing the authority granted by the Constitution. The ruling appears to reaffirm and extend the power of Congress to mandate special treatment for minorities.

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No Engineers on DAB Task Force

by Charles Taylor

Washington DC The NAB Radio Board has taken a first step toward defining its stance on digital audio broadcasting (DAB) with the formation of an eight-member task force, however, some members of the *ad hoc* Advanced Radio Committee are baffled by its non-inclusion of engineers.

The task force was assembled after The Advanced Radio Committee, established to help guide DAB's growth in the US, pressed the NAB for a position statement on the new technology.

The NAB group, which opposes satellite applications for radio delivery because it violates principles of localism, among other objections, will focus its efforts on land-based uses of DAB.

Members of Radio Board

The task force is made up of eight members of NAB's Radio Board (see related story, this issue.)

What surprised some members of the Advanced Radio Committee was the absence of engineers on the NAB task force roster.

"DAB is such a detailed and complex technical issue. I'm curious that they don't have any engineering advisors on it," said Paul Donahue, acting chairman of the Advanced Radio Group and Gannett Radio engineering VP. "Why assemble a new technology group without that resource?"

Take DAB seriously

"We take digital radio very seriously and we wanted to see if the NAB takes it seriously," said CBS Radio Technical Operations Director Tony Masiello. "One way they could show that is to put the major players on a board, including technical forces.

"This starts out being an engineering question and there is no engineering person on the task force. We're dealing with pretty leading edge technological issues here and technical representation is important," he said.

Masiello added that he is surprised that no one from the Advanced Radio Committee was placed on the task force. "If you take a look at the number of people who are interested in the formulation

"We're dealing with pretty leading edge technological issues here and technical representation is important."

of the Advanced Radio Committee, there's no representation of any of those people in the task force—no one from ABC, CBS or Gannett."

According to Susquehanna Radio Senior VP Charlie Morgan, "In their mission to investigate the potential of such a system they probably have the right people. But to determine if it is a viable system, they could use some engineering input. Maybe they expect the input from their own (NAB Science and Technology) group."

Assistance from outside

David Hicks, chairman of NAB's Radio Board and president and CEO of Hicks Broadcasting Corp., said he felt the chosen eight represented a good cross section of large, medium and small market broadcasters and added that assistance from industry officials from outside the group was a given.

"We have the freedom to draw from resource people outside of the group as we see fit," Hicks said, including the Science and Technology department. "They surely will be involved and brought in as a resource. We certainly want to make sure we acquire whatever information is necessary."

The task force, which was officially announced 22 June, was to have held its initial meeting 10 July, at which time

specific goals would be decided.

At an NAB Radio Board meeting in June, NAB made clear that it opposes any DAB system that would utilize satellite delivery because it threatens the concept of localism.

The board added that its task force would hold as general goals: assuring that any DAB system would provide competitive protection to broadcasters providing local service and minimal economic or market upsets to those broadcasters. It also recommended that land-based uses of DAB should be advocated at the 1992 World Administration Radio Conference in 1992.

Hicks added that he intends for the group to be "more or less be an information gathering and study committee." It likely will meet monthly, he added.

After the task force has charted its

goals for DAB in the US, the Advanced Radio Committee will react and possibly join forces. But for now the group is anxiously awaiting to see what directions the new task force takes.

Wait and see

"We're waiting to see how NAB would approach digital broadcasting. There's no sense in both of us doing the same thing to achieve the same goal," Morgan said. "If they decided not to take it seriously, then the Advanced Radio Committee would have reacted differently. At this point, we're waiting to see what the NAB does."

Added Donahue, "The NAB has to realize that should they stall on reaching a decision, DAB is going to continue with or without their help. The concept will continue to gain steam in the US and we need to understand it and how we're going to adapt our systems to it. If we don't, we'll be left with a lower grade service."

For information, contact the NAB at 202-429-5350.

NAB Board Tackles DAB

(continued from page 1)

At Radio Satellite Corp., company organizer Gary Noreen said the NAB position was anti-competitive.

"With our proposal, we don't see how they can stop it," Noreen said. "I don't see what grounds they have to stop it. I'm not asking for any new spectrum."

Radio Satellite proposes to use existing spectrum under the mobile satellite service, Noreen said.

Without naming names, Noreen said "a lot of broadcasters are coming on board," and a "super-duper radio" capable of receiving his signal could be on the market by 1993. Manufacturers he noted that are interested in making the product included Comsat Labs, Qualcomm and Pacific Communication Sciences—all specialty radio builders which want to make a consumer product.

Noreen was not surprised at the NAB opposition. "That was expected," he said.

Task force at work

David Hicks, the newly-elected chairman of the NAB radio board and president/CEO of Hicks Broadcasting, said there are numerous questions and concerns the task force will examine.

"DAB is one technology... we should investigate carefully," he said.

The task force was assigned duties including determining recommendations to assure that DAB systems provide adequate competitive protections for licensees now providing local service and minimal economics or other market dislocations to existing providers and consumers of local service.

Members of the committee are: Alan Box, president, EZ Communications,

who is chairman; Michael Faherty, executive VP-radio, Cox Broadcasting; Skip Finley, president/general manager, Albimar Communications; Dean Goodman, executive VP-radio, Gilmore Broadcasting; Gary Grossman, VP, KRKT AM/FM; Walter May, president, East



NAB's board adopted a position that "prefers" terrestrial rather than satellite delivery for DAB.



NAB Joint Board Chairman L. Lowry Mays

Kentucky Broadcasting; Donald Newberg, president/GM, WGOW-AM/WSKZ-FM, and Michael Osterhout, president, COO, Edens Broadcasting, Tampa.

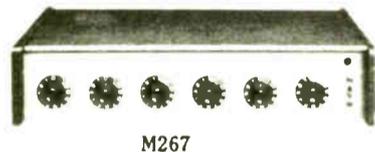
In a final action related to DAB, the board recommended that the US government support a world technical standard for terrestrial DAB at the 1992 World Administrative Radio Conference (WARC).

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DAT Hopes Pinned to Copy Bill

by John Gatski

Washington DC Consumer DAT recorder prices could remain high and software scarce if Congress does not approve a bill that would require the equipment to have anti-tape copying circuitry, according to supporters of the legislation.

Without the legislation, the market may remain confused and companies may not put their full resources into the products, according to Electronic Industries Association Consumer Electronics Group VP Thomas Friel.

"We will not get any mass production to get the price down," Friel said.

The DAT bill would require the Philips-developed Serial Copy Management System (SCMS) on all consumer DAT equipment made or imported into the US.

The legislation, however, received a cool reception at a recent senate hearing because of subcommittee members' apparent sympathy to groups who want to link DAT's approval to royalties on blank tapes.

Although pro-DAT bill advocates believe the legislation is necessary for a healthy DAT market, some audio analysts said it does not matter because companies have already announced plans to import SCMS recorders.

Sony has already started selling SCMS-equipped DAT recorders and others have announced late summer deliveries.

Members of an anti-DAT bill coalition indicated at the Senate hearing they will mount a legal challenge against those companies.

A poor showing

Based on subcommittee member comments, an anti-DAT bill group calling itself the Copyright Coalition was more convincing than the pro-DAT forces. The Copyright Coalition is composed of several recording artist groups, includ-

ing ASCAP and the Songwriters Guild of America.

The Copyright Coalition argued that royalty compensation to recording artists must be addressed before the government approves DAT legislation.

Subcommittee members also heard testimony by bill opponents that SCMS circuitry could easily be defeated, a scenario that proponents said is unlikely.

SCMS-equipped DAT machines contain circuitry that allow a CD or other digital sources to be recorded once, but the copy cannot be copied.

Friel admitted that his pro-SCMS group, known as the Home Recording Rights Coalition (HRCC), did not help its case at the hearing.

The HRCC's poor showing before the Senate apparently moved the House leadership to also rethink consideration of its own DAT bill, according to congressional sources. The House-scheduled 26 June DAT bill hearing was "postponed indefinitely" following the Senate hearing. Such a move usually means no action is likely on the bill.

Coalition disagrees

The fragile pro-DAT coalition, which includes the EIA and the Recording Industry Association of America (RIAA), appeared to crack during the senate hearing.

During testimony, RIAA broke ranks with HRCC on whether the DAT bill covers the much-rumored Digital Compact Cassette (DCC) that has yet to be announced by developer Philips. DCC is purported to be a standard size digital cassette deck that can record and play digitally.

RIAA President Jason Burman said the DAT bill should be amended to include DCC. Friel said the bill already covered DCC under its digital tape recorder definition.

Many hearing observers said the disagreement over DCC did not help the

HRCC's case.

The DAT alliance was formed in 1989 when an international DAT agreement was reached among manufacturers and recording industry groups. The agreement proposed SCMS to national governments as a first step in addressing the royalty issue. The HRCC and RIAA also endorsed the pact.

SCMS was believed to be a solution that would address the tape piracy issue and alleviate royalty proponent's concerns.

The international DAT agreement led to the two DAT bills being introduced into Congress earlier this year.

Royalty issue

Royalty groups, however, were not in favor of the agreement. Since DAT's introduction, royalty proponents said the DAT recorder provides the greatest potential for generations of perfect "pirated" copies of copyrighted work that can be distributed without artists receiving compensation.

As a result, pro-royalty groups have threatened to sue any DAT manufacturers that brought machines into the US

which could digitally copy CDs.

Like the Copyright Coalition, the RIAA said the royalty issue must be addressed, but it supported the DAT bills anyway because the group believes the technology and the royalty issues should not be linked.

Debit card recording

One new idea to protect recording copyrights surfaced at the hearing.

US Register of Copyrights Ralph Oman suggested that a "debit card" system could be used for royalty collection and distribution.

Although there have been no specific proposals, a debit card would entail a card being purchased for a certain amount of money, according to Oman and interviews with audio experts.

That card could then be used to activate a tape recorder based on the amount paid, which would allow the tape recorder to tape copyrighted material until the card's value is exhausted. To resume recording, a person would have to buy another card.

Audio writer Leonard Feldman, who testified on behalf of the DAT bill, said the debit card systems would be akin to "putting money into a parking meter every time you pulled into your own driveway."

FCC Says No to Drugs

by Charles Taylor

Washington DC If you're on the federal government's list of convicted drug users or pushers and want an FCC license or certification, you might as well forget it.

The Commission has proposed an amendment to require applicants of commercial and professional licenses to submit information that would show ineligibility for federal benefits, including FCC licenses, based on illegal drug convictions.

The proposal would modify Part 1 of the Commission's rules, allowing it to

collect information necessary to implement Section 5301 of the Anti-Drug Abuse Act of 1988.

The act gives federal and state court judges the discretion to deny federal benefits to those convicted of offenses such as possession or distribution of illegal substances. Federal benefits include Commission-issued licenses.

If adopted, an additional question would appear on FCC applications. Those who have been placed on a Debarment List for Section 5301 violations would have to note such on the application, thus automatically denying them an FCC license.

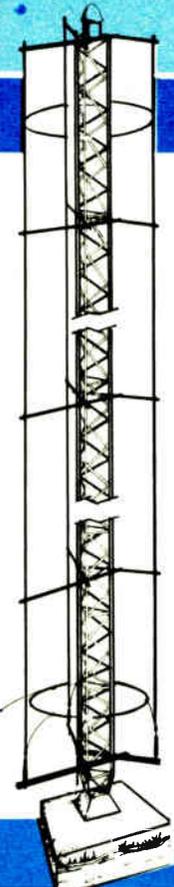
"In some cases, a conviction for a drug-related felony would be relevant to the Commission's judgment. This is different," said FCC staff attorney Marty Blumenthal. "The qualifications of an applicant have already been determined by a judge in a trial."

Those subject to such scrutiny would include officers of an applicant, directors, non-limited partners, holders of 5% or more of the voting stock and non-voting stockholders or limited partners with 5% or more interest in the applicant or licensee.

The rule would apply to all forms of Commission "instruments of authority," including authorization for the use of radio spectrum, radio operator authorizations, equipment authorizations, type acceptances or type approvals and certificates of authority to build telecommunications lines.

If the change is passed, applications in the future that do not include the Section 5301 section would be dismissed. The Commission also proposed requiring licensees to inform the FCC if they or any of their principals become subject to debarment during the course of the license term.

For information, contact the Commission at 202-254-6530. For further discussion of the new FCC drug policy, see *Cole's Law* this issue.



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Translator Comments Flood FCC

by Charles Taylor

Washington DC While more than 100 parties filed comments on the FCC's March proposal to limit the use of FM translators, none offered anything revolutionary for the Commission's consideration.

The mass of filings—including comments from standard translator foes NAB and the Association for Maximum Service Television, and proponents John La Tour, Moody Bible Institute and the National Translator Association—primarily rehashed arguments that have been presented time and time again.

Translator technology is intended to extend an FM signal into weak areas within its 1 mV/m contour. Opponents of the equipment say operators use translators to conquer secondary markets, creating a low-power FM service.

Longstanding controversy

Translator technology has been controversial since before March 1988, when an FCC freeze was placed on new translator applications pending the recent petition for rulemaking. In that proposal, the FCC advised a number of limitations on the use of translators.

First, it suggested that translators be

classified into two categories: one, to provide fill-in service within the 1 mV/m contour of the originating—or primary—station; and two, to provide service outside of the 1 mV/m contour of the primary station.

Translators providing fill-in service may be owned either by the primary FM station or by an independent party and may rebroadcast the signal using terrestrial microwave transmission facilities, the Commission suggested. Financial support arrangements would be left to the parties involved.

However, in a case where a translator provides service outside the coverage area, it was proposed that it may be owned only by an independent party and that a primary station is prohibited from supporting, directly or indirectly, any commercial FM translator providing service in this area, both before and after it begins operation.

Among those crying foul on the Commission's proposal was John La Tour, who has been a vocal supporter of translators in support of his company, Power Du Pree, which leases translators across portions of the US. In his comments, La Tour maintained that fears of translators taking business from established primary FM stations are unfounded.

FMs not hurt by translators

"When the Commission first established FM translator rules, they were concerned that translator competition may have an adverse impact on small, marginally profitable stations located in small markets or rural areas," La Tour said.

"Our experience since 1970 strongly suggests that these fears have not materialized. . . . Our company operates translators in some 50 market areas and we have never heard of one case where an FM station has even come close to going out of business," he said.

La Tour also argued that it is a myth

to suggest that FM translator operators abuse the intended purpose of the equipment.

"The Commission should keep in mind that translator operators are hard-working, small business people who are trying to make a living," La Tour said. "Please don't be swayed by arguments that portray us as renegade broadcasters that abuse rules and put other stations out of business. That is simply not true."

The National Translator Association argued that the Commission's revisions are overbroad and "will extinguish needed FM translator service to millions of rural Americans."

The organization proposed that the Commission adopt guidelines that permit interested parties to report translator violations instead of limiting their use with a blanket policy.

A number of small, often religiously-based organizations also filed comments to support translators, pointing out that if they were limited, specialized programming would cease to reach many communities.

We agree, but . . .

While the Association for Broadcast Engineering Standards generally supported the FCC proposal limiting the technology, it asked that a more flexible approach be taken in the "remote and isolated communities" of intermountain west and Pacific northwestern regions of the US.

"Where populations are sparse, where communities are often widely separated and where terrain obstacles present pick-up and coverage problems, ABES fears that the Commission's proposals are not feasible and are bound to result in a loss in service to the public," it wrote.

Otherwise, the vast majority of comments praised the Commission's proposal. NAB, a consistent opponent of translator use, said that recently many translator operators have sought to expand their service to near-primary status, "encroaching on many well-served radio markets."

"Translator operators often seek expanded transmission power and commercial origination as a back-door way to compete unfairly with traditional radio stations," NAB said.

The association supported traditional uses of FM translators to fill in dead spots in a station's service area and to remote areas in the nation that lack regular radio service.

CBS wrote that the FCC proposal "struck at the heart of the problem and reaffirmed the Commission's basic FM allocations and translator policy." Misuse of the technology, the network said, places undue economic burdens on local full-service stations, imperiling otherwise needed and beneficial FM service to a community.

The Association for Maximum Service Television (MST) resurfaced its consistent complaint that the FCC was not providing sufficient protection against translator interference to viewers of television channel 6. The FCC proposed that TV interference could be handled by relying on viewer complaints.

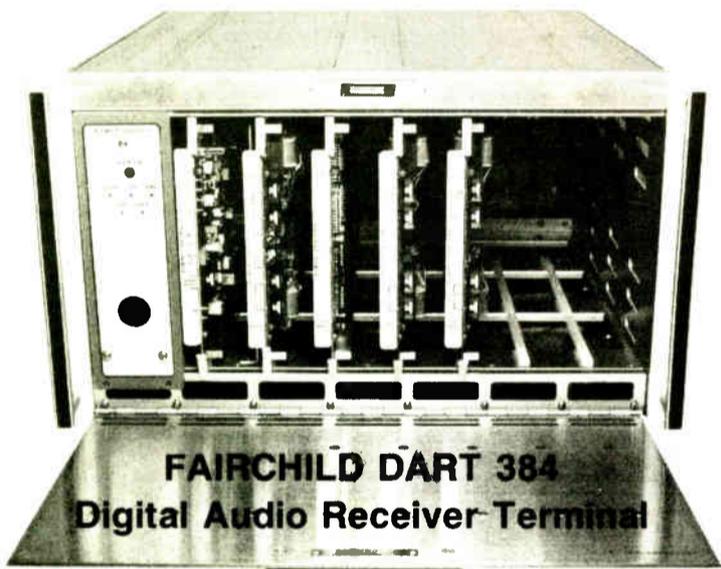
Moody Bible Institute refuted the argument of translator opponents by stating: "The past 20 years has conclusively demonstrated that there is, in fact, no likelihood that low-power FM translators pose a threat to the reception of channel 6 signals."

For information on MM docket 88-140, contact the FCC at 202-653-5050.

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Circle 53 On Reader Service Card

Production Tips for Tight Budgets

by Ty Ford

Baltimore MD It's very easy to become transfixed by some of the more amazing advances in audio production gear. At times, the lure of hot new equipment is so strong that it can cause us to focus more on the equipment than the art/craft/science of producing. Even if the equipment is not "cutting edge," when more attention is paid to it than to the job, you're in trouble.

