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Radio World®

Broadcast Equipment Exchange
see pages 25-30

January 1, 1988

Volume 12, Number 1

Rau New Head of NAB S&T

by David Hughes

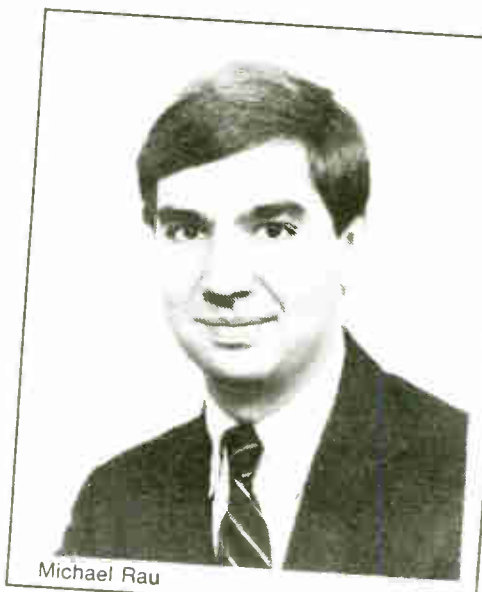
Washington DC ... NAB Director of Spectrum Engineering and Regulatory Affairs Michael Rau has been named VP and acting head of the association's Science and Technology (S&T) Department.

Meanwhile, former S&T Director Tom Keller will become the NAB's chief scientist, working out of the association's planned high-definition TV (HDTV) lab.

The 4 December announcement from NAB President Eddie Fritts took some by surprise. While changes were brewing in the S&T Department, few expected that Keller would become chief scientist of the HDTV lab instead of the head of the lab.

In September, Fritts indicated at an HDTV conference in Washington that Keller would become head of the lab. He also said that a replacement for him would have to be found as head of the S&T Department.

However, as late as the end of November, Keller indicated that he was still in line for the lab position, and that a decision had not been made on who would head the S&T Department.



Michael Rau

Tom Keller

"Outstanding scientist"

Following the 4 December 1987 announcement of the job changes, Fritts said: "Tom Keller is an outstanding scientist who will make a vital contribution to the development of HDTV."

At a 2 December press conference, NAB VP/Operations John Abel did not want to discuss the reason for Keller's job change.

On Rau, Fritts said his "experience and talents equip him superbly to manage the Science and Technology Department as Tom's successor."

Rau, who joined the NAB in 1981, has been active in AM improvement work, including the NRSC, and in the policy and technical aspects of TV spectrum allocations. He also owns WKLV-AM and WBBC-FM in Blackstone, VA. Earlier this year he was named director of Spectrum Engineering and Regulatory Affairs.

More new people

While Rau will head the S&T Department, a decision on who will manage the new HDTV lab—dubbed the Broadcast Technology Center—will come "later," according to an NAB official.

At press time, Fritts said the NAB was still "looking at outside space for the lab," which will be located within walking distance of the NAB's Washington DC headquarters.

Keller, who became the VP of the S&T

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Biby Antenna On Hold For Now

by Alex Zavistovich

Washington DC ... After months of delays in implementing its AM antiskywave antenna project, the NAB is getting ready to defer work on one of the antennas, in favor of time-sharing of a single site.

That arrangement was proposed following preliminary word that the NAB had placed "on hiatus" the AM monopole design of Richard Biby.

The hiatus originally came as an apparent surprise to Biby, head of the Arlington, VA-based Communications Engineering Services, who maintained he had not been told about plans to suspend the project.

The action was the latest in a series of complications in implementing the Biby design. Difficulties in obtaining a Loudoun County VA test site held the project in stasis for 19 months.

There were problems internal to the project, as well. Biby had maintained that the project—which had a two-year zoning grant for a test site—seemed to be rushed into an "irrationally short timetable."

Despite these and similar disagreements, the NAB is apparently still committed to the Biby antenna.

NAB VP/Science and Technology Mike Rau assured that the NAB "had faith" in Biby's design and underscored the association's intent to accommodate the inventor in a schedule for the project.

Intense pressure

However, in November, after a series of problems and delays, the NAB appeared to be uncertain of the status of the project.

Biby said that in mid-November he was contacted by Rau, who told him the AM antenna project was coming under "intense pressure" because of "lack of progress." There was talk of cancelling the project entirely, Biby added.

In response to the conversation, Biby on 4 December sent a letter to Rau at the NAB. In it, he said the antenna project would require "at least five years" of development.

Biby urged the NAB to consider his antenna to be "a long term development." He suggested that the project might ad-

(continued on page 12)

Capitol Deal In Progress

Hollywood CA ... An eleventh-hour agreement may salvage Capitol Magnetics products from a retrenchment by parent company Capitol Industries.

Capitol Industries, which also owns Capitol Records, announced in December that it would withdraw its Capital Magnetic Products Division from the magnetic base tape business, and close its Winchester, VA tape duplicating facility in 1988, in favor of a consolidated plant in Jacksonville, IL.

However, at press time, negotiations were ongoing with several parties to arrange a sale of the broadcast cartridge business, according to the company.

At least two groups were said to be interested in the broadcast cartridge business, which has supplied Audiopak carts to radio stations for many years.

A source confirmed that current negotiations were "well underway," al-

(continued on page 3)

REGULATORY NEWS

FCC's AM Deadline Extended

by David Hughes

Washington DC ... The FCC has extended the comment deadlines in its review of AM technical assignment criteria.

The action follows a request from the NAB to extend the comment deadlines on the "comprehensive review," which was unveiled last July.

The FCC is examining a wide range of issues including interference protection, technical assignment principles, ground and skywave propagation curves, improved receivers, as well as the concept of negotiated interference.

In response to the NAB, on 11 December the Commission reset the 17 December comment deadline and the 17 February reply comment deadline using a staggered schedule, according to FCC Policy and Rules Division Assistant Chief Wilson LaFollette.

> *NAB said it needed more time for two studies.*

Comments on sections II and III of the Notice of Inquiry, which deal with assignment criteria, emission limits and the examination of the National Radio Systems Committee (NRSC) pre/deemphasis curve, are due 1 February, with reply comments due 1 March, he said.

Comments on parts I and IV, which look at antenna issues and more subjective audio listening studies, are due 17 June, with reply comments due 17 August, La Follette added.

"We decided that we wanted to put the (separate) issues on a different track," he said.

In a 1 December request asking for an extension of the comment deadlines, the NAB said it needed more time for two studies being conducted.

"Recognizing the import of this proceeding and the effect it will have on the future of AM broadcasting, (the) NAB is dedicating substantial resources to analyses of the matters at issue," the association said.

"Also, the NRSC is continuing its own analysis of AM technical rules and its efforts to adopt additional industry positions on matters addressed in the notice," the NAB maintained.

The two technical studies include an analysis of the listening public's expectations of audio quality. The NAB said it would take "several months" to complete the test, which would "entail significant numbers of audio tests with public volunteers."

The NAB is also conducting an investigation into AM technical standards overall, including the relationship between allocations standards and receiver performance. The results of this and the other study must also be reviewed by the NRSC and the Radio Advisory Committee.

In asking for an extension, the NAB added that the NRSC will be receiving comments in March on the RF mask issue. "These comments will be useful in the development—by the NRSC and the NAB—of comments dealing with, among other things, spurious emissions."

The NAB had asked the FCC not to extend the comment deadline as much on the part of the docket dealing with the adoption of "the transmission portions of the NRSC standard for AM broadcasting."

In November, the NAB asked the Commission to adopt the AM preemphasis curve and the 10 kHz audio bandwidth characteristics embodied in the NRSC's recommended standard.

"Indeed," the NAB added, "the Commission's Notice acknowledges the NRSC standard and encourages such technical efforts."

"In our petition, (the) NAB strongly urged that the NRSC Standard issue be elevated to rulemaking status at the earliest practicable time. However, we recognize that the Commission may desire to elicit some initial public comment on the NAB petition prior to instituting a rulemaking proceeding on its proposals," the NAB said.

NAB VP/Science and Technology Mike Rau said he was satisified that the new deadlines would allow enough time for the completion of the NAB's studies.

The FCC docket is MM 87-267. Contact Wilson LaFollette at 202-632-5414.

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FCC Clips

Carroll Doctrine eliminated

At its 24 November meeting, the FCC abolished the Carroll Doctrine, and announced it would no longer consider the doctrine in broadcast licensing or allotment proceedings.

The Carroll Doctrine required the FCC to conduct hearings on allegations of economically "ruinous competition" from proposed broadcasting facilities.

These new facilities, the doctrine held, would compete for the same advertising revenues as existing stations, resulting in a net loss of service to the public.

However, in eliminating the doctrine, FCC Chairman Dennis Patrick commented, "If competition is fair, then the notion of 'ruinous competition' is an oxymoron." New facilities are more likely to find alternative advertising revenues than to compete for those of existing stations, he indicated.

Both Patrick and Commissioner Mimi Dawson noted the Carroll Doctrine had never been the basis for denying an application to a new station.

The Commission also noted that petitions invoking the doctrine in proceedings have resulted only in delays in new service initiation and costly legal proceedings.

FCC docket number is MM 87-68. For more information, contact Douglas Minster at the Mass Media Bureau, 202-632-7792.

Review Board member resigns

Jerold L. Jacobs, a senior member of the FCC's Review Board, announced his resignation in early December.

Jacobs was scheduled to move to the job of special counsel for the Washington DC law firm of Fly, Shuebruk, Gaguine, Boros and Braun.

Jacobs had been with the FCC since 1968 and spent 10 years in the Cable Television Bureau, rising to deputy bureau chief.

In 1978, he took on the role of chief of the Mass Media Bureau's former Broadcast Facilities Division, where he led a program to increase the speed of application processing and to reduce backlogs.

In November, 1980, he was appointed to the Review Board, the FCC's appellate panel for adjudicatory matters.

Contact the news media information office at 202-632-5050.

Broadcast station totals

As of 30 November, the Commission reported a total of 10,230 licensed AM and FM broadcasting stations.

Of this total, 4,900 were AM stations and 4,033 were commercial FM facilities. The remaining 1,297 broadcasters were non-commercial FMs.

Contact the FCC news media information office at 202-632-5050.

No Compromise on Class A's

by David Hughes

Washington DC ... A group of New Jersey broadcasters may continue to campaign for a Class A FM blanket power hike without the NAB's backing.

The NAB FM Transmission Subcommittee failed in December to reach a final compromise with the Class A forces on a blanket power hike for Class A FMers. At press time in mid-December, NAB officials said that a decision will be made in January as to the association's formal position on the proposal.

The New Jersey Class A FM Broadcasters Association, which last September submitted a proposal to the FCC for a blanket power hike to 6 kW at 100 m (or the equivalent), was hoping the NAB subcommittee would recommend that the NAB support its plan.

Class A's, which now operate with a 3 kW (or the equivalent) maximum power limit, claim that with rapid growth in many areas they need more than 3 kW to cover their entire markets.

FM Transmission Subcommittee Chairman John Marino, of NewCity Communications, said in mid-December that his group "cannot endorse a compromise with the New Jersey broadcasters to the degree they want."

Last October, the subcommittee was reportedly close to an agreement to support a blanket power hike for Class A FMers. However, even after a 17 November meeting, the group still had not decided on the plan.

There had been questions about whether the NAB would support the plan since its FM radio members also consist of Class B and Class C owners, some of whom fear increased congestion from the Class A blanket hike.

Marino stressed that while the FM subgroup supported the concept of a Class A hike, it did not want to increase interference to existing stations, especially Class Bs.

The NAB's VP/Science and Technology Mike Rau said the transmission subcommittee has submitted its report to the NAB board, which will determine at a 19 January meeting whether to file comments on the Class A plan.

While he would not discuss specifics, Rau confirmed that the subcommittee had developed a "compromise proposal" in a new mileage table for Class A's but that it was "somewhat different" in its protection levels for Class B's than the New Jersey plan.

Ken Keane, the Washington DC-based attorney representing the New Jersey Class A group, said the Class A petition was in the process of being modified and would be resubmitted to the Commission by mid-December. He said he did not want to discuss any changes until the filing was completed.

Bob McAllan, president of Asbury Park, NJ-based Press Broadcasting, one of the Class A owners behind the NJ petition, said, as of press time, the petition was scheduled to be refiled by about 18 December.

"We reran some tables" in response to previous talks with Mass Media Bureau Chief Alex Felker and deputy chief William Hassinger, he said.

Regardless of whether the NAB will formally support the petition, McAllan said that the New Jersey group will proceed with its request for rulemaking. He said the question remains open as to whether the NAB will decide to comment on the Class A petition at all.

For more information on the FM Transmission Subcommittee contact John Marino at 203-333-4800, or Mike Rau at the NAB, 202-429-5346. The Class A group contact is Ken Keane at 202-861-7800.

Agreement May Save Capitol Products

(continued from page 1)

though it appeared too early to tell how close interested parties were to a deal.

Fidelipac interested

One of the companies talking with Capitol is Fidelipac, which has been successfully producing high quality audio tape for many years.

"We were contacted by Capitol at about the time the company announced the closing of its facility, and have been in negotiations since then," confirmed Art Constantine, VP marketing for Fidelipac.

He added "we are hoping for an agreement whereby Fidelipac would purchase the rights and certain manufacturing assets to manufacture Audiopak cartridges and quarter-inch back lubricated tape."

Although he was optimistic about the ongoing discussions, Constantine stressed it was too early to predict their outcome at this time.

Continued availability

One of the benefits of a deal between Capitol and Fidelipac would be the continued availability of Audiopak carts.

Capitol confirmed that it would continue to produce its products in Winchester, and a source said the manufacturing was slated to continue at least through mid-February or March.

Constantine said that an agreement between Fidelipac and Capitol would allay stations' concerns about the availability of Audiopak products.

"Our intention would be to continue to make Audiopak products available in their original form," Constantine said, 'our plan would be no surprises, no changes, complete availability of the product.'

Fidelipac would also continue to manufacture its own cartridge products, in the interest of providing "a multiplicity of choices for radio stations, to give them the selection of outstanding products they've had in the past," Constantine maintained.

"Fierce overseas competition" from Asian and European tape companies had been cited by Capitol Industries when it announced the withdrawal. However, a source confirmed that the dollar losses were primarily in the cassette part of the business, and not in the tape loop and broadcast products.

Sue Satriano, a Capitol Industries spokesperson, said overseas companies have flooded the magnetic tape market with "excess manufacturing capacity."

To remain competitive, Capitol said it would have had to invest "extraordinarily high" amounts into continued research and development, which the company was apparently unwilling to do.

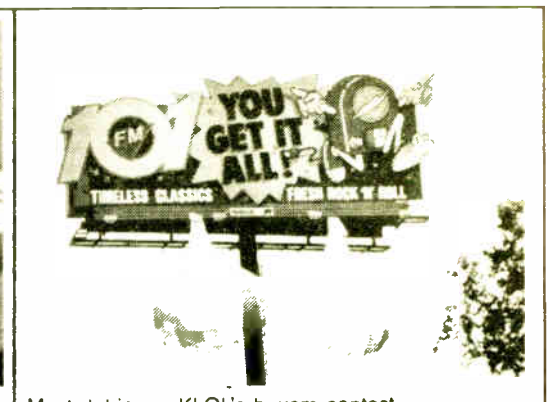
For additional information, contact Sue Satriano at 213-462-6252.

Dubious and Real Achievements

by Judith Gross


Dubious—Al Sikes releases NTIA report.


Real—Denon's CD cart player.



Most dubious—KLOL's buxom contest.

Falls Church VA ... With the start of a brand new year, it's time to present *Earwaves'* own **Dubious Achievement Awards** ... along with some that can be considered **Real Achievements**.

Most **dubious** of all has to be the **NTIA's efforts to "clarify" the AM stereo** situation. NTIA muddied the picture with not one, but two studies which all but contradicted each other.

Study number one straddled the fence by suggesting that multimode receivers were an answer to the standards controversy. Study number two admitted the fact that nobody is interested in making multimode, and recommended pilot tone protection for C-QUAM. Which left us right back where we started.

A close second is the continuous **scheduling and tabling** of the AM stereo issue from the **FCC's agenda**. The industry holds its breath for The Big Word, and then is told to "wait a little longer" on a question which has been dragging on for way too long.

Next on the dubious list is the **Voice of America's renovation** of 19 radio studios. VOA shunned qualified broadcast companies in favor of a general contractor with a string of government contracts under its belt.

That contractor hired an electrical subcontractor which had been previously charged with defrauding a local government which in turn hired another subcontractor to install studio equipment which had never actually built a broadcast radio studio.

Next on the list is the **FCC's new indecency policy**. Treading awfully close to the First Amendment, the Commission cited three stations for airing blue material which included the prepubescent humor of Infinity's Howard Stern, a song called "Makin' Bacon" and a graphic play about homosexuality called "Jerker" broadcast on a Pacifica station.

The FCC included actual transcripts of each broadcast in written details of its action, making it the hottest reading in town.

☆☆☆

Also of a dubious nature are the record companies' efforts to put **anti-copy devices into R-DAT** players, and a triggering tone to set off the anti-copy device on recorded music of all kinds.

Not only does the audible tone threaten to destroy the musical integrity of recordings, but pending action by Congress has delayed this new technology from introduction to radio stations and consumers in the US.

Another award goes to the NAB's **Eddie Fritts** for his idea to fund public broadcasting with a tax on **radio and TV receivers** and VCRs.

This idea comes at a time when AM broadcasters are trying to convince receiver makers that there really is a good reason to spend more money to design and market new AM radios.

Then there is the series of incidents that can only be called **The Ray McMartin Capers**.

This creative enterpreneur's original company in Omaha went into bankruptcy (it has since been revived by new owners), then left the state.

He was wooed by a consortium of banks in Gunnison CO, and **started another company**, leaving another trail of financial devastation.

Gunnison employees went without being paid for a month before tax agents closed the place down when McMartin was nowhere to be found.

Then an equipment manufacturer hired McMartin as a consultant for a brief stint, but lately he's been keeping a very low profile amid rumors that he's about to start yet another company. (Some people never give up).

Another dubious achievement award goes to the **NAB 1987 spring convention**, for no other reason than it was held the second year in Dallas. Ugh!

And a final award has to go to the dumbest station promotion to ever cross my desk. **Houston's KLOL**, apparently having run out of truly worthy ideas, held a contest with a $5000 award.

The money was given to a female listener for (of all things) a **breast enlargement operation**. Thousands of women wrote in saying they wanted the operation, and the contest was promoted all over town with a 40 foot brassiere.

And KLOL was actually proud enough to seek out publicity on the contest, which blew $5000 on the ridiculous at a time when there are thousands of women dying of things like breast cancer every year. You guys couldn't think of a better way to spend it?

☆☆☆

Now for the **Real Achievements**.

High on the list is the **NRSC standard**, which not only is helping to clean up the AM band, but may be just the catalyst needed to get new, high-fidelity radios for AM. Congrats to the NAB and EIA for their efforts.

As a corollary, an award goes to all those **processing companies** providing NRSC kits and new processors with the filters.

While we're at it, how about an award to all those **AM stations who switched** to NRSC and the ones who went stereo, especially if they've told their listeners. You're helping to educate the public.

And an award to **any FM station** which did not crank up its processing to the point where all that can be heard is massive, ear-killing distortion. (We know the station across town is doing it, but really!)

☆☆☆

There are several product innovations which rate a special mention. These include the **Denon CD cart player**, the **Harris digital AM transmitter**, the adaption of **Dolby SR** for broadcast cart use by **Pacific Recorders & Engineering**, and all innovations brave enough to make use of new technologies such as R-DAT.

Another award goes to **Allied Broadcast** for starting up **24-hour emergency service** for some of its line.

An award to the NAB for taking the advice of its advisory committee and hiring a new person to set up what seems to be a **vastly improved booth assignment system** for the NAB convention. (The gold chain guys are finally out this year!)

Kudos to the FCC for recognizing the need to take a look at **AM allocations** in its NOI.

Cheers for all those daytimers who have been able to go to **night power** because of changes in the rules.

And finally, a real achievement award to every company that shipped a new piece of gear that arrived when promised, at the cost quoted and performed the way it was supposed to.

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

OPINION

Readers' Forum

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

IGM replies

Dear **RW**:

Your 1 November article on IGM's new service policies may have left some readers with a couple of misconceptions that should be corrected.

IGM is not charging new customers for service. New customers are covered by their warranty agreement for one year. This warranty covers all parts and labor.

At the customer's option, the warranty can be extended for a second year. Customers who are not covered by the equipment warranty have the option of purchasing a one-year service agreement.

The service agreement provides access to IGM's 800 WATS service (reachable from all 50 states), a discount on IGM parts and repair labor, software updates without charge and a guaranteed trade-in value on IGM equipment.

Customers who do not choose the service agreement may be charged for extended telephone service support. In general, we are talking about customers who need 1-3 hours of assistance, not customers who want a quick question answered.

Your article quoted one of our competitors with regard to the satisfaction of our customer base. He characterized the reaction to our new programs as negative.

I don't know who he was referring to—those customers who have contacted us with questions have been satisfied with our answers.

We can only judge our program by the customers who have chosen the extended warranty and the service agreement programs.

One of our customers felt positively enough about our programs to write an editorial for another magazine.

Your article would lead the reader to believe that IGM had been interviewed. This is not the case.

The quotations shown in the article are from a letter that we mailed to our customers and are accurate.

However, I would have expected an opportunity to expand on the goals of our programs or to respond to a competitor's representation of our customer's satisfaction.

The recent improvements in **Radio World**'s editorial content have been appreciated, but in this case it appears that **RW** dropped the ball.

Thomas R. Ransom, Director
Sales and Marketing
IGM Communications
Bellingham, WA

Editor's reply: **RW**'s *news department tried several times to get through to IGM spokespersons but phone calls placed were not returned in time for deadline, so we let the letter speak for itself.*

In retrospect this was a mistake. We regret any misconceptions that resulted.

Phone fees a bad idea

Dear **RW**:

I am "peeved" (to put it nicely) about IGM's decision to charge a fee for technical service phone calls.

Recently, while making an outboard modification to our Go-Cart 24's, I discovered an error on IGM's schematics.

Being grateful for the technical support that I have received from other companies, I decided to extend a favor and notify IGM of its mistake.

IGM's service person acknowledged the oversight and I felt good about returning some help (free of charge no less!)

A few months passed and another Go-Cart 24 arrived at our station. I quickly opened the service manual and found my revision penned in.

Knowing that the free phone service had helped both me and IGM, I now feel betrayed (and uncompensated) by IGM's decision to charge a fee for its phone support.

I cannot believe that a broadcast manufacturer would not recognize that part of the high cost of broadcast gear always includes telephone service help.

In the future, I will recommend for purchase solely those equipment manufacturers who provide free telephone support.

Bill Bobich, Asst. CE
WCOL
Columbus, OH

Phone service should cost

Dear **RW**:

In regard to the article "Service Phone Calls Now Cost" in the 1 November issue, I applaud IGM's decision to begin charging for telephone support of their products.

As the former service manager for Broadcast Electronics and the now defunct Cetec Broadcast Group, I had lobbied to begin charging for service as IGM is now doing.

I was always told "we can't charge since no other manufacturer is charging!"

I do understand that the cost of the service support is built into the product however, since the broadcaster never "sees" the cost on any invoice, he "thinks" the service is *free*!

The broadcast equipment manufacturers have been their own worst enemies in this area.

These types of charges have always been the "norm" in the computer industry, including computers used in broadcast traffic systems.

Much of the problems associated with charging for service originated with the mistaken idea that if a piece of broadcast equipment was microprocessor based it could not be promoted that way, or "the broadcaster will not buy it"!

Happily, this archaic idea is a thing of the past and the manufacturers of broadcast equipment go to great extremes to advertise the fact that their equipment *is* micro processor based.