The equipment and its operation should be as transparent as possible. This means that, as the operator of the equipment, you have to internalize its functions. At the risk of creating really bad imagery, you need to become "one" with the equipment.

PRODUCER'S FILE

But what if your studio has little or no gear to speak of in the first place? Lots of small and medium market radio stations (and even some major market ones) are pretty sparsely equipped. If you're doing production at a station like this, this installment of *Producer's File* is devoted to you.

Getting creative

First of all, don't get discouraged. Secondly, start thinking of new ways of doing what you thought could only be done with a lot of expensive equipment.

For instance, if you're at a stereo AM or FM station using mono cart machines, the boss probably doesn't want to spend the money for new stereo cart machines for both production and air studios.

Fine, but maybe the boss will spring for one three-bay stereo record/playback machine for the production studio and a single-bay stereo playback machine for the air studio. Even if the budget is only big enough for a single-bay record/play machine in the production studio and a single bay stereo playback, you can still do remarkable things on the air.

With one single-bay stereo playback cart machine in the air studio and a record/play deck in the production studio, you can start producing stereo promos, IDs, bumpers and drop-ins. All you need is at least one stereo reel-to-reel machine and a few pan pots for those mono cart machines.

Channel assignment switches will work if you don't have pan pots. Keep in mind, however, that you have to listen to your "stereo" mix in mono to make sure that those elements of the mix that appear on only one channel still work in mono.

Pan pots are better because they let you position SFX and other drop-in elements at various places across the stereo spectrum. So what if the commercials are in mono? You want your promos to stand out from the rest of the clutter anyway!

"Multi-trick" recording

So you don't have a multitrack machine—so what! Learn how to Hot Mix. With a little experience you can build up your chops to the degree that you can do a good copy read and fire off

music and sound effects at the same time. Consider it a challenge!

Suppose you can't get every element in the spot without losing control. No problem! First, get as much down on reel-to-reel as you can humanly handle. Then, mix the other stuff in on the fly as you dub to cart. Sure, it may take you a couple of tries.

One of the simplest most effective additions to a multi-machine setup like this is the addition of a footswitch. Rig it to start one of those machines you can't quite get to.

Some fearless production rats I know have rigged pedal boards that contain a number of these switches. They load up cart and reel-to-reel machines with all the stuff they need and use both hands and feet as they read the copy!

Reely nice effects

If you have more than one reel-to-reel machine in the production studio, you can use the second one to sequence music and sound effects with what you've recorded on the first machine.

Sure, you may have to trim a little tape or maybe insert a little leader or drag your thumb on one of the tape flanges (yes, that's where the term came from). It may even take a few tries to figure out exactly when to hit the second start button.

That second tape machine is also great for creating echo to a mix. Try adding just enough under your stuff to fill it up a bit.

But be careful: Use too much and you end up with garbage. Use just enough and you increase the uniqueness and "listening interest factor." Variable speed tape machines are even better because you can fine-tune the distance between echoes by changing the tape speed.

Speed changes can also help you on the turntable (you remember turntables, right?). I once went through an old MOR LP library and found that several in-

strumental cuts sounded a lot better at 45 RPM than they did at 33 1/3.

If you're working on character voices, but find that they sound too similar to your own voice when you use them together, try changing the speed of the character voices slightly. A 3-4% speed change can alter the timbre just enough to make the character voice a lot more

convincing. If you don't have a vari-speed tape machine, try wrapping the capstan with a few winds of paper or tape. As you increase the circumference of the capstan the tape speed increases.

Please remember to unwrap and thoroughly clean the capstan after you do this. Starting with a few winds of tightly wound paper means you won't have to use a razor blade to scrape the tape adhesive from the capstan when you're finished.

One of the simplest most effective additions to a multi-machine setup like this is the addition of a footswitch. Rig it to start one of those machines you can't quite get to.

If you're trying to get that "under water" sound, put lots of wrinkles in you capstan wrap. The more bumps on your capstan, the more flutter and the deeper and less intelligible you get.

Human chorus

Want to add chorus to a voice track? Record the track on two different machines and play them back together. For an even more interesting effect, put one voice track on tape and then read along with it as you do your master.

Obviously, if you have a two-track reel-to-reel machine with sync capabilities, you can put one voice track on one chan-

nel and listen to it while you record on the other channel. If you've got different machines and pan pots, experiment with splitting the two different voices out in stereo. Again, this takes practice, but all of these variations help to improve your performance and timing.

Esrever ni kcabyalp

Are you tired of all the sound effects in that old library? Try putting them on tape and listening to them in reverse. If you have a vari-speed reel-to-reel, try changing the playback speed as you listen in reverse. This doesn't work on every track, but you will end up with a collection of effects that absolutely no one else has.

Simple rhythm tracks can become distinctive musical effect tracks for station promos when played in reverse. "Break down" parts, as they're sometimes referred to, are those parts in a song where the playing becomes very minimal before building back up to a verse or chorus. Musically, some song intros behave the same way. Tape them, looping them to make them long enough if needed. Play them back in reverse and experiment with vari-speed, if you've got it.

Since we're talking reverse stuff, (continued on page 18)

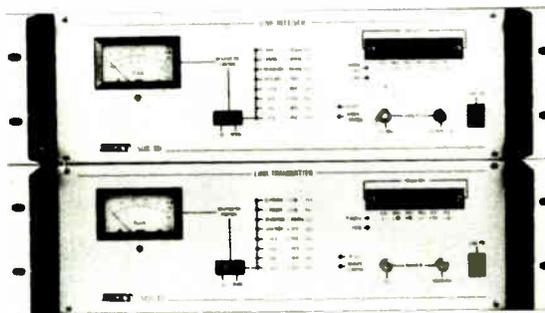
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FCC Translator Rules Get Facelift

by Steve Crowley

Washington DC The FCC is proposing new FM translator rules to curb abuses in that service. At the same time, opportunities would be expanded for those operating translators in a manner consistent with the original intended purpose of the service—to provide service to areas where direct reception of stations is unsatisfactory due to distance or intervening terrain barriers.

CONSULTANTS CORNER

Since the FM translator service was established in 1970, some stations have gone beyond that original intent. They have built and supported translators to extend coverage area beyond that which was originally authorized.

About two years ago, the NAB asked the FCC to tighten up the translator rules to curb such abuse. In response, others filed petitions seeking an expansion of the translator service.

Two categories of translators

During March, 1988, the FCC began a broad inquiry into the translator service. The result is the set of new rules now being proposed.

If the proposed rules are adopted, FM translators will be put into two categories. The first is for those providing "fill-in" service—the translator's predicted 1 mV/m contour falls entirely within the predicted protected contour of the primary station (0.5 mV/m for commercial Class B, 0.7 mV/m for Class B1, and 1 mV/m for other classes).

The second category is for FM translators providing service to "other areas," or areas outside the station's protected contour. Financial support for fill-in translators may come from the station or third parties. Translators serving other areas can be supported by third parties but not by the primary station. Non-commercial educational stations are not

subject to the above restrictions.

Stations will thus be able to continue to operate translators within their predicted coverage contours. The only alternative for filling-in coverage gaps is FM boosters, but they often cause widespread interference to the primary station—that's one reason they're not that popular, even with recently relaxed rules.

Non-commercial interference rules

The non-commercial interference rules of Section 73.509 will be adopted. A translator cannot cause predicted interference to the protected contour of a station. Still, interference might be caused to the station in areas outside its protected contour.

Because translators are secondary services, the Commission would require

Some want to make translators little radio stations—a low power FM service.

the translator operator to modify or cease operation in the presence of a "significant number of complaints."

Unfortunately, most listeners don't complain when experiencing interference; they just stop listening. To prevent the problem from occurring in the first place, we could follow the model of the television translator service and protect the contour that can be received in the absence of interference—the noise-limited contour. In FM, this is around 0.05 mV/m. That value could be increased as experience warranted.

Other proposals

Several other rules are being proposed. In one, local program origination would continue to be restricted to 30 se-

conds per hour to solicit or acknowledge contributions. Some commenting in the proceeding want to make translators little radio stations—a low power FM service.

As the NAB and others noted, that's really beyond the scope of the translator service. The Commission also makes the important point that substantial spectrum inefficiencies occur (at least in FM) when a large number of limited range stations operate: The ratio of coverage to interference area is much larger for high-power FM stations.

In another proposed rule, present

translator power limits are expressed in terms of transmitter power output: one or ten watts depending on location. The new power limit would be expressed in terms of maximum effective radiated power—1000 watts.

This is subject to the restriction that the translator's predicted 1 mV/m contour may not extend further than 16 km. Some Class A stations could be put in the interesting position of having a translator with a higher ERP than the primary station.

Still, it's nice to have a limit expressed
(continued on page 20)



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Analyze STL Paths by Computer

Programs from EDX Engineering and SoftWright Help Determine Whether Your Feeds Will Work

by Barry Mishkind

Tucson AZ Not everyone has the relatively happy situation of being in a market where the geography is nice and flat, with a tall antenna smack dab in the middle of things.

According to Murphy's Law of STL Applications, if you are trying to line up an STL feed, there will be an obstruction between the studio site and the transmitter site. Sometimes, several of them.

Using the temporal urgency factor, the law then reads: The more critical the time factor (or non-availability of phone loops), the more and larger obstructions there will be found to exist.

The corollary to this law is: When setting up a remote broadcast, the client's location will be the only one in the area without line of sight to the studio or repeater.

Over the years, virtually every broadcast engineer will swear that these are not just joke laws.

Meeting a challenge head-on

It seems like it happens too often to be mere coincidence. In fact, some days it seems like the GM or sales staff has picked a site just to provide a challenge.

As you drag out the USGS topographical maps, inevitably the one you need

is either missing or so marked up it is hard to see the points of interest.

So a trip is needed to get a new map or two and then begin several hours of plotting the path angle and checking for the terrain elevation heights between the sites.

KEYBOARD CONNECTION

And each new site has to be done by hand. This can be fatal in trying to cover a news story without delay. It may be more critical for TV crews in this day of cellular phones, but radio news reporters can end up in locations without access to a phone, too.

Wouldn't it be a neat idea to plug in the locations somewhere and be able to find out quickly if the path will work? Fortunately, the answer is only as far away as your nearest computer.

Although STLs and remote broadcasts are two distinct functions, several programs available can save a lot of time and effort in laying out and making such short term links successful.

Some such services, of course are available on-line at the big data services. You can dial in and get a listing of the terrain elevation above sea level

between any two points. This is, however, not always as dynamically interactive as would be ideal.

On-line at your station

EDX Engineering and SoftWright are two companies that provide programs for your computer to analyze any path. The same data can also be used for other applications, as we shall see.

TERRN™ and RPATH™ from EDX will work in as little as one megabyte of hard disk space. They are designed to work with either the 30-second NGDC database or the three-second USGS database.

The database you use depends on your demand for accuracy and also whether or not the results will be sent on to the FCC for licensing.

A similar program, the Terrain Analysis Package (TAP) from SoftWright, also provides the ability to extract terrain data over a wide range of application needs.

Additionally, both EDX and SoftWright provide a means for you to use the data in other ways, such as developing HAAT figures or predicted coverage maps for FM, TV and part 22 stations. And both packages are able to link to another program we'll talk about later on, SURFER®, which combines topographic and RF data into a 3-D picture that can be plotted using most printers.

In fact, these programs are all in use by many companies in the two-way and cellular field.

Using such programs can allow you to resolve any STL or RPU problem, as well as explore the "what ifs" that arise whenever a station considers how the transmitter would do "over there."

So, if you have ever sat for hours over a pile of topographic maps, reading, tabulating and calculating the elevations for a path or paths, take a tip from Larry Ellis of SoftWright:

"A thirty-five mile path can be extracted and plotted in 90 seconds!"

Then, you can change the site by 1/4 mile and do it again in less than two

minutes. It's that simple.

Of course, simplicity and convenience don't necessarily come free. None of these are public domain or shareware programs. Yet, they can pay for themselves the first time you use them.

Are they really affordable?

Over the next couple of months, we'll explore these programs more closely, but first, let's consider why you should think about acquiring them.

If you're thinking about moving into new studios, plotting the proposed STL

The database you use depends on your demand for accuracy and also whether or not the results will be sent on to the FCC for licensing.

path can save a lot of grief.

Some stations have chosen a different location in a development, or eliminated a potential site on the basis of a path plot.

"Well, OK," you say, "I can look at a topographic map and determine whether or not a path will work without a program."

That may be. But in complex terrain, or if you're new to an area, a slight mistake can be very expensive. Buying equipment and renting a site for a double hop STL can quickly outweigh the savings in lease for some otherwise attractive studio locations. Similarly, going out to a marginal remote site and trying several different locations takes a lot more time than running the plots in the comfort of your office.

Harry Anderson of EDX related how one TV station installed a computer in its remote truck. When a story breaks, they can be figuring out where to set up before they even get to the location.

The station reports that they can often "scoop" others because of the reduced set-up time required upon arrival.

Perhaps you're thinking, "That's nice for the big guys, but our station can't afford this."

One answer was suggested by Anderson. "Several stations in an area could get together (or even your local SBE chapter), buy the program and share the benefits."

While it wouldn't be right to have copies of the program at each station (Harry sells his program by site license), there is nothing wrong with a pooling of resources. Anderson says that as long as his programs stay on one machine, he is reasonably flexible with how his clients use them.

In the end, all you have to lose is a lot of frustration and uncertainty when setting up RF paths. Instead, the elimination of most of the unknowns can provide more efficient and effective use of station facilities.

Barry Mishkind is a consultant and contract engineer in Tucson. He can be reached at 602-296-3797, or on FidoNet 1:300/11.

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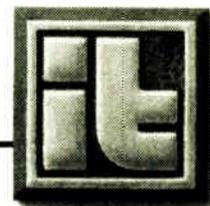
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World Radio History

War on Drugs Reaches Radio

by Harry Cole

Washington DC OK sports fans, today's text is from the Steppenwolf song-book: "G—damn the pusherman." In mid-June the Commission announced a new set of proposals which could seriously affect the way broadcast licensees and applicants structure themselves.

The story starts with the Anti-Drug Abuse Act of 1988, one element of the Federal government's war on drugs. Section 5301 of the Act gives judges (both state and federal) the discretion to deny federal benefits to persons convicted of offenses consisting of the distribution or possession of controlled substances.

So what, you say? Well, it turns out that just about *any* license issued by the FCC constitutes a "federal benefit" subject to the Act and therein lies the rub.

The mechanism at work

The way the Section 5301 mechanism is supposed to work is pretty straightforward. You start with a guy who is convicted of an "offense consisting of the distribution or possession of controlled substances." At sentencing, Section 5301 permits the judge to include, as part of the sentence, a provision barring the defendant from some, or even all, federal benefits—the judge has the authority to let the punishment fit the crime and the criminal. This does not mean that the guy would necessarily have to forfeit any and all FCC licenses he happens to hold, but it does mean

that the sentencing judge clearly has the authority to order such a forfeiture, on either a temporary or a permanent basis, if the judge sees fit.

Let's say the judge does include forfeiture of FCC licenses as part of the sentence. Under the rules just proposed by the FCC, if the guy is a Commission licensee or applicant, he would have to notify the Commission of his "debarment." For applicants, such notification would likely lead to the dismissal of the application. It is not clear at this point how it would affect existing licensees, but you can bet that there is more than a slight chance that notification of debarment will create some definite threat to any outstanding licenses.

How you get drawn in

For those of you out there still scratching your heads and wondering what this has to do with you, consider this: the notification requirement would apply to all "licensees or *any of their principals*." That is, even if the licensee itself is not the subject of any drug (er, I mean "controlled substance") problems, a debarment can affect the continued validity of a license if any of the licensee's "principals" find themselves on the wrong end of a conviction.

This creates problems because of the scope of the term "principal," which would include all officers, directors and any partner (limited or non-limited) or any stockholder (voting or non-voting) holding 5% or more ownership interest.

For instance, maybe you happened to give a little 5% chunk of non-voting stock to one of your kids as a birthday present or maybe you appointed a GM (or even a secretary) at one of your stations as some kind of corporate officer (say "Vice President" or "Assistant Secretary") so that he or she could sign the occasional FCC report in your absence. Or maybe you have one of your lawyers serve as "Secretary" because your corporate books are maintained at the lawyer's office.

COLE'S LAW

In each case, that person is a "principal" subject to the debarment notification proposal. And therefore, each such person represents some potential threat to your license.

And even non-"principals" may cause you operational problems. Remember that many, if not all, of your air staff themselves hold individual operator licenses that could be subject to the new rule. Thus, as another *for instance*, if your star morning team were to get busted, they could lose their individual licenses, leaving you to fill the gap in your schedule.

Not just felonies

There are a couple of other intriguing aspects here. First, the Anti-Drug Abuse Act relates not just to felonies, but to any "offense consisting of the distribution or possession of controlled substances." This would include misdemeanors.

Maybe more importantly, it includes offenses involving *any* "controlled substances." This includes not only cocaine, marijuana and the like, but also a variety of other substances which you might

not otherwise have focused on. Aren't steroids in one form or another "controlled"? What about prescription drugs like Valium?

Not that I want to keep you up all night worrying, but the "federal benefits" which could be lost as a result of debarment would also include FCC equipment certifications.

That raises another interesting question: What would happen if a "principal" of the company that manufactured your transmitter happens to be debarred? Would that void out the certification on that company's equipment (and, therefore, your transmitter), rendering continued operation—by you, an innocent third-party—with that equipment illegal?

Second guesswork

My guess is that, as a practical matter, the FCC would never take that position. At this early stage, though, it is far from certain. At a minimum, it is safe to say that all broadcasters should keep a close watch on what the FCC does in this area. Of course, the government cannot be faulted for trying to do all that it can to stop drug abuse. Nevertheless, it will be important for the Commission to exercise care (perhaps it could just say "Whoa") to assure that its rules do not impose unnecessary and unforeseen burdens on people who are not themselves involved in any way with drug abuse.