W. Dow Jones, CE
EVEN Broadcasting Corp.
Ventura, CA

No charge, IGM

Dear **RW**:

I was very interested in your story (1 November) on IGM charging for telephone service/support.

Let me say I have never bought a new piece of gear from IGM except for some parts to keep my "used" IGM gear rolling . . . some of it 15 years and older! And even though this gear is old it works GREAT!

Others agree that IGM had made and still makes great quality gear, so it seems to me that if there is a lot of second- and third-hand, 15 year old gear running around then IGM ought to be proud of their record of quality instead of complaining about having to offer service information on it.

It's like IGM wants to penalize stations (prospective new equipment buyers) for buying their used gear . . . which appears to have some resale value which would be incentive to buy new IGM gear when the time comes.

When I buy new equipment, one factor I look at more closely than price is the customer service/support.

If a manufacturer is going to start charging me for telephone support after the warranty . . . then that manufacturer is not going to get my business!

I feel that these new support charges will put undue pressure on engineering personel.

It's bad enough to have a vital piece of gear down (especially automation equipment).

You take heat from station managment to get it in operation, and then finally out of frustration call the customer support number only to have to give a billing address, or a charge card number before the guy will talk to you!

And afterwards you catch hell because "Why didn't you know how to fix it?" "That call costs us $60 plus the long distance charge!"

Please IGM get back in our corner!

Stu Tell, CE
KGLO/KNIQ
Mason City, IA

Working Together

Almost anyone connected with the technical business of radio a by now that AM's problems stem at least as much from poor qu receivers as they do from any other single factor.

Now that technical improvements such as stereo and the NRSC standard are available, AM stations are eager to see new radios on the market and are anxiously wondering how soon new products will be out there in listeners' hands.

This only serves to point out yet again the lack of effective coordination and communication between the broadcast and receiver industries.

Radio manufacturers want to see enough stations making use of new technology and creating a consumer demand by promoting it before committing large amounts of time and money to new products.

And even when they are pledged to support emerging technologies—as has occurred with the NRSC standard—the time from initial R&D to the arrival of a new product in the marketplace may be longer than broadcasters realize.

Receiver companies, for their part, should realize that an investment in a new transmission technology may be a big step for a struggling station, and one many stations hesitate to take unless they know the new radios will be out there in quantity and within a reasonable timeframe.

There should be a way for the trade organizations representing each faction: the NAB and the EIA, to foster better communication between their members.

It was successfully done on the agreement of a stereo standard for TV, and may again work for HDTV. It has been an ongoing process in the NRSC work but needs to be extended beyond where it now stands.

The NAB and the EIA need to take the initiative and bring both factions together for discussions and whatever action is needed.

It's time for each of them to acknowledge their symbiotic relationship and pursue a course of self-interest that will better serve the interests of both.

—RW

Radio World

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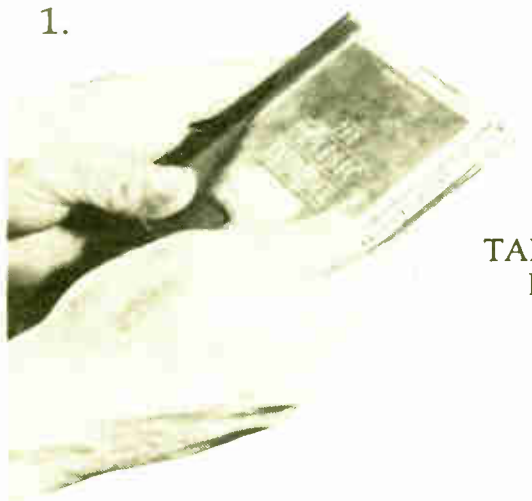

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RICHMOND, INDIANA 317-962-8596
DALLAS, TEXAS 214-423-8667
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RICHMOND HILL, ONTARIO, CANADA 416-731-3697

USED EQUIPMENT DIVISION 317-962-1471
BROADCAST SYSTEMS DIVISION 714-752-6664
SATELLITE EQUIPMENT DIVISION 317-962-8596
NIGHTS WEEKENDS EMERGENCY 317-962-8961

Translator Abuse is FCC Focus

by David Hughes

Washington DC ... The FCC is planning to tackle the thorny question of FM translator "abuse"—a problem that is particularly evident in the southwest.

In a November meeting with NAB officials, FCC Chairman Dennis Patrick instructed his staff to undertake a rulemaking effort that will address the problems associated with using FM translators to extend a station's coverage well beyond its 1 mV/m coverage area.

The NAB also wants the FCC to stop the use of "third party" ownership of translators, in which a party not related to the station signs a contract for the use of its translator.

Owners of stations in markets like Tucson, AZ, where translators relay stations from Phoenix, almost 100 miles away, complain that these extra services do not serve the local community and unfairly siphon off listeners and advertising revenue.

Meeting with Patrick

In a 20 November meeting with Patrick and Commissioner James Quello, the NAB board members discussed what has come to be known as translator "abuse."

Robert Fox, CEO of KVEN/KHAY, Ventura, CA, and a member of the NAB Executive Board, said that following the meeting, Patrick directed his staff to prepare a rulemaking on translator "use problems."

Former NAB Joint Board Chairman Ted Snider, of KARN/KKYK, Little Rock, AR, said the board was concerned about the financing of translators, technical abuses and who is operating them.

"I'd say it is the single most important issue in the southwest," said Lindy Williams, VP/director of engineering with Lotus Communications, which owns two stations in Tucson. "The local stations are being crucified."

Williams maintained that four translators operate in Tucson, two of which relay Phoenix stations. The 10 W translators, perched atop an 8,000' mountain, put out more power than area Class A facilities and cause interference to other area stations, he said.

While Patrick, Williams added, made a "verbal committment" to begin a rulemaking to address the problems of translator abuse, he did not specify a time frame for it.

Critics say the Commission's translator rules are not specific enough to prohibit translator abuse in portions of the country like the southwest where the population is concentrated in small and mid-size cities widely separated by open space.

According to Larry Eads, head of the FCC's Audio Services Department, an FM station can "construct and support" translators within its 1 mV/m contour level. It cannot construct and support translators beyond the 1 mV/m contour level if the location is within another station's 1 mV/m contour.

However, the FCC does not prohibit a station from providing "operating support"—but not ownership—to a translator owned by a third party located outside the originating station's 1 mV/m contour and within another station's 1 mV/m contour, he said.

This is how Los Angeles signals get relayed to Palm Springs, and how Phoenix stations get relayed to Tucson, despite the fact that Palm Springs and Tucson both have their own local stations.

Eads added that the FCC considers an "open question" the practice of the originating station entering into a contract with a third party translator owner.

He confirmed that no timetable has been set when the FCC will address the issues with a rulemaking proposal. "It will be sometime in 1988," Eads said.

Loopholes

"There is a tremendous distortion of the translator rules in the southwest—in Southern California and Arizona," said NAB Deputy General Counsel Barry Umansky.

In previous translator related issues, such as the FCC's examination of whether translators can be fed by microwave and satellite, the NAB has filed comments calling for a wholesale review of the rules, he added.

"Translators owned by third party entrepreneurs devastate local markets," Umansky added. "We want more effective rules to deal with the interference caused by translators and on their funding."

"There are so many loopholes (in the FCC's translator rules) that you could drive a Mack truck through," Umansky added.

"It boils down to people taking advantage of the rules," Fox responded.

The rules were written to allow the use of translators to fill in coverage area gaps for stations. However, Fox said that many translators are being used to extend a station's coverage area way beyond its own market. "And, translators do not have to serve their community."

Money for carriage

Fox indicated that this use of contracted, third party translators is occurring in Santa Barbara and Riverside, CA. Stations can pay between $200 and $500 per month for carriage on a translator.

Williams maintained that the Phoenix stations pay upwards of $1000 per month for carriage on Tucson translators.

One source indicated that at least one translator operator in the southwest actually inserts advertising spots into the programming of the station his transla-

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US, Cuba Discussing Interference

by David Hughes

Washington DC ... While the lines of communication between the US and Cuba are opening up, sources say there is a long way to go to resolve all of the AM band interference disputes between the two nations.

In November, the US and Cuba held talks in Mexico City to "delink" the communications issues from other issues, the most pressing involving immigration, according to Wilson LaFollette, assistant chief of the FCC's Policy and Rules Division.

The resulting immigration agreement, in which Cuba will be allowed to send more of its people to the US and the US will send some of the immigrants from the 1980 "boat lift" back to Cuba, had sparked riots from some of those immigrants who had been incarcerated in Georgia and Louisiana.

The delinking procedure, LaFollette said, allowed Cuba to go ahead with a new immigration agreement with the US despite the continued radio interference issues.

No dates set

"Future meetings are scheduled in order to discuss the Cuban/US radio issues," LaFollette said. However, no dates had been set at press time in mid-December.

"All kinds of discussions are going on," said NAB Deputy General Counsel Barry Umansky.

Fears that a TV version of the Voice of America's Cuban oriented Radio Marti, dubbed "TV Marti," is brewing in Congress could result in retaliatory AM interference, Umansky said.

"We just want to sit down with the Cuban government and resolve the interference."

"Nothing is going on per se," regarding specific talks between the two nations, apart from the delinking procedure, according to Bill Haratunian, a consultant the NAB has hired to study the Cuban interference situation.

Cuba wants US channel

While the US wants a reduction in AM band interference that has severely plagued south Florida stations for almost three decades, as well as some clear channel stations across the country at night, Haratunian said that Cuba wants the US government to allow it to use a clear channel AM frequency to respond to Radio Marti.

"While these are the basis for future discussions, no date has been set for future meetings," he said.

Haratunian stressed that the NAB wants to make sure that US broadcasters have a voice in any negotiations that take place with Cuban authorities.

He added that the TV Marti issue is just an "idea that is being floated" in Congress and any discussion about it is still very preliminary.

For more information on the Cuban interference problem, contact Wilson LaFollette at the FCC: 202-632-5414.

NAB Names Rau Acting Head of S&T

(continued from page 1)

Department in October 1981, said the move to chief scientist will free him of the administrative bureaucracy that goes with the S&T position.

"I will be able to do more technical work, rather than having to focus on rulemakings," he said. "I will be able to devote almost all of my time to HDTV and to FMX."

Keller, co-developer of the FMX FM stereo extension system, is also a member of Broadcast Technology Partners, which is continuing its research and development.

"Now, I will be able to concentrate on a single thing. It will free me up from the bureaucratic stuff," he said.

Rau indicated that no immediate changes are planned at the S&T Department under his leadership.

"We have a great deal of work to do," he said. "The department has an ambitious agenda and trying to keep all of our projects on track will be a big challenge."

Replacing staff

He did say that his immediate task is to find a replacement for himself on the S&T staff. And, in the near future, he will have to replace two other S&T engineers who will make the move over to the HDTV lab.

While staff engineers Ben Crutchfield and Ed Williams have been working on HDTV-related projects, Rau would not confirm that they are the two that will be moving to the lab.

On Keller's shift to become the lab's chief scientist, Rau commented that "Tom Keller is one of the best engineers I have encountered and there is no one more qualified to work on HDTV on behalf of the US."

While Rau is technically the "acting" director of S&T, NAB sources indicate that he stands a good chance of becoming the permanent head of the department.

For more information, contact the NAB S&T Department at 202-429-5346.

NAB Plans New "Super" Radio

by Alex Zavistovich

Washington DC ... Member stations of the NAB may soon have the opportunity to sample much of the radio industry's emerging technology in a single package.

In early December, the NAB's executive committee gave the association permission to develop a proposal for a "high quality" multi-function AM-FM receiver, according to Mike Rau, NAB's VP/Science and Technology.

The proposed tabletop receiver will be designed by a consultant and marketed through the NAB to its member stations, Rau said.

Design elements would include many of the recent advances proposed for both AM and FM receiver technology, including National Radio Systems Committee (NRSC) deemphasis and FMX decoding.

In addition, the radio would have continuous tuning through the AM and FM bands, without the need to switch from AM to FM.

Rau added the design would also incorporate "some type of multisystem method" of decoding Motorola's C-QUAM and Kahn Communications' ISB AM stereo systems. However, Rau acknowledged that this latter feature "may not be possible."

Circuitry to decode more than one system of AM stereo is currently not being mass marketed.

The proposed receiver was heralded as a "great idea" by consulting engineer John F.X. Browne. Browne is a managing partner in Broadcast Technology Partners, which promotes FMX technology in a joint agreement with NAB.

"A problem with FMX has been that no one could buy a receiver—there has been none built yet," Browne commented. Although he noted that Sanyo will soon be promoting an FMX chip, Browne said it would "still be several months" before the technology would be available.

Everyone was not as enthusiastic about the receiver concept, however. Motorola's AM Stereo Manager Frank Hilbert said he had some "reservations" about the planned high-performance radio.

The experimental nature of some of the technology to be incorporated is "incompatible with the concept of high performance," he commented.

Without citing specifics, Hilbert noted that the performance of the receiver would "only be as strong as its weakest link."

Hilbert was also skeptical about a multisystem approach to decoding the two AM stereo systems. He admitted, however, that a separate decoder could be used for each system.

Still, Hilbert cautioned that the problem of "falsing"—improper detection of the transmission system—is an additive condition. A radio with two AM stereo systems would be likely to generate more falsing than a single system receiver, he maintained.

Kahn Communications President Leonard Kahn declined to comment on the proposed receiver.

At press time, a more defined proposal for the high-performance radio was expected by the end of December, according to Rau. There was no timetable for completion of a receiver prototype.

For more information, contact Mike Rau at 202-429-5340.

Translator Abuse Cited

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tor is carrying.

Some small towns with only a handful of stations, Fox added, can have a dozen translators from a neighboring market.

Translators outnumber local broadcasters in several southwestern towns such as Flagstaff, AZ, which he said sports 14 translators, relaying stations from Phoenix and Las Vegas, according to Williams. Flagstaff has six full-service stations licensed to it.

On the other side of the issue, some owners of the less powerful Class A FM stations, which have a 1 mV/m contour that does not cover the whole metro area, claim that by utilizing third party owned translators they can more effectively compete with the 100 kW FMers in their markets.

One broadcaster said that listeners have difficulty hearing his Class A signal because of a neighboring 100 kW operation. The translator, he said, makes his station, which serves the local market, more competitive.

The FCC contact on the translator issue is Larry Eads: 202-632-6485.

Plans For FMX Are Progressing

by David Hughes

Greenwich CT ... With increasing interest from Japanese receiver manufacturers, as well as chip development reaching the final stages and news of additional on-air tests, FMX Co-developer Emil Torick says he is optimistic about the future of his FM stereo extension system.

Torick says his firm, Broadcast Technology Partners (BTP), which handles the development of FMX, has opened a liaison office in Tokyo in order to "coordinate with the consumer electronics industry."

During a November visit, Torick said he visited 20 Japanese firms that manufacture receivers and noted "renewed interest from a number of manufacturers."

The latest developments follow news last spring that Torick and co-developer, Tom Keller, now the chief scientist at the NAB's high-definition TV lab, modified the FMX system to reduce multipath interference complaints.

The interest from the manufacturers, Torick maintained, will be highlighted at the Consumer Electronics Show (CES), to be held in Las Vegas in early January.

According to Torick, by mid-December Sanyo Semiconductor had delivered the first engineering sample of the decoder chip. While it "looks promising," he said the chip must still be evaluated.

Sprague Electric Co., Torick said, plans to have its first engineering sample ready for evaluation by late January.

He maintained that chips could be ready for the mass production of receivers about four months after BTP gives the go-ahead.

On the generator side, Torick said that things are "moving farther along," but did not give specifics about when gear would be ready for broadcasters.

Two manufacturers have either conducted or plan on-air tests of the modified FMX system.

Inovonics President Jim Wood said his firm conducted tests of the modified FMX system on a "Monterrey Bay area" classical music station. The test involved two NAD Electronics prototype receivers.

Wood said the test performed "quite well" with no increase in multipath reported on the NAD receiver in or out of the FMX mode. On older receivers, only in one location out of 50 was an increase in multipath interference noted, he said.

Wood said Inovonics has its Model 705 generator ready with a plug-in FMX module that is available now. While he has received inquiries, to date, no FMX modules have been ordered.

"It's a chicken and egg situation," Wood added. "We will have to have FMX receivers out there before stations will want to add it."

Orban Associates Marketing and Sales Manager Howard Mullinack said his firm will conduct on-air tests in the "Bay Area" in January. So far, it has conducted lab tests of a prototype box which has delivered results that look "somewhat promising."

"In fact, it is a vast improvement over the previous (FMX) incarnation," Mullinack said.

CRL Sales and Marketing Director Ray Updike said his firm has nothing new on FMX. The firm's SG-800A generator has room for an FMX adaptable card. But the firm's original plans to market a specific FMX generator remain on the back burner for now.

Aphex Systems Product Manager Jon Sanserino said his firm's position on FMX has not changed from its previous "wait and see" position.

"We're still waiting until the bugs are worked out, but we haven't written it off, either," he said.

For more information on FMX development, contact Emil Torick at BTP: 203-622-2643.

NRSC Radios: Are They Coming?

Editor's note: In Part I of this special report, RW looked at potential obstacles to the introduction of new, higher fidelity NRSC AM radios. Part II looks at the manufacturers' design considerations, and whether the current AM stereo controversy will play a role.

by Alex Zavistovich

Washington DC ... AM stations can expect to see receivers incorporating the NRSC standard by the end of next year at the earliest.

Some manufacturers are working on such a receiver design, but many are taking a "wait and see" attitude to determine if enough stations will implement the standard before committing themselves.

Special Report

A recent push to make the voluntary NRSC standard a mandatory FCC rule may have an effect on the timetable for manufacturer's commitment.

But an as yet unknown factor is the link between building NRSC compliant radios and the continuing controversy over an AM stereo standard.

Steady conversions

Since its adoption of the 75 μS preemphasis standard, the NRSC has reported steady increases in the number of AM stations which have made the conversion. Despite this, the earliest date cited recently by manufacturers for availability of receivers with complementary NRSC deemphasis was "late 1988."

With the possibility of a gap between conversion to NRSC preemphasis and the commercial availability of broadbanded, deemphasizing receivers, some in the broadcast industry are concerned that receiver manufacturers may be losing interest in the AM transmission standard.

Others speculate NRSC-compliant receivers are in some way tied to the selection of an AM stereo standard. Manufacturers, some observers suggest, may wait for an AM stereo standard and then introduce components with both stereo and NRSC preemphasis.

Motorola, a competitor in the AM stereo market, has predicted "mono radios will not be improved" with NRSC deemphasis, and Delco has admitted that much of its NRSC design work has been with AM stereo receivers.

Still, many manufacturers have stated there is no intended connection between AM stereo and NRSC-compliant receivers. For these companies, determining consumer interest is the only obstacle remaining in building the receivers.

The enthusiastic campaign by NRSC proponents to convince stations to make the conversion may have unintentionally clouded the issue of receiver design.

At October's NRSC subgroup meeting, several members wondered if receiver manufacturers were concurrently working on bringing an NRSC product to market as the number of NRSC compliant stations steadily grows.

"I feel misled," said Harry Simons, CE of WAEB, Allentown, PA. Simons, an NRSC member, expressed frustration that receiver manufacturers have not yet produced NRSC receivers for the consumer market.

In early NRSC meetings, according to Simons, radio manufacturers on the committee said that the NRSC curve would be included in mono and stereo radios.

These companies generally estimated that the NRSC standard would be implemented in receiver design "about six months" after the standard was approved, he maintained.

However, the standard was adopted in its draft voluntary form in 1986, and took effect in January, 1987. Yet the industry has seen the development of only a few prototype receivers, Simons said.

"There have been no radios built yet that are available to the public," he indicated.

Complete reversal

In light of what he called "a complete reversal" of manufacturers' initial support for the curve, Simons said he was opposed to a recent proposal by the NAB to have the NRSC standard made mandatory.

On 6 November, the NAB petitioned the FCC to have the NRSC standard incorporated in the Commission's rules. Carrying the FCC mandate, the NRSC standard would "justify ... voluntary conversion to the standard in receiver design," the NAB wrote.

However, Simons objected that a mandatory guideline would "twist broadcasters' arms to conform to a standard, just to twist manufacturers' arms to make receivers which comply with that standard."

NAB VP/Science and Technology Mike Rau, NRSC coordinator, maintained there was no reversal from manufacturers' original attitude regarding implementation of the NRSC standard.

The companies have indicated their continued interest in the NRSC standard, Rau said. The curve will be included in the designs for future receivers from all the AM radio manufacturers

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New Timetables for Antennas

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versely affect the time he needed to spend with his own consulting practice.

Rau had told RW that work on the Biby monopole design was "temporarily suspended." because of the "availability of the inventor." He added that the NAB felt the project would require greater coordination with Biby than the antenna designer's schedule would permit.

Rau said later that a formal response to the Biby letter was being drafted. The NAB had decided it could move the Biby antenna to the site of the second antenna in the project, after tests on that antenna were finished, Rau proposed.

Beltsville, MD

The NAB's second antenna—designed by Ogden Prestholdt, a consultant to Washington DC-based AD Ring and Associates—is to be built on a site in Beltsville, MD belonging to Howard University.

Although building Biby's antenna on the Prestholdt site would mean a still longer delay for the project, it would relieve some difficulties that have beset the NAB in its search for a site for the antenna.

In November 1986, the NAB was refused a waiver of zoning ordinances for the Biby antenna's test site in Loudoun County, a rural Virginia area some 40 miles west of Washington DC. The decision, made by the Loudoun County Planning Commission, was subsequently overturned by the county's board of supervisors.

But it was mid-November 1987 before any further progress was made in obtaining a test site. At that time, according to Rau, a lease was being drafted between the NAB and the property owners.

Biby said that he had spoken with Rau about time-sharing a test site with the other antenna over a year ago. At the time, he said, the idea was not pursued.

While the adoption of a new test site may solve some of the administrative problems in the project, it does not address the most recent communication problems which have cropped up between Biby and the NAB.

Timetable concerns

One disagreement centered on a timetable for research of the antenna.

The antenna design is "an idea," stressed Biby, and would require a number of years to develop.

"I don't think that even RCA in its day could have completed such a feat in two years, even with unlimited time and money," Biby said of the NAB's antenna project.

Biby maintained that completing the project within the period estimated by the NAB would be "more than a full time job" regardless of when the project was begun.

He commented that the experiment would take "at least five years."

According to Rau, part of the NAB's motive in setting any timetable at all was "in response to strong interest in the industry to have an antiskywave antenna developed" expeditiously.

He also said that the time frame selected by the NAB was part of the negotiating process the NAB accepted "as a tradeoff for having the Loudoun County board of supervisors change an otherwise rigid provision in their zoning laws."

Biby, however, said he was not in attendance at any of the Loudoun County meetings.

Not the salvation

While the project's short deadline may have been a direct response to industry interest, Biby suggested that the NAB might have begun its tackling of the antenna project somewhat over-zealously.

He commented that the antiskywave AM antenna project was "never intended to be the salvation of the AM band," and that reduction of power line noise and improved receiver signal processing technology should be pursued first.

However, he added that the antenna could play an important role in the "reemergence of the AM band." He said the antenna's role in that reemergence could be adversely affected if insufficient time was allowed for study of the design.

Rau said that the previously set schedule "doesn't have to be put on the project" now, especially in light of the timesharing arrangement.

"Any research we can have on the project will be helpful," he said. He stressed that the decision to defer the Biby project did not mean to imply a preference of one antenna over the other.

More receptive

Although the AM antenna project has been bogged down in administrative problems, most recent indications are that the NAB will make itself more receptive to Biby's concerns.

Although at press time the NAB had not formally responded to Biby's 4 December letter, Rau stressed that such a response was in the works, and that the particulars of the letter had already been discussed with Biby by phone, including the proposal for use of the Beltsville site.

Also, Rau noted, while the Prestholdt antenna is being studied, the NAB would provide Biby's project with other support.

"If Dick wants, we will provide him with funding, or obtain equipment for him, subject to our own budgetary and staff resources," Rau said. He added that the NAB has faith in the antenna and commented, "Whatever Dick wants is OK with the NAB."

Biby, for his part, was satisfied with the proposed relocation to the Beltsville site, a move which would make Loudoun County-based time constraints on the antenna project moot.

"At least they (NAB) have begun to understand my position," he said.

With the dispute over the Biby project apparently finished, work will soon begin on the Prestholdt design.

According to Rau, an agreement was recently reached between the NAB and Howard University, owners of the Beltsville site. There had been some problems in authorizing the site, because Howard University had been concerned that the experimental tower might interfere with astronomy classes conducted in an observatory adjacent to the test site.

The university gave its consent to the NAB project after the association agreed to move the tower to another part of the test site. Rau estimated the antenna would be built in the spring.

For additional information, contact Mike Rau at 202-429-5346, or Dick Biby at 703-522-5722.

Wing Named For FCC

by Alex Zavistovich

Washington DC ... The FCC may finally be on its way to a full Commission panel again, with the White House's nomination of Washington DC communications attorney Susan Wing.

According to a White House source, Wing, an attorney with the Washington, DC-based firm of Hogan & Hartson, was nominated for the Commission job by President Reagan on 11 December.

Wing was picked to replace former FCC Commissioner Mimi Dawson, who in early December moved on to the role of deputy secretary of transportation. Dawson's last Commission meeting was 24 November.

At press time, no date had been set for Wing's Senate confirmation hearing.

Wing's appointment marks the first time since April 1987 that the FCC stands to have a full five-member panel.

In November, FCC lawyer Bradley Holmes was tapped by the White House to fill the vacancy left by Mark Fowler's departure. Holmes had served at the FCC first as Chairman Dennis Patrick's legal aide, then as chief of the Mass Media Bureau's Policy and Rules division.

A confirmation hearing for Holmes was also unscheduled at press time.

FCC spokesperson John Kamp said no decisions have been made yet at the FCC for Holmes' successor in the Policy and Rules Division.

For more details, contact the White House Publications Office at 202-395-7332.

More Daytimers Extend Hours

by David Hughes

Washington DC ... After an initial delay, the FCC has approved a plan that allows "qualifying" daytimers operating on regional channels and on 940 and 1550 kHz to add nighttime operations.

The ruling, which was announced 19 November and took effect 1 December, permits affected daytimers to operate at night with a maximum power of 500 W, "reduced as necessary to avoid interference to existing full-time stations."

While the plan, one of several recent FCC actions that provide night operations for daytimers, was issued in May, some daytimers at the September Radio '87 show were disappointed that they could not add night hours by early fall.

However, because of a requirement that the FCC get approval from both Canada and Mexico, the implementation was delayed until December.

Despite the delay, many daytimers are happy with it. "It was a good move by the FCC," said Jim Wychor, owner of a daytimer, KWOA in Worthington, MN, and past president of the Daytimer Broadcasters Association, which became the NAB Daytimers Committee.

"This will effect 1300 Class III daytimers who, for the first time, will be able to operate at night," Wychor said.

The regional channel ruling is the latest in a string of rule changes allowing increased night operations for daytimers. In October, the Commission adopted rules allowing daytimers on the 14 Class I-A foreign clear channels to operate at night.

In its latest ruling, the FCC stressed that the regional channel night powers—which affect stations on Class I and Class III channels—are contingent on the station's "applicable interference protection requirements."

Show cause orders specifying each station's night power levels were issued in November, according to the Commission.

The FCC said it "calculated the power the station can use based on protection to existing full-time stations, but not to the proposed nighttime operation of the other former daytime-only stations."

The former daytimers, the Commission added, will be reclassified as unlimited-time Class III stations and will be exempt from the principal city signal requirement. The FCC indicated that this exemption will not be granted to daytimers that apply to use nighttime powers greater than their initial authorization.

In addition, the FCC said it also reduced the "generally applicable" minimum power for unlimited-time Class III stations on regional channels from 500 W to 250 W.

The Commission had said the change would "permit these stations to obtain nighttime protection from subsequently authorized stations."

It also said that the former daytimers operating under the authority of their show cause orders will not have to meet city coverage requirements, or the requirement that full-time stations operate two-thirds of the hours between 6 PM and midnight each day of the week except Sunday.

"Almost all the reaction I've heard has been extremely positive," said Wychor, who has been a long-time advocate of increased operations for daytimers. "Several stations started running night operations the first night they were able to."

Wychor indicated that he has heard "a few" complaints about low power levels, "but I advise th... complain." In most ... night levels are simil... hour post-sunset author...

Dean Sorenson, head of th... Broadcast Group, said he will b... add night operations to KCUE in ... Wing, MN. The 1 kW operation on 12... kHz, will be adding a 110 W nighttime service.

Sorenson said the AM station, which is owned with an FM facility, will focus on "local" events such as sports, while the FMer will take a more "regional" stance.

"We're very excited about it," he added. "We're going to take our 110 W and do some local services and make some money."

Betty Baudler, president/GM of KASI, a 1 kW daytimer on 1430 kHz in Ames,

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The Other Side of the Interview

by Tim McCartney

Boise ID ... Engineers who are advancing to management positions need to plan for and learn how to conduct successful job interviews.

The more traditional approach of hiring on "gut level" instincts has proven far too costly and troublesome in recent years. There is a definite process involved in making the right match between job and candidate.

The model suggested here is typical of those being presented by management consultants at seminars on effective interviewing skills.

The first task is to establish qualification standards. Decide on your minimum and desired requirements.

You might require a prospective candidate to have two years electronics education required, with three or more preferred.

The requirements might also include three years full-time broadcast engineering experience with five or more preferred, and FCC General License and SBE Broadcast Engineer certification required with a higher level preferred.

Don't foget to include things like the ability to diagnose problems to the component level, as well as interpersonal communication skills required.

Then go back and determine your priorities among these standards. It is important to frequently review and stick with these through the entire hiring process.

Preparing the interview

Plan the major topics to be covered, such as responsibilities, expectations, future plans, advancement opportunities, working conditions, hours, wages and evaluation procedures.

Organize these into a logical order for discussion during the interview. Then, prepare final notes for the interview.

Decide when and where the interview will take place. Pay attention to environmental factors such as privacy, noise level, lighting, comfort, room temperature and placement of furniture.

Plan your opening and closing, which I will describe later in the article.

Review basic communications techniques such as creating a comfortable atmosphere, avoiding barriers to communication, listening to your candidate, avoiding distracting mannerisms, and being aware of your own prejudices.

Establishing rapport

The objective here is to overcome the candidate's natural anxiety. It's your responsibility to establish the tone of the meeting.

A warm greeting, handshake and smile goes a long way in helping to relax both of you.

Be sure to use the candidate's name in the greeting, and thank him/her for coming.

Try for agreement on something early in the interview. This paves the way for agreement later on more difficult matters.

State the purpose of the interview and what accomplishments are expected.

Motivate the candidate to play an active role in the interview by remembering that the candidate sees you as an agent of change for a particular goal.

And, keep the opening psychological tone consistent with the rest of the interview.

Gather information

This stage is completed before the candidate is given information about the position and the organization. It helps avoid "answers aimed to please."

Emphasize the use of open-ended questions to allow the candidate considerable freedom to structure the answers. Such questions might include:

- How have your past job experiences prepared you for this position?
- What methods do you use to make decisions?
- How would you describe your previous supervisor? In what ways were you alike—and different?

Using the job application as a basis explore areas such as attitude toward the job being sought, reasons for leaving past employment, likes and dislikes of past jobs, detailed information on educational background.

You can also explore specific qualifications not reflected on the application, but stay away from intangibles such as appearance, manner, speech, character, gut reactions and the like.

And, be very careful of areas of inquiry

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Developing Effective Job Interview Skills

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which are inappropriate and may be unlawful, such as those summarized in Figure 1.

Job description

This is the time for detailing the qualifications for the job and the organization's expectations for its performance.

Also, advise the candidate of general information about the organization and the department in which the job opening is located. You might want to take the applicant on a brief tour.

Review and summarize the major points of the interview, and orient the candidate toward the next step, such as when and how the next communication will take place.

Keep the psychological tone consistent with the rest of the interview.

Make any permanent notes and evaluate the results of the interview right away.

Evaluation

Compare the candidate's qualifications to the established, prioritized qualifications standards. An interviewer's worksheet, such as shown in Figure 2, may be helpful.

Complete any required follow-up memos.

Take action or implement any agreement that was reached with the candidate as a result of the interview.

Review your own performance by asking yourself some fundamental questions.

Did you come prepared with a thorough advance analysis of the job and the job requirements and an advance list of interview questions developed?

Were you able to establish a rapport? Were you listening rather than talking?

Did you get the applicant to open up and talk freely? Did you correct for your own preconceptions and biases?

If this model asks more of you than time allows consider the unappealing alternative: a poorly matched, disgruntled, unproductive employee under your daily supervision.

As a manager, you are needed to match jobs and people. This difficult responsibility must be carried out deliberately and carefully.

A model such as the one described here provides a useful outline of the necessary procedures to make the match needed. The time is far better spent up front than later.

Tim McCartney is director of engineering and operations at KBSU, Boise State University. He is an SBE broadcast engineer, a former GM and has a masters degree in human resources development. He can be reached at 208-385-3760.

Figure 1. Inappropriate and/or Unlawful Inquiries

Age	Maiden Name or Prior Married Name
Arrests	Marital Status
Bonding (only when necessary)	National Origin
Child Care Arrangements	Number and Ages of Children
Citizenship	Ownership of Home/Vehicle/Furniture
Convictions (only if directly related to job performance)	Photograph
Credit Record	Pregnancy and Future Plans To Have Children
Dress and Appearance	Race
English Language Requirement (only if speaking English is not necessary)	Religion
Garnishment Records	Fidelity Bond Status
Hair and Eye Color	Sex
Handicaps*	Spouse's Background
Height and Weight	Spouse's Name or Work
	Weekend Availability(unless essential to the business)

*except in the context of seeking to make reasonable accommodation or where clearly related to staff or satisfactory job performance

Figure 2. Interviewer's Worksheet

JOB REQUIREMENTS	CANDIDATE QUALIFICATIONS Poor ... Excellent
Electronics Education	0 1 2 3 4 5
Engineering Experience	0 1 2 3 4 5
FCC License	0 5
SBE Certification	0 1 3 4 5
Diagnosis Abilities	0 1 2 3 4 5
Interpersonal Skills	0 1 2 3 4 5

Latest Daytimer Relief Takes Effect

(continued from page 13)
Iowa, said her station began running 32 W at night on 1 December.

"It doesn't seem like much, but the signal gets about 10 miles—five miles really good," she said. "We're more than delighted. We've waited long enough."

Like Sorenson, Baudler's station will use its night operations to focus on "local" events—news, information and sports.

"We plan to add some local high school basketball games, as well as some university sports that haven't been carried before such as women's basketball," she added.

Lewis Latto, president of 1 kW daytiimer KXTP, Superior, WI, said he is glad his station can now operate at night, but he would like to have 50 to 100 W instead of the 26 W his station was given. He also started night broadcasts 1 December.

KXTP's nighttime coverage, which includes "local Superior high school sports—which has never been done before," depends on the "atmosphere," Latto said.

"We plan to stay on the air until 10 PM or until the sports event ends, whichever is later," he added.

Even though the FCC has granted this latest extension of daytimers' hours, the battle is not over.

Wychor said that the FCC still has to address another issue of concern to many daytimers—allowing nighttime operations for daytimers on US Class I-A clear channels.

"The US clear channels are protected out to 700 miles," he said. "We'd like to see that reduced to 300 miles. Studies have shown that very few people depend on a clear channel (signal) for their primary radio service."

For more information contact Louis Stephens at the FCC: 202-254-3394. The item is contained in docket MM 87-131. Contact Jim Wychor at 507-376-6165.

Getting Control Of Your Time

by John "Q" Shepler

Rockford IL ... Welcome to 1988! It's the top of the calendar ... a brand new year. Now, the big question. What will you do with this year?

All new years begin with promise. There's time to take a breather now that the crush of the holidays is over. A lot of things seem possible when you look at a whole year stretched out at once.

Maybe that's part of the problem. There seems to be so much time available that there is little incentive to get started now. Tomorrow or next month will be plenty soon enough.

Unfortunately, we quickly get lulled into that false feeling of endless time. Weeks and then months slip quietly by. Before you know it, October has come and gone with nothing really special to show for 10 months effort.

If you are tired of letting good years slip through your fingers, then it's time to grab that calendar with both hands and put it under your control. There will be no better time than right now to take this control.

The way to keep that calendar under control is to manage it. This means that you have to make conscious decisions about how the days and weeks are going to be used. The tighter you manage the calendar, the more you'll get out of it.

This might be a good time to gather up some calendars. The little paper desk calendars are free from banks and insurance companies. They have monthly sheets that you tear off.

They are too small to write notes on, but you can circle or color in special dates. They take up very little room on your desk and can be glanced at quickly when you're on the phone.

Another freebie is the plastic pocket yearly calendar. Hallmark shops give these away. They even include a list of holidays for easy reference. Put one in your wallet.

You may even luck out and get a nice wall or desk scheduling calendar for free. Many churches give these away at Christmas. They are also popular as gifts from suppliers.

I like the standard 8½×11" monthly format divided into daily squares big enough to write notes in.

Now that you have the tool, you need to decide on the projects. Those 365 (366 in '88!) little boxes are your opportunities for accomplishments this year.

Good scheduling

It's probably easiest to start by making several lists. The first lists are all the routine chores that you have to do on a daily, weekly, or monthly basis. These lists will contain more detail that you will enter on the calendar.

Q-Tips

In fact, make typed charts of the lists, enclose them in plastic protectors and fasten them to the wall. They become the routine instructions for yourself and anyone who might be filling in for you.

Depending on personal preference, you may choose to set aside whole days to get the mundane cleaning and adjusting chores out of the way or spread them out a few hours a day for the entire week.

Say Monday is maintenance day. Write a big "M" in every Monday block to indicate that this time is already allocated.

If you spend half a day once a month checking the antenna system, pick the appropriate day for each month, divide the block in two and write "ANT" in half of the block. Do this for every routine procedure for the year.

The next order of business is to mark off holidays, vacation—if you can schedule it this soon—conventions, seminars and other times that you will be away from the station.

The remaining empty blocks are project opportunity blocks. Certainly, many of these will get eaten up by unexpected equipment breakdowns, meetings or even illness.

You can't predict when these will happen, but they can be provided for by adding extra days to every project.

Picking projects

Looking at the number of open days, it's hard to believe that they'll all get used up, but they will. Your goal is to use them productively and deliberately to achieve what you want to this year. Now, what do you want to achieve?

This stage is really a brainstorming session. Find some peace and quiet for a few hours and start writing down whatever projects come into your mind.

This is not a final list. Just write down whatever projects come to mind, even if they don't seem practical or may be beyond the expected station budget.

You can easily cross off the impractical ideas later. Right now you want quantity, not quality.

After listing a few dozen or a few hundred projects, go through and weed out the ridiculous ones. Now, rank the remaining projects from most important to least important.

Some of these might be things like rewiring the control studio, adding battery

(continued on next page)

Time Planning Tips To Start a New Year

(continued from previous page)
backup to the automation, putting up a new tower, installing a backup transmitter, or maybe converting the station to stereo.

This list of major projects may have to be divided into two lists: those projects that you can decide on and schedule yourself, and those that will require management approval.

Anything that involves spending more than just the cost of repair parts will probably need approval.

Timetable

If your ambitions are high, the list of major projects will be long. Try to estimate how many days each project will take and see how many projects you will be able to squeeze in this year.

In fact, you may wind up scheduling the rest of this month for the purpose of estimating and proposing projects for the remaining 11 months.

In some stations, this process is exactly as described except that the planning is done in the last quarter of the year rather than the first.

This is because capital expenditures, those projects costing more than some expense limit such as $100 or $500, have to be approved and budgeted before the end of the previous year. The thought process is the same. You just have to start earlier.

> *"Don't forget to schedule some goals for yourself."*

Once the list of projects is generally agreed on, you can start spreading the time throughout the year.

You can start building a tentative schedule anytime. However, mark the blocks lightly until you at least have a nod from the boss that the project will probably be approved.

Some of the scheduling will be determined by season. Obviously, you're not going to bury new heliax during January in Maine.

Other scheduling will depend on the lead time to have equipment delivered. Most transmitters aren't sold with next day delivery. Be sure to consider these factors when laying out the year.

Personal projects

Don't forget to schedule some goals for yourself. These should be above and beyond directly improving the station facilities. You need to put in some time devoted to improving your skills and advancing your career.

What type of projects are appropriate? Learning new technology should be high on the list, even if the particular technology is only new to you.

An example would be a course in AM antenna maintenance. It's only new technology if you aren't familiar with vacuum capacitors and phasors.

Some projects should be chosen as much for learning as for building something the station really needs.

Designing and constructing a digital timer for the production studio may seem like a waste of time since you can easily buy one of these.

However, even if you don't save money, you will certainly learn something about digital circuits that will come in handy for future troubleshooting.

Factory training courses on your particular transmitter or automation system are often worthwhile.

Once you get the GM to agree, you need to get into the next available class and block off that time on your calendar.

Other courses may be taught at a local college or vocational center. These usually only require a few hours a week, probably in the evening.

Good choices might be an introduction to microprocessors, solid state electronics theory, equipment fabrication, welding, HVAC servicing or whatever else would come in handy.

One thing to consider is how much of your personal time you want to devote to career development or earning extra income.

You set aside a few hours a week, if for nothing else than reading electronics magazines.

Another approach is to allocate an hour or two a day for building a business or advancing to the next level of responsibility.

Maybe you'll have business cards printed and talk to two-way shops about handling some overflow work. Or, maybe you'll just use that t
friends around the country to see
know of a better job that's opening

The amount of time you'll devote to business and career is strictly a personal decision. However, don't forget to provide a good portion of your time for family and just plain fun.

Good scheduling will actually give you more time for fun. That's because you're making better use of the hours that are mandatory.

When you structure those mandatory hours, you'll get as much done in 40 hours as most people accomplish in 50.

The boss will smile and you'll get to enjoy life, too.

John Shepler is an engineering manager, broadcast consultant, writer and regular **RW** *columnist. He can be reached at 815-654-0145.*

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Are NRSC Radios On The Way?

(continued from page 11)

contacted by the NRSC, according to Rau.

However, Rau could not fix a date that the receivers could be expected in the marketplace. Delco, he said, has speculated the radios may be ready by late 1988 or 1989.

Although Rau maintains there is no lack of interest in the NRSC standard, questions have been raised about whether the curve will be built into monophonic receivers or whether radio manufacturers will wait for an AM stereo standard and release both improvements in a single unit.

During a 12 November NRSC meeting in St. Louis, Delco engineer Bill Gilbert was asked whether his firm would build mono NRSC receivers.

Gilbert said Delco believes the future of AM is stereo, and that the NRSC standard was being incorporated into the company's C-QUAM radios with no intentions to date of manufacturing a mono NRSC receiver.

When asked whether an AM stereo de facto standard, coupled with the NRSC standard, would expedite production of new AM radios, Gilbert acknowledged that compliant receivers might appear more quickly on the market "if the NRSC standard was tied to AM stereo."

Gilbert assured **RW** in late November that there was "no lack of commitment" at Delco regarding NRSC receivers.

"We will be implementing the NRSC standard in our AM stereo models," said Gilbert, noting that the company is "not that far off" from the NRSC specifications in its wideband receivers already.

Delco was not actively working on monophonic NRSC-compliant receivers because "there are so many different models of mono radio" in the marketplace. Further, he said, because "AM is disappearing from cars as a standalone format," Delco would concentrate on FM stereo-AM stereo models, which would include the NRSC curve.

Despite Delco's stated commitment to the NRSC, Gilbert acknowledged that the company had no timetable for making the receivers available to the public.

Downplaying mono

Delco's downplaying of monophonic AM NRSC-compliant receivers was typical of some engineers' design concerns. Although a number of companies denied a link between NRSC radios and the resolution of the AM stereo issue, some admitted that incorporating the NRSC curve into an existing mono design is more difficult than introducing both NRSC and AM stereo at once.

John Marino, an NRSC board member and VP/engineering of NewCity Communications, conceded "it would be easier (for manufacturers) to implement a design change all in one shot." He added, however, that no radio manufacturers he has spoken with are waiting for an AM stereo standard before implementing NRSC.

Motorola's AM Stereo Manager Frank Hilbert maintained that monophonic radios would likely not include the NRSC curve.

"Mono won't be improved," predicted Hilbert, adding that, "like monophonic FM, monophonic AM will gradually begin to disappear." Design considerations were among the problems Hilbert cited in support of the statement.

"You can't just go to the third IF in a mono radio and stick in the curve," he explained. "You have to change the whole radio design."

Still, Hilbert noted the technology is being adapted by Motorola in its integrated circuits and decoder units. The company's medium voltage and low voltage decoder design notes specifically address the NRSC curve, he said.

Eventually, Hilbert maintained, all receivers will be NRSC compliant.

What increasingly appears to be the

> *'like monophonic FM, monophonic AM will gradually begin to disappear.'*

case among receiver manufacturers is that, although their interest in NRSC deemphasis is high, the technology will still follow the same developmental channels as any other technology.

Among those channels is a determination of consumer interest. Delco's Gilbert warned against releasing NRSC radios before a majority of stations had converted to the standard. Consumers would be skeptical about the standard if they listened and heard no change because their local AM had not yet converted, he pointed out.

However, Gilbert could give no target number of converted AM stations needed for receivers to become more available.

Officials with some prominent Japanese electronic component companies revealed that, although the NRSC specifications have been sent to their design centers in Japan, work on radios compliant with the curve has not progressed much beyond the research stage.

At Sansui, a target date for NRSC receivers was undetermined. Sansui spokesperson Arnold Singer commented that, although there are currently no NRSC radios available from Sansui, the designs are "under development."

"The NRSC standards were forwarded to our design center in Japan a few months ago," said Singer. He could not comment on the company's progress in implementing the specifications.

However, Singer denied any connection between the availability of NRSC radios and the resolution of the AM stereo question.

Although he acknowledged that the lack of a stereo standard has resulted in a "marketplace deterrent" in producing AM stereo receivers, he said Sansui would implement the NRSC standard in its AM radios "under any circumstances."

Perry Tamura, spokesperson for Sanyo, said that before the company begins building NRSC radios a determination of "consumer interest" must be made.

A similar attitude was found at Sony, where VP/engineering Sabura Oniki maintained that Sony "has not decided" whether to build NRSC receivers. Oniki said Sony was "studying interest among customers" for the product.

Sony's design group in Japan has the NRSC's deemphasis specification, Oniki said, and has produced some experimental models. However, he admitted that he "did not know" the timetable for introduction of the receivers on the market.

Although he did not comment on whether such radios would be built in mono, Oniki denied any connection between the unavailability of NRSC radios and the lack of an AM stereo standard.

Interestingly, some executives in Sony and Sanyo had never heard of the NRSC or its guidelines for receiver deemphasis.

At Sanyo in Los Angeles, Chuck Davis, the company's sales promotion manager for marketing, was unaware of any work Sanyo may be doing with NRSC deemphasis. Likewise, Ira Diamond, a Sony design engineer for marketing and aesthetic design, said he had not heard of the standard.

However, neither the NRSC nor the Electronic Industries Association (EIA) was concerned about awareness of the specification.

The NRSC's Rau pointed out, "Consumer electronics is a big industry. There are still some people in the AM broadcasting industry who don't know what the NRSC is or what it does."