Fortunately for us all, the FCC is still in the process of developing its own particular rules for dealing with these and related questions. If you have any ideas about them, you should be sure to let the FCC know—public participation in the design of the FCC's regulations is, after all, what the rulemaking process is all about.

■ ■ ■

Harry Cole is a partner in the Washington DC-based law firm of Bechtel & Cole, Chartered. He can be reached at 202-833-4190.

Pro Chops on the Cheap

(continued from page 13)

there's also reverse reverb. To do this you need a reverb, or some way to generate effects and two tape machines. First, record a voice track in the normal way. You can add a little effect here, but don't overdo it.

Next, play that tape backwards and add your effect to the signal while you record it on the second machine. Then turn the backwards effected tape from the second machine around and listen to what it sounds like when played forward. Pretty weird! The effects you put on precede the source audio.

It will probably take you a little time to become comfortable with this one, because you have to learn how to think backwards and forwards at the same time. Learning where and when to use the correct amount is critical to the success of this effect.

Loop de loop

Finally, there is the simple tape loop/echoplex effect. If you have two reel-to-reel machines that are lined up next to each other, on special occasions you can create your own echoplex effects.

Make a loop of tape that runs from the capstan and pinch roller of the machine on the left through the guides, heads,

capstan and pinch roller of the machine on the right. The tape winds through an empty reel on the right machine's take-up reel table, back through an empty reel on the left side of the machine on the left, through the tape guides all the way back to the first machine's capstan and pinch roller. You can do this trick with only one tape machine, if you don't have the space, the machines or the patience.

When to use them

The simpler rig is usually used for playback only. If your sample is too long, hang it on a nail or a broomstick somewhere in the room so that it keeps running.

The two-machine rig can be used just for playback, but will also provide you with some very long delays if you record on one machine and playback on the other. The delay time varies by the distance between the record and playback heads.

If you've got any more "stupid studio tricks" I'd love to hear from you. If you haven't perfected these yet, *get to work and stop complaining!*

■ ■ ■

Ty Ford is an independent audio consultant and regular contributor to RW. He is currently writing an advanced production book for Focal Press. Reach him by phone at 301-889-6201 or by MCI mail #347-6635.

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FROM THE TRENCHES

by Alan Peterson

Getting in Sequence

Dear JG,

Am I seeing a new trend developing? Perusing the classifieds in a number of trade pubs, I have begun to notice something very interesting.

"Must know multitrack," "experience with Cakewalk necessary" (sounds messy), "sampler experience preferred" ... all told, pretty amazing. Only a year and change ago I was pleased to see my mutterings pushing for a marriage between music recording technology and the broadcast environment published in RW as a *Guest Editorial*. Seems as if the competitiveness of the industry is causing stations to look for the guyz'n'galz who know the gear forwards and backwards.

I'm overjoyed. Fact is, I'd reply to one or two of those ads myself if my current gig weren't so terrific.

Besides, I have my home rig to work with. This way, I can blow takes in the stupidity of my own home without embarrassing myself in front of my fellow jocks ... oh God, if they only knew how many flubs are made in recording those simple little "sweeps & bleeps."

Recently, in an effort to stay up on the technology (as well as to stay competitive in a growing field) I updated my sequencing system for my synths. For the benefit of folks who missed Ty Ford's and Bruce Bartlett's descriptions, I define a sequencer as a super-duper player piano disguised as a computer. It memorizes whatever you play on a MIDI keyboard and plays it back at you—clams and all. Fortunately, they are designed so you can go back and edit out little hiccups in your performance like in word processing.

New equipment always comes with a few lessons to be learned. Lesson One: Never completely trust words like "intuitive" and "friendly." My new acquisition came out of the box sweet as Linda Blair and turned into Satan as soon as it hit the business end of my MIDI Thru box. Notes began flying out of gear I didn't know I owned and they were things I never put in there!

Lesson Two: The chances of your work getting eaten are exponentially proportional to the number of tracks the sequencer contains. Once Linda settled down, I began playing (*ahem*) "performance data" into the computer.

Now, I saw the music get there on the display. When I went for a playback, the track was empty. So were the next six. Finally, there it was in number eight. And I know I didn't put it there. Linda was playing checkers with my sanity.

Lesson Three: There's a reason Chernobyl had a button saying "No Touch."

I went for the "quantize" feature on my system—this kinda "rounds off the corners" so little timing inconsistencies get digitally ironed out. Linda ironed it out to sound like a Viennese waltz.

Naturally, my next step was to go for the "Merge Tracks" feature, so I could open up some space for more (*ahem*) performance data. Linda merged tracks all right, right into each other for the biggest musical train wreck I had heard up 'til then.

I say "up 'til then" because my next step was a beaut. In my haste to kill the playback, I accidentally hit the feature that sent the earth spinning into the sun: "MIDI Echo." Imagine runaway tape echo at 31.25 kilobytes with your monitors turned up to eleven. All my synths tried to read a replica of a signal they were sending back to the computer and playing at the same time, while Linda kept sending and receiving the same signal with joyful abandon. Any second now I expected to see her head spin around.

Finally, I did three smart things—I stopped the sequencer, sent an ALL NOTES OFF command (thank you Anatek, for the "Pocket Panic!"), and yanked the plugs on everything. Then and only then did I actually decide to crack the instruction manual.

Lesson Four: Always read the blessed book before hitting a single key!

With book in hand, and a resignation to the fact I'd blow it a few more times, Linda and I went to work. Happily now, she's best friends with all my gear. I'm happy because I made my mistakes at home, avoiding the frustrations and anger associated with deadline-type performance (and not looking like a pinhead in front of a client).

It's possible somebody else would've gotten discouraged, never gone back, flung it through a double-pane and griped about "What a mistake it was to buy that piece of junk for the station." Like anything else, time and training is important. Even a Production Rat needs a little time to nibble through an obstacle.

And if anybody ever asks me why my music is in B-natural, I tell them everything but the real reason: I've got a groundloop I can't chase down. Low B-natural is 61.735 Hz and covers the hum beautifully!

All Notes Off and so am I,
—Al

■ ■ ■

Al Peterson is production manager for WLAD-98Q Danbury, CT, and a genuine *Midiot*. Send (*ahem*) performance data to Al c/o RW.

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On Both Sides of a Simulcast

by Clayton Blick

New York, NY Typically, radio stations do not produce television programs. When it comes to co-producing a radio-TV simulcast, a radio station rarely has much impact on the net result.

To further complicate the radio portion of the simulcast, video sound tracks will include phrases like "as we look at" or "as you can see" which mean absolutely nothing to the radio listener.

Minnesota Public Radio (MPR) recently provided an example of how to produce a simulcast where neither radio nor TV are compromised. "When we do a show which will air on TV we approach it as a 'radio show to be televised,'" said Preston Smith, engineer and producer, MPR.

A pretty good night

When it came to simulcasting the show entitled *A Pretty Good Night at Carnegie Hall* recorded live here in New York for airing over the Disney Channel and public radio stations, Smith was sensitive to how the "audio-for-radio" part of the broadcast would turn out.

Garrison Keillor hosted the event and Chet Atkins, the legendary country music star, was included in the show's lineup of stars.

Realizing that most simulcasts offer the discerning radio listener little consideration, Smith addressed the issue of giving the show maximum appeal to his audience.

He met this challenge first by recording the evening's entertainment live on a Sony PCM-3324 24-track digital audio recorder and posting it on a Sony PCM-3402 two-channel digital audio recorder.

The initial digital recording of the program had been mixed down to a two-track digital machine before the PCM-3402 DASH recorder was employed to produce the digital broadcast masters of the show.

There were two masters produced.

One, the "audio-for-TV" soundtrack, was produced for the TV part of the simulcast to be aired on the Disney Channel.

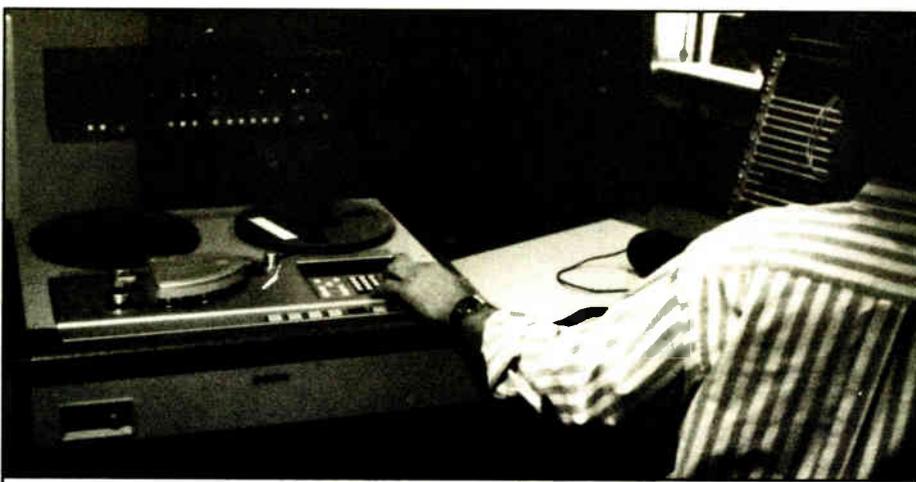
The other soundtrack, the "audio-for-radio" part of the simulcast, was designed for the radio half. The two differed in content—for example the show introductions and endings were tailored to meet the specific requirements of each medium.

MPR needed to include the underwriting announcements of its sponsors and opening show credits, while Disney had

ing synchronization with the TV signal.

One possibility was to spend \$3000 and three working days, rent a transportable uplink and set it up in the parking lot of the Disney Operations Center.

A PCM-3402 two-track digital recorder synchronization to the VTR's SMPTE timecode could output the digital stereo radio master, via the uplink, to the public radio channels on the Westar IV satellite. This could then be downlinked to almost 200 local stations and affiliates of the American Public Radio network.



Synchronization for the simulcast was accomplished with the help of MPR's Sony PCM-3402 DASH recorder.

created a sound effects sequence to match the show's televised opening. Disney did not require sponsor recognition and the sound effects sequence would have been lost on radio listeners.

Typically, the radio feed for a simulcast is taken directly from the VTR soundtracks. "The quality of 1" VTRs has improved over the years but it still doesn't hold a candle to digital audio," commented Smith.

Uplink or landlines?

Smith began to work on a method to broadcast the audio directly from the digital stereo radio master while still retain-

ing synchronization with the TV signal. But this approach was deemed too expensive and time-consuming. In addition, FCC approval for the uplink would have to be sought and granted.

The second option was to lease two telephone landlines from Pacific Telephone to carry the digital stereo audio signal across Los Angeles to KUSC Radio, which has a satellite uplink.

This would require two engineers to carry out an extensive range of tests and quality analyses to ensure that the lines would be suitable for transmission. While the high quality lines can carry signals spanning a frequency range from 50 Hz to 15 kHz, it is often difficult to obtain temporary circuits of suitable quality.

Although the cost for three to four hours on a fixed uplink is reasonable (approximately \$200), the charge for the land lines could bring the overall expense back up to the initial estimate of \$3000.

Smith began to examine other possibilities including the leasing of broadcast lines to carry SMPTE timecode to KUSC instead of audio. This would allow him to synchronize the audio machine and uplink the digital audio directly without sending it across town over the leased

lines. This method could reduce interconnect costs but would also require renting a digital machine in LA.

Why go to LA at all?

Then the solution dawned on Smith. Why not transmit the SMPTE timecode from the video playback machine to MPR studios in St. Paul via an otherwise unused audio channel on Disney's satellite channel?

MPR has direct coaxial links with the local cable TV licensee, Continental Cablevision, which allowed them to downlink the timecode signal encoded on The Disney Channel. The SMPTE timecode was channeled back to the MPR studios and routed to their own in-studio Sony PCM-3402 DASH recorder.

"This was the solution we were looking for," said Smith. "Disney had a free channel on which to transmit the SMPTE code to us. Once we approached them with the idea, they agreed to run with it."

Both parties conducted a series of tests to determine the integrity of the incoming code. "We completed a near exhaustive number of tests to be 100% certain that the signal degradation was small enough not to affect the quality of the timecode received by the PCM-3402," Smith pointed out.

"As far as we know this is the first time anyone has done a national simulcast where the tapes for radio and television have been uplinked from different parts of the country! But the real beauty of the whole thing was the cost: only \$60—and that was to rent a sync generator," he added triumphantly.

The sweetness of success

For the simulcast, The Disney Channel had the "audio-for-TV" master in Los Angeles while MPR in St. Paul retained the "audio-for-radio" master. One of the Disney engineers who had worked closely on the project agreed with Smith that there was no reason that the new approach shouldn't work, but had remained a strong advocate of more tradi-

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Translators

(continued from page 15)

in terms of ERP. It eliminates the need to play the game of feeding multiple transmitter amplifier outputs into multiple antennas.

Like non-commercial educational stations, commercial stations (in another proposed rule) would be able to use auxiliary frequencies to deliver programming to the translator on a secondary basis (when such use would not interfere with use by a station).

The current rule preventing AM stations from using FM translators would be retained.

Additionally, commercial translators would be able to operate on all 80 commercial channels, instead of being restricted to the 20 channels formerly authorized for Class A service.

Overall, this is a good set of rules that will both curb abuses of the translator service and increase opportunities for stations with legitimate coverage problems.

■ ■ ■

Steve Crowley is a registered professional engineer with the consulting firm of du Treil, Lundin & Rackley, Inc., 1019 19th Street, NW, Third Floor, Washington, DC, 20036. He can be reached at 202-223-6700 or by FAX at 202-466-2042.

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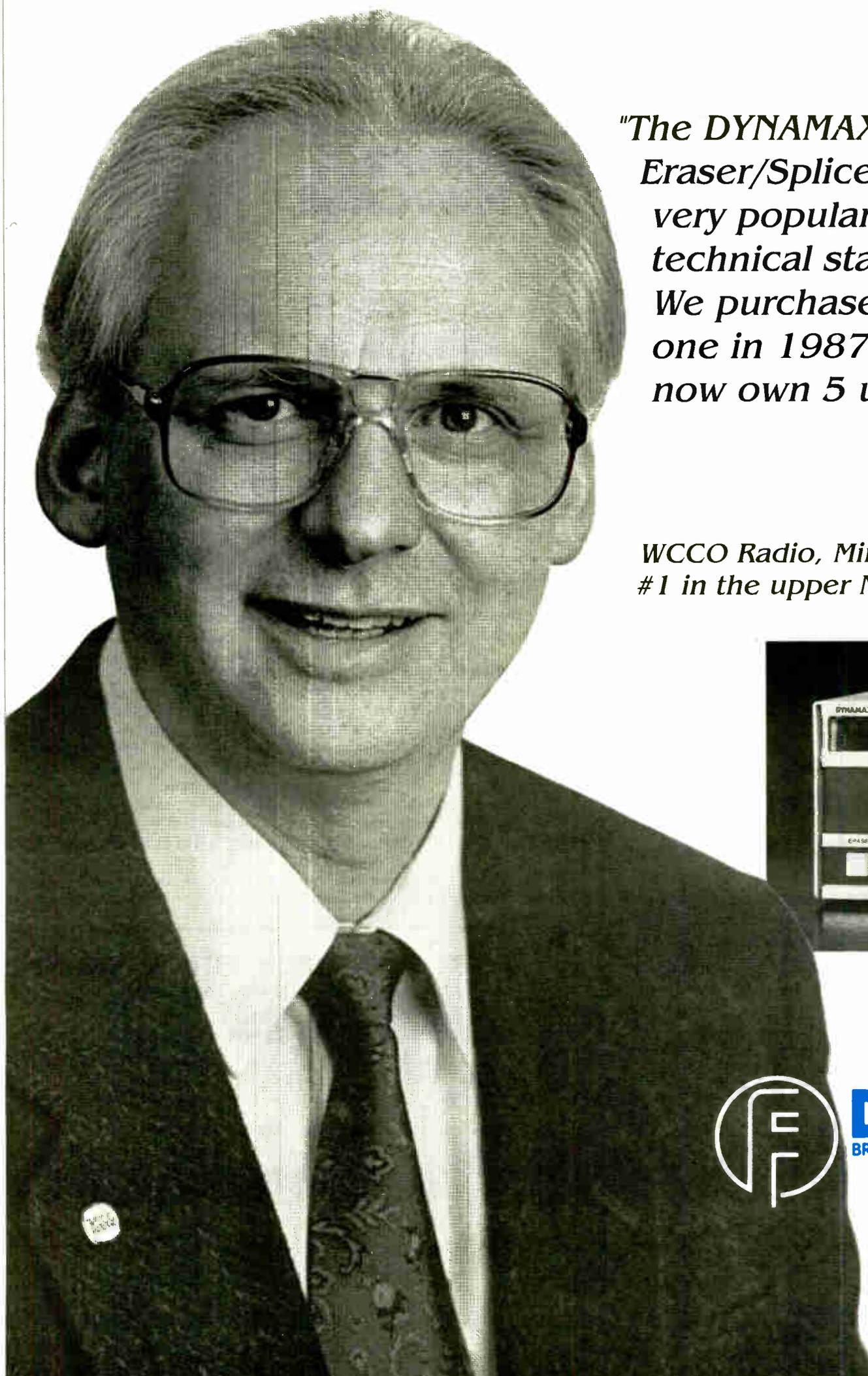
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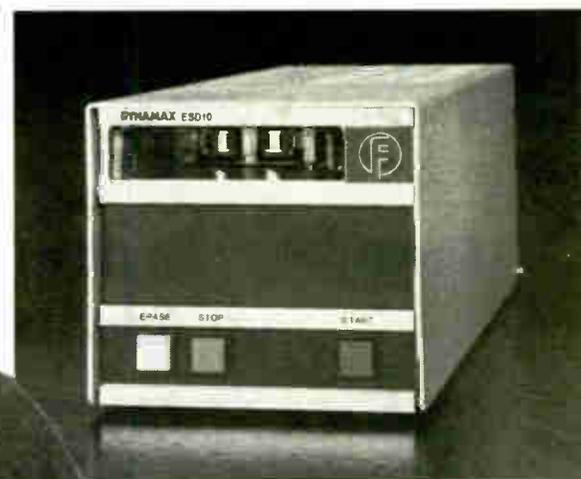
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Circle 148 On Reader Service Card

KTMJ: Texas Radio's Rising Star

by Dee McVicker

Dallas TX Just about every radio station has a bit of vintage history surrounding it. But not so for newcomer KTMJ-FM in Tyler, TX. Its history began on 7 May 1990.