"You just can't hope to get the information to everyone who arguably has any interest whatever in the standard," Rau said. "It's just impossible."

EIA Director of Engineering Tom Mock added that NRSC deemphasis is not an advertising gimmick, therefore marketing people may not have heard of the standard. He added, however, that "a majority of receiver manufacturers" are involved in applying the NRSC's efforts.

For additional information, contact Mike Rau at 202-429-5340. Bill Gilbert at 317-451-7275 or Arnold Singer at 212-302-5500. Contact Sabura Oniki at 201-930-6370 or Perry Tamura at 201-641-2333. Contact Harry Simons at 215-434-4424.

Network Control of Transmitters

by Harold Hallikainen

San Luis Obispo CA ... Radio World correctly reprinted an error in my article in the 1 November 1987 issue.

The erroneous sentence should have read: "Use of a control point where routine metering is accomplished over a dial-up circuit but where some continuous circuit to the transmitter is available does appear to meet the requirements of FCC policy."

Thanks to those who phoned to point out the error.

Last time we looked at transmitter control from a couple of non-typical locations (answering services or the manager's home). This time we'll look at transmitter control by a program network.

At least two radio networks, Skylight and Family Stations, are controlling remote transmitters of co-owned and affiliate (or subscriber) stations.

This is similar to the use of an answering service for transmitter control, with a couple of exceptions.

Routine control and monitoring is typically done over dial-up phone lines, as discussed in previous columns. The Commission is notified of this additional control point, satisfying 73.1400(c).

Continuous carrier control is provided through the satellite network data or program channel.

Should the operator need to shut down a station (due to an interference causing condition) but is unable to do so through the dial-up network, individual stations can possibly be shut down through the network data channel.

Or all network stations could be shut down by interruption of the data or program channel, similar to using silence sense for fail safe or continuous carrier control.

Since the network operator has control over these circuits, the continuous carrier control requirement of FCC policy is met.

But in such cases, EBS raises interesting problems. Rule 73.932(a) requires the station operator to monitor a local EBS assignment.

Since the monitoring assignments of the affiliates are generally not audible at the network control point, it is difficult to meet this requirement.

Insight on Rules

I imagine with adequate hardware and software, the monitoring could be done over a dial-up circuit.

But does this need to be as continuous as "continuous carrier control," making dial-up unacceptable?

The monitoring requirement provides a backup link, to wire services and networks, between stations for national emergencies.

In some stations this may be the only link for national emergencies.

In local or state emergencies, the EBS monitor receiver is often the only link to emergency programming.

Should a state or local emergency message be received, the station may, at the discretion of management, rebroadcast the state or local emergency programming [73.936(d), 73.937(d)].

Since national emergency programming is the only mandatory emergency programming for a station, the Commission has issued individual waivers to stations to reduce the local EBS monitoring requirement.

A letter granting a waiver of 73.933 to specified stations while under control of the network was sent to the Skylight Satellite Network (call me for a copy).

Under the waiver, the network is to use an FCC type accepted EBS encoder to send the EBS tone, followed by Presidential programming in a national emergency.

The network should be affiliated with other networks and wire services, providing a source of national emergency programming.

The network must conduct its own on-air EBS tests during the time it is controlling subscriber stations.

The network operator should be properly trained in EBS equipment and procedures.

The network must keep logs of EBS activities, and should be equipped with an EBS receiver/decoder as a backup means of receiving national emergency programming.

The EBS receiver at a subscriber station must automatically alert the network operator and a local "on-call" person.

The local on-call person then decides what action to take due to the local EBS activation.

During times that the
der control of the networ
comply with the normal
ments (monitoring, tests, etc.,

It would appear that similar s
could be set up by the various sat
program services to provide transmit
operators for that difficult to fill "after midnight" shift.

This does, however, bring up some interesting questions regarding broadcasting in general.

After the 1985 NAB Radio New Technologies session, an audience member commented to me that all the schemes to go "unattended almost" made it unclear as to whether the station was indeed providing a public service for the local community.

I asked if it would be better for the station to be forced off the air after midnight because of economics. He thought that would be better than each station turning into a background music service.

As stations turn to more network programming with local inserts, the result approaches the proposed satellite distribution of programming to FM translators.

This has been suggested by the Moody Bible Institute in a filing to the Commission and is still under consideration.

I believe Moody originally suggested that 74.1231(b) be changed from " ... only for the purpose of transmitting the signals of an FM broadcast station or another FM translator station

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CONTRACT ENGINEERING

Reaping the Benefits of NRSC

by Mark W. Persons

Brainerd MN ... Now that a number of AM stations are converting to the new NRSC (National Radio Systems Committee) AM audio preemphasis and bandpass standard, it's becoming clear that the voluntary standard is an excellent improvement for AM.

The immediate and long term benefits are very good at very low cost. Implementing the standard is voluntary, but definitely in the best interest of all AM broadcasters.

The recommended transmitted audio preemphasis (high frequency boost) is a little less than some stations have been running, but complements many existing AM receiver deemphasis curves well.

It is also a standard by which receiver manufacturers will be building new AM radios. Up until now, there has been no standard and, as you know, the sound of receivers has varied greatly.

When transmitter audio processor and receiver frequency response curves complement each other under the new standard, AM can sound like FM.

However, it can only work when bandpass filters are also used in transmitter audio processing to keep preemphasized audio from getting into adjacent channels causing interference to other stations, especially at night.

Right now, stations on second adjacent channels (20 kHz away) suffer severe monkey chatter interference from stations without bandpass filters.

This problem can be almost completely eliminated by using the NRSC standard 10 kHz low pass filter.

The filter has an extremely sharp skirt to keep audio on channel where it belongs.

The sharp skirts limit unwanted and unneeded sidebands. I don't know of any AM receivers with response past 10 kHz. The filter keeps transmitter power in the audio range where it is needed.

Preemphasis and filter modules are available for Orban's audio processors at up to $450 depending on the model.

CRL (Circuit Research Labs) has a unit called the SPF-300 that can be used in conjunction with its monaural Peak Modulation Controller or other manufacturer's processing.

The SPF (standard preemphasis/filter) adds preemphasis before the processing system's peak clipper and puts a 10 kHz low pass filter between the clipper and the transmitter input. List price is $495.

CRL offers a circuit card to modify existing CRL SMP-900 AM Stereo Matrix Processors. It is $195 and takes about an hour to install.

This is a small price to pay for standardization and cleaning up the AM band. Failure of broadcasters to act will, in the future, result in customer complaints about new NRSC standard wideband radios and the danger of a return to low quality narrowband receivers.

Broadcasters *must* act in their own best interest to adopt the standard and clean up the AM band. I have absolutely no sympathy for a broadcaster who doesn't.

Circuit Research Labs also has an audio deemphasis filter to be put at the output of modulation monitors. This also has a 10 kHz notch filter to get rid of adjacent channel 10 kHz whistle.

No longer will control room operators have to listen to preemphasized unnatural sounding air audio straight from a modulation monitor. The monaural MFD-400 version lists for $295, while the stereo MDF-800 lists for $395. Both are rack mounted. Other manufacturers have similar gear as well.

The NRSC standard audio preemphasis and bandpass filter standards have the potential of saving AM from doom. There can be no stragglers.

Equipment manufacturers are making the new equipment. It is inexpensive and available almost right away. There is no reason why every AM station couldn't and shouldn't be converted to the new standard in the next 12 months.

We have 34 regular AM clients, and 22 of them are now converted to the NRSC standard. That's 65%. Equipment is on order now for two more.

I ran into high frequency distortion, due to restricted antenna bandwidth, in only one case. We are in the process of resolving that problem now.

On an even more positive note, most stations I installed NRSC adapters on sound *better* after the modification.

After thinking about it, I realized that intermodulation distortion is worse at high frequencies in transmitters. Preemphasized audio can have a significant level above 10 kHz.

If 12 kHz and 13 kHz audio intermodulates, one of the distortion products is at 1 kHz where it is easily heard by all listeners. 10 kHz is a well-chosen low pass filter frequency for AM because I have found most transmitters do well up to 10 kHz, but absolutely fall apart in their audio specifications above 10 kHz.

Another good by-product of the filter is that the station is easier to tune on the dial.

I am glad the NRSC is finally here to help clean up the band for everyone. I am also glad to hear the NAB has recommended the FCC adopt and require the standard at all stations.

Mark Persons is president of M.W. Persons and Associates engineering consultants. He can be reached at 218-829-1326.

A Second Look At FM Antennas

by W.C. Alexander

Dallas TX ... Such a tremendous response was generated by my four-part series on FM antennas and so many specific questions were raised that perhaps a follow-up series addressing these questions is appropriate.

The series touched on such topics as terrain effects, Brewster angle, Fresnel zone, multipath causes and cures, transmitter power versus antenna gain, beam tilt and null fill.

Some of these discussions hit home with station owners and engineers, and in this series, I'll take a practical approach to answer some of the most often asked questions.

Multipath

Multipath problems seem to be on everyone's mind these days. The sad fact is that urban sprawl and FM radio don't mix, at least signal-wise.

In many situations, multipath is unavoidable. Wherever conductive objects protrude into the path of an FM signal, some of that signal will be reflected back toward the source, much as a mirror will reflect a light beam.

It is good to think in terms of visible light when discussing FM propagation.

In fact, some of the physical laws that govern the propagation of radio waves were discovered by using visible-light models in the laboratory.

Much as the reflective glass high-rise buildings that are so much the part of 1980's American architecture reflect sunlight, blinding the drivers on the streets below, buildings of all types and other obstructions reflect, to varying degrees, the RF fields of FM stations.

In such cases, not all of the signal is reflected, but those that strike the obstruction will be reflected and very little will pass through the object.

In the lee of the obstruction will be a shadow area where the signals will be greatly reduced.

In the area between the obstruction and the antenna, reflected signals will mix with direct signals from the antenna and cause multipath.

> *"Urban sprawl and FM radio don't mix."*

How much and how severe will depend on the signal level at the point where the obstruction cuts the RF path, the angle of incidence and the conductivity of the obstruction's surface.

In the lee of the obstruction, the attenuated direct-path signals will mix with other reflected signals and produce another area of multipath.

The size of this area and the severity of the multipath are dependent on the amount of attenuation caused by the obstruction and on whether or not there are other obstructions beyond.

Urban areas with large clusters of high-rise buildings are perhaps the hardest hit.

There will inevitably be a large multipath area on the antenna side of the cluster, and an even larger area of multipath in the shadow area beyond.

Little can be done from the broadcaster's end to alleviate this type of multipath in the shadow area, but improvements can be made in the multipath area on the antenna side of the obstructions.

Of course, tearing down all the buildings would go a long way to cure these ills, but such is nearly always beyond the means and capabilities of the broadcaster.

Locating the antenna on top of one of the buildings would also solve some of the multipath problems, but channel spacings, space availability, building height and EMI concerns often rule this out as an option.

In addition, other near-field problems can be of concern and make such an option less attractive.

Beam tilt

Beam-tilting can many times solve a number of obstruction-induced multipath problems.

As calls started coming in from all over the US as a result of the antenna series, it became apparent that there are many stations in situations where proper application of beam-tilt can go a long way toward alleviating multipath.

The typical scenario is a Class B or C station located 20 to 30 miles outside the target city or cities, using a relatively tall tower and a high-gain antenna.

A large multipath area exists between the downtown area of the target city and the antenna, but relatively close-in to the buildings. A shadow area also exists in the lee of the buildings.

Other multipath areas exist within a few miles of the tower in locations that are invariably over either a target suburb or a heavily travelled artery.

Consider that with no beam-tilt, half of the power being radiated from the antenna is at angles above the horizon and therefore wasted.

Also consider that the downtown buildings, which are often 500 feet tall or more, will intersect the path of the signal at an angle with respect to the antenna where a much higher radiated field exists than is present on the ground.

Depending on the angle of incidence, the reflections can be of an equal or greater intensity than the signal from the direct path. How strong the reflected signal is will directly affect the amount and severity of the resulting multipath.

Many times, the direct-path signal in the multipath area can be increased considerably with proper use of beam-tilt.

We can kill two birds with one stone by tilting the beam by an amount that puts the multipath area more in the main lobe in the vertical plane, and at the same time reduce the amount of radiation that strikes the buildings near the top.

How much change can be made depends on the size (number of bays and gain) of the transmitting antenna, the height of the center of radiation and the distance between the buildings and the antenna.

Class A considerations

I cannot ignore the fact that several operators of Class A stations have raised the question of what beam-tilt can do for them. Generally speaking, Class A stations utilize near-unity gain antennas with two or fewer bays on relatively short towers.

As a rule the main lobe in the vertical plane of such antennas is so broad that there is little to be gained with beam tilt.

In several specific cases that I studied in detail, less than a 2% increase in signal level in the target area was obtainable by tilting the beam of the antenna.

With the antenna so close to the ground, beyond a very near distance from the antenna, the surface is well inside the main lobe in the vertical plane.

This is not to say that beam tilt is of entirely no value to Class A stations.

Indeed, some western Class A facilities in mountainous areas use high antenna elevations with respect to the community to be served. Beam-tilt can be essential in such situations.

In Part II, we will examine the effects of antenna nulls on multipath and what techniques can be used to overcome them.

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

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Resolutions for 1988

by Dave Hebert

Pasco WA ... At the Society of Broadcast Engineers convention recently held in St. Louis there was talk of reintroducing a Canon of Ethics.

I realized that we are now trying to tame this crazy business and overcome the new breed of "buyer-speculators" that are, in some cases, taking the very character out of the industry we respect so much.

These may also be our way of preventing broadcast engineering from becoming an endangered species.

But, I hasten to add, the real canons come from us.

This is the time of year we reserve for new beginnings.

Maybe it's a good time to program some New Year's resolutions of our own and compare how our previous year stacks up against the one we are starting.

Be it resolved to try to start each day anew. The frustrations of yesterday don't belong in today.

That disagreement we had before can't be allowed to poison the goals I have set for myself.

Since operating a radio station demands teamwork, I must surrender part of myself to something that is bigger.

Since the sales department, programmers, department heads and I are all working for the same goal, it's imperative that divergent points of view that separated us yesterday don't impede the growth we need for this new day.

Our common goal is like a thread that weaves us together in a way that we really can't ignore.

I want to pull my share since my work is a reflection of who I am and the integrity I stand for.

I will promise to be a better listener this year.

I want to encourage operations and on-air staff to provide me with the information I need to do my job more effectively.

Opinions, observations, concerns and complaints about equipment problems come with the territory.

But no operator should feel uncomfortable in coming to me with a problem.

I will try to become a skillful interrogator to build a large information base about a problem so I can efficiently diagnose and solve a problem as quickly as possible.

As I want to be a better listener, I also want to communicate better with others.

Complimenting an operator for a particular job well done is a good way of making a friend.

Since we deal with people in the course of our business, we can't forget to take time to find a small reason to be reassuring, or supportive of the team member that may need that special skill.

Part of my job is that of a diplomat, and this skill is every bit as important as my technical expertise.

People, like equipment, need attention.

I will try harder to improve my skill level and knowledge of my profession, and resist complacency in myself.

I instinctively want to give to the industry to make it better. I can only do that when I have more of something worth giving.

I will study technical material, learn from other engineers, attend seminars and whatever else it takes to improve my own technical talent.

In the final analysis, I must be better to myself.

I will try to watch out for the fatigue that looms just over the next hill.

It is most important, to be sure, that the production room cart machine gets fixed, or the final be replaced, not to mention that cranky automation and the clogged bathroom sink.

But I must learn to prioritize these things and not let them run my life. The most important machine is me.

I have to learn there are times when I simply have to walk away for a spell and regroup for a more frontal assault.

I realize that out of exhaustion comes mistakes, frustration and negativism that only makes matters worse.

I must hang up my cape once in a while and get in touch with the ones I love as well as myself.

Without this all my previous resolutions will be impossible to achieve.

Dave Hebert is president of Dave Hebert Engineering. He is an occasional contributor to **RW** *and can be reached at 509-545-9672.*

Rules Differ For Program Networks

(continued from page 19)

which have been received directly through space . . . " to a wording similar to the wording of 74.731(b).

This allows the link between the primary station and a television translator to be "directly through space" or through almost any other means, including remodulation of video and audio signals coming in by microwave.

It was only a short step from the FCC's revision of the TV translator rules from "frequency conversion and amplification only" to "any video/audio feed that results in simultaneous broadcast of the programming of the primary TV station" to allowing full local origination by TV translators, which we now call Low Power TV.

The Commission rejected Moody's original petition to allow FM translators to be fed by any which way.

Moody has applied again, this time limiting the new freedom to FM translators being fed programming by non-commercial educational (NCE) stations.

While the Commission hasn't taken any action on it as yet, many commercial broadcasters appear to be concerned about "FM translator abuses" and are asking the Commission to place further restrictions on them.

I see a great deal of similarity between an FM translator and a centrally programmed full power FM station.

An advantage that FM translators have over full power FM stations is the lack of an operator requirement (unattended operation authorized by 74.1234).

This rule is based on section 318 of the Communications Act of 1934, which specifically requires licensed operators for all broadcast stations except those merely rebroadcasting another broadcast station.

The Act does not limit this operator-free operation to low power rebroadcasting of other stations.

It'd be interesting to know the intent of Congress when they wrote this section.

Was their concern that a licensed operator have control over the programming of the station rather than the technical operation of the transmitter (interference prevention)?

Radio is changing. The days of the local station hiring a high school student to spin records is going or gone.

Instead, a disc jockey in Los Angeles plays records for the whole country.

Many stations are trying to work within the FCC requirements to offer their listeners higher quality programming at lower cost. I'll look forward to your comments.

Harold Hallikainen is president of Hallikainen & Friends, a broadcast equipment design, manufacture, sales and installation firm. He can be reached at 805-541-0200.

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AMPLIFIERS

Want to Sell

Crown DC300, vgc, $300; Crown D150, gd cond, $200 plus ship. W Laughlin, KDCV, 2636 N 56. Lincoln NE 68504. 402-466-8670.

Kenwood KA-5700 integrated amp, 40 W/chan. $135. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Ampex 620 speaker amp, (3), $375/all or $150 ea. Mr. Oliver, 212-874-0274.

Dynaco Stereo 70, $150. Mr. Oliver. 212-874-0274.

Hafler P225 power amp, $350; Hafler DH110 preamp, $250. H Underwood, Underwood Audio, 1909 Tree Corners Pkwy, Norcross GA 30292. 404-449-5502

Shure M64 phono preamp, $50. P Cibley, Cibley Music, 138 E 38th St, NY NY 10016. 212-986-2219.

Shure **M64** phono preamp, BO. P Cibley, Cibley Music, 138 E 38th. NY NY 10016 212-986-2219.

Dynakit 70 stereo, $75, Ampex 620 spkr-amp, $100 L Oliver, 304 W 89th St. NY NY 10024. 212-874-7660.

Langevin AM16 preamps, rack of 12, excel cond w/manual, $450; Langevin AM17 (5) program amps, excel cond, w/books, $100 ea. R Estes, 11557 Sunshine Terr, Studio City CA 91604. 818-769-6569.

Ampex 620 speaker/amp; newer 1969 model w/JBL speaker, $75. M Matthews, Rockwell, 3318 Shield Ln, Garland TX 75042. 214-996-6844.

Sparta MAS-50 (2) 50 W monitor amps. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Belar AM RF amp, $250. J McGinty, WEKC, Jackson Mall, Williamsburg KY 40769. 606-864-7843.

RCA BA-40 dist amps (3), as-is, $45 ea. M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

Gates Criterion 80 record amp, works, $150. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

Marantz 15 amp & 7T preamp 1968 vintage, both in mint cond w/manuals, $600/both. R Cane, Miami Picture & Snd, 6142 Miramar Pkwy, Miramar FL 33023. 305-962-8111.

Gates Solid Statesman II preamps (2) in operating cond w/manuals, $50 ea, plus ship. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

ANTENNAS & TOWERS

Want to Sell

Anixter-Mark P4120GRN grid type dish, 10', less feed; (2) Anixter-Mark P472GRN grid type dish, 6', less feed; Anixter-Mark 450-470 feed for 6' dish; Phelps Dodge 1 bay educ CP FM antenna at 100.9; Powerstate 3 phase 20 A Variac; Triad Utrad transformer 230 V, pri, 3000 V 0.5 A sec; (6) Bird 4230 wattmeter line sections, N connectors $25 ea. J Hunter, KBRE, Box 858, Cedar City UT 84720. 801-586-5273.

Towers, (2) 310', 5'face single guy level, has insulated guys; 190' utility tower 2'face; 240' angle tower 3'face; 6 bay Phelps Dodge CP antenna w/radomes; 4 bay Phelps Dodge CO antenna; 6 bay RCA CP antenna; (300) 3" Andrews Heliax; also tower erection equipment for heavy & tall towers. Southern Tower Service, 804-539-8365.

CSP 1000 W 50 ohm dummy load, $200/BO R Dietterich, WAMO, 411 7th Ave. Pittsburgh PA 15219. 412-471-2181.

Jampro JSCP 12 bay w/heaters. 105.1 MHz retunable to any higher freq. $10,000 plus ship/handling. D Booth, KMJX, 11300 Rodney Parham, Little Rock AR 72212. 501-224-6500.

RCA MI-19089-2C, flanged, 3-1/8". new (8). B Matta, 5001 Baum Blvd, Pittsburgh PA 15213. 412-683-2020.

Cablewave HCC 300-50J Heliax, 374' w/clamps & round member adapters, gas pass & gas barrier attached, $2600 plus ship/handling. D Booth, KMJX, 11300 Rodney Parham, Little Rock AR 72212. 501-224-6500.

Lapp 2912 tower insulator, 24" high, BO. W Heizer, 7830 Heizer, Wisconsin Rapid WI 54494. 715-423-3667.

Cablewave FLC78-50S TCC (2) connectors, new, BO; Cablewave FLC 78-50J, 6' section, new BO. L Seidenderg, WSCT, POB 1350, Aberdeen NC 28387. 919-944-1350.

Pi-Rod tower, 430', 24" face, galvanized & painted, $12,000 plus ship/handling. D Booth, KMJX, 11300 Rodney Parham, Little Rock AR 72212. 501-224-6500.

Tower, 980', solid leg zone A w/guy wires on ground; Continental ERI 12 bay CP antenna 93.1 MHz. L Dupree, KQID, 318-445-1234.

Andrew 83799 1-5/8" fittings EIA flange for Andrew HJ7-58 heliax, $69 ea. W Foster. WBBK, POB 762, Blakely GA 31723. 912-723-6828.

Celwave 4 bay, class A 3 kW tuned to 101.7. $2500 plus move & shpg. J Chunn, KKIQ, 1603 Barcelona St, Livermore CA 94550. 415-455-4500.

Phelps-Dodge CFM-10 on 96.3 & 528' of Cablewave 3-1/8" transmission line, BO. M House, KLLL, 1314 50th St, Lubbock TX 79412. 806-763-1911.

Jampro 25 kW harmonic filter, BO. G Kippel, KAMB, 90 E 16th, Merced CA 95340 209-723-1015.

Harris/ERI FM8-8 FM antenna 67/33 power split, set for 101.9. M Fiedler, KCOR, 1115 W Martin, San Antonio TX 78207. 515-225-2751.

Kintronic 7.5 kW FM isocoupler, new, BO; Regency HF two-way 12V 450.55, BO; Scully stereo PB in 48" Bud rack, 14" reels, 7.5-15 ips bi-directional, will swap for late model console in GA-AL-FL or MS. B Hoisington, SMC Automation Southeast, POB 1776. Andalusia AL 36420. 205-222-8849.

FM, 3-5 bay antenna and/or tower. M Gaunt, WHCB, POB 2061, Bristol TN 37621. 615-878-6279.

S-A or Fairchild satellite dish & digital receiver, for ABC Network. D Fernquist, WBRB, POB 288, Mt Clemens MI 48046. 313-792-1400.

Guyed tower, 800' for FM in gd cond. J Stitt, WIOK, 7075 Industrial Rd. Florence KY 41042. 606-727-0800.

RCA TFU 24DM UHF ant on chan 41, $5000; Emcee UHF corner reflector antenna 10 gain, $200. C Haynes, WJMI, POB 31235. Jackson MS 39206. 601-948-1515.

Trusscom 254' self-supporting tower on ground, near Des Moines IA, w/all bolts, lighting, base insulator, etc, install plans avail. J Hanson, KFMD, 100 Court Ave #103, Des Moines IA 50309. 515-282-1033.

Jampro 2 bay FM, 92.1 MHz, excel cond, BO. B Mishkind, KFXX, 3222 S Richey, Tucson AZ 85713. 602-748-1450.

Approx 3-L's & 550' o rigid, 70 ohm, 2 bays, BO. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Tower, coastal Maine, 341' above sea level, can include 21,000 sq ft of bldgs w/security, etc, lease or buy. G Jodoin, POB 231, Manchester NH 03105. 603-669-5710/883-7903.

Gates antenna shunts (2) w/meters, gd working cond, $40 ea/BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

Andrew 1304-2 4-bay hor FM, $200; Phelps Dodge 1 bay FM, $400. John, 315-487-2393.

AM sampling line/isolation coil. w/weather proof enclosure, $200; also one additional weatherproof enclosure, $50 R Topp, KOLM, 1220 4th Ave SW, Rochester MN 55902. 507-288-1971.

Phelps Dodge 12 bay, 106.7 FM, 1000', 3-1/8" rigid transmission line, on ground, BO. J Sorensen, WJQY, 2100 NW 21 Ave, Ft Lauderdale FL 33311. 305-484-8107.

Rohn 45G 260' 18" face, w/light package & cable, gd cond, $2900. A Saks, WAGP, POB 119, Beaufort SC 29901. 803-525-1859.

Harris FMH-12AC CP 12 bay FM, 92.9 MHz, salvage as replaced due to ice damage, $1000. D Weisenberger, Crawford & Co, POB 581, Bismark ND 58502. 701-258-2090.

Fittings for 3-1/8 hard line, 90's. 45's, T's, BO. J Scaggs, KGNZ, 542 Butternut, Abilene TX 79602. 915-673-3045.

Scala MF960 miniflector STL antennas (3), gd cond, 2 yrs old, $175/BO. J Torsitano, KARZ, POB 1918, Redding CA 96099. 916-244-2600.

AM tower for 1430 kHz, 160-170', BO. C Nandel, KAMP, POB 1018, El Centro CA 92244. 619-352-2277.

Scala color log for ch 3, (4) Scala HDV for ch 3 & 300' of cable. J Carroll, Carroll Bdctg, POB 549. Tawas City MI 48764. 517-362-3417.

HF-4 1/8" Cu2Y 255' Cablewave Flexwell (141' new); (2) 734602 Cablewave gas pass female 6" connectors; 913864 Cablewave hoisting grip, $4000/all. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

Cablewave 30' FLC7850J w/(2) N connectors; 10' FLC7850J w/(1) N connector. B Musso, WGCD, 165 Harris St, Chester SC 29706. 803-377-1111.

Andrew 83799 1-5/8" fittings, EIA flanges for Andrew HJ7-58 heliax, $69 ea; Andrew HJ7-59 heliax 1-5/8", gd cond, $3/ft. W Foster, WBBK, POB 568, Blakely GA 31723. 912-723-4311.

Jampro 2 bay & ERI 3 bay on 92.1 MHz, BO. B Mishkind, KFXX, 3222 S Richey, Tucson AZ 85713. 602-296-3797.

Andrew 3-1/8" coax, 425' w/connectors, EIA plus pressure inlet w/90 hangers & tower leg stand-offs, no burns. T Vaubel, KEZT, Box 1647, Ames IA 50010. 515-232-0104.

BFA-4-A 4 bay, tuned to 96.7 MHz antenna. P Knies, WBDC, POB 95, Madison IN 47250. 812-265-3322.

RCA BFH-7A FM antenna at 98.3, 1-5/8" flange input, excel cond, w/deicer transformers but not tower mounts or deicer external wiring, BO plus pkg & ship. S Kuiper, WFMR, POB 147, Menomonee Falls WI 53051. 414-255-3100.

Phelps Dodge CPFM-8 8 bay CP antenna, tuned to 101.1 MHz, BO; 20 sections of 3-1/8" rigid coax, 20' length, including bullets & non-insulated hangars, BO; Stainless 3000' of 1" guy wire on reels of 1000', approx 2 yrs old, BO. R Goodman, WCKN, POB 650. Anderson SC 29621. 803-226-1511.

Want to Buy

Lighting for 300' tower. J Stromquist, WNCB, 2816 Hagberg St, Duluth MN 55811. 218-722-3017.

AUDIO PRODUCTION OTHER

Want to Sell

Tascam 246 Porta Studio, less than 5 mos old, $795. A Tranmer, KBOY, POB 1280, Boise ID 83701. 208-336-3670

Accuphase T-100 stereo tuner, $195; Technics ST-9030 stereo tuner, $165. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Burwen TNE-7000, excel, $275. W Laughlin, KDCV, 2636 N 56, Lincoln NE 68504. 402-466-8670.

Shure M267, $275 & 268, $165, both w/rack mts. C Butler, Butler Bdct Srvs, 1775 Bartlett, Orange Park FL 32073. 904-264-8169.

Fairchild 664NLS (2) equalizer modules, BO. P Cibley, Cibley Music, 138 E 38th, NY NY 10016. 212-986-2219.

Shure M62V Level-Loc, gd cond, $50. E Helvey, Helvey Prod, POB 1357. Winchester VA 22601. 703-877-1191.

Eventide RD-770 w/dbx, 2 chan mono/stereo rec/rep w/dbx for eliminating cart phase error; Fidelipac 300 & 350, music lengths; AKG BX20E1, transmission line reverb, 2 chan w/remote, excel cond; Orban 516EC, 3 chan unit. B Matta, 5001 Baum Blvd, Pittsburgh PA 15213. 412-683-2020.

Studio Tech Echoplate II, $800/BO M Fiedler, Mahoney-Fiedler Prod, 5346 Dupont Ave S, Minn MN 55419. 612-822-0013

Shure Level Loc, cond unknown, looks gd $75, McCurdy dual row tip-ring-sleve patch bay, to solder trees, 2 sets, $100 ea R Dietterich, SBN, 411 Grande Plaza, Pittsburgh PA 15219. 412-471-2181

Shure Voice Masters excel cond, one has rack mount, $150/both. M Banks, WSTH, 208 Main, Alexander City AL 205-234-2566

dbx 216 16 chan NR system (2) w/spare modules/16 chan system, $2000 ea. P Costa Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832

UREI 533, mono graphic audio EQ, excel cond, $200 L Bergman, Universal Snds POB 18716, Spokane WA 99208 509-328-0766

Tascam MH-4Q 4 ch headphone amp, Eventide BD955 digital delay, Ramko DA-6RIE 6 ch DA, UREI 545 parametric EQ; Collins 26-U2 compressor M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111 801-364-3561.

Eventide H949 Harmonizer, like new, $2500 Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

Eventide H949 Harmonizer, new, used about 5 times, generates effects, audio delays, flanging, lengthen or shorten audio productions, w/manual & all connectors, $2250 plus ship. T Erickson, KBLG, 4140 King Ave East, Billings MT 59101. 406-245-5000.

Orban 414A, used only 6 mos. J Kennedy, WGEL, POB 177, Greenville IL 62246. 618-664-3300.

Shure SM-7, $275; new SM-54, $175. J Ripley, KORD, POB 2485. Tri-Cities WA 99302. 509-547-9791.

Altec 9860A graphic EQ. W Ditzel, Ditzel Prod, 933 Shroger Rd, Dayton OH 45419 513-298-5381.

Shure M62V Level Lock, gd cond; M68, rough cond; 675 prod master, gd cond. K Smith, Smith Engr, RR#3 Box 483, Gorham ME 04038. 207-929-6129.

Eventide BD980 stereo digital delay, used less than 5 mos, $4500. J Boyd, Capps Bdctg, 115 NW Oregon Ave #18, Bend OR 97701. 503-389-7885.

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RW Broadcast Equipment Exchange

AUDIO PROD . . . WTB

Want to Buy

Various cart machines, turntables, boards, etc. Fox Radio, POB 3387, Cocoa FL 32924. 305-799-3306.

Quad headphones. D Fortenberry, KVON, 1124 Foster Rd, Napa CA 94558. 707-252-1440.

AUTOMATION EQUIP.

Want to Sell

SMC 452 Carousels (3) stereo, Auditronics 10M-915 video display, PDC-4X clock, SMC ESP-1 programmer, (2) racks, TSB-3 power control, DS-20A digital switcher, (2) Otari R-R reproducers & all manuals, well maintained. C Larsen, KAMI, 835 Meridian, Cozad NE 69130. 308-784-1580.

Cetec 7000, in use w/Level II software, (5) Revox A77, (3) Audiofiles 1 stereo 2 mono, (2) Control Design Carousels, (2) Beehive terminals, (3) ITC 750, 25 Hz tone gen, Automated Bdct Control time announce & numerous parts, for sale or lease $25,000/BO. D Digerness, KMMT, POB 1284, Mammoth Lakes CA 93546.

Schafer 800 complete in one rack & cannibalized system, sell as is, $200. R Bagby, KWEY, POB 587, Weatherford OK 73096. 405-772-5939.

SMC Minipro controller, 10 source inputs, 100 events, 50 timed events, perfect for sm operation, memory backup, $1200. L Selzle, KFBC, 1806 Capital Ave, Cheyenne WY 82001. 307-637-7771.

SMC ESP-1, gd cond, w/many options, $6000/BO. P Wolf, WRCC, 2600 Pine Island, Cape Coral FL 33909. 813-574-5548.

IGM 504 3 chan, $900. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

Cetec-Schafer 7000, (3) Audiofile, (2) Otari RR, (2) Carousels & misc, BO. D Mance, WCDO, 75 Main, Sidney NY 13838. 716-335-2273.

Harris 9000 complete w/IGM Go-Carts & terminals, SMC DP20 w/5 Carousels & R-R equipment. P Scott, WJMI, 1850 Lynch, Jackson MS 39203. 601-948-1515.

SMC random select Carousels (4); (3) SMC cart machines, SMC 592 R/P cart machine. D Jackson, WPRN, POB 566, Butler AL 36904. 205-459-2835.

Schafer 800S 10 ch auto controller (2); other auto equip supplies, BO. B Van Proogen, 2111 Shangrila Dr SE, Grand Rapids MI 49508. 616-243-2026.

Harris 9000 program controller w/IGM 48 tray Go-Cart, IGM 78 tray Instacart, TEC70X terminal & video monitor & TI thermal printer, on air, $15000. J Moore, WPEX, 1517 Aberdeen Rd, Hampton VA 23666. 804-827-0911.

SMC RSC100 w/cables & drum switches & controls, (2) 250 or 250 Carousels, $900/will ship. J Young, KIBS, POB 757, Bishop CA 93514. 619-873-6324.

IGM Instacart 48 tray stereo, gd cond, $6500/BO. B Potterton, KSGN, 11498 Pierce St, Riverside CA 92505. 714-687-5746.

SMC ESP-1 complete w/RC, data encoder, (5) tape decks, (5) 24-tray, digital switcher, auto record & interfaces, BO. V Balkcum, WEQR, 914 W Grantham, Goldsboro NC 27533. 919-734-3336.

Tone gen, 25 Hz. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

BE Control 16, (4) Otari ARS1000 decks, (2) ITC 770 decks, (4) IGM Go-Cart 24, ITC 3D cart deck, (2) ITC RP stereo cart decks, plus lots more. D White, WYBR, Box 7180, Rockford IL 61126. 815-874-7861.

Schafer 800 control unit, as is in rack, $400 w/diagrams. N Allebaugh, WICE, 100 John St, Cumberland RI 02864. 401-725-9000.

Autocue 25 Hz tone gen, rack mount, gd cond, manual, $100 plus ship. R Kerbawy, WTNJ, Box 1127, Beckley WV 25802. 304-877-5592.

SMC 450 Carousel bi-directional, excel cond, $2500. B Stephens, WQCB, POB 273, Brewer ME 04412. 207-989-5631.

SMC RS50 (3) 50 event programmer for 250 & 350 series Carousels, w/cables, $500 ea. R Casey, KGOK, POB 610, Pauls Valley OK 73075. 405-238-3314.

Gates SC-48 system, (4) Carousel, (2) random access units, (2) Scully 270 RR switcher loggers extras, as is, you pay frt, BO. JR Cox, KRZK, Box S, Branson MO 65616. 417-334-6003.

Want to Buy

IGM Instacart 48 tray stereo, operating condition, to be used w/IGM Rampart system. J Parker, WUBE, 225 E 6th, Cincinnati OH 45202. 513-621-6960.

Harris Instacart mod board 994-7789-001 for 90/9000 Harris auto system; IGM Instacart 48-tray mono, less than 10 yrs old. B Frahm, Pacific NW Bdctg, POB 1280, Boise ID 83701. 208-336-3670.

IGM 500 parts, control drawers, monitor panels or complete 500; SMC 581 time announcer for parts. B Van Proogen, 2111 Shangrila Dr SE, Grand Rapids MI 49508. 616-243-2026.

CAMERAS (VIDEO)

Want to Sell

Sanyo B&W VC-1600L system, $300 complete; camera & lenses, $200, TV/monitor, $125. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

RCA PK-701 color std camera, $1250; Panasonic 3890B color portable, $1995; Norelco PC-70, BO; Norelco PCP-90, $750; Houston Fearless pedestals, $350. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515.

Sony B/W portable video system, AVC3450, AV3400, AV3600, AC3400, monitor, light, xtra Canon TV16 lens & 65 reels tape, $600/BO. R Branske, WLOO, 875 N Michigan, Chicago IL 60611. 312-440-3100.

Underwater camera, custom made by Fujinon & Sony, gd to 1,000', $30,000. W Norman, A/V Industries, 15 E Mall, Plainview NY 11803. 516-753-9393.

Ikegami HL79A w/Angenieux lens, BO. M Geraci, Light Scope, 420 W 45th, 4th FL, NY NY 10036. 212-757-0204.

Panasonic AK760 3 tube diode-plumbicon w/studio & ENG config, Canon 9-118, f1.6 w/2X & macro green line lens, hard case, excel cond, $3500. R Kragen, Box 397, Roosevelt NJ 08555. 609-448-4739.

Ikegami HL79EAL w/studio finder config & tripod, $26,000. W Norman, A/V Industries, 15 E Mall, Plainview NY 11803. 516-753-9393.

JVC KY1900U camera, 10 x 1 w/AC adapt/bat pak/case, $1995; JVC KY1900U camera 6 x 1 w/AC adpt/bat pak/case, $1695; Knox K-60 char gen, 4PGS memory, flasher, char over video, $375. P Costa, Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832.

Sony DCX-5000 (4), w/(2) Fuji zooms; (2) Panasonic WV2100, (2) WV3700/3702, WV2310. M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

Want to Buy

RCA late mdl TK45/46's & access & cable. H Henson, Henson Prod, 4569 Havencrest Rd, Winston-Salem NC 27106. 919-924-8717.

CART MACHINES

Want to Sell

Tapecaster 700RD delay cart machine, will take A-B size carts, also will work in a normal mode, $100. R Dietterrich, SBN, 411 Grande Plaza, Pittsburgh PA 15219. 412-471-2181.

Tapecaster, Spotmaster machines repaired, bought & sold. Advent Duplication, 9723 Riggs Rd., Adelphi MD 20783. 301-439-7222.

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Criterion 80 (3) w/record amp that matches, fair cond, $300 for all. S Blair, WKCB, Rt 550 West, Hindman KY 41822. 606-785-3129.

Audicord Twin R/P, stereo, like new, $1500. B Baron, Bdct Prod E. 23 Rustic Ave, Medford NY 11763. 516-286-8125.

Fidelipac CTR 100's, (4) stereo R/P, (8) stereo players, 2 yrs old, BO as group or individual. J Lackness, KRIA, 3407 NE Pkwy Ste 210, San Antonio TX 78218. 512-828-3737.

UMC stereo PBs (3), gd working cond, new heads, complete w/service manuals; UMC stereo R/P, needs alignment & set-up, gd cond. J Gerard, WIHS, POB 117, Middletown CT 06457. 203-346-3846.

Sparta Century mono cart PB (8); BE 3200RP mono R/P, gd cond; Spotmaster mono cart PB; ATC mono cart PB. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Spotmaster 500C R/P, gd cond, $280 plus frt. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

ITC SP Series, stereo, 3 tone sensor, gd cond, $1000/both; BE 900-3202-000 (2) 1 yr old, excel cond, stereo, $1100/both. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Tapecaster 700RP, $120; 700 P gd cond, $200; Auto-Cue 25 Hz tone gen/detector, $100. John, 315-487-2393.

ITC R/P stereo, fair cond, $700. P Christanson, WIVY, 2101 Univ S, Jacksonville FL 32216. 904-721-9111.

Tapecaster 700RP mono in excel cond, $250. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

Scully 280 2 trk R/P, gd cond, $450 ea; Gates mono PB, $150 ea. A Moore, WVOC, POB 21567, Columbia SC 29221. 803-772-5600.

BE 500C DL, R/P, mono, new heads, excel cond, $150. J Gardner, Cutting Edge Prod, 2 Maria Holchkiss Rd, Prospect CT 06712. 203-758-4769.

IGM Instacart 48 tray mono, BO over $2000. L Dubose, WBLR, POB 410, Batesburg SC 29006. 803-532-4315.

SMC mono recorder, mono player, clean, (2), $350/both; ATC PC-190 updated, $150; several Viking decks & amps; Gates ST101 (antique), $75. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328.

UMC mono (4), (1) UMC stereo, (3) Spartamatic PB, (1) Spartamatic record, SMC Carousel, several work well, others may be fixed or used for parts, also approx 1500 Fidelipac Master carts (red) w/mono country library. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

Beaucart Type 22, (2) stereo PB, gd cond, $400 ea. P Wolf, WRCC, 2600 Pine Island Rd, Cape Coral FL 33909. 813-574-5548.

RCA RT-126 mono R/P, gd cond w/tech manuals, $200; RCA RT-126 mono PB, $150; rack mount tray for (2) RT-126 cart machines, $25. P Combs, Only Son Prods, 2316 Forrest Home Ave, Dayton OH 45404. 513-236-2340.

Gates-ATC Criterion 80 mono cart machines (2), gd working cond, $250 ea. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

Tapecaster 700RP, gd working cond, $475; Tapecaster 700P, gd for parts, BO. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

Want to Buy

ITC 3D's, (3) stereo w/tones, must be solid machines. J Lackness, KRIA, 3407 NE Pkwy Ste 210, San Antonio TX 78218. 512-828-3737.

BE 3000 & 2100 cart machines wanted. Exporter needs 90 used machines, working cond, not more than 6 yrs old, reasonable price avail. Send particulars to: RW, POB 1214, Falls Church VA 22041. Attn: Box 1-1.

Collins/ATC, need several Collins 642A cart machines & 216C record amps or ATC AB150 R/P. S Todd, 2911 Simpson St, Roseville MN 55113. 612-633-4458.

UMC 111-01 or 101-111-034 Beaucarts, type 10 repro, also need record/repro. D Christian, KPLU, Tacoma WA 98447. 206-535-7265.

ITC SP mono. T Drigger, Driggers Bdctg, 818 Quail Ct, Healdsburg CA 95448. 707-433-9370.

CASSETTE & REEL-TO-REEL RECORDERS

Want to Sell

Tascam 122 stereo cassette rec/PB deck, light use, mint cond, BO. K Browall, KTRZ, Box 808, Riverton WY 82501. 307-856-2922.

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Ampex 350 3 tk console, $725; Ampex AG350 8 tk SS, $1850; Ampex 300-350 SS 4 tk, $900; Ampex 350-351 2 tk (2) $725 & $750/both for $1350. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660.

Teac A-4010 GSL, excel w/case, $125; Teac A4010S, gd cond, auto rev, $60, plus ship. W Laughlin, KDCV, 2636 N 56, Lincoln NE 68504. 402-466-8670.

Revox A77 2 trk, 7.5-15, low time on recent heads, w/remote, $595. B Borrelli, Media Group, 462 Merrimack St, Methuen MA 01844. 617-688-5373.

Nagra 4.2 Crystal, many extras, excel cond, $4200. R Kragen, Box 397, Roosevelt NJ 08555. 609-448-4739.

Studer/Revox HS-77 MK IV, FT mono, spec factory order 15 ips, as new, $995/BO/trade. R Katz, Allegro Snd, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-766-9101.

Scully 280; Ampex AG-440; Ampex AG-350; Alpha 21; VSC Soundpacer C-4. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

Ampex remotes for 350-351, $100 ea. Mr Oliver, 212-874-0274.

Otari ARS100 reproduce, gd cond, (4), $900 ea. M Holderfield, WOOF, POB 1427, Dothan AL 36302. 205-792-1149.

Ampex AG500 (4) mono, 7-1/2-15, rack mount, $150 ea; 30 day automatic logger w/rack, time code indicator, manual & 30 tapes, $500 plus shpg. SA Cisler, Orbit Radio/Video, 2405 Hermitage Way, Louisville KY 40241. 502-458-7420.

Scully 100 24 trk, w/16 trk heads, spares, docs. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

Revox B-77, 1/2 trk $1100, Revox B-77 1/4 trk, $900; Sony TCR-81 stereo, $200; Sony TC-770-2 portable, $00. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Scully 280A 8 trk, BO. M Geraci, Light Scope, 420 W 45th, 4th FL, NY NY 10036. 212-757-0204.

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Ampex 350-2 2 trk 7.5/15 ips tube elec w/several sets new spare tubes, spare capstan motor, spare head cluster & manual. $500/BO. S Morton, KBBI, 215 E Main Ct, Homer AK 99603. 907-235-7721.

Teac A3340, rebuilt, heads, guides, rubber, $500/BO. G Knight, Creation Video, 711 Soft St, West Dundee IL 60118. 312-426-5363.

ITC 750 Series stereo, 4 PB units, all have 25 Hz tone detectors, gd cond, $7500 for all plus crating/ship. S Smith, WKSB, 717-327--1400.

Tascam 22-2, almost new, $525. A Tranmer, KBOY, POB 1280, Boise ID 83701. 208-336-3670.

Ampex AG600 & Ampex AG600B, both solid state w/cases & books, one works, one needs work, could make one gd machine, $300 plus ship/both. S Blair, WKCB, Rt 550 West, Hindman KY 41822. 606-785-3129.

Ampex 354, (3) Ampex AG-350, Teac, Sony & Pioneer, most in gd cond, some need work. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

Ampex AG500 w/(2) sets of elect & stereo heads, $200. N Carlson, Mobile Snd Group, 721 W Melrose, Chicago IL 60657. 312-871-7459.

Ampex AG350 (2) single trk, gd cond, $500/both. K Barty, KWQB, POB 1301, Fargo ND 58107. 218-236-7900.

ITC 850 in fair cond, stereo, BO. P Christanson, WIVY, 2101 Univ S, Jacksonville FL 32216. 904-721-9111.

Ampex AG 500 vgc, $350; Ampex PR-10 stereo, vgc, $200; Ampex 440E, mono & rack mount, vgc, $950; Tape-A-Thon 900 stereo w/travel case & rack mount, vg mech cond, has hum in 1 chnl, $300. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

Panasonic, cassette deck, gd cond, $75; Wollensak R-R, $75. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Otari ARS 1000 w/25 Hz detector, never used, $1200/will ship. J Young, KIBS, POB 757, Bishop CA 93514. 619-873-6324.