Even so, history does have a way of

local educational stations.

KTMJ's most pressing problems, however, centered around what Hawkins refers to as "environmental impact," a more modern nemesis for '90s start-ups and relocations. One problem in particular—buzzes and hums traveling down lines from a community



Denon DN-950A CD players in the control room are KTMJ's source equipment.

repeating itself. There was the historical red tape, for instance, that KTMJ-FM hurdled to occupy 104.1 MHz in the Dallas/Fort Worth market.

And following that were the traditional engineering problems, which kept KTMJ engineer-on-call Sans Hawkins hopping. "I was spending four to five hours a day just working out the bugs," said Hawkins, who also engineers two

transformer—was creating havoc in KTMJ's new control studio, production studio and newsroom.

Tracing noisy transformers

Said Hawkins, "If you're in your own building, you can run off your own transformer. So any interference that's generated, you pretty much generate yourself; you can control that." KTMJ-

FM's new studios are located in a business complex along with several other companies and currently Hawkins is tracking down an annoying hum that starts at 9 AM sharp and mysteriously vanishes at 6 PM. Suspects are computers and dental X-ray equipment just a few doors down from the station.

Despite the noisy transformer, the business complex was a choice location. City congestion, another environmental impact of modern proportion, left very few options.

FACILITIES SHOWCASE

"Trying to find a location that was visible (to guests), yet would work technically—where we could get a direct microwave shot off the roof to the tower 16 miles away—was difficult," said Hawkins. The choices were limited, he added, because city regulations disallowed structures more than 30 feet above building construction.

KTMJ's business complex in Tyler offered the station line-of-sight access to the transmitter site in Mount Sylvan, 16 miles northwest of the studio. And fortunately, unlike a lot of new start-ups and relocations that settle into high-rise buildings, KTMJ was able to bypass much of the acoustical concerns associated with a multilevel building.

However, KTMJ's single story facility does have a large volume of glass enclosing it, making the studios highly reflective—at almost 40%.

Robinhood to the rescue

Recording and audio production genius Robinhood Brians, whose recording studio produces all of ZZ Top's hits as well as those of other gold-plated artists, was able to help out with KTMJ's reflective problem.

A good friend of station owner and GM Rick Reynolds, Brians suggested angling glass windows to create a soundproof barrier. He also recommended placing plush carpeting underneath Sonex wall treatment for greater absor-

bency. These solutions, said Hawkins, were very affordable and effective.

KTMJ's soft AC format, which spans recordings from the '50s to today, is based on a Century 21 CD library that rotates from a Power Play computer program. Hardly the vinyl of yesteryear start-ups, KTMJ is over 99% CD driven and rotated according to tempo, era and other criteria checked daily by the station's PD.

Three Denon DN-950A CD players in the control room and another in the four-track production studio play back the 2200 or so songs on compact disc.

"We only have one turntable in the entire building," reported Hawkins, "(and we) don't have any reel-to-reel machines in the on-air control room."

Microprocessor-controlled cart machines also found their way into the new start-up. Broadcast Electronics Phase Trak 90 cart machines—record and record/playback models—are used in both the production studio and the control studio for commercial load.

Soon to follow will be an R-DAT ma-



The station's newsroom features an Autogram Pacemaker console, BE cart machines and a Tascam reel-to-reel.

chine. Recommended by the station's equipment supplier, RF Specialties of Texas, DAT will be used for commercials, some source material and audio presentations for prospective advertising clients. The new DAT machine will be brought into the station's four-track production studio to "eliminate generation loss," according to Reynolds.

The new DAT is an integral part of the larger picture in KTMJ's radio production. The key to a successful production studio today, commented general man-

(continued on page 29)

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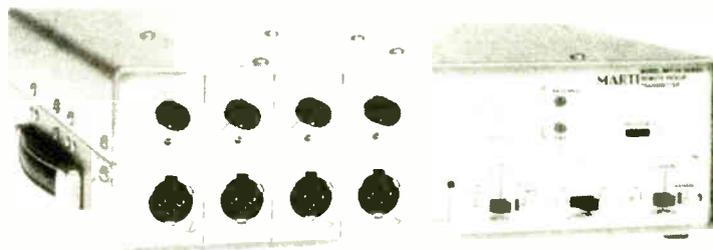


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Circle 65 On Reader Service Card

AM Synchronization Reduces Interference

by Thomas Vernon

Harrisburg PA There's been much discussion in recent years about technical improvements to AM radio. At least one of the "new" suggestions, synchronous AM broadcasting, actually was in existence in the 1920s.

STATION SKETCHES

Synchronous broadcasting involves locking the carrier frequencies of two or more stations on the same channel to a common oscillator. This all but eliminates the individual variations in frequency by stations on the same channel.

Many of the undesirable phenomena heard on the AM band, especially at night, are caused by slight variations in frequency of two or more stations on the same channel. These include flutter, fading, crosstalk and sideband heterodynes. The occurrence and intensity of such interference is a function of the ratio between signal strengths, difference in frequency, receiver location and other factors.

The flutter effect, particularly noticeable on Class IV channels at night, is caused by sub-audible beat notes between transmitters. These beat notes in-

teract with receiver noise components to produce flutter.

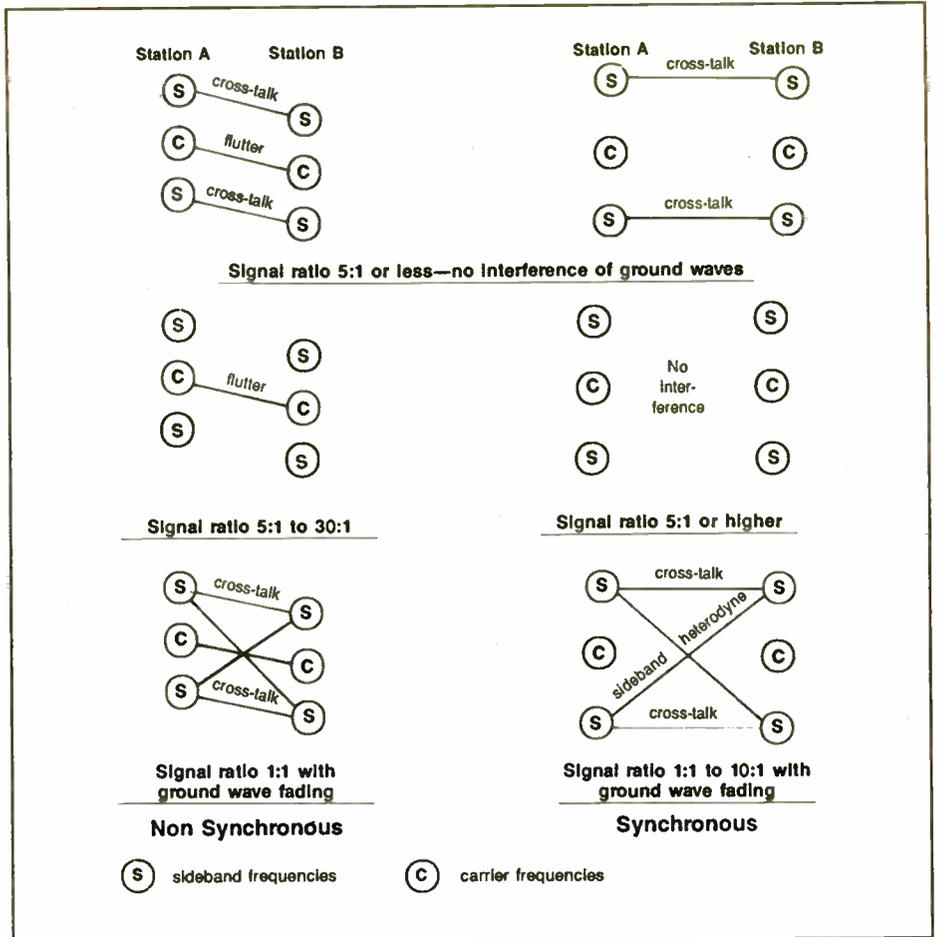
In extreme cases, when the variation between transmitters approaches 20 cycles, the heterodyne frequency becomes audible as a growling noise. These effects are fairly well understood but what many people don't realize is that the ratio of field strengths can be greater than 20 to 1 and the interference can still occur. It's no wonder that many of the Class IV channels are virtually unlistenable at night!

While it won't cure all AM reception problems, synchronous broadcast would eliminate beat notes and some heterodyne effects. Figure 1, derived from earlier research on the subject, shows the types of interference that can and cannot be reduced through synchronization of transmitters.

Even if signals are synchronized, crosstalk can be a nuisance if the incoming signals are of the same field strength. This can be reduced to some degree by orienting the receiver's antenna to favor the desired signal.

Ground wave interference

Ground wave interference can also be a problem in some locations. There is a particular cancellation of carrier when two signals on the same frequency arrive at a given location. The sidebands of these carriers do not



cancel out, however.

The result is beating between sidebands, usually noticed as "hash" on the receiver. Sideband hash cannot be cured through synchronous broadcast.

The concept of synchronizing AM transmitters to a common oscillator is not new. In fact, it had its origins in the earliest days of broadcasting.

The first synchronous broadcasts began

in 1926, with WBZ in Boston and WBZA in Springfield, MA. At this time WBZ operated with 50,000 W from a transmitter site in Millis, while WBZA operated with 1000 W. Both operated on 990 kHz.

The system was designed and built by the radio division of the Westinghouse Electric and Manufacturing Company. The master 990 kHz oscillator was lo-

(continued on page 26)

The engineers who know RF best already know us very well.

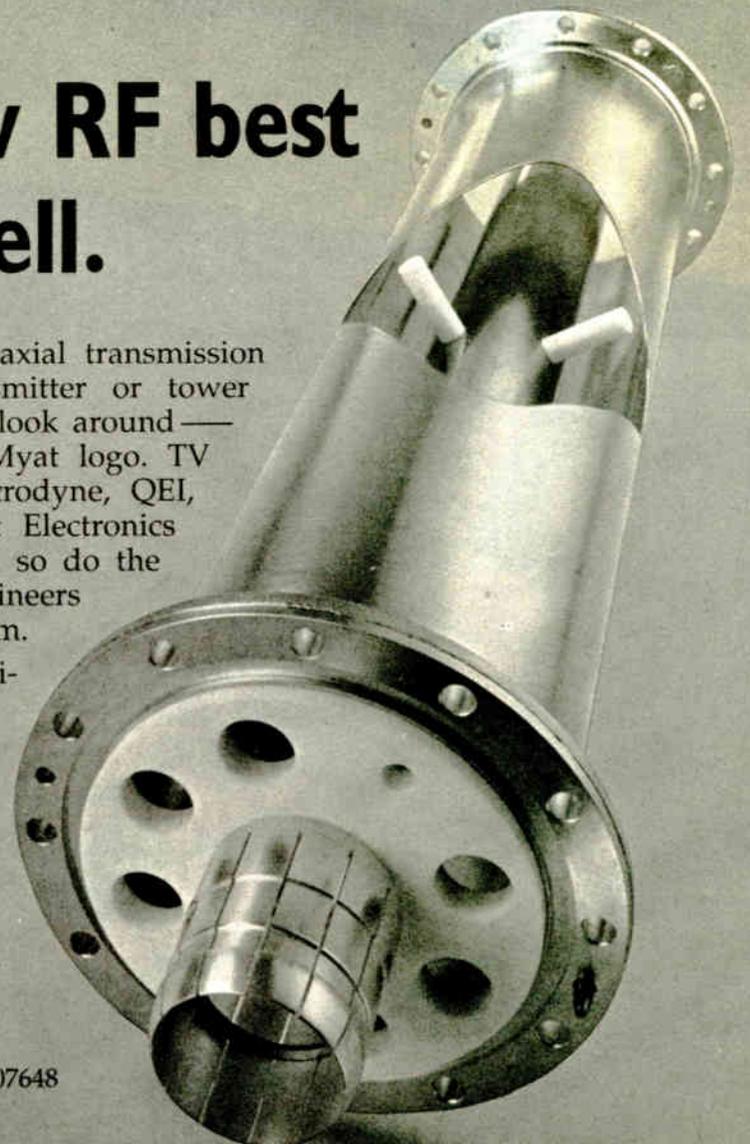


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A Guide to Proposal Writing

by John Cummuta

Downers Grove IL You see a new piece of equipment that would work perfectly in your audio chain. Or you know that the old control board is running on borrowed time. So you run to the boss and say, "We need . . ."

You finish what you believe to be a compelling argument for your request and he or she smiles and says, "Sounds interesting. Give me a written proposal on that."

Ahhh!

If you had *wanted* to be a writer, that's what you'd *be*. But you're a technical specialist, because you like technical things, not words. Well, maybe I can help, by giving you a short course on proposal writing that will make it simple, straightforward and logical—just like the things you enjoy doing.

Start at the end

This probably sounds dumb, but what most managers want to see at the beginning of a proposal is a *summary*. Some call this an Executive Summary, but it means the same thing: a quick summation of what the proposal is about.

ENGINEERING MANAGER

This is not where the details go. It's just where you tell the basic idea your proposal carries—in a hundred words or less.

You might say, "I'm proposing that we get a new audio control board for the main studio, because the old one is introducing noise into our broadcast signal, it fails too frequently and it doesn't have many of the features the announcers want. There are also a couple of great opportunities to pick up a new board for far less than the normal price."

Be simple, concise, to the point. If a boss is even slightly inclined to entertain the possibility of getting a new board, he/she will know why reading your proposal is a good idea. This summary tells what the rest of the proposal will be about, so they can get their mind into the right frame to appreciate and absorb the information to follow.

Use the news person's tools

To flesh out the rest of the proposal, reach into the newsroom's toolbox and grab what they might call their six most important tools: *Who, What, When, Where, How* and *Why*. To this collection add *How Much*.

Your job, for the balance of the proposal, is to answer these questions. They're the same questions your news people use when they're doing a story. Using this list of questions assures that they'll never leave any important facts out. They'll do the same for you.

What is the word that reminds you to clearly explain what you're talking about in your proposal. *What's* the problem? *What's* the equipment? *What's* the focus of this proposal?

Do not assume that your reader knows any of the facts or even the terms you throw around every day in your job. Ex-

plain clearly the piece of equipment, problem, person, job or whatever you're talking about.

You should also explain *what* you want as a solution to whatever problem you're presenting.

Who, when, where and how

Who deals with people. These people can be technicians to be assigned to the job, a consultant or the supplier of the new equipment. This is the people part of the equation.

When gives your reader a time frame. This would include such things as whether there are any advanced notice requirements to get a certain part, or a price date through which a special price may last. Any of the facts that pertain both to when you need the boss to act, as well as when you propose to do your part of the implementation, should be in this section.

Where can remind you to include other useful information. For example: Will the consultant be coming to your site or providing assistance from an office via phone or FAX? *Where* is the new piece of equipment being shipped from? *Where* do you propose to find the revenue to do what you're proposing? *Where* will the new equipment be installed?

How is another important element of your proposal. This question makes you really think things through. If you can't describe, in words, exactly how you intend to carry out your proposal, it's probable that you haven't really considered all the facts yourself.

But if, on the other hand, you can clearly present the exact steps necessary to accomplish your goal, your boss will be considerably more confident in the value and potential of the entire concept.

The bottom line

How Much is the dirty question no one ever wants to deal with, but it's the bottom line of American business. This is another area of the proposal where you'll be showing the man or woman with the checkbook either that you've done your homework or that you're flying by the seat of your pants.

Remember that the real figure you want to end up with is "cost." Cost is how much less money the company will eventually have, after it has the new piece of equipment or whatever you're proposing.

To arrive at this figure be sure you consider any trade-in or resale value for the old equipment. You should also get the accountant to help you figure in depreciation or any other cost-spreading considerations. And don't forget any ways that the new widget might increase

revenues.

In other words, you're trying to arrive at a net figure that offers a true representation of the gains and losses of the course you're proposing.

Why? Here's where you get to be Perry Mason. It's your chance to make your case for your position. You can summarize. You can emotionalize. You can rationalize. Just don't be boring.

In short, the *why* section should simply be a restatement of the reasons this issue became important to you in the first place.

Well, there you have it. A simple system for written proposals. You may have

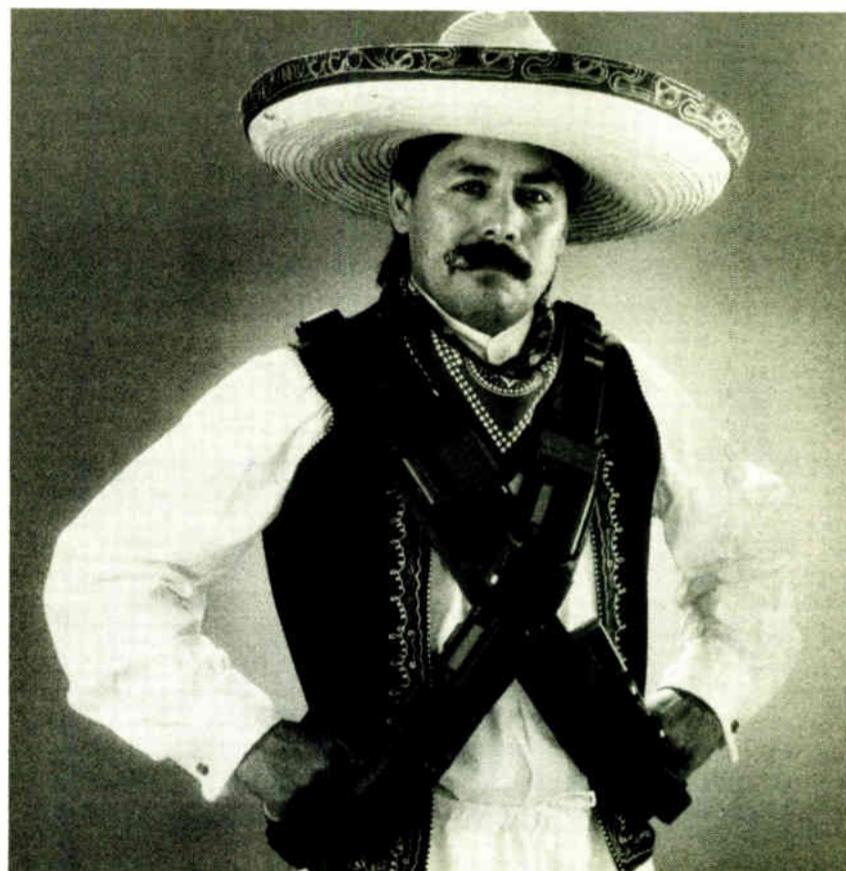
seen other formats that suggest breaking the process down into differently named sections than I offered. But, if you look them over, they end up presenting the same information as the *What, Who, When, Where, How, How Much* and *Why* questions.

If you stick to this simple approach, you'll rarely have anyone come back to you and say that your proposal lacked some important piece of information. But, more importantly, you won't be submitting proposals where you haven't thought through the important questions yourself.

■ ■ ■

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 708-969-4400.

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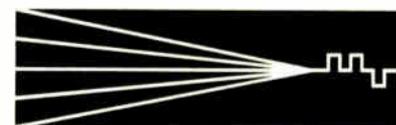
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Synchronous AM is Nothing New

(continued from page 24)

cated in Springfield. Multivibrators divided this frequency 72 times to give a reference frequency of 13.75 kHz.

This frequency was fed via phone lines 65 miles to the WBZ studios at the Stabler Hotel in Boston. Here the reference frequency was sent along with the program signal over another phone line from Boston to Millis. Ten kHz low pass filters kept the program audio from interfering with the reference frequency.

At Millis, the 13.75 kHz signal was amplified in a saturated amplifier whose output was independent of input level changes. It was then multi-

plied back up the 990 kHz, passed through a two-stage crystal filter and a buffer and then applied to the transmitter. Provisions were made to switch from the reference frequency to a local 990 kHz oscillator automatically if the reference frequency from Springfield was interrupted.

By use of a directional antenna at Millis, the zone of interference between the two stations was made to fall in an unpopulated area. Synchronism within 0.1 cycles, or 36 electrical degrees, could be maintained with this system.

Other synchronous stations from the 1930s included WJZ, operating with

50,000 W from Bound Brook, NJ; and WBAL, then operating with 2500 W in Baltimore. Both stations were on 760 kHz. Their synchronizing equipment was designed by C.W. Horn of NBC engineering and locked the stations within three or four electrical degrees. Both stations were locked to a 4000 Hz master frequency source for the Bell System in New York.

WBBM Chicago, and KFAB in Lincoln, NE were synchronized on 770 kHz, and used the standard Western Electric Synchronization System developed at the Bell Telephone Laboratories. This was a variation on the 4000 Hz system described above.

Aid to overcrowding

It is interesting to note that plans existed in the 1930s to use synchronized stations to alleviate congestion on what was then considered an overcrowded AM band. A 1935 proposal suggested 1527 stations, seven of them being super power 500 kW to 2000 kW, 20 kHz outlets. There were also plans for 1 kW regional and 100 W local stations with 10 kHz bandwidth.

The proposal went on to suggest network programs on three or four adjoining channels, set up so that each network was on an established dial position wherever heard. Other more ambitious proposals suggested up to 3000 and even 6000 stations on the present

AM band.

Finally, the 1935 report lamented, "Of course, anyone familiar with broadcasting and the Washington situation recognizes the almost insurmountable barriers to bringing about another reallocation, and the hardships it would impose on present broadcasters."

From past to present

Technology has changed a bit in the last 60 years and attempts at synchronization today would no doubt be done (and have been experimented with) quite differently.

Probably the easiest way to lock several stations on the same channel to an exact frequency would be through the use of WWV as a standard. This would involve the use of a HF receiver, frequency division circuitry and a switching system to return the transmitter to the local oscillator should the receiver fail or WWV reception become unsatisfactory.

Owing to the unstable nature of the ionosphere, there are cyclical propagation changes every 24 hours that limit the accuracy of WWV as a reference to .1 part per million. However, by use of audible ticks sent by WWV as the reference, an accuracy of .001 parts per million can be achieved.

And thus, new technology may revive an idea that started out in Boston 64 years ago.

■ ■ ■

Tom Vernon, a regular RW columnist, divides his time among broadcast consulting, computers and instructional technology. He can be reached at 717-367-1151.

MPR's Simulcast Success

(continued from page 20)

tional methods of handling the simulcast.

Then came the moment of truth. Smith waited to see if it would work.

"One minute before the program went on-the-air, the PCM-3402 sitting alongside me in St. Paul kicked into action. It was quite a thrill knowing that it was au-

tomatically synchronizing to a VTR in Los Angeles," noted Smith. "A few seconds later, the LED indicating that the machine was in sync lit up. The whole thing worked out beautifully," he added.

The national broadcast of the show was uplinked via the Westar IV satellite for radio and Satcom 1R satellite for television.

Both satellites are in geosynchronous orbit 23,000 miles above the earth, resulting in a 1/4-second delay between the time the signal is uplinked and the time it is received on earth.

But because of the flexibility of the internal synchronizer in the PCM-3402, it was simple to pre-program a 1/4-second offset in order to make the lipsynch between radio and television perfect. "The PCM-3402 has a fabulous internal synchronizer," noted Smith. "It makes the unit one of the best around for synchronizing audio to video."

As if that wasn't enough work, Smith was quick to mention that while they mixed and edited the show during the day, they were busy making a CD master tape in the evenings.

"We used the same 3402s to record and edit a compact disc of Bach Lute Suites by the internationally renowned guitarist Sharon Isbin, for Virgin Classics Ltd.," said Smith. "In addition to everything else, this machine is a fantastic music editor because of its large built-in electronic memory buffer."

Which shows that careful planning and selection of the right equipment can let even a busy crew perform two jobs at once—or in this case three jobs.

■ ■ ■

Clayton Blick is product manager for Sony pro audio products and can be reached through Sony at 201-930-6432.

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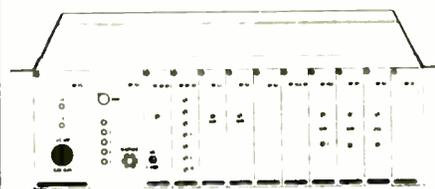
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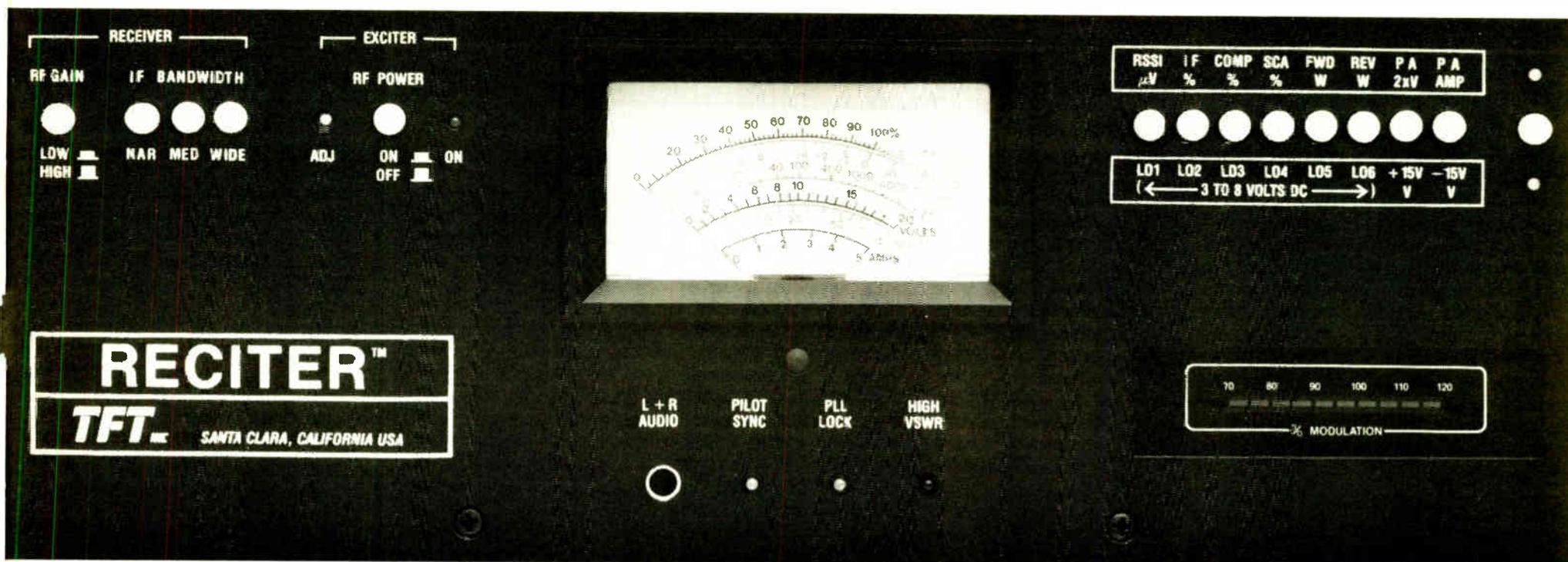
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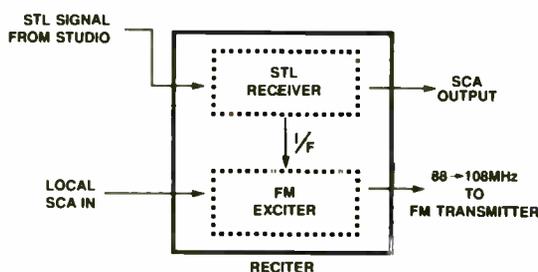
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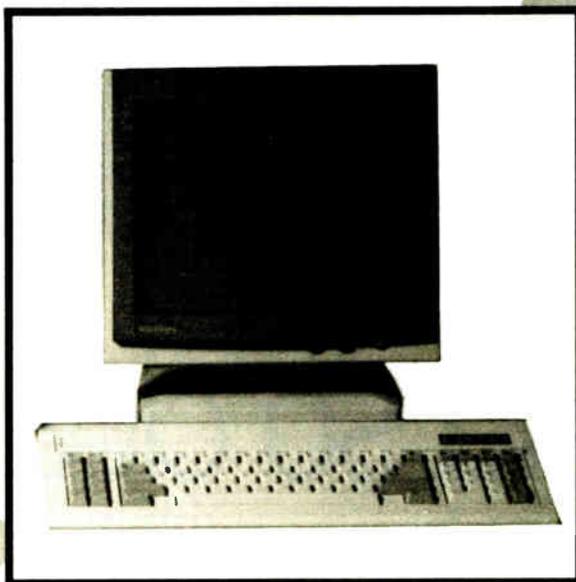
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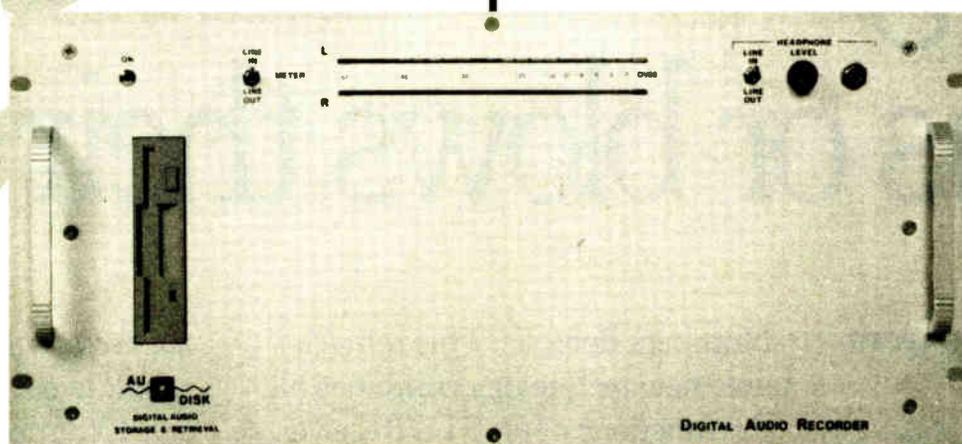
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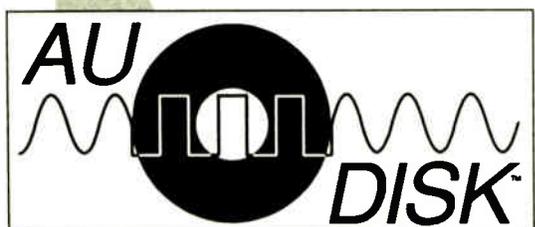
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"Call me, I'm interested." Circle 54.

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KTMJ Rides Tall in the Saddle

(continued from page 22)

ager Reynolds, "is versatility." The station's 4-track studio, headed by 20-channel Tascam recording console model M-320B, is capable of extremely versatile production.

4-track studio

"It's a nice production tool when you want to dub," said Hawkins. "You can put a voice on track three, a voice on track four, and put music on channel one and two. Normally, you'd have to re-record everything." An 8-track, both Hawkins and Reynolds agreed, would

be overkill for the ease-of-use studio they wanted.

In addition to the Denon CD player and BE cart machines, support equipment in the production studio includes a Tascam 44B 4-track reel-to-reel and Tascam 42B 2-track recorder. Effects processing is done with an ART Multiverb III, which allows station operators to change pitch and reverberation in over a hundred audio effects.

For the control room, Hawkins suggested the new Autogram R/TV 20 console. Hawkins, who has worked with Autogram boards in the past, particu-

larly liked the circuit layout of the board. "(The Autogram) is very convenient from an engineer's standpoint," he commented.

The newsroom, where all news for KTMJ is originated, is equally well

board (every time you want to make a change). It makes it convenient; if something goes wrong I can verify with a pair of headphones really fast."

Hawkins admits that he used to be an advocate of more traditional methods of wiring. "I came up from the old way of thinking that if you don't solder it, it won't make a good connection. But it's not really so." Citing the telephone company as an example, Hawkins reasoned

More Readers Forum

(continued from page 5)

wave activity in the transmission system, antenna and cavity (if any) passband, audio and signal processing, SCA presence and level, pilot level and coherence, power line fluctuations, temperature of the antenna, transmitter, transmitter house, etc., radiation from other sources, weather, vibration of the FMO, and for all I know things like the elevators going up and down in the big buildings downtown or whether or not Georgia-Pacific has clear-cut the mountain behind the town opposite your antenna or the phase of the moon.

The resulting tidal forces affect large aggregate groups of light wavelengths and might have a modest effect upon this. Some of this might sound ridiculous until you are driving slowly on an expressway in a metropolitan area and listen to the effects of large trucks going the other way on the other lane . . . how many wavelengths away? I have personally noticed an effect similar (?) to multipath in the same vehicle with two different receive antennas, one much more flexible than the other. Does this vibration cause an AM effect?

Certainly the work of Harry Simons at

WAEB is indicative of a need for serious qualitative and quantitative work in this area. There is no suggestion in this work that it will result in a specific solution to this problem. It is the lack of specificity in proposing solutions which seem to point toward a potential solution which is "market specific" or perhaps more closely defined as a "station specific" solution.

Simon's lack of interplay with the NRSC seems to show a lack of understanding of the purpose of this organization. Certainly Simons should be encouraged to submit his findings and certainly he should be encouraged to publish his findings through some professional journal.

Unless researchers like Simons publish their findings, we will find that the solution to multipath, if there is one, is much harder to find and the growth of the body of technical knowledge within the industry will be retarded.

Thank you for a fine thought provoking article. Keep up the good work!

James L. Sorensen, CE

WJQY FM

Ft. Lauderdale, FL



BE Dura Trak 90 and Phase Trak 90 cart machines play back commercials in the control room at KTMJ.

equipped with a Pacemaker 8-channel board, BE Dura Trak 90 playback and Dura Trak 90 record cart machines and a Tascam reel-to-reel that feeds 7 1/2" reels. A VCR is also fed into the back of the Pacemaker for news tapings.

Studio wiring

Inter-wiring between the studios is done with Gentner punch blocks, which Hawkins set up next to the consoles as utility wiring panels. This way, he said, "you're not having to lift the top of the

that, "If punch blocks didn't work, the telephone company would be out of business."

On the air for just a few months, newcomer KTMJ-FM is already making inroads in the Dallas/Fort Worth market. Since history has an uncanny way of repeating itself, this trend should continue for a long time to come.

■ ■ ■

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

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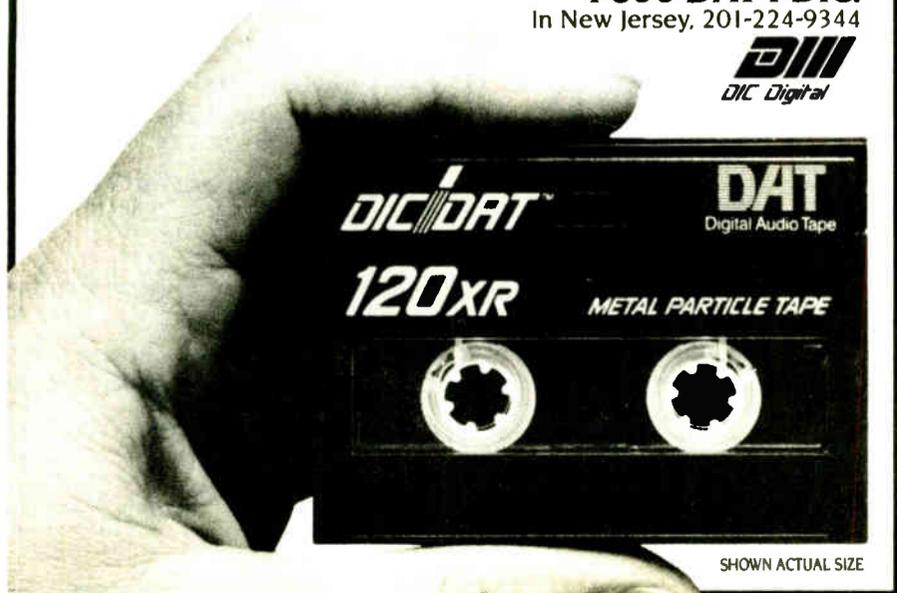
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BUYERS GUIDE

Studio Audio Equipment & Studio Furniture

RPG Key to WQXR Acoustics

by Alfred W. D'Alessio, President
Northeastern Communications
Concepts, Inc.