Ampex 8 trk 1" recorder, MM1000, gd cond; TC 650 Sony 2 trk 1/2 trk recorder, gd cond. G O'Neal, Tiki Recd, 195 S 26th, San Jose CA 95116. 408-286-9840.

Altec 604 spkrs, $400 ea; Ampex ATR-800 2 trk, $4200; Ampex 440-C (2), $3600 ea. A Adams, United Research, 681 5th Ave, NY NY 10022. 212-751-4661.

Teac V-350 stereo cassette decks (2). $85 ea; Teac V-300 stereo cassette deck, $75. P Costa, Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832.

Pioneer RT-1011L stereo 1/4 trk, 4 head, fair cond, w/manual, $175/BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

Ampex 351 (3) working (3) in parts, $500 for all/BO. R Furby, KORE, 2080 Laura, Springfield OR 97477. 503-747-5673.

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ITC 750 PB, $100 & ITC 750 R/P stereo, $300, both need minor repair. L Wilkins, WLWI, POB 4999, Montgomery AL 36195. 205-240-9274.

Scully 280-B 1/2 trk stereo, gd cond, Russlang cabinet. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Ampex PR10 & 600, $125/BO. M Kantor, WPOB, 50 Knickerbocker, Plainview NY 11803. 516-822-6915.

Ampex 351-2, $500 or trade; Echo Echoplate II, $500 or trade. H Sewell, Oakridge Recd, 2001 Elton Rd, Ft Worth TX 76117. 817-838-8001.

Scully 10-1/2" w/electr, needs heads & cleaning, works great, all books, $600/BO. Wollensak, in original box, works great, $75. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Ampex 602, 2 speed, $225. B Diffee, WRXO, POB 1176, Roxboro NC 27573. 919-599-0266.

Otari MX 5050B2 2 trk (2), one in Russlang cabinet, other in Otari floor stand, both in gd working cond, 6 yrs old, relatively new heads, $1600 ea/BO plus ship. L Josephson, Radio Foundation, 1 W 89th, NY NY 10024. 212-595-1837.

Ampex 4 trk w/electr, 1/4" 1/2 & 1/4 trk heads, remote, $2550. D Green, Waves Snd Rcdrs, 1956 N Cahuenga, Hollywood CA 90068. 213-466-6141.

Uher Reporter 440, $150. JB Salazar, Gods Missionary Revival Crusade, 102 E Lyon, Laredo TX 78040. 512-722-6832.

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Sony 501PCM 2 chan digital recorders (2), one $700, one $500 as is. R Sanchez, Lincoln Fine Arts Radio, 3600 S 48th St, Lincoln NE 68506. 402-486-2520.

Technics 1520 (2) 2 trk, $500 ea. R Sanchez, Lincoln Fine Arts Radio, 3800 S 48th St, Lincoln NE 68506. 402-486-2520.

Ampex single chan chassis tube elect, $50 ea. M Preace, Foothill Deanza Comm Coll, 12345 El Monte Ave, Los Altos Hills CA 94022. 415-960-4260 or 408-773-9793.

Ampex 351 2 trk, 7.5/15, $450; 1/4 trk 3.75/7.5, $250. M Preace, Foothill Deanza Comm Coll, 12345 El Monte Ave, Los Altos Hills CA 94022. 415-960-4260 or 408-773-9793.

Scully 250-2 R/P, 2 ch 2 trk stereo, 7.5 & 15 ips, 10.5" cap, rack mountable simulsync, rarely used mint cond, w/manuals, $925 firm. J Lee, WNGS, POB 1292, Lake Worth FL 33460. 305-969-3684.

Ampex PR10 w/manual, $100; Crown 700, 2 trk, w/manual, $150. R Nimtz, Univ of Notre Dame, POB 542, Notre Dame IN 46556. 219-239-6423.

Scully 280 R/P, takes up to 14" reels as-is, repairable, w/book, $200. N Allebaugh, WICE, 100 John St, Cumberland RI 02864. 401-725-9000.

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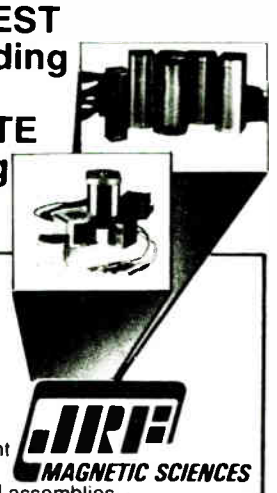

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Late model R-R w/10-1/2" reel capability. D Jackson, WPRN, POB 566, Butler AL 36904. 205-459-2835.

Revox A77 remote control. G Sive, Your Video Connection, 31844 Rancho Amigos, Bonsall CA 92003. 619-749-7662.

Head stock for Ampex AG 600. J Schloss, KICD, 2600 Hiway Blvd, Spencer IA 51301. 712-262-1240.

CONSOLES

Want to Sell

Ramsa WR500 mixing console, portable, vgc, $750. C Butler, Butler Bdct Srvs, 1775 Bartlett, Orange Park FL 32073. 904-264-8769.

Autogram IC-10 10 chan rotary, 28 inputs total, on air, updated 1-87 w/Henry Engr module package, $7500; CRL SEP-800 4 chan EQ stereo processor, 2 yrs old, $1200. R Lane, KTYD, 5360 Hollister Ave, Santa Barbara CA 93116. 805-967-4511.

Quantum 12A custom, excel cond, w/ATA-type flight case w/casters & full docs, $2950. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Ampex MX35's (3), $250 ea/all for $725; Sigma 4 chan (3), $100 ea/all for $275; Altec portable mixers (2) 1567A, $265 ea; Harmon-Kardon mixers (2) mdl DPR7, $100 ea, echo bleeds (3) passive off mic input lines to echo Fisher or any, $25 ea/all for $60. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660.

Shure SE30, 4 input mic mixer w/compressor, $300; Sparta A10B 4 pot mono, cond unknown, BO. R Dietterich, SBN, 411 Grande Plaza, Pittsburgh PA 15219. 412-471-2181.

Micro-Trak 6618 6 ch stereo, 18 inputs, 4 yrs old, $850. G Durham, WWXL, Rt 5 Box 50, Manchester KY 40962. 606-598-5102.

Gates Executive program amps (2), $200 ea. Sparta RA-4 remote mixer, $165. K Gordon, 10622 SW 100 St, Miami FL 33176. 305-271-1571.

Gates Yard mono (2), 1 OK, 1 needs repair, 1 power supply. R Ness, WCSG, 105-1/2 Main, Morris IL 60450. 815-942-0022.

Gates Gateway mono 8 ch solid state complete w/book, gd cond, will trade. $1300. T Crockett, Hot Tracks Recdg, POB 10501, Blacksburg VA 24062. 703-953-0222.

Gates Stereo Statesman, $600. B Payne, 5198 Perry Rd, Mt Airy MD 21771. 301-875-2423.

Autogram IC 10 stereo, new, few hrs. BO. R Kaufman, POB 462247, Garland TX 75046. 214-271-7625.

UREI 1681, trade for 4 output prod mixer of like quality. M Cohen, KDUR, POB 7339, Durango CO 81301. 303-247-7261.

Altec 1567A mic mixer, $90. N Carlson, Mobile Snd Group, 721 W Melrose, Chicago IL 60657. 312-871-7459.

Gates Yard mono 8 chan, complete & working, $200; Spectrum SA-90 slide pot stereo prod board, fair cond, $30. John, 315-487-2393.

Ampro DCS10B 40 chan, dual stereo, talkback, mono mixdown amp & some spares, gd cond, $2000. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Cetec/Sparta AS30B 5 ch stereo w/TTs, low hrs, stored 6 yrs, like new cond, new Stanton cartridges, all preamps incl, detachable legs, $125. J Gardner, Cutting Edge Prod, 2 Maria Hotchkiss Rd, Prospect CT 06712. 203-758-4769.

Quantum 16 x 16, gd cond. G O'Neal, Tiki Recd, 195 S 26th, San Jose CA 95116. 408-286-9840.

BE 4M50 mono, 4 chnl std mixer, excel cond, $500; 5 chnl mono board, looks like a BE board, vgc, has changeable circuit boards, $350. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

Quantum/Concept Design console, modified, 16 x 8 x 2, direct coupling & 5534 IC's, has noisy pots, BO. D Petrik, KACE, 1710 E 111th St, LA CA 90059. 213-564-7951.

Gatesway 10 chan mono in gd cond, $700. C Cage, WERT, POB 487, Van Wert OH 45891. 419-238-1220.

Sparta AS100-B 4 ch; Sparta A-15B, mono M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Gates Executive, 10 pot, clean, $1900. D Swanson, KTFC, RR 2, Sioux City IA 51106. 712-252-4621.

Harris Executive 10 chnl working fine. $1500. L Wilkins, WLWI, POB 4999, Montgomery AL 36195. 205-240-9274.

CCA Futura 6, looks clean, $300, Collins 212-T2 stereo w/extras, $2200. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328.

UREI 1681 to trade for prod console of like quality. M Cohen, KDUR, POB 7339, Durango CO 81301. 303-247-7261.

Tapco C12 mixer, 12", 4-2-1 main outs, plus echo & effects sends & returns, 3-band EQ, monitor, aux & effects busses, (4) large meters switchable between busses, headphone monitor, manual & spare parts, gd cond, $1000/BO plus ship. L Josephson, Radio Foundation, 1 W 89th, NY NY 10024. 212-595-1837.

API console parts: type 2061 input modules, 4 ch/assembly, faders, blank panels, connectors, meters & metal rails. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

Ramsa WRT-820 w/optional meter bridge, new, never used, $3900. B Covert, WMBO, 504 Metcalf Plaza, Auburn NY 13021. 315-253-7355.

Autogram IC10 stereo, new, few hrs, BO. R Kaufman, POB 462247, Garland TX 75046. 214-271-7625.

Harris Stereo 5, excel cond, BO. B Mishkind, KFXX, 3222 S Richey Ave, Tucson AZ 85713. 602-748-1450.

API console parts, type 2061 input modules, faders, meters, 440 faders, 475 faders, custom echo returns, custom monitor section. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

Ramko DC 38-8S 8 chnl stereo, $700. A Moore, WVOC, POB 21567, Columbia SC 29221. 803-772-5600.

Altec 250 SU tube type, 9 in 2 out, excel cond, BO. B Woolf, 3986 Edidin Dr, Jacksonville FL 32211. 804-744-1661 aft 5 PM.

Automated mix system retrofitable to any console, Optimix disc based system w/40 chan capacity, 32 VCAs in this system, $10K. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

RCA 5 chan, 4 inputs/chan, gd cond, $500; Ampro DCS10B, clean & rebuilt, gd cond, $2000. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

CCA Futura Six stereo broadcast board, works, $750. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

Harris Gateway, mono 8 chan, now in service. BO. JR Cox, KRZK, Box S, Branson MO 65616. 417-334-6003.

Ampro, 5 chan mono, fair cond, operating, $175. P Wolf, WRCC, 2600 Pine Island Rd, Cape Coral FL 33909. 813-574-5548.

Neotek Series I, 16 x 8 x 2, $5000. BEM 100 dual mono bdct console, $895. Teac mdl 3, 8 x 4, $250, all complete w/full manuals. T Trott, 305-323-0472.

Soundcraft 200B-24 audio mixer, excel cond, $2500. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

Yamaha PM-430 8 x 2 portable mixer, mint cond, $700. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

Gates Yard power supplies & monitor amps (2) in excel cond w/tubes, $75 ea; GE BC-1A power supply, gd cond, needs minor work, $30; Gates Yard misc parts, some new, some used, call for details. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

Russco 505 mono, new, $900. J Bretzke, 709 Colgate, Lancaster TX 75115. 214-227-9077.

BE 4M50 mono 4 chan, w/spare chips, gd cond, $500. B Brown, Pro Bdct Serv, 3720 Greenwich Rd, Louisville KY 40218. 502-459-8792 aft 5 PM.

API console parts: amps, faders, meters, older 2061 type input modules, 4 chan/assembly, 24 chan monitor mix section. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

Want to Buy

Stereo board, 6 chan for on air. M Gaunt, WHCB, POB 2061, Bristol TN 37621. 615-878-6279.

Console, bdct quality, donation or reasonable price, tax deductable. R Yoder, WJMU, Millikin Univ, 1184 W Main, Decatur IL 62522. 217-424-6369.

Harris Stereo Statesman, doesn't need work but complete. T Crockett, Hot Tracks Recdg, POB 10501, Blacksburg VA 24062. 703-953-0222.

DISCO & SOUND EQUIP.

Want to Sell

JBL L-100 Century monitors, avg cond, $300 plus ship. W Laughlin, KDCV, 2636 N 56, Lincoln NE 68504. 402-466-8670.

Home made tape echo machine, 16 delay, needs work, 2 trk, play heads 8202, all heads lapped or new, $650. S Russell, 60410 Klett Dr, Decatur MI 49045. 616-782-9258.

EMT 140ST reverb plate, excel cond, $2950/BO. R Vogt, VQR Digital, Box 302, Needham MA 02192. 617-444-8686.

Koss ESP-10 electrostatic headphones, $325, AKG K-240 headphones, $40 ea; Telex CB-88 headset for CB system, unused, $35; assorted loudspeakers from $5. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Pultec HLF-3C hi & lo filter. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

JBL 4311B, $400/BO for pair. M Fiedler, Mahoney-Fiedler Prod, 5346 Dupont Ave S, Minn MN 55419. 612-822-0013.

Sennheiser HD414, $25. J Sunier, Audiophile Audition, 21 Stetson Ave, Kentfield CA 94904. 415-457-2741.

Fairchild 644B (2) equalizer module, BO. P Cibley, Cibley Music, 138 E 38th, NY NY 10016. 212-986-2219.

8 trk recording pkg, all US gear, take car/truck trade, $5500. G Burchett, Dur-K Inc, 842 Belfont Princess Rd, Ashland KY 41101. 606-324-8812.

Delta-Lab DL-4 digital delay, $275; Loft delay line/flanger, $200; Eventide phaser, $375, Omni-Craft 4 chan noise gate, $200; UREI 9 band stereo graphic EQ, $425. P Costa, Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832.

dbx 157 stereo, as new. G O'Neal, Tiki Recd, 195 S 26th, San Jose CA 95116. 408-286-9840.

JBL 4313-B speakers, gd cond. G O'Neal, Tiki Recd, 195 S 26th, San Jose CA 95116. 408-286-9840.

JBL 4301B monitor speaker in excel cond, $100; JBL 2345 w/15" & horn in excel cond, $250. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

JBL L-26 speaker system, gd cond, $100, JBL L-19 speaker system, like new, $125; one set of extender boards for Ampex 440 series recorders w/record, play & bias extenders, also one spare reproduce board. $150. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

Valley People 440 comp/limiter (2), $245 ea. EXR exciters SPI (2), $225 ea; Alesis XT digital reverb, $325. P Costa, Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832.

dbx 161 compressor/limiter, $150. D Green, Waves Snd Rcdrs, 1956 N Cahuenga, Hollywood CA 90068. 213-466-6141.

Echoplate III reverb 142, vgc, $800. D Green, Waves Snd Rcdrs, 1956 N Cahuenga, Hollywood CA 90068. 213-466-6141.

Ursa Major 8X-32, digital reverb w/programmable memory, like new w/manual, rack mountable, stereo, $800. K MacGregor, 38 Talbot Ln, Greenwich CT 06820. 203-531-6075.

Orban 622B, parametric EQ, stereo, 4 bands/chan, excel cond. K MacGregor, 38 Talbot Ln, Greenwich CT 06820. 203-531-6075.

Mic splitter, 3 space rack panel w/3 Audisar transformers plus 1 Hi Z to Lo Z instrument transformer, ground lift switchers. $125. Scamp mini rack w/power supply, TT patchbay, 504 parametric, S23 stereo autopanner, F300S expander/gate, 501 compressor, $1500. R McMillen, Cascade Recdg, 3809 SW Marigold St, Portland OR 97219. 503-293-1170.

EML 101 synthesizer plus Roland 104 analog sequencer, FAT 4 oscillator analog sound, $500/pr. R McMillen, Cascade Recdg, 3809 SW Marigold St, Portland OR 97219. 503-293-1170.

Want to Buy

Ibenez MSP 1000 limiter/EQ. D Wade, Collegium Snd, 3541 72nd, Jackson Heights NY 11372. 718-426-8555.

LIMITERS

Want to Sell

Harris MSP-90 AGC amp, BO or pr of DAP 310. J Caracciolo, WLIR, 175 Fulton Ave, Hempstead NY 11550. 516-485-9200.

Ampex Compellor in superb cond. B Matta, 5001 Baum Blvd, Pittsburgh PA 15213. 412-683-2020.

Orban 8000A, $1800. B Downs, KJCS, Box 11111, Nachadoges TX 75963. 409-564-4444.

UREI LA4 (2) limiters, $250 ea. H Underwood, Underwood Audio, 1909 Tree Corners Pkwy, Norcross GA 30092. 404-449-5502.

CRL APP-400, gd cond, $375, CRL SMP-800, gd cond, $600. P Wolf, WRCC, 2600 Pine Island, Cape Coral FL 33909. 813-574-5548.

CRL PMC 300 processor, BO. C Mendel, KAMP, POB 1018, El Centro CA 92244. 619-352-2277.

Gates Harris solid state limiters, $100. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515.

UREI LA5, w/rack mt, $250/BO. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

Fairchild Conac 600 mono, $250, Gates Stay-well M5167, $200. L Oliver, 304 W 89th, NY NY 10024. 212-874-7660.

Harris-Gates M6631 1976 matched pair w/manuals, $250/both. S Blair, WKCB, Rt 550 West, Hindman KY 41822. 606-785-3129.

Orban 8000A, new caps, hi slew IC update, $2000/BO. D Hacker, WHZZ, POB 23, Huntington TN 38344. 901-986-22205.

Gates M5546 Level Devil. R Ness, WCSG, 105-1/2 Main, Morris IL 60450. 815-942-0022.

Automated Bdct Controls Sta-Max composite processor, gd cond, $300; Pacific Recorders Multi Max AM limiter similar to BL-40, gd cond, $500. R Dietterich, WAMO, 411 7th Ave, Pittsburgh PA 15219. 412-471-2181.

Orban 8100 Optimod, excel cond; (2) Gates Sta-Level compressors; Spectra-Sonics compliminter, CBS Audimax II, tube type. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Orban 8100A Optimod, excel cond, $3700. Orban 8000A, excel cond, $1900; Dorrough 610 stereo processor (2), w/80-B stereo gen excel cond, $4900. P Christenson, WIVY, 3101 University S, Jacksonville FL 32216. 904-721-9111.

Pye stereo compressor, discrete transistor design from early 70's, spare parts & doc. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

UREI LA-4, excel cond, $150. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

Orban 8000 Optimod, excel cond, new caps, $1500. P Russell, Bowdoin College, WBAR, Sills Hall, Brunswick ME 04011. 207-725-3066.

Marti CLA40, BO. C Cage, WERT, POB 487, Van Wert OH 45891. 419-238-1220.

Dorrough 310 DAPs (3), gd cond. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

Texar Audio Prism, stereo, pair w/RCF-1 card for Optimod, excel cond, $3000. P Christensen, WIVY, 3101 University South, Jacksonville FL 32216. 904-721-9111.

Gates Solid Statesman FM 994-6631-006 (2), $150 ea/$275 both, CBS FM Volumax 411, $180. John, 315-487-2393.

CRL 300A peak mod controller, in use, vgc, $380/BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

Distributor Directory

The following distributors serving the broadcast industry would be glad to help you with any of your requirements.

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RW Broadcast Equipment Exchange

LIMITERS . . . WTS

CBS 450 dynamic presence EQ/manual, $250, Harris ME-1 mod enhancer, $75; (2) Gates Level Devils, $75 ea; (3) Kahn Symmetra-Peaks, $75 ea; (2) Gates SA-39 limiter, BO; Altec 1591 compressor, $200; CBS 411 stereo Volumax, $600; (2) Collins 26W, BO; (2) RCA BA-6, BO; Gates dual limiter, $300. M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

Harris MSP-100 mono, working but needs minor power supply work, $300. L Wilkins, WLWI, POB 4999, Montgomery AL 36195. 205-240-9274.

CRL APP300A, SEP400A, PMC300A mono audio processing unit. V Balkcum, WGBR, 914 W Grantham, Goldsboro NC 27533. 919-736-1150.

Harris Solid Statesman, as is, works but needs minor repair, $75. L Wilkins, WLWI, POB 4999, Montgomery AL 36195 205-240-9274

Want to Buy

Sony **PCM's**, all models T McCartney, KBSU, 1910 University Dr, Boise IA 83725. 208-385-3760.

MICROPHONES

Want to Sell

Beyer 740 studio condenser mic, perfect cond, large diaphram, 5 patterns, $700 R Duvall 84 Martens Rd, San Rafael CA 94901 415-456-7106

Sony C-37A tube mics, large diaphragm, all orig w/supplies, tables & cases, mint cond, $995/pr/BO/trade. R Katz, Allegro Snd, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-766-9101

Sennheiser MD421U, almost new, $175 A Tranmer KBOY, POB 1280, Boise ID 83701. 208-336-3670

Neumann U47 w/PS & mic stand, $2000 L Oliver 304 W 89th, NY NY 10024 212-874-7660

Pressure zone mics, original pre-Crown versions (6) $120 ea/$685 for all R Streicher, 545 Cloverleaf Way, Monrovia CA 91016 818-359-8012

Sennheiser 404 & 405, both need work, spare cables, PS, BO/trade, parts for AKG C-28 & S7C 4126A, mainly outer shell & windscreen R Robinson, TNA, Box 57, Wallingford CT 06492 203-269-4465

EV RE-15 in excel cond, $100. L Bergman, Universal Snds, POB 18716, Spokane WA 99208 509-328-0766

Comrex RRB 450 belt pack xmtr & rack rcvr, 455 5 & 455 9, $200. L Wilkins, WLWI, POB 4999, Montgomery AL 36195. 205-240-9274.

AKG D330BT, vocal mic, LF filter & hi-boost, $110, E-V CS15 condenser, cardioid, similar to AKG 451, $125. R McMillen, Cascade Recdg, 3809 SW Marigold St, Portland OR 97219 503-293-1170.

Parts for AKG C28A & S7C 4126A mics R Robinson, TNA, Box 57, Wallingford CT 06492 203-269-4465.

RCA 77DX (2) very clean w/orig cloth covers, like new, $500 ea. B Pinkstaff, Pinkstaff Prod, POB 5262, Santa Monica CA 90405 213-399-1942

E-V 642 shotgun, gd cond, $95. B Dickerson, WPXE, Box 520, Starke FL 32091. 904-964-5001.

RCA UZ 4089-A antique ring spring condenser mic w/stand, used by Roosevelt in Demo convention of 1932, excel original cond, w/framed letter of authenticity, $395. R Cane, Miami Picture & Snd, 6142 Miramar Pkwy, Miramar FL 33023. 305-962-8111.

Want to Buy

Neumann U67, reasonable working order. R Kaufman, POB 462247, Garland TX 75046. 214-271-7625.

Old mics for collection, working or not, esp want 44BX, 77DX, other ribbon mics, Altec Birdcage, 20's carbon mics, Shure PA mics, stand, booms, cables, etc, also collect radios & TV's from all eras. L Josephson, Radio Foundation, 1 W 89th, NY NY 10024. 212-595-1837.

American DR-330, must be in gd working cond. JM Newman, Box 7703, Atlanta GA 30357 404-876-8623.