New York NY In radio the concept of the studio has become virtually extinct . . . or to be more precise, its functions have become incorporated into the control room itself. Except for talk oriented formats, most stations have no studio at all.

SPECIAL REPORT

With the advent of digital recording and sampling applied to routine overdubbing techniques, what studios remain have shrunk to a new compact size, while the control rooms have expanded to accommodate all sorts of synthesis and processing gear. Controlling sound within any given space becomes increasingly difficult as that space becomes smaller.

Relying on traditional materials for designing a live performance studio at classical format WQXR in New York City would have been difficult. The gross

space available for the studio would yield a useful acoustical volume of less than 5000 cubic feet.

To complicate matters, every weekday afternoon a live show is broadcast which includes an informal mix of chamber music and roundtable discussions with the musicians themselves.

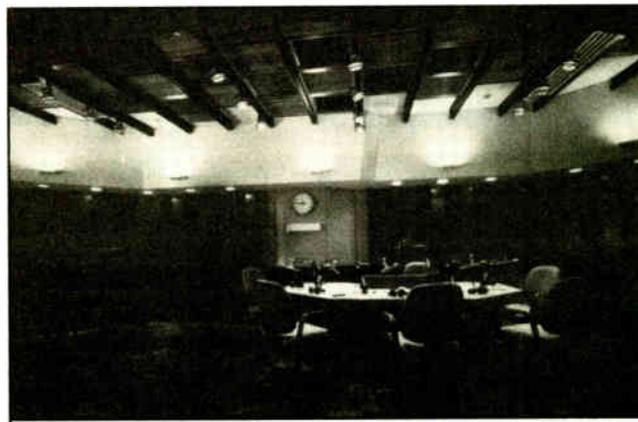
Combining talk and music functions in this manner leaves no available time to make adjustments between the music and speech portions of the program.

The properties of absorption, reflection and diffusion make up the acoustician's entire palette. Tuning a given room for a specific purpose is a matter of selecting the appropriate materials to keep these properties in proper proportion relative to the listener or the microphone.

But just as capacitors and inductors can each exhibit the characteristics of the other as a function of frequency, so can acoustical absorbers and reflectors. Traditionally, using these two classes of materials, reverberation time could be tailored by balancing the proportion of absorptive to reflective materials, relative to the incident angle and frequency of any sound to be controlled.

In order to maintain that balance throughout a room, the reflective

materials were usually contoured to disperse the sound they reflected over a large area. This is the property of diffusion.



RPG Diffusors are an integral part of WQXR's studio acoustic ceiling treatment.

However, in small rooms such as the WQXR studio, no practical diffusion was available until the advent of the RPG Diffusor.

Ceiling-mounted Diffusors

The RPG Diffusor lends WQXR's studio its most obvious acoustic characteristic. Mounted in the ceiling, a field of over 100 square feet of modified QRD 1911s opposes a specularly reflective wood parquet floor.

The result is that sound originating in any location in the room is distributed with clarity and intelligibility throughout the entire studio, without significantly increasing the sound's reverberation decay time.

Such characteristics permit intimate miking of musical ensembles with a distant pair of coincident stereophonic microphones. The placement of the microphones is not critical since the sound distribution in the room is so even.

Once seated at the interview table, up to five guests and one host can be individually miked, with no disturbing room artifacts, thanks to the short reverberation decay the RPG Diffusors help maintain.

To understand how the RPG Diffusor differs from a reflector,

consider your bathroom mirror as a simple reflector and a white painted wall as a diffuser. If you hold a lamp in front of the mirror, its reflection will be harsh and blinding. This is known as a specular reflection.

Slap echo twang

Place two specular reflectors opposite each other and like barber shop mirrors they will support numerous reflections of each other, an analogy of the "twang" you hear when you clap your hands between two brick buildings. Known as slap echo, this makes listening uncomfortable and miking impossible.

Holding that same lamp in front of a

(continued on page 35)

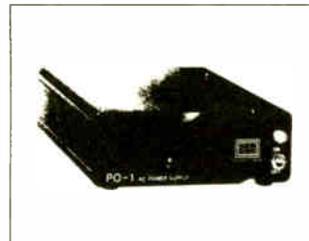


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Also, Technology Updates from Dolby and Benchmark Media Systems, and a Reference Guide to Studio Furniture.

MLW-1 Switches WSYR Sources

by Conrad Trautmann, CE
WSYR

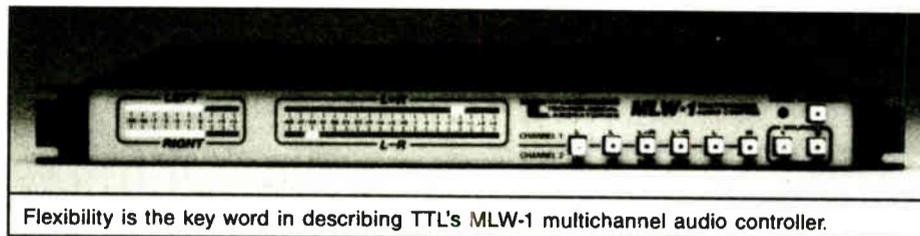
Syracuse NY Here's the situation: you have an aural STL feeding your AM transmitter and a backup phone line in place in case the STL fails. How do you switch from the STL to the phone line if it does fail?

You could hook a relay up to the squelch contacts on the STL receiver. That works if the receiver loses signal. But if the RF is still there without audio, then the squelch relay won't switch. You could hook a relay up to the remote control, but that means having an operator switch it manually . . . need I say more?

At WSYR and Y94 we found the solution to this problem. It is the MLW-1, manufactured by Titus Technological Laboratories (TTL). The MLW-1 is a multichannel audio controller capable of doing a variety of switching with any of three sources.

In the above scenario, we feed the STL demodulated audio into Source One and the phone line audio into Source Two. The MLW-1 will watch Source One; if it were to disappear, the unit would automatically switch to Source Two.

No worry about RF versus the audio section on an STL. When the STL comes back, the MLW-1 will switch back im-



Flexibility is the key word in describing TTL's MLW-1 multichannel audio controller.

mediately. An alarm on the front panel will notify you if the MLW-1 has done its job.

Looking ahead

Sounds good so far, but what if you have an operator who walked out of the studio and let the cart run out—will the unit switch? In that case, a nice feature of the MLW-1 is the look ahead mode.

USER REPORT

If the Source One input is dead it will check first to see if there is audio at Source Two before it switches. In our application, where we duplicate the audio on the STL and the phone line, having a cart run out would not cause the unit to switch.

For a stereo radio station or a stereo TV

station the MLW-1 can also switch sources upon detection of a channel loss. A dub comes in from the mono AM station across town and is only recorded on the left channel. An operator dubs this onto a cart, with no right channel and it makes it into the air studio.

The MLW-1 can do a few things here. It can duplicate the left channel into the right channel (also the right into the left, if that occurs). Or it can switch to either Source Two or Source Three. This comes in handy for a TV or AM station that has recently made the switch to stereo and is still running old commercials with left only.

On the air with MLW-1

We purchased the MLW-1 just before we moved our studios across town in May. The first use of the unit was to actually put us on the air from the new studios. We had the STL from the new studios wired to Source One and the phone line from the old studios wired to Source Two.

In the automatic mode, the MLW-1 had no Source One (since the new studios were not on yet) and automatically brought up Source Two. When we were ready to switch, all we did was turn on the STL transmitter and run some audio from the new air studio and the MLW-1 instantly switched us over and we were on the air.

The MLW-1 has a selectable source switch time, anywhere from 15 seconds to four minutes. The channel fill time can be anywhere from immediate to 75 seconds. An individual source can be programmed to do channel fill or switch to another source.

Another application, especially for radio, includes running a main and auxiliary audio chain. The main chain would feed Source One; the auxiliary chain, Source Two. You can leave the MLW-1 in the automatic mode and make sure your audio chain is protected, or you can manually switch from main to auxiliary, for an A to B comparison.

More good news

The MLW-1 metering is very complete. You can monitor the source you have up in discrete left and right, L+R and L-R all at once on the front panel. All of this is provided by bar graph displays.

If your transmitter site is far away, don't fret—the MLW-1 is fully remote-controllable.

The service that comes with purchasing from TTL is excellent. Problems or questions are handled immediately on the phone and if you have a problem with a unit, TTL will turn it around usually in one or two days.

The multitude of features available in the MLW-1 make it so flexible, it's hard not to see an application for it somewhere in your station.

Editor's note: For more information on the MLW-1, contact Larry Titus at TTL: 203-633-5472, or circle Reader Service 48.

Analog Still Studio Mainstay

by Alex Zavistovich

Falls Church VA The catchword for audio over the past few years has been "digital." The proliferation of digital electronics is undeniable, but lately radio stations seem to be implementing the technology more slowly than initial reactions might have indicated.

In many cases, it boils down to a matter of budget—digital products can be expensive, and in these days of bottom-line oriented operations, the extra cost can be the deciding factor in whether a station chooses analog or digital.

"That's part of the reason so many manufacturers came out with cart machines at the NAB," said Conover, whose company introduced the RS-2000 cart machine this year. "Whereas three years ago people may have said the analog cart machine is dead, all this confusion, price and problems with digital have made some manufacturers and many radio stations take a hard look at the 'anti-quoted' technology. The same goes for

digital consoles and the like."

Kevin Tam, broadcast technology manager at Dolby Laboratories, agreed that many stations are adopting a "wait and see" attitude toward digital technology.

Like Conover, Tam also pointed to the appearance of new cart machines as evidence of analog's continued place in the industry. "In the overall studio market, it would appear that analog is still very

(continued on page 32)

INDUSTRY ROUNDUP

But some observers also point to the somewhat spotty early track record of some digital products, as well as the improved audio quality of analog equipment. These factors have also influenced stations' willingness to put digital to work in the studio.

Gerrett Conover, broadcast sales rep for Radio Systems, noted that "a lot of radio stations are treading lightly in the digital realm." Lessons learned from early problems with reliability of consumer CDs and the prohibitive costs of good pro machines have made many stations wary of new digital products, he said.

"There's been a lot of confusion in the pro and consumer realms as to what digital is going to be tomorrow, or five years from now. You have so much technology—workstations, DAT decks, recordable CDs—so many choices, so much conflicting information. Stations are slowing down (digital) implementation.

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Circle 76 On Reader Service Card

ITC Switches VOA Delano Audio

by Perry Gene Pitts, Maint. Mgr.
VOA

Delano CA In early 1989, the VOA Delano Relay Station installed an ITC audio routing switcher to handle six program audio feeds for Delano, delivered via satellite from our studios in Washington, DC.

In addition to the primary duty of routing the correct program feed to one or more transmitters for transmission, the ITC switcher also routes CD players used for local sign-on and sign-off and other announcements. Backup telephone patch audio is also brought through the switcher for use in the event of a satellite failure.

Driven by PC

One shortcoming with the ITC switcher for our application is its limited number of programmable events. With six program lines feeding twelve transmitter inputs, the number of daily scheduled switching events significantly exceeds the memory capacity of the switcher.

This problem was solved by driving the switcher from a PC type computer using in-house software written in Turbo Basic. The switcher has an RS-232 port for this purpose.

The software provides a graphic display of the status of audio routing and allows both automatic and manual oper-

ation. An entire seasonal daily schedule is stored on files in the PC. It provides virtually hands-off switching of the audio for the entire relay station, including monitoring.

USER REPORT

An optional feature available with the ITC switcher is the machine control unit. This device provides a choice of 16 relay contacts or opto-isolated open collector outputs. Each output can be programmed for either momentary or latched closures.

Installation is made over the RS-485 remote controller bus. The machine controller can be configured to follow input selection to provide a contact closure whenever that input is connected to any of the outputs.

We use the machine control unit to start CD players for various station announcement inserts and fill music. A reel-to-reel tape and cassette machines are also controlled by this unit.

Another option is a desktop remote control unit that can be programmed to control up to four output channels on the ITC switcher.

We use these units in various locations throughout the transmitter plant to switch audio to monitor speakers. The

selected audio is routed from the ITC to voltage controlled attenuators through Crown D-75 monitor amplifiers to speakers near the desk control units.

Control wiring for the desk control units is through the switcher's balanced 2-wire RS-485 bus. The ITC switcher provides a serial printer port and a printer. The printer functions as a dumb terminal during switcher configuration and is available to print out each switching event on a real-time basis.

There is provision for connecting a parallel BCD encoded clock into the ITC switcher. The master clock at Delano is an EROS satellite receiver locked to NIST time. This time is fed into the switcher to guarantee the switcher is locked to station time.

Power supplies

The ITC switcher is supplied with dual power supplies and has a one farad capacitor across its RAM DC supply. According to ITC, it will power the RAM for up to two weeks without AC power.

There is also a configuration backup RAM module that consists of a self con-

tained, plug-in memory block (Dallas Chip) with its own battery backup. In the event of power failure or other catastrophe, the system configuration may be reloaded from this plug-in memory block.

Our only significant complaint with the switcher is related to the RS-485 remote bus. A momentary short or glitch on the bus line will totally lock up the switcher.

The only recovery from this locked-up condition is a cold reboot. This requires both power supplies to be switched off and the RAM supply voltage drained (with a clip lead) before power is switched back on.

Another inconvenience is the liquid crystal display. It is difficult to see without being in the proper position. A better readout screen on the control unit would help.

Despite these minor points, since the initial installation and shakedown of the ITC switcher at the Delano Relay Station, the VOA has purchased and installed the ITC audio switcher at other installations in the US, Germany and Liberia.

Editor's note: For more information on the ITC audio routing switcher, contact Bruce Helling at ITC: 309-828-1381; FAX: 309-828-1386, or circle Reader Service 115.

Studios Wary of Digital

(continued from page 31)

much the mainstay of broadcasting and audio production in general," he said.

But it's more than just a matter of cost—there's also the question of "utility," Tam noted. "There seems to be a price to be paid for going digital—a loss of convenience because of user interfaces which may not yet have been perfected. These interfaces have a touch and feel quite different from, say, shoving a cart into a machine."

Still, the industry is moving forward in the development of more and better digital devices. Larry Titus, president of Titus Technological Laboratories estimates that in the next "six months to a year you'll see a DSP for studio audio that'll be the end-all. Compression, expansion, equalization—anything that exists now, it will be able to duplicate." Initially, however, Titus acknowledged that "cost will be pretty high," making the equipment prohibitive for many budgets.

Conover commented that it would be very difficult to sell a digital signal processor for studio use, "because the early stuff will be so expensive and probably have too many glitches for studios. That's not to say anything bad about digital; that's just the way it is with new formats."

Titus also added that advances in technology would not sound the death knell

for analog gear. "Analog equipment will be with us forever—we live in an analog world. It's still much easier to do things in the analog domain."

"If I sound a little tinny over the phone, I can throw a two-cent cap across the phone line. To do the same thing with a digital processor would take 600 instructions and quite a bit of hardware to accomplish."

Analog has even made bold progress in sound quality. As Titus noted, "The quality of analog is already comparable to digital—in some ways, it's better. With analog you don't have to worry about quantization noise, you haven't contributed to the noise floor."

Conover added that in the case of tape recording, "You can give a big pat on the back to Dolby Labs for its Dolby S and Dolby SR. In multitrack machines, it's cheaper to retrofit your analog machines with Dolby S than to buy a digital machine." He also believes Dolby's specs "exceed the signal to noise of most digital multitrack machines."

While studio use of digital technology may be slow on the uptake, its application in transmission is picking up speed and other digital sources are always on the horizon. As Conover cautioned stations, "Watch out for digital satellite direct broadcast, because it's coming."

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World Radio History



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Circle 44 On Reader Service Card

World Radio History

WWRX Bowled Over by DA-16

by Anthony Kord, CE
WWRX

Westerly RI A salesman at Radio Systems told me that someone once dropped a bowling ball on a Radio Systems DA-16 distribution amplifier and it still worked.

USER REPORT

I didn't have the nerve to ask him what a bowling ball was doing in a radio station, or why a distribution amplifier was in a bowling alley. However, being an avid bowler, the choice of distribution amplifier was obvious when WWRX decided to upgrade its facilities.

A distribution amplifier allows the connection of a satellite receiver output, for example, to several different tape decks, consoles and other inputs, without fear of any interaction between these various devices. Should the input to one studio

short out, other studios continue to receive the program with no degradation.

The Radio Systems DA-16 performs this job handsomely with its two independent 1x8 amplifier sections. Eight individual outputs are provided for each input signal.

This eight-output capacity was one of the most compelling reasons for choosing the DA-16. Most other DAs examined in the same price range provide only six outputs per channel. Another plus is the individual gain controls for each output, which make level adjustments for each input device a breeze.

Just one chip

Circuit design centers around the well-respected NE5534N op amp. In fact, because that's the only chip in the unit,

keeping spare parts on hand is rather simplified. If a spare isn't on the shelf when a problem strikes, the DA-16's



The DA-16, from Radio Systems, is WWRX's low cost solution for delivering CD quality audio.

abundance of outputs almost guarantees you'll have an unused channel from which to borrow a chip until a replacement is available.

THD less than 0.01% and a -90dB noise floor means the pristine audio entering the DA-16 emerges just as pretty.

Two NE5534Ns form an active balanced output circuit for each channel. Just in case you're new to active balanced wiring, the DA-16's manual provides a very informative primer on the subject.

Physical construction is rugged and compact, taking up only one rack space and six inches of rack depth. Front panel layout is neat and logical: one power LED and a level control for each channel.

More good news is found under the top cover. All ICs are socketed, making replacement a snap. Should any other component fail, four screws put the entire circuit board in your hand. Rear panel connections are provided by terminal strips.

In fact, the only criticism I have about the DA-16 involves the rear panel: No suitable method exists to dress incoming wiring. Several DAs and hundreds of wires later will make the back of your racks look like a exuberant pasta maker. One strategically placed sheet metal screw with cable clamp on the rear of my units took care of wire-dressing problems.

Audio for everyone

WWRX's eight DA-16s have flawlessly delivered CD quality audio to our studios for almost a year. Radio Systems delivers a low cost, high performance distribution amplifier.

I was most anxious to quantitatively measure the durability of my units on bowling night; however, a dilemma soon presented itself: Should a candle-pin or ten pin bowling ball be chosen to plummet onto the unsuspecting chassis? Unfortunately, the manual avoids mention of the subject entirely. I would suggest checking with Radio Systems before attempting DA-16 bowling ball stress analysis.

For additional information on the DA-16 distribution amp, contact Paul McLane or Gerrett Conover at Radio Systems: 1-800-523-2133, ext. 110; FAX: 609-467-3044, or circle Reader Service 4.

RPG Works for WQXR

(continued from page 30)

white painted wall will illuminate the entire room, just as an acoustical diffuser disperses sound.

The RPG Diffusor products work on a principle similar to diffraction gratings in the field of optics. The acoustical "grating" is actually composed of a series of wells separated by thin dividers.

For WQXR, NCC chose the RPG Diffusor with the highest number of wells per unit length, the model with the highest frequency at which diffusion outranks specular reflection.

The RPG Diffusor disperses sound at multiple angles to the incident sound source in one plane, while exhibiting a specular reflection of the sound source at 90° to that plane.

The RPG Diffusor also has the advantage of diffusing any incident source over a full 180° within its diffusing plane. In order to provide dispersion in two planes and to diminish the chance of

supporting any slap echoes from the specularly reflective floor, the WQXR diffusers were modified to form a checkerboard pattern in the ceiling.

Enthusiastic appreciation

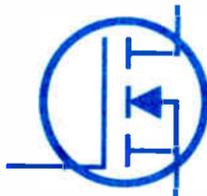
The acoustic quality of the new WQXR live performance studio is appreciated enthusiastically by the musicians who have played there, as well as the WQXR engineers and on-air talent.

As an essential ingredient to the studio's success, the RPG Diffusor remains the only field-proven commercial product to provide efficient acoustical diffusion for the broadcast and recording industries, wherever uniform sound dispersion is desired within a limited space.

Editor's note: For additional information on RPG Diffusors, contact Peter D'Antonio at RPG Diffusor Systems: 301-249-5647; FAX: 301-249-3912, or circle Reader Service 23.

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Dolby AC-2 Reduces Bit Rate

by Kevinn Tam, Bdcst Tech Mgr.
Dolby Laboratories Inc.

San Francisco CA Dolby AC-2, a new digital coding process which permits transmitting and storing broadcast-quality audio at greatly reduced bit rates, is featured in Dolby Laboratories' new Model DP501 encoder and DP502 decoder.

These new two-channel units, available in October, will provide a frequency response of 20 Hz to 15 kHz ± 0.2 dB, distortion less than 0.4% and a dynamic range greater than 90 dB at only 128 kbits/sec per channel (one-sixth that of 48 k samples/sec 16 bit PCM). Applications include satellite subcarrier, band-

Lowering bit rates to save transmission bandwidth or storage space results in increased quantization noise. Dealing with

TECHNOLOGY UPDATE

that noise effectively is the key to a high-quality low bit-rate system, and depends as in analog noise reduction on a thorough understanding of auditory masking.

The general idea is to apply bit-rate reduction to segments of the audible bandwidth so narrow that the signals being coded at the reduced rate themselves mask the quantization noise. Our investigations of human hearing characteristics confirm that the audio spectrum must be divided into no fewer than 25 non-uniform segments, or "critical bands," to ensure satisfactory masking on musical program material of wide frequency and dynamic range (utilizing fewer bands has proved adequate for speech-only systems).

However, creating 25 non-uniform frequency bands can be computationally very intensive. The full capabilities of several DSP chips are required just to create the necessary filter bands. Thus, we chose to use Fast Fourier Transform, a frequency-division technique that results in even smaller bands than the narrowest critical band, while using only a small part of a single DSP chip's processing capability. It is this approach which puts the Dolby AC-2 process into the general class of bit-rate reduction techniques known as adaptive transform coding.

This form of coding, for all its com-

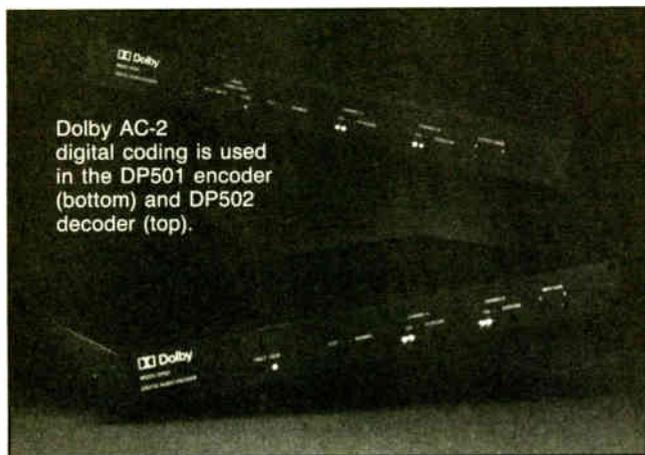
putational efficiency, brings with it obstacles of its own. The development of solutions for these obstacles has led to new, proprietary techniques that differentiate Dolby AC-2 from all other adaptive transform schemes. Its benefits include frequency selectivity consistent with that of the human ear itself and inaudible noise modulation. Furthermore, the Dolby AC-2 process is easily adaptable to other applications. For example, a simple reduction of audio bandwidth results in further bit-rate reduction while preserving the original sampling rate of 48 k samples/second.

While combining the new Dolby DP501 encoder with the DP502 decoder will prove economical in many professional

applications, Dolby Laboratories is also making the Dolby AC-2 process available under license to build OEM decoders for use in conjunction with the DP501.

Manufacturing decoders under license generally becomes cost-effective for point-to-multipoint transmission systems requiring ten or more decoders for each encoder. There has been considerable interest in Dolby AC-2 and its licensing from the communications equipment industry. The first such license was recently taken out by Wegener Communications of Duluth, GA, a leading manufacturer of satellite and cable communications systems.

Editor's note: For further information on the Model DP501/502 encoders and decoders, licensed Dolby AC-2 decoders, and the Dolby AC-2 process itself, contact Kevinn Tam at Dolby Laboratories Inc.: 415-559-0200; FAX: 415-863-1373, or circle Reader Service 35.



Dolby AC-2 digital coding is used in the DP501 encoder (bottom) and DP502 decoder (top).

edge and SCPC schemes as well as terrestrial and microwave telecommunication links (including STLs).

Unlike other digital audio compression schemes, Dolby AC-2's effectiveness is not limited to or affected by particular kinds of program material. All high-quality music and speech signals are encoded and decoded with sound quality subjectively equivalent to conventional 16-bit PCM. This high performance is the result of a newly-developed (and proprietary) variation of a process called adaptive transform coding.

KODJ On Fast Trac

by Jim Garrett, CE
KODJ-FM

Los Angeles CA A few months ago, KODJ, an all-oldies FM station in LA, made the decision to re-cart most of its music library. Existing titles would be re-dubbed from the best sources we could find and many new titles would be added.

USER REPORT

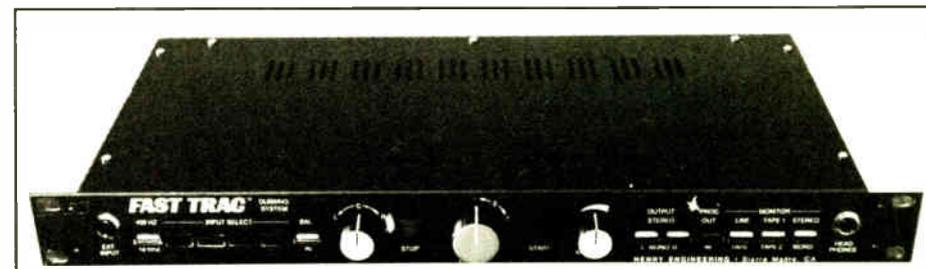
The existing production studios couldn't be used; they were busy enough and this project would take several months. The solution was a dedicated

The unit's record output is connected to an ITC 99B cart recorder, and the monitoring outputs feed a Crown amplifier, which drives a pair of Tannoy near-field monitor speakers. The Fast Trac's "scope" output is connected to an X-Y audio monitor scope to check for phase error.

A snap to use

The most unique feature of the Fast Trac is its automatic machine control system, which is what makes dubbing carts a snap.

I first select one of the three source machines with a pushbutton. While auditioning the tune, I set the recording level by adjusting the "Line Gain" knob. I then cue the source, put a cart in the recorder and hit the "Start" button on



KODJ re-carted its music library with the Fast Trac from Henry Engineering.

dubbing studio using the Fast Trac dubbing system from Henry Engineering.

The Fast Trac has inputs for three sources and I use all three: one for a Technics turntable, one for an Otari reel-to-reel deck and the third for a Studer CD player. There are internal gain adjustments for each source, so a -10 dBv output from a turntable preamp can be made to match the level of a +4 dBm CD player.

the Fast Trac.

If I'm dubbing a record the turntable starts first—with the audio muted. A bit later the cart recorder starts. Just as modulation reaches the stylus, the audio is smoothly un-muted and recording begins. If I am dubbing a CD, the cart machine will start just slightly before the CD player. This prevents the intro from being

(continued on page 41)

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Orban Riding Gain for WILL

by R.E. West, CE
WILL-AM/FM

Urbana IL In reconfiguring the WILL master control plant, we needed a system that would provide a uniformly loud, well-controlled audio signal to our AM transmitter from any of five studios.

USER REPORT

These studios are operated by staff with widely varying gain-riding skills. Couple this with a wide range of inputs, from live voice to poor-quality long distance phone calls on call-in shows, and the need for a high quality AGC (automatic gain control) unit was obvious.

The search was short. We already use an Orban 9100A1 (with the NRSC-1 option) as the modulation controller at the AM transmitter, and the 8100 unit at our FM plant. Both units have performed flawlessly since installation so it was natural to look to Orban.

Orban's provides answer

As it happened, the company had just brought out its Model 464A gated leveller/compressor/high-frequency limiter/peak clipper. After hearing one in operation at the NAB and studying the manual, we knew this dynamite little

unit (only 1 3/4" of rack space) was the answer to our needs.

The comprehensive Orban manual allowed us to set up the Co-Operator in minutes. All operating controls, with the exception of two jumpers (clipping and output preemphasis) are on the front panel, with left channel controls on top and right channel controls on the bottom row.

Hidden behind an easily removable cover on the left side are the limiter preemphasis, output meter calibration and output level controls. Next to the right are the gain reduction bar graph meters with a total range of 25 dB, and the peak output level bargraphs with segments indicating from -20 to +3. Between the two meters are LEDs that flash when high-frequency limiting is taking place.

To the right of the meters are controls that set input level (adjusted to get the amount of gain reduction desired), the

frequency limiting (enables or disables the high frequency limiting function; also the clipping function if the internal jumper is set).

... we're very pleased with the transparency and consistency of the audio through the "Co-Operator."

Other operating functions are compression (enables or disables the compression function, which provides better fast transient overshoot protection than the leveling function can) and high

which hardwire the inputs and outputs when in "Bypass." Next are the power switch, on top, and—on the bottom right—a "Stereo/Dual" mode switch that couples the left and right channel gain control functions when in stereo.

On the back panel are screw terminals and 1/4" phone plug connections for input and output, as well as cutouts for optional XLR connectors. The phone plug connectors, while providing quick connections for the recording and sound reinforcement industries, just don't provide the reliability broadcasters need.

Using the 464 at WILL

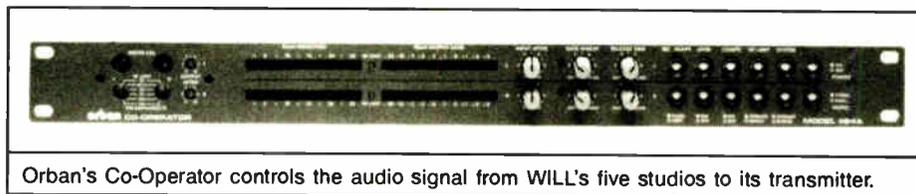
While relatively slow AGC is the most important feature we need at WILL, we also use light compression and the high frequency limiting feature (preemphasized at 75 μsec, the same as NRSC-1). These features allow the limiter at the transmitter to work a little less strenuously.

We adjust the input attenuation control to give us 10-12 dB of leveling action, which provides plenty of range for all studios and kinds of audio.

We don't use the clip function at the studio, preferring to let the transmitter unit clip according to the modulation requirements of the transmitter being driven (a Gates Five as the main unit and an RCA BTA-5U backup).

All in all, we're very pleased with the transparency and consistency of the audio through the "Co-Operator."

Editor's note: For more information on the Orban 464A, contact Dave Roudebush at Orban: 415-351-3500; FAX: 415-957-1070, or circle Reader Service 37.

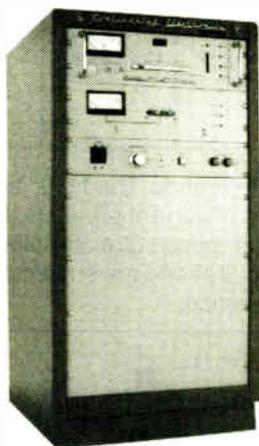


Orban's Co-Operator controls the audio signal from WILL's five studios to its transmitter.

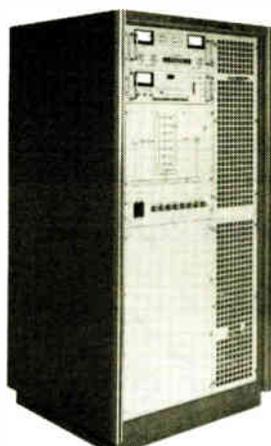
gate threshold (the input level below which gain change freezes) and release time (these speed or slow the program controlled release time).

Next come four pushbuttons per channel, which select the operating func-

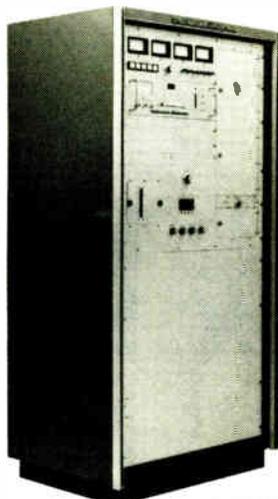
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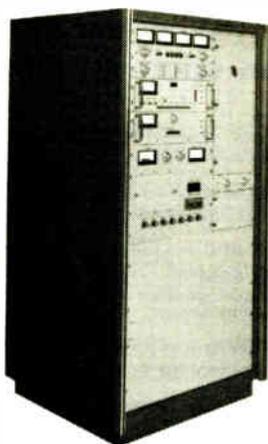
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2.5 kW



5 kW

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Reference Guide* : Studio Furniture

Studio furniture is available through a variety of sources. Contact manufacturers for distributor information.

Company And Contact	Reader Service #	Lines	Price Range	Materials	Pre-fab, Custom	Pre-wired	Features	How shipped	Delivery Time
Arrakis Systems Inc. Rod Graham 303-224-2248 FAX: 303-493-1076	24	Modulux supreme, Modulux, Modulux II, Modulink®	\$1500-\$15,000	Polyboard, hardwood plywood, Wilsonart plastic, oak	Both	Yes	Modular, flexible, high quality, affordable	UPS, air freight, van lines	3-30 days
Audio Broadcast Group Dave Howland 800-999-9281 FAX: 616-452-1652	13	Pro Studio, Executive, Custom, Video 1000	\$2200 and up	High density composition board, 16th grade formica, solid oak trim	Standard stock systems, and built to customer specs	Standard AC wiring inc. pre-wires, complete turnkey install. avail.	AC wiring/cable runs, construction exceeds AWI standards, leveling feet, drilled/tapped rack rails, frameless cabinet design, choice of colors	Company truck, blanket rap, padded van	10-45 days
The Express Group Bob Burns 619-298-2834 FAX: 619-298-4143	68	Series 1000, 2000, 3000, 4000, 5000, 6000 & custom	\$2915 and up	Void-free birch plywood, poplar wood supports, high grade laminate, steel rack rails, solid hand rubbed oak or walnut	Both	Yes, by Express Group distributors	High impact corner protection, built-in wire passes, factory-intalated rack rails, passive ventilation, removable access panels, cart & CD storage capabilities, stand-up & custom colors available	Truck—US, Canada, Mexico; Air freight—Overseas	1-4 weeks
LPB, Inc. John P. Tiedeck 215-644-1123 FAX: 215-644-8651	55	Standard and Premium	\$2000 and up	3/4" 7 ply furniture grade plywood with formica laminate	Both	No	Solid oak trim, choice of colors, built-in rack space, stand-up designs	Motor freight	4 weeks
Murphy Studio Furniture Dennis Murphy 619-698-4658 FAX: 619-698-1268	95	Elite, Premier, Classic & Dub/Edit Station, custom designs	\$1000-\$15,000	Solid oak, birch plywood, poplar, high density particle board, steel, plexiglass	Both	Option exists	Superior ergonomic design, modular construction, flexibility of layout, bumper base, sloped fronts, ventilating reveal	Blanket wrapped moving van except for Classic, which is shipped by freight	2-8 weeks
Pacific Recorders & Engineering Corp. Anders Madsen 619-438-3911 FAX: 619-438-9277	50	Custom and Primeline	\$3000 and up	All wood and laminate, hardwood trim	Both	Yes, if desired	Custom: unique prototypes, tailored for fit & function. Primeline: Modular design, flat one-piece working surface, no laminate-to laminate corners (chair proof)	UPS, air freight, padded van; assembled into modules	Custom: as quoted individually, Primeline: 2-4 weeks
Ruslang Corporation Frank Ruskey, Jr. 203-384-1266	63	Complete line of studio furniture & cart-CD-record-tape storage	\$27-\$1700	High pressure laminate	Both	No	High quality	Truck & UPS	1-6 weeks
Wheatstone Corporation Ray Esparolini 315-455-7740 FAX: 315-454-8104	25	Wheatstone Furniture	\$5000-\$15,000	Horizontal grade laminates, all oak trim, steel rack rails	Both	Yes	1 1/2" thick counters & partitions throughout, solid oak trim, easy access punch block housing, copious rack space, fast on-site assembly	Moving van	4-10 weeks

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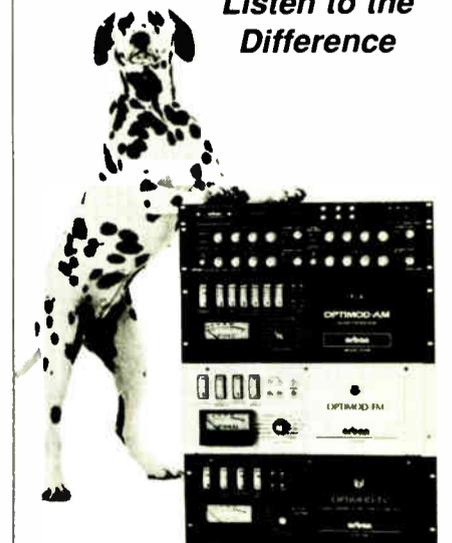
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DEC 4 1989

Modulation Sciences Inc.
115 Myrtle Avenue
Brooklyn, NY 11201

Attention: Mr. Eric Small

Dear Mr. Small:

I was recently contacted by your attorney, Mr. Harry Cole, concerning Modulation Sciences' "Modminder" FM broadcasting modulation monitor. I understand your company has received several inquiries about the validity of FM modulation measurements made with this instrument.