MISCELLANEOUS

Want to Sell

RCA 5 H, 10 ohm, 2 A mod choke, very heavy, free but you ship. S Todd, 2911 Simpson St, Roseville MN 55113 612-633-4458

Ford Van, 1981 w/Onan 4 kW gen, Wilburt mast, air sys, control 13500 BTU air, cell phone, sophisticated Alpine secur. sys S Costantino, DW Sargent Bdct Srvs Inc, 804 Richard Rd, Cherry Hill NJ 08034. 609-667-8573

Sola 63-13-150, gd cond, constant line voltage protector & harmonic neutralizer, $250/BO; BE cart rewinder, like new, $200; Elgin ERL-19645-4, gd cond, $75. P Wolf, WRCC, 2600 Pine Island, Cape Coral FL 33909. 813-574-5548.

Impedance matching transformers (5) for Sescom MI7 & (1) UTC A27, $15 ea or $65/all. P Cibley, Cibley Music, 138 E 38th St, NY NY 10016. 212-986-2219.

Jack strip, 52 RTS, dbl closed circuit jacks, gnds normalled, gd cond, $100/BO; UTC xfmrs A-21, (2) A-22, (2) A-24, (2) A-39, $20 ea/$120 all; (2) UTC A-33 20 dB magnetic shields, $10/both; line xfmrs (2) EV 502, EV 502B; Shure A86A, $12.50 ea/$40 all; Pioneer JA-R102 rk mnt adaptor kit, $7. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

Equipment rack, BO C Haynes, W JMI, POB 31235, Jackson MS 39206. 601-9- 8-1515.

Patch bays, 24 inputs (4), $75 ea/all for $225, Daven pots for volume controls, clean (8), take all, mounted, $100, Canon plugs, almost 100, all for $150. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660

Teletype 43 data terminal, weather wire. G Hornung, KRGI, POB G, Grand Island NE 68802. 308-381-1430.

Okidata 82A printer, fair cond, runs well, BO K Browall, KTRZ, Box 808, Riverton WY 82501. 307-856-2922.

Harris 25 nitrogen tank regulator w/2 gauges, used 45 days, factory cond. K Browall, KTRZ, Box 808, Riverton WY 82501. 307-856-2922.

ADC Propatch w/punch tool. BO. T Driggers, Driggers Bdctg, 818 Quail Ct, Healdsburg CA 95448. 707-433-9370.

Manuals & spec sheets from Ampexes 350-351, Neumann U47 & others; Gotham Neumann disc cutter & Gotham amps & many others. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660

HP 440C VTVM, $35. R Streicher, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

Rack, 72" high standard 19" grey metal, w/screws & rackmount kits for Teac & Technics open reel decks, gd cond, $150. J Sunier, Audiphile Audition, 21 Stetson Ave, Kentfield CA 94904. 415-457-2741.

Traffic/acc't computer, 24 meg hard disk w/monochrome monitor, w/traffic for AM & FM, A/R, A/P, payroll & general ledger, music scheduling & spread sheet, w/manual, $6000 plus ship/handling. D Booth, KMJX, 11300 Rodney Parham, Little Rock AR 72212. 501-224-6500.

Teletypes, (3) w/keyboard strip punch & read & stands, also several McIntosh monitor amps, plus much misc gear & parts. A Somers, KBBY, Box 5600, Ventura CA 93003 805-656-6300

Riders PA manual, Vol 1, $65. B Woolf, 3986 Edidin Dr, Jacksonville FL 32211. 804-744-1661.

Equipment rack, new, 77" rack space, white, $275, 5 rack, fair cond, $50, 77" great cond, $100 M Banks, WSTH, 208 Main, Alexander City AL 205-234-2566

Equip rack, 77" rack space, $100. M Banks, WSTH, 208 Main, Alexander City AL 205-234-2566.

Equipment rack, custom made, 19", table model, black in vgc, $75. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

Simpson 543 3-1/2" illuminated A scale VU, new, $40/pr M Matthews, Rockwell, 3318 Shield Ln, Garland TX 75042 214-996-6844.

NBC NGT Alert, clean, $50, Prodelin AMC antenna position controller, $75, Cunningham crossbar switcher mechanism & extra relay, $75 M Holladay, WCOS, POB 748, Columbia SC 29303, 803-256-7328

MultiTech Systems FM-30 data coupler; Roto-Phase single-phase to 3 phase electr converter, Regency scanner; Marti SCR-8-H subcarrier receiver; Moseley SCD-8 subcarrier demod; McMartin TR-2001 SCA tuner; Moseley SPD-1 secondary pgm demod, Johnson ST-4A SCA tuner; RCA (Moseley) BTX-101; Moseley SCG-4T SCA gen, QEI 811 SCA gen. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111 801-364-3561

Weston 640 0-3 RF amps, $5 ea min 25 ordered; Daven attenuators 1.5-2 dB steps, (15) new, $400 for all. S Bartkowski, WEDC, 4923 W 28th, Cicero IL 60650. 312-863-3090

AM RF ammeter switch, $35, Weston DC ammeter 2031, $25; manual for McMartin BA-1K xmtr, $10. John, 315-487-2393.

Kelik voltage reg, 3 phase 103 A, from 208-250 V, $1700. J Scaggs, KGNZ, 542 Butternut, Abilene TX 79602. 915-673-3045.

WECO 94N & 120E repeat coils, $10 ea R Kerbawy, WTNJ, Box 1127, Beckley WV 25802. 304-877-5592.

Radio Shack 4, 2 disk drives, BO J Bretzke, 709 Colgate, Lancaster TX 75115 214-227-9077.

Anvil travel road case, new, $150. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

Radio Shack 64K color computer, word processor, TP10 40 column printer, Centronic 588 DM printer, $150 plus ship R Kerbawy, WTNJ, Box 1127, Beckley WV 25802 304-877-5592.

Patch panels, 6 rows tip, ring, sleeve, normalled, 24 jacks/row, stereo or mono, $50 wire wrap, $35 solder plus ship. R Kerbawy, WTNJ, Box 1127, Beckley WV 25802 304-877-5592.

Square D 100 A 3PDT safety switch, $100 plus ship R Kerbawy, WTNJ, Box 1127, Beckley WV 25802. 304-877-5592

S-A SAT-32, trade 15 kHz audio card for 7 5 kHz card G Avey, KHSL, POB 489, Chico CA 95927 916-893-8926

Want to Buy

Cetec Stereo 10 console manual or copy for cash SA Cisler Orbit Radio/Video, 2405 Hermitage Way, Louisville KY 40241 502-458-7420

UTC LS-49 or Chicago BD-2 audio xfmr or similar class B driver M Carroll, So Bctg Svcs, 108 Wessington C Hendersonville TN 37075 615-822-0082

Book for Magnecord 1028, dry air pump & econoload (20 kW). J Schloss, KICD, 2600 Hiway Blvd, Spencer IA 51301. 712-262-1240.

Softwave & hardware for computer logging & traffic for radio station. C Alexander, WYTW, Box 669, Cadillac MI 49601. 616-775-1071.

MONITORS

Want to Sell

Gates 1970 M-4990 tuned to 1540 kHz w/manual, $35 plus ship. S Blair, WKCB, Rt 550 West, Hindman KY 41822. 606-785-3129.

TFT stereo monitor, like new cond, $1650. R Dietterich, SBN, 411 Grande Plaza, Pittsburgh PA 15219. 412-471-2181.

Nems-Clarke 108E antenna monitor, $40/BO; Gates M5240 remote xmtr monitor, $50/BO plus frt. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556

RCA (Moseley) BW-100B FM RF amp, McMartin MMR-1 AM EBS rcvr; McMartin TBM-2500 RF amp M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111 801-364-3561

Gates MO-2639 AM, $100; McMartin TBM-4500A FM, $500; Collins 250 W AM xmtr, $1200 firm, Gates GTM-88R FM RF amp, $140, Gates M03 stereo gen $400, McMartin TVM-3500 FM mod mon, $100, Simpson 488 TV VHF meter, $100 John, 315-487-2393

Collins FM mod monitor, BO or trade for stereo audio console or TTs Kosack, 516-489-1071.

HP 335B FM monitor, tuned to 99.9 MHz w/manual & all tubes, $75; GR Type 11 AM freq monitor, 1010 kHz w/manual & all tubes, $30. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172 716-751-6187.

Want to Buy

McMartin EBS receiver tuned to 94.7 or equiv. L Seidenberg, WSCT, POB 1350, Aberdeen NC 28387. 919-944-1350.

Manuals & schematics for GR731 mod mon & 475C/681B freq mon. S Todd, 2911 Simpson St, Roseville MN 55113. 612-633-4458.

CCA AMM-1D AM mod mon.; CCA AMF-1D AM freq mon. B Barry, WAMB, 1617 Lebanon Rd, Nashville TN 37210. 615-889-1960.

MOVIE PROD. EQUIP.

Want to Sell

Auricon 16mm pro sound film camera w/amp, mic, cables & 3 prime lenses, excel cond, $475. H Deans, Deans Prod, 170 Grand, White Plains NY 10601 914-949-5920.

Bolex H16 16mm, like new in case, $250; Bolex 16mm reflex, 3 primes, sync cassette recorder in case, $375; Canon 1014XLS Super 8mm snd camera w/boom mic & wireless mic, photo lens hood, like new in box, $395 H Deans, Deans Prod, 170 Grand St, White Plains NY 10601. 914-949-5920

Film synchronizers (3) 16mm Magnasync-Moviola, (6) 8mm Precision-United, (2) Maier-Hancock 16mm hot splicers, 35mm splicer, winders, Opta-Sound power supply, BO. M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

Arriflex UST 5B1 single system audio amp, $200 plus UPS Maine Reel Comm, 67 Green St, Augusta ME 04330. 207-623-1941

Want to Buy

Kodachrome 16mm film 100' rolls, Ektachrome, 100' rolls, recent or out dated stock, Super-8 cartridges, Kodachrome & Ektachrome. H Deans, Deans Prod, 170 Grand St, White Plains NY 10601. 914-949-5920. **Magazines**, 2000' for Kodak Cine cameras & 400' for Bolex cameras H Deans, Deans Prod, 170 Grand St, White Plains NY 10601 914-949-5920.

RECEIVERS & TRANSCEIVERS

Want to Sell

Realistic C-Quam AM stereo tuner, $40. R Humphrey, WLTJ, 1051 Brinton Rd, Pittsburgh PA 15221. 412-244-7600.

Wilson WE-800, 144-148 MHz, synthesized transceiver, 1 W/12 W, 12 VDC or internal NiCad batt, w/spkr-mic & hand-tooled leather case, mobile mnt, $200/BO; ICOM IC-280, 144-148 MHz, synthesized transceiver, 1 W/10 W, 3 memory chan, mobile mnt, Drake 1525 touchtone pad mic, $175/BO. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

Jerrold Modline shelf assembly (4) M-AM, (3) M-MP, (2) M-AA modules, $200/lot. M Holladay, WCOS, POB 748, Columbia SC 29303 803-256-7328.

Want to Buy

Crystal or tube, VHF 2-way radio, base, mobile or hand-held, give price & cond; manuals CTCSS, etc DM Jordan, 718 Rheinlander Ave C, Evansville IN 47712.

SCA receiver, any make P Hons, Mainline Comm, 100 Poplor St, Portage PA 15946 814-736-3883.

REMOTE & MICROWAVE EQUIP.

Want to Sell

Avcom SCPC 2000C analog satel rcvr, used 1 yr, Mutual crystals, BO. K Browall, KTRZ, Box 808, Riverton WY 82501 307-856-2922

Consultants

Call for Availabilities.
Phone 800-336-3045

Employment

To place ads in this section, use the Action-Gram form. To respond to box numbers, write Radio World, Box 1214, Falls Church VA 22041, Attn: __.

HELP WANTED

CE, NE major mktg FM, need results oriented person w/gd people skills & top level construction & maint abailities Send resume to Radio World, POB 1214 Falls Church VA 22041 Attn: Box 11-1

POSITIONS WANTED

Bdctr looking for right FM-CP to buy or help build RNS & Assoc, POB 50124, Austin TX 78763 512-346-5056

Tech writer to work on contract translating info from engineers to operating & maint manual for bdct equipment JA Risse, 1223 Monroe Ave, Dunmore PA 18509 717-344-6194

CE, hardworking, looking for FT position w/growing company, well qual in AM/FM, 10 yrs exp, will consider announcer w/Country station, in KS, CO, MO, NE, OK, TX, IL & IA. Larry, 402-461-3528.

CE seeks work, eng 2 college stations, NBN, HBO MDS CE NYC, CET FCC licensed & certified, NABER, NARTE & ISCET member. M Rakoff, 114-41 Queens Blvd, Ste 148, Forest Hills NY 11375 718-591-0002

DJ, young, ambitious, experienced seeks a FT position on medium or large market Gospel or Christian Rock station, medium market exper, 9,000 hrs on air. C Hull, 2834 E Malone Box 8, Sikeston MO 63801. 314-683-6044 (12-3 PM).

CE, 1st Class license, skills in maint, repair & ops of radio bdct & prod equip, supervisory & admin skills, knowledge of FCC regs R Lewis GM, KLON, 1288 No Bellflower, Long Beach CA 90815

RW Broadcast Equipment Exchange

REMOTE . . . WTS

S-A DAT 32 complete receiving system, $9850. G Wachter, The Bdct Group, 631 N 1st Ave, Phoenix AZ 85003. 602-258-6161.

Gates M5863 complete, working when removed. R Ness, WCSJ, 105-1/2 E Main, Morris IL 60450. 815-942-0022.

M/A-com MA4001 receiver, 19" rack mnt, excel cond, $550. T Crockett, Hot Tracks Recdg, POB 10501, Blacksburg VA 24062. 703-953-0222.

Marti KPT, gd cond, 1 W, 161.67 MHz, $550. P Wolf, WRCC, 2600 Pine Island, Cape Coral FL 33909. 813-574-5548.

ITC FM-1 telco interfaces (3), never used. BO. K Browall, KTRZ, Box 808, Riverton WY 82501. 307-856-2922.

Moseley PBR15 needs work, $275; McMartin TR55D SCA receiver, $45. T Wortmann, WJAG, 309 Braasch Ave, Norfolk NE 68701. 402-371-0780.

Microdyne 1100 Series down converter for SPSC receiver, BO. J Kiefer, WXVQ, Box 1777, DeLand FL 32721. 904-734-9386.

Moseley TRC-15AR gd cond on 67 kHz, $1750/BO. B Mishkind, KFXX, 3222 S Richey Ave, Tucson AZ 85713. 602-748-1450.

Equatorial satellite rcvr, 5100 controller, like new, mdl 5102-00, BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

TFT 7601, 10 chan remote control, w/studio & xmtr units, set up for telco, gd cond. B Simmons, KRRV, POB 1598, Winston OR 97496. 503-679-8185.

Comrex PTLX portable 2-line encoder, freq extender which transmits 5 kHz over 2 dial or dedicated lines, built-in telephone interface for 2 program lines w/3rd for comm, $3000. A Patnode, Convenant House, 440 9th Ave, NY NY 10001. 212-330-0403.

S-A digital sat receiver, w/(2) 15 kHz ch, 2.5 kHz cue ch, crystals for ABC, NBC, CBS & United Stations. B Potterton, KSGN, 11498 Pierce St, Riverside CA 92505. 714-687-5746.

Coastcom mainframe w/(2) 412-360 demods plus power supply, excel cond, $3000. K Barty, KGWB, POB 1301, Fargo ND 58107. 218-236-7900.

Farinon 2.5 GHz system (2) complete single ch point-point 10 W video microwave systems. 2450-2500 MHz, both w/synthesized ENG rcvrs & 8' Annixter grid. P Tatge, American Comm Srvs, 1 American Plaza Ste 310, Evanston IL 60201. 312-869-8001.

Moseley MRC-1600 telco; PBR-15A, TR-55A telemetry rcvr, TR-66 telemetry rcvr; 1077-2 meter panel; 185 kHz SCA demod. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111. 801-364-3561.

Gentner Microtel 1 w/AC adapter, remote mixer modified for high gain, $125. P Kaminski, Sportcom/Motor Sports Radio, 1285 Zevan Rd, Johnson City NY 13790. 607-770-9165.

Shafer remote control, old but works, $200. J McGinty, WEKC, Jackson Mall, Williamsburg KY 40769. 606-864-7843.

M/A-com 23 GHz 23 VFM (2) complete single ch video microwave systems, one at 21.825 & one at 21.925. P Tatge, American Comm Srvs, 1 American Plaza Ste 310, Evanston IL 60201. 312-869-8001.

Moseley PCL 505/C STL composite in very gd cond, 2 yrs old, factory checked, 951.000 MHz, $4000/BO. J Torsitano, KARZ, POB 1918, Redding CA 96099. 916-244-2600.

Modulation Associates ASAT SCPC rcvr, wide band, for reception of NPR, Mutual, etc, excel cond, $1095. G Kippel, KAMB, 90 E 16th, Merced CA 95340. 209-723-1015.

Want to Buy

S-A 32 digital network receiver, compatible w/ABC, CBS, NBC & CNN. K Kuenzie, KSLQ, 102 Elm Ste 203, Washington MO 63090. 314-239-6800.

Wide band STL system. J Stromquist, WNCB, 2816 Hagberg St, Duluth MN 55811. 218-722-3017.

Microdyne downconverter & agile demod for Westar III transponder 2, Fairchild Dart 384 sat receiver & downconverter for major networks. R Miller, WRVI, Box 68, Virden IL 62690. 217-965-3388.

Harris 6550 or equal satellite receiver, must have functioning down converter & power supply. D Voss, KADR, Round Rt 1 Box 86, Elkader IA 52043. 319-245-1400.

SCPC sat receiver equip. D Schleutker, 4066 Lewis, Oceanside CA 92056. 619-726-8989.

STATIONS

Want to Sell

AM/FM stations, excel NW Colorado coverage, sacrefice by owner, terms/$360,000. D Gayer, KKMX, Hayden-Steamboat Springs CO. 303-233-8433.

Richmond VA, 5 kW AM station at 1410 kHz in 10th fastest growing county in the country, must divest immediately. P Scott, 804-345-9395.

Hi power AM, FC CP in SE. D Evans, 803-223-1334.

FM Class A, AM daytimer, fully automated combo, 3 bedroom, std-office, 2800 sq ft, 750 sq ft xmtr bldg all on 3 acres of land, retiring, $350,000. JP Robillard, 1803 N First East, Haynesville LA 71038. 318-624-0105.

Want to Buy

Looking for AM, FM or CP in east for right price/terms. H Kozlowski, 703-631-0197.

Small to medium station(s) in Mid-Atlantic, or New England states. Underdeveloped AM's, FM's or combos with gd terms will be considered. Write to RW, POB 1214, Falls Church VA 22041. Attn: Box 1-1-88.

Will buy your AM, FM or combo, your price, my terms, no money down, brokers protected, I pay all fees, any location. Box 81, Westhampton NY 11977.

STEREO GENERATORS

Want to Sell

Harris MSP-95 high freq limiter, stereo gen main frame, gd cond, w/manual & extender card, $400/BO. M McVey, KMCD, 57-1/2 Cort St, Fairfield IA 52556. 515-472-4191.

Power Pak SMG 40 stereo gen, $1500. J Scaggs, KGNZ, 542 Butternut, Abilene TX 79602. 915-673-3045.

Sparta 682 solid state gen, $500; McMartin B-113R SCA, $300. John, 315-487-2393.

Leader LSD 231 FM stereo gen, like new w/manual, $170/BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

SWITCHERS (VIDEO)

Want to Sell

Crosspoint Latch 6112BH 8 input, $5000. W Norman, A/V Industries, 15 E Mall, Plainview NY 11803. 516-753-9393.

Utah Scientific AVS-1 20 x 20 video, 10 x 10 stereo audio redundant power supplies & control processors, (3) CSP 20's, (2) CPD PL's, CSP10, SC150, CSP800R, $17,000. B Waiss, Instant Replay Prod, 1349 E McMillen, Cincinatti OH 45206. 513-861-7065.

TAPES, CARTS REELS

Want to Sell

Oldies Rock-N-Roll, 1000 songs stereo library on Audiopak carts, perfect cond, used for trade show, $4000. T Hall, Radio Prog Svcs, 3615 E Vintah, Colorado Springs CO 80909. 303-574-8628.

We have largest quantity of reprocessed audio tape in the world. We also have the lowest prices! Sizes from 5" to 14" & 1/4" to 2", all brands, all types. We carry a full line of cassettes, broadcast carts, reels, boxes & related accessories at unbeatable prices. Call for our new catalog & more info. 1-800-331-3191/516-678-4414 in NY. Burlington Audio Tapes, 106 Mott St, Oceanside, NY 11572.

NAB reels, 10.5" metal 1/4" all in gd cond. 1-10, $1.50 ea, 11-100, $1.25 ea, 100+, $1 ea. Falk Recd Srvs, 7914 Fegenbush Ln, Louisville KY 40228. 502-239-1010.

Top 100/200 songs or jingles from '36-'55 all or part on records or tapes, fire destroyed library. S Stevenson, Stevenson Corp, POB 735, Blaine WA 98230. 604-531-4576.

Light AC music library on stereo carts, $3500. R Humphrey, WLTJ, 1051 Brinton Rd, Pittsburg PA 15221. 412-244-7600.

Replacement record jackets, white, 50 $10 plus shpg. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

3M 206 1/2" (12) full, (2) partial hubs. 208 full hub. Ampex 406 full hub, $5 per hub; (2) 1/2" metal 10" reels, $3 ea, entire lot $75. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

3M 206 1" tape, (6) full on reels; (2) 208 full, one on reel, other on hub, Ampex 406, partial on hub, $10/roll or entire lot for $75. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

U-Matic 3/4" video cassettes, (9) short lengths, 5-10 min, w/vinyl cases, $2.50 ea/$27 all. E Helvey, Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

Video tapes, 3/4", BO; & 1" VTR, $750. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515.

R-R tapes, 10" (150), $1.50. T Wortmann, WJAG, 309 Braasch Ave, Norfolk NE 68701. 402-371-0780.

Scotch 2500' 1" (13) new, all $150, Scotch 2500', 1/4" (12) 206 new, all $100; also 5", 7", 12" reels, cheap. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660.

TDK endless loop cassettes, still in shrink-wrap, 1 min, 5 min & 6 min, call for prices. M Masterson, KEOL, State College, La Grande OR 97850. 503-963-1397.

Various cart makes & lengths (120 approx). $1 ea. K Wallace, KPCO, Box 11370, Quincy CA 95971. 916-283-1370.

Aristocarts, hundreds, selected $2 ea, ROS $1 ea. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328.

RCA Thesaurus, 16" music transcription library, BO. R Bellevia, WSBC, 4949 W Belmont, Chicago IL 60641. 312-282-9722.

Want to Buy

Scott Ross show & sim pgms, pre'78, any format, +debate btwn Dr Walter Martin & Madalyn Murray O'Hare. STodd, 2911 Simpson St, Roseville MN 55113. 612-633-4458.

ITC WRA record unit Premium line, w/all tones, mono pref, but will consider stereo. B Surratt, WINA, POB 498, Charlottesville VA 22902. 804-977-3030.

Jingle demo reels & pkgs to trade. D Ferreira, WFCR, POB 416, Sunderland MA 01375. 413-665-8536.

TAX DEDUCT. EQUIP

Donations wanted, video D/A, proc amp, waveform monitor, vector scope, test gen & remote control, need not work, be repairable, will pay shipping. R Holler, WAOYWV, 1285 Houseman Rd, Colorado Springs CO 80950. 303-634-4896.

Eng student desiring donation of old bdct equip (anything), EE student at Purdue. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

Donations of prod gear for non-profit FM. M Cohen, KDUR, POB 7339, Durango CO 81301. 303-247-7261.