Commission rules currently contain no requirements for FM modulation monitors. Technical specifications and other performance requirements did exist until July 1983 when the Commission, by Report and Order in MM Docket 81-698, deleted them as unnecessary. While the requirements for modulation monitors were deleted, the Commission retained the standards governing FM modulation. See Section 73.1570 of the current Rules.

Mr. Cole stated that the Modminder is designed to satisfy the pre-1983 technical requirements for FM modulation monitors. If the equipment does indeed meet the pre-1983 technical requirements (see the enclosed copy of former Section 73.332), I expect it would produce valid readings of FM modulation. Equipment meeting the pre-1983 requirements is satisfactory for determining compliance with the current FM modulation requirements.

Please let me know if I may be of any further assistance.

Sincerely,

Thomas P. Stanley
Thomas P. Stanley
Chief Engineer

Enclosure

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Circle 33 On Reader Service Card

World Radio History

IFA: The Benchmark of Quality

by Allen H. Burdick, President
Benchmark Media Systems

North Syracuse NY Back in 1988, we at Benchmark were approached by an engineer from NBC Television in New York to build a recorder interface amplifier (i.e., Pro to IHF and back). He and his staff had looked at most of the available products and decided they did not meet NBC's performance requirements.

Additionally, he needed functions that were not yet commercially available. We sensed that the networks were not the only ones who needed the additional

functions coupled with very high performance, and so we set about to create the highest performance recorder interface we could.

Keeping power supply separate

To do this and keep hum levels at or below the residual noise floor of the NE5534 family, we decided to separate the power supply and its magnetic radiation (emitted even from toroidal transformers) from the active circuits.

At this point we also decided to use modem-style chassis for the envisioned amplifier series. We would house a common power supply (for up to four am-

plifiers) in one such chassis and the various amplifiers in their own separate units. This provided the desired use options for the customer.

TECHNOLOGY UPDATE

The units could be used either freestanding or rack mounted (with a simple aluminum extrusion). Rack mounting allows up to three chassis (power supply, amplifier or any combination) in a single RU assembly.

The IFA-I was the first product designed; it is a recorder interface with balanced input and output circuits that use the NE5534 and NE5532 devices. The balanced inputs have a 10 k input impedance and a fixed loss of 6 dB, giving it an input clip point of +27 dBu and a noise floor of -104 dBu, thus providing a dynamic range of over 131 dB.

highest measured performance in every test administered and was rated as the best overall unit on the market.

NBC needed a mixing interface as well, which we provided in the IFA-2: two balanced inputs and one balanced output with variable gain. Next in the series is the IFA-3, a stereo balanced output device, intended for use with CD players, tuners, etc.

The IFA-5 is a quad output unit, and the IFA-6 a dual balanced input, for use with power amplifiers. The IFA-7 is a stereo headphone amplifier, with balanced inputs and the IFA-8, a quad balanced input module, rounds out the current product line.

An IFA-8 quad input and IFA-5 quad output pair will fully interface a four-track recorder; two of each will interface an eight-track machine. Of the eight interface amplifiers, six have not existed commercially in the past and new modules are in the planning stage, including an ultra-high quality dual mic preamp.

New external power

Until recently the primary external power supply available for use with these amplifiers was the PS-11, a ±18



The PS-11 power supply is part of Benchmark Media Systems' IFA interface amplifiers.

The bandwidth is a very RF immune 320 kHz with no overshoot or ringing to a square wave input, and the 20 kHz THD is 0.0009%. The output section has variable gain from off to +26 dB and also provides a clip point of +27 dBu with an output impedance of 60. Noise, distortion and bandwidth performances are similar to the input stage.

Put to the test

Shortly after the introduction of the IFA-I, NPR's Raymond Jason requested a unit for evaluation. He tested every similar product that could be obtained; when finished he had thoroughly evaluated products from eight manufacturers, including Benchmark, Aphex, RTS, Valley International, ATI and Henry Engineering.

The results of that evaluation were published in three issues of NPR's *Engineering Update*, beginning in September 1988. Needless to say, we were delighted to find the IFA-I had the

volt at 300 mA supply. This supply has a four position RJ11 modular telephone style connector, for powering up to four amplifier systems.

We assumed most users would be using multiple amplifiers at a single location. However, we have found this is generally not the case, as we have continually received requests for an inexpensive single unit supply. The introduction of the new PS-1 wall mount supply, with a pro-net price of only \$30, answers this need.

The PS-1 provides a ±18 volt output at 100 mA that is fully regulated, very low noise and comes with an integral RJ11 jack. The IFA-1 recorder interface with the PS-1 power supply is priced at \$275.



Editor's note: For further information on the IFA line, contact Albert Beckary at Benchmark Media Systems: 315-452-0400; FAX: 315-452-1316, or circle Reader Service 116.

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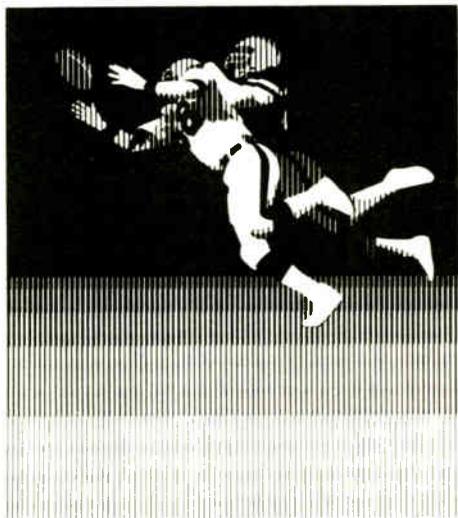
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Shure Automates WTMX Mics

by Scott Fenstermaker, Asst. CE
WTMX

Skokie IL Some things never change. Just minutes before the scheduled taping of one of several public affairs programs aired on WTMX, we were running around

USER REPORT

trying to figure out where all the talk studio microphones had gone.

As a station that produces much of its own PA material as well as other inter-

view programming, WTMX needed to find a better way of maintaining a basic interview studio without having microphones, mic stands and headphones disappear between taping sessions.

We tested several different systems before discovering the Shure AMS-4000 automatic microphone mixer. Used with a compressor/limiter to ride gain, it seems to be the answer to our prayers.

Dedicated mics

The AMS-4000 is a four-channel mixer (an eight-channel version is also available) which automatically gates each mic on and off as needed. It is important to note that the mics used with the AMS-

4000 are specially designed for use only with this system and are connected using supplied cable.

The AMS mics are available in either a "probe" type with a cardioid pattern or low-profile surface-mount style with a hemi-cardioid pattern. Again, both types of microphones can only be used with the Shure AMS system, but this fits our needs perfectly . . . these mics can't get up and walk into another studio between uses.

Using the AMS-4000 is simple. Set the input gain and master gain controls as you would with any microphone mixer, except that you don't need to keep unused mics turned off—the mixer does it for you.

When sufficient audio level is detected within the pickup zone of the mic, the mixer gates that mic on, leaving the unused mics off. This minimizes background conversation, air vent noise, paper shuffling, etc., from being picked up.

Straightforward layout

Layout of the controls on the AMS-4000 is straightforward. Individual channel input gain controls and a master gain control make up the front panel along with an aux input control to adjust gain of the 1/4" unbalanced aux input and output jacks located on both front and back panels.

The microphones plug into rear panel XLR jacks. Front panel LEDs indicate which microphones are gated on. Each channel module also provides an unbalanced direct output that can be internally jumpered to feed pre- or post-fader mic audio independent of the balanced Line/Mic program output.

For even more versatility, Shure provides logic control for each channel. From these rear panel barrier strip connections, it's possible to control the gating, muting, remote indications, etc., of each individual input channel.

Other rear panel controls include an

adjustable (.5 to 2 seconds) "time to off" delay to keep the mic gated on after audio is no longer present, as well as an adjustment (-8 dB to minus infinity) to determine how "off" you want the mics to be. Also available are audio patching jacks that allow the linking of up to 25 AMS-4000s, for a total of 200 microphone inputs.

All in all, the AMS-4000 is an extraordinary piece of equipment. It does exactly what Shure says it will do, and it has a very detailed user's manual that explains how and why. There is no question this mixer has improved the quality of our news and public affairs programming at WTMX.

■ ■ ■

Editor's note: For more information on the AMS-4000, contact John Phelan at Shure: 708-866-2523; FAX: 708-866-2279, or circle Reader Service 91.

Dubbing with Fast Trac

(continued from page 36)

"clipped," since most CD players will start more quickly than a cart machine.

I especially liked the ability to select different recording modes on the Fast Trac. I can record in stereo but I can also take just the left or right channel and feed it to both L and R outputs. This is useful when the source is "re-channeled stereo" and only one channel is usable. The L and R inputs can also be summed to mono.

Being able to switch among these recording modes is an absolute necessity when dealing with "oldies" material from numerous sources. A "Balance" control lets me fix those "off center" vocals and there's a "Process In/Out" button that inserts external devices (like an equalizer or filter) into the recording chain for quick A/B comparison.

Monitoring playback

I always monitor the actual cart playback when dubbing. The PB output of the cart recorder is connected to the tape monitor input of the Fast Trac. A button allows me to switch between "Line" and "Tape" to

instantly check recording quality.

A "Mono" button puts the monitor system in mono to check for phase error, without affecting the actual stereo recording. The X-Y scope displays the monitor signal and provides a visual indication of cart phase performance.

I've used the Fast Trac for about six months now, and it's done a fine job. The automatic start-timing makes the dubbing process a one-button operation and the carts are consistently tight. Having to re-dub a cart because the cue isn't quite right is a thing of the past. And it's great to be able to dub music carts without tying up a production studio.

What would I change about the unit? I'd put some kind of numerical scale around the "Line Gain" knob so I could easily return to a certain gain setting.

When you add up the quality, convenience and utility of this little unit, the Fast Trac dubbing system is hard to beat.

■ ■ ■

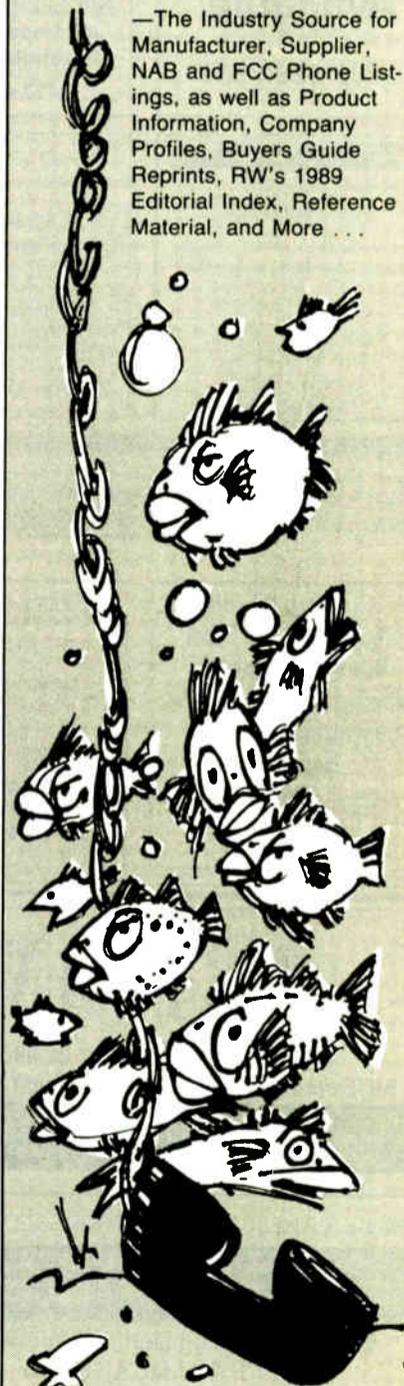
Editor's note: For more information on the Fast Trac, contact Hank Landsberg at Henry Engineering: 818-355-3656; FAX: 818-355-0077, or circle Reader Service 67.

Fishing For A Phone Number?

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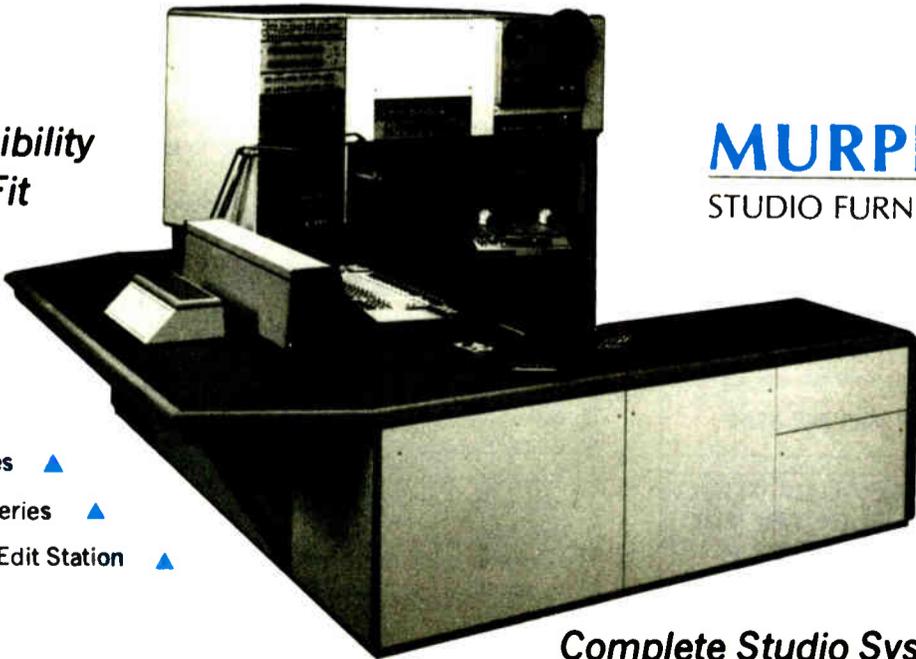
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Kenneth Casey
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Azonic Quiets Q-94

by Eric B. Shaffer, CE
WSSQ/WSDR

Sterling IL When the studios for WSSQ (Q-94) and sister station WSDR were first built the owners, Seith-Serafin Communications Inc., decided that 11' ceilings would give the building an airy, roomy appearance.

folks who supply Sonex foam. Azonic offers inexpensive, low frequency sound absorption. It comes in sheets textured in a distinctive pyramid pattern and is available in several colors. Installation was straightforward. The material was easy to work with, lightweight and easy to cut to size with just about any reasonably sharp blade or even scissors. In an afternoon, the job was done and I had to congratulate myself on a nice choice of color.

USER REPORT

It does have that "look." But the lofty ceilings also gave our studios a reverberance usually found only in the last four pews of the Cistine Chapel. Our GM, Anne-Louise Shaffer, found the "cathedral effect" useful for her station commentaries, but after that its usefulness dropped off.

One thing I hadn't expected was that after an afternoon of cutting and sizing, a fine dusting of blue coated the equipment, so I would recommend that everything be covered before installation.

Clearly, some kind of acoustical treatment was in order. It had to be cost effective, of course, but also should get the job done and, if possible, look good. After investigating the alternatives, I settled on Azonic foam. The material is being marketed by Alpha Audio's acoustics division, the same

I'm glad we chose Azonic. It met all our criteria: It was cost-effective, it looks great and as far as acoustics go, we now refer to the studio as "The Dead Zone." The jocks, the production people—everybody's happy.

With one exception—the GM misses the grander sound that her commentaries used to have.

Editor's note: For more information on Azonic acoustical foam, contact Terri Murphy at Alpha Audio: 804-358-3852; FAX: 804-358-9496, or circle Reader Service 85.

People International Tapetronics Corporation (ITC) recently announced the addition of Ray Updike to its sales staff. Updike joins ITC as eastern regional sales



manager, and will be responsible for distributor product sales coordination and marketing duties.

Company moves Modulation Sciences has moved from Brooklyn to Central New Jersey. The new address is: 12A World's Fair Drive, Somerset, NJ 08873. Modulation Sciences' new phone number is 201-302-3090. The new fax number is 201-302-0206. The toll free number, which remains unchanged, is 800-826-2603.

Extrema Systems International Corporation (XSI) has moved to larger headquarters in Reston, VA. The company address is: 10700 Parkridge Boulevard, Reston, VA 22091. The telephone numbers are 800-347-6007 and 703-648-3181. The XSI fax number is 703-648-3183.

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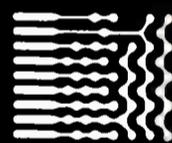
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