16mm equip for developing educ & ecological films, any equip accepted. Dr R Gerber, College of St Joseph, Windham ME 04062. 207-892-6766.

School needs 250 W FM xmtr & mod monitor, any make, any model, can provide tax deduction receipt. M Persinger, Dixie College, St George UT 84770. 801-673-4811.

Non-profit Gospel station looking for parts for Altec 250 T-3 console. Gospel Spotlight of N GA, POB 406, Summerville GA 30747.

TEST EQUIPMENT

Want to Sell

Tek waveform monitors, BO. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515.

Eico audio gen, $50. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

Heath SG-18A, gd cond. Heath assembled $100/BO. P Wolf, WRCC, 2600 Pine Island, Cape Coral FL 33909. 813-574-5548.

B&K 850 color analyst, $25. S Weber, KGRV, POB 1598, Winston OR 97496. 503-679-8185.

Weston 640 0+3 RF amp panel meters, brand new, $5 ea; Daven attenuators (14) $400 for all. S Bartkowski, WEDC, 4923 W 28th, Cicero IL 60650. 312-294-6523.

Multitester 1480 w/meter, $50. Presto in/out dummy load w/meter, $50. Heath scope 012, $50. Lafayette audio gen TE22, $50. Fisher k10 expanders echo spring box, $50 ea (3). Power xformer PC8411, $40. Hot Stylus for cutting discs w/meters & ampere boxes (2), $50/both; all of the above for $300. L Oliver, 304 W 89th St, NY NY 10024. 212-874-7660.

GR 1606A RF bridge, excel cond, $400. M Matthews, Rockwell, 3318 Shield Ln, Garland TX 75042. 214-996-6844.

ACTION-GRAM

EQUIPMENT LISTINGS:
Radio World's Broadcast Equipment Exchange provides a FREE listing service for all broadcast and pro-sound end users. Simply call 1-800-426-8434 to place your listings courtesy of Broadcast Supply West.

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Listings are available on an $18.25 word basis. Call 800-336-3045 for details and complete display rates.

EMPLOYMENT SECTION:

Help Wanted
Any company or station can run "Help Wanted" ads at the flat rate of $18 per listing per month (25 words max). Payment must accompany insert, there will be no invoicing. Blind box numbers will be provided at an extra charge of $2. Responses will be forwarded to listee unopened upon receipt. Call 800-336-3045 for display rates.

Positions Wanted
Any individual can run a "Position Wanted" ad, FREE of charge (25 words max.) and it will appear in the following 3 issues of Radio World. Contact information will be provided, but if box number is required, there is a $2 fee which must be paid with the listing (there will be NO invoicing). Responses will be forwarded to the listee unopened.

Check as appropriate: ☐ Help Wanted ☐ Positions Wanted ☐ With Box Number ☐ Without Box Number

Text (25 words maximum): _____

Name _____ Title _____

Company/Station _____

Address _____

City _____ State _____ Zip _____

Telephone _____

BROADCAST EQUIPMENT EXCHANGE
PO BOX 1214
FALLS CHURCH VA 22041

Broadcast Equipment Exchange

TEST . . . WTS

Radion VHF/UHF ch 2-83 & FM field strength meter, needs work/cal, w/schem & spare tubes no manual, $80; Tek 315D 5 MHz scope, works well, $80/BO S Todd, 2911 Simpson St, Roseville MN 55113 612-633-4458

Sound Tech 1710A dist measurement system w/options 3, 5 & 7, excel cond, $2500; Ferrograph RB 2 & ATV balance box, in/out audio test set, $1200; Tek 528A, 1420 waveform & vectorscope w/single & rack mount cases, $2500. R Kragen, Box 397, Roosevelt NJ 08555. 609-448-4739

Bird Thruline 4712 w/matching 1-5/8" flange section, plus 500 & 5000 W elements, 50 to 125 MHz, as new cond, $300 B Tilton, KMNT, 1635 S Gold, Centralia WA 98531 206-736-3321

Potomac FIM 41 field meter 540 kHz, 5 MHz, excel cond, $1000; 1606-A RF bridge, excel cond, 41300; Potomac SD-31 synth & rcvr, excel cond, $1500; operating impedance bridge, $700; HP 5382A freq counter, $400; Duo site range height finder, BO; portable radio 2-way xmtg equip, BO; field intensity meter 120D, $200; Ballantine 314A voltmeter, BO R Silliman, 8121 Georgia Ave, Silver Spring MD 20910. 301-589-8288.

Potomac 120E field intensity meter, gd working order, $600/BO; HP 5212 elect counter, gd working cond, $150/BO E Hudson, WIYD, 900 River St, Palatka FL 32077 904-325-4556.

RCA WX-2C (Potomac FIM-120-E) field intensity meter, excel physical/electr cond, 1972 cal w/manuals, $750 or trade for excel cond Revox A77, Sparta AS-30 stereo console or LPB S-13 stereo console. D Sites, AmConGen, MRS, APO NY NY 09108-0002.

Potomac SD-31 RF synthesizer/detector, $2000, Potomac FIM-21 field strength meter, $1500; Potomac FIM-41, $2100; Delta OIB-3 operating impedance bridge, $2200; or all for $7000. H Ginsberg, WKAJ, 1 Bdct Plaza, West Ave, Saratoga Springs NY 12866. 518-584-1610.

B&W distortion meter, $75. J McGinty, WEKC, Jackson Mall, Williamsburg KY 40769. 606-864-7843.

Bird 460 wattmeter, gd cond, duel port unflanged, $300. J Schloss, KICD, 2600 Hiway Blvd, Spencer IA 51301. 712-262-1240.

GR 1001, G$250; Tek 585 w/82 & cart, $400, Tek 524D w/cart, $100; Ballantine 411 U/B, $75, B&W 410 dist meter, $75, Precision E200C, $30; Kay Marka-Sweep, $35, 3M 6500 recorder test set, $300. M Holladay, WCOS, POB 748, Columbia SC 29303 803-256-7328.

Heath CT-1 capacitor tester, $15, Heath function, tone gen SG-1271, $60 John, 315-487-2393

MLS Touch-Test 20 multimeter, Heathkit impedance bridge; Heathkit transistor checker IM-36; HP 400D voltmeter; RCA WX-2B field strength meter; EICO 460 scope, Heathkit 10-101 vector scope. M McKenzie, KALL, 312 E S Temple, Salt Lake City UT 84111 801-364-3561.

Want to Buy

Field strength meters, AM. (2) gd cond V Baker, POB 889, Blacksburg VA 24060 703-552-4252.

Spectrum analyzer to 10 GHz (ie: 491, 8551B, etc). K Ericson, KOSI, 10200 E Girard B131, Denver CO 80231. 303-696-1714.

TRANSMITTERS

Want to Sell

Gates FM 1-G w/exciter, used in service, BO. J Gerard, WIHS, POB 117, Middletown CT 06457 203-346-3846.

Versa Count 10 W FM exciter/xmtr w/stereo gen, $1500. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515

Gates BC500G on 1170 kHz as stand-by. V Baker, Box 889, Blacksburg VA 24060 703-552-4252.

RCA TTU 12 kW on chan 49, spare xmtr for parts included, $9500/BO. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515

Adler 100 W RA-7 xmtr, $600. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515

LPB AM25A, mint cond, tuned to 860, $500; Andrew LDF5-50, 100' roll, 7/8" coax, $250 plus ship; CCA 10 W FM, clean cond, in cabinet, tuned to 88.9, complete w/(2) Andrew V-bay antennas & coax, $800 plus ship. B Mountjoy, Custom A/V, POB 1240, Elizabethton TN 37644. 615-543-5849.

RCA BTF20E FM 20 kW FM, w/BTE 115 exciter, 7 yrs old w/excel current proof, power increase prompts sale, BO. L Vandam, Peninsula Bdctg, POB 152, Newberry MI 49868 906-293-5114

LPB RC-25C, needs repair, w/manual & most spare tubes, $75 w/ship S Todd, 2911 Simpson St, Roseville MN 55113 612-633-4458.

Wilkinson FM 1500E, FME-10 exciter & stereo gen, all in new cond, $10,000. J Gerard, WIHS, POB 117, Middletown CT 06457. 203-346-3846.

Harris/Gates Type M 6095 stereo exciter, tube type, also stereo gen M6146, in working cond, BO. R Farrelley, 815-963-6080.

RCA 1R1 AM xmtr, avail 30 days. 1000/500 W, buyer arranges shipping A Aymen/J Thomas, WLEW, 935 S Van Dyke, Bad Axe MI 48413. 517-269-9931

Gates FM1C 1 kW xmtr plus exciter, in use as standby, gd cond, $2200 C Cage, WERT POB 487, Van Wert OH 45891 419-238-1220

CCA AM 2500D, 2.5 kW AM xmtr, excel cond, tuned to 1190 kHz C Frodsham, KVSV POB 7, Beloit KS 67420 913-738-2206

RCA power supply for BTF-5E other 5E components, Rust model OD remote control units, $200, Ampex AG600, $300; Ampex 3202 duplicator, 4 slaves, $2500; second master for $500. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328

CCA 1000DS, excel cond, w/2-bay ant at 91.3 MHz, $7500 K Kruger, KGTS, 204 S College, Collegeplace WA 99324. 509-527-2991

Collins 20V3 excel cond, on air, $6000 J Scott, WENT, Harrison St Ext, Gloversville NY 12078. 518-725-7175.

RCA BTE115 & BTS101A 15 W FM exciter & stereo gen w/manual, gd cond, $1500/BO M Peters, POB 33004, Phila PA 19142.

Collins 250 W AM, excel cond, perfect for export, $2000 firm J Couches, KBRL, 183 Jane Dr, Syracuse NY 13219. 315-487-2393

Gates FM5G w/MS15 exciter & low pass filter, S Delay, WCVS, 3055 S 4th St, Springfield MO 62703. 217-544-9855

Want to Buy

Xtal ovens for RCA BTE 10B exciter 120 V heaters, freq not important; also junk 10B exciter, must have gd T103, PA tube cage, O-scope cover & gd L105 helpful, S Todd, 2911 Simpson St, Roseville MN 55113 612-633-4458.

Standby FM xmtr, 3-5000 watts for Panama City FL. Peter Bardach, 201-827-2525

Short wave xmtr, 50 or 100 kW. G McLintock, WWCR, 3314 West End Ave, Nashville TN 37203. 800-238-5576

FM xmtr, 2.5-5 kW, donation or reasonable price, tax deductable. R Yodes, WJMU, Millikin Univ, 1184 W Main, Decatur IL 62522 217-424-6369.

FM xmtr, 1 5-2.5 kW. M Gaunt, WHCB, POB 2061, Bristol TN 37621 615-878-6279

Harris MW-10 or similar 10 kW AM no later than 2/88. H McDonald, KKMT POB 710, Ennis MT 59729. 406-682-7171/406-252-4391

FM xmtr (2) for educ chnls, 5-10 kW in gd cond V Baker, POB 889, Blacksburg VA 24060. 703-552-4252

5 or 10 kW AM & 20 or 25 kW FM B Zuela, KWSA, 1415 Laverne, Klamath Falls OR 97601. 714-636-5040.

Gates 2.5 H3 or other 2 to 5 kW FM xmtr J Ganley, WWWY, 1333 Washington, Columbus IN 47201. 812-372-9933

FM xmtr, 5 kW, Moseley 606C STL & remote control system. J Stitt, WIOK, 7075 Industrial Rd, Florence KY 41042 606-727-0800

LPTV xmtrs, 100-1000 W also need diplexer/filterplexer for chan 24. N Davis, 107 E Bruce, DeFuniak Spngs FL 32433 904-892-4038 (collect)

FM xmtr, 2.5 or 3 kW w/exciter. T Driggers, Driggers Bdctg, 818 Quail Ct, Healdsburg CA 95448. 707-433-9370

Collins 20V xmtr. R Smith, 2245 Felspar St, San Diego CA. 619-483-9331

TUBES

Want to Sell

100 misc tubes, cheap or swap, few oldies avail, SASE for list/call. J Mathes, WYNU, 115 Devonshire Sq, Jackson TN 38305. 901-668-9201.

RCA 6166 (10) 10 kW tubes for FM or TV, $1500. G Torres, GT Int'l, 48 W 48th, NY NY 10036. 212-730-7114.

Tubes, new 807's, $4.95 ea. N Carlson, Mobile Snd Group, 721 W Melrose, Chicago IL 60657. 312-871-7459.

Resistor, Ohmite 1500 ohm 175 W, $10; (5) EIMAC 4-1000A, $350 ea; (4) Amperex 4-125A, $30 ea; (2) Amperex 4-125A, $70 ea, 892R, $1200; (3) 892R, $300 ea; Bliley crystal oven type TC-92, $25; Mica capacitors. John, 315-487-2393.

Assorted tubes, call for list. B McGregor, McGregor Assoc, 1428 Lansdowne, Denim Sp LA 70726. 504-665-9808.

Want to Buy

Tubes, 6072/6072A, need 1000 pieces. R Katz, Allegro Snd, 15015 Ventura Blvd, Sherman Oaks CA 91403. 818-766-9101.

Xmtr tubes, 833A & other small xmtr tubes JB Salazar, MRC, POB 3246 Laredo TX 79044 512-722-6832.

TURNTABLES

Want to Sell

Rek-O-Kut lathe, in orig case, built-in record amp & speaker. D Sofonia, WTCM 314 E Front, Traverse City MI 49684 616-947-7675

Presto 6N disc cutter lead screws, 224/104/106 lines per inch, $50 ea/all $125, Rek-O-Kut CVS12 speed variance L Oliver, 304 W 89th St, NY NY 10024 212-874-7660

Rek-O-Kut B12H delux, w/arms, headshells &Stanton 500 carts, $40/both S Todd, 2911 Simpson St, Roseville MN 55113 612-633-4458

Audiometrics TP 84, 6 mos old, excel cond, $175, BE QRK 12C (2), excel cond, has Micro-Trak 300 tonearm w/new Stanton cartridges, 600E model, $500 for all. M Banks, WSTH, 208 Main, Alexander City AL 205-234-2566.

Rek-O-Kut B-12-GH 3 speed, gd cond, in base w/extra Shure tonearm, $100/BO E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

Russco Studio Pro (2), (3) Sparta, some w/tone arms, + misc preamps. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

Technics SL1200 MKII w/Stanton 310 preamp, Stanton 680EL cartridge, excel cond, $400. S Twitchell, Twitchell Prod, POB 982, Columbia MO 65205 314-875-6715.

SME 3012R (5) 16" tonearms, new, $200 ea; Gates 16" CB500 TT & pedestal, $95; QRK 12", $75. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328

QRK 3 speed w/Rek-O-Kut tone arms & head, vgc cond (2), $150 ea; Gates CB77 w/Grey tonearm & head in vgc, $100; RCA TT, plays up to 14" discs & has 2 tonearms, 1 for old transcriptions & 1 for regular recordings, 45, 78 & 33⅓ speeds, vgc, $250 L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766

Want to Buy

Technics pro TTs & parts, bad/non-working okay M Steven, WPON, 2222 Franklin Rd, Bloomfield Hills MI 48013 313-332-8883.

Tonearm, & 16" TT, 78, 33-1/3, 45 speeds, in working order, compatible with home stereo unit D Barlow, AG Edwards & Sons, PO Box 93, Columbia IL 62236 618-281-5588

TV FILM EQUIP.

Want to Sell

Conrac AV12E (2) TV tuner w/manuals, $50 ea; Vital VI-500 color processor w/manual, $100; RCA PK330 (2) B&W cameras, vidicon studio cameras, w/zoom lenses. B Humpherys, Utah St University, Dept of Telecomm, Logan UT 84322 801-750-3133.

VIDEO PROD. EQUIP.

Want to Sell

Digital Phasor IIA TBC w/freeze frame & drop out comp, $2500 R Kragen, Box 397, Roosevelt NJ 08555. 609-448-4739

JVC RM 70U remote control for CR6650U w/45 pin cable, BO P Cibley, Cibley Music, 138 E 38th, NY NY 10016. 212-986-2219

Panasonic 9" color monitor, $225; Panasonic twin B&W monitor, $295, Telemation sync gen, $500; Video Prod special effects switcher, $795. C Haynes, WJMI, POB 31235, Jackson MS 39206. 601-948-1515.

Panasonic NV-B50 AC adaptor, $15; Panasonic WJ111 color sync gen, $200; Sony ACP-220 AC pack, $50; Sony PSA-101 phase shifter, $100; (3) visual video DA's, rough, $50/lot; visual switcher mechanism, as-is, $30. M Holladay, WCOS, POB 748, Columbia SC 29303 803-256-7328.

Panasonic 9240 3/4" source deck, $2495; Panasonic 9600 3/4" editor deck, $2750; Panasonic A650 edit controller, $1650; total editing system, $6500 P Costa, Eastern Snd/Video, 462 Merrimack, Methuen MA 01844. 617-685-1832.

HP 78301A display control, $150; Thomson-CSF 9000 digital NR M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

Tek 527 waveform monitor, $450; Dage 100641 B&W 8" monitor, $100. B Weiss, KLSI, 1722 Main, Kansas City MO 64108 816-474-6400.

Power supply for BVU-800, used, BO or trade. 516-489-1071

Tek 527 waveform monitor, $450, Dage 100641 B&W 8" monitor, $100 B Weiss, KLSI, 1722 Main, Kansas City MO 64108 816-474-6400.

Want to Buy

Panasonic NV8500 & NVA500 edit controller; Convergence 100 Series interface card & cable for Sony type V. G Sive, Your Video Connection, 31844 Rancho Amigos, Bonsall CA 92003. 619-749-7662.

Convergence 100 interface card & cable for Sony Type 5 G Sive, Video Connection, 31844 Ranch Amigos Rd, Bonfall CA 92003 619-749-7662

Sony BVG 100 to be used for parts Kosack, 516-489-1071

Sony BVG 100 time code reader gen, for parts only. 516-489-1071

VIDEO TAPE RECORDERS

Want to Sell

NEC VC-9207 3/4" VCR players, like new, $795; JVC 5200U 3/4" VCR player, like new, $895 C Haynes, WJMI, POB 31235, Jackson MS 39206 601-948-1515

Sony VO2860 3/4" editing system w/2 VO2860 editing VCR's & RM430 editing controller, $2000. C Haynes, WJMI, POB 31235 Jackson MS 39206 601-948-1515.

Sony V-32 & RH-7V helical scan video tapes (9), $25/all, Sony AV-8600 color VTRs (2), $200 ea. John, 315-487-2393.

NEC time lapse VCR, 3/4" R/PB up to 72 hrs, $650, Panasonic 9500 3/4" VCR R/PB, $900, IVC 1" portable VCR R/PB, $850, plus UPS on all. J Baltar, Maine Reel Comm, 67 Green St, Augusta ME 04330 207-623-1941.

Mitsubishi HS-347UR 1/2" VTR, $250; Panasonic AG 6200 1/2" Pro VTR, $1000. R Sanchez, Lincoln Fine Arts Radio, 3800 S 48th St, Lincoln NE 68506 402-486-2520

Sony BVU 50, gd cond, w/AC power supply w/BP90, $1500 G Sive, Video Connection, 31844 Ranch Amigos Rd, Bonfall CA 92003. 619-749-7662.

Want to Buy

BVU 820 or 950 w/slo-mo; trade 1956 Mark II Lincoln for 1" C format editing system. J Harsh, Country Club II, HCR1 Box 117E, Oakley KS 67748 913-672-3428

RCA TR800's & access, need not be working. H Henson, Henson Prod, 4569 Havencrest Rd, Winston-Salem NC 27106 919-924-8717.

Sony SLO-323 (10-20) decks, also parts. G Hobart, Pacific Comm, 1801 E 4th, Olympia WA 98506 206-754-7081

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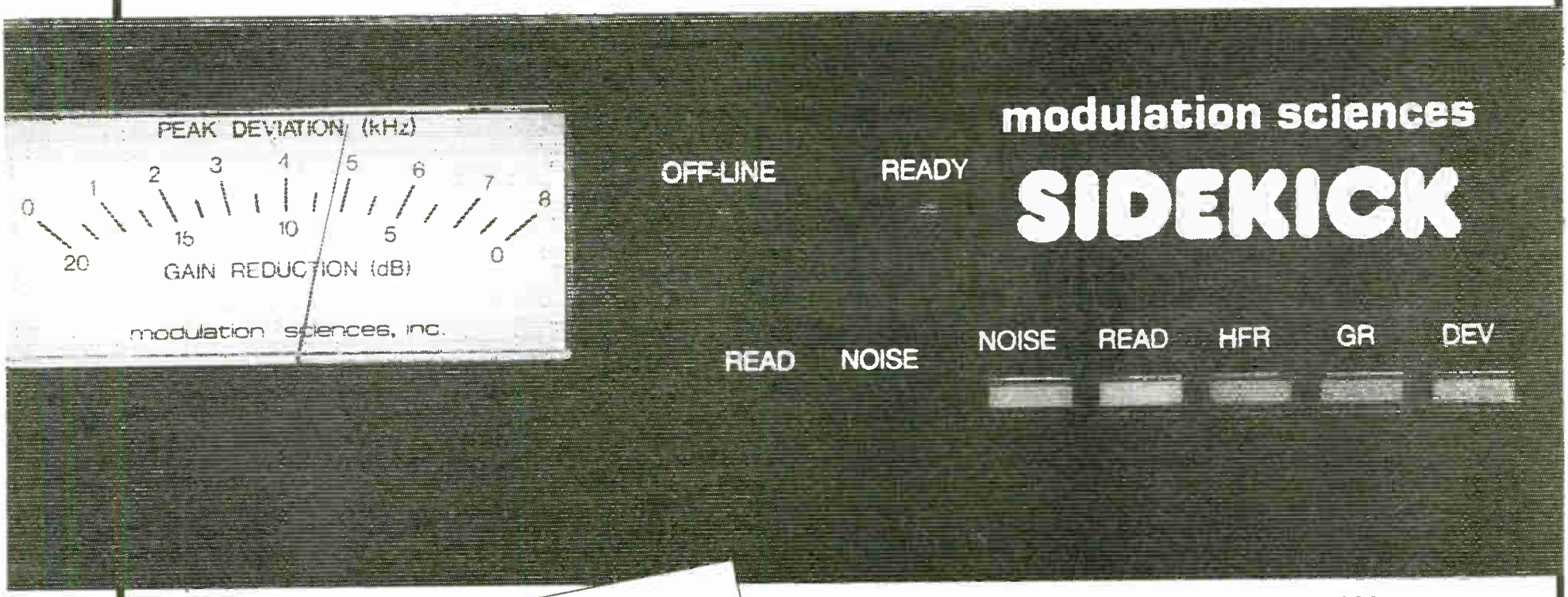

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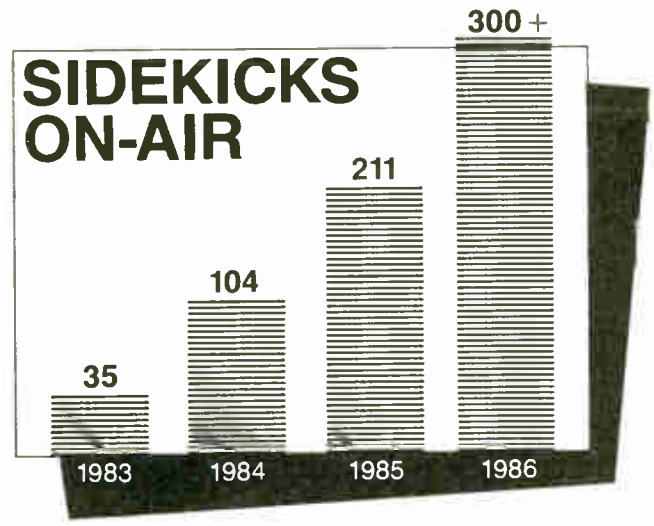

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