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December 1, 1987

Volume 11, Number 23

## NAB Files Petition on NRSC

by Alex Zavistovich

Washington DC... If the FCC approves a petition for rulemaking recently submitted by the NAB, use of the preemphasis standard established by the National Radio Systems Committee (NRSC) will be mandatory for AM broadcasters by 1990.

The petition, which also received the support of the National Telecommunications and Information Administration

(NTIA), is one of several new steps the NRSC has taken in improving the overall quality of AM broadcasting in the US.

Other measures being launched by the NRSC—with funding from the NAB—include a comprehensive report on FCC AM technical standards and psychoacoustic listening tests to determine audience tolerance of interference to AM broadcasting.

### Rule change requested

On 6 November, the NAB submitted a request to the FCC to have the transmission portions of the NRSC standard for AM broadcasting incorporated into the Commission's rules.

The 75  $\mu$ S preemphasis curve and the

10 kHz audio bandwidth aspects of the NRSC guideline were specifically cited in the petition for FCC adoption. The NAB also suggested 1 January 1990 as the effective date for the rule changes.

According to the petition, having the standard made mandatory would "provide the level of certainty needed to encourage prompt radio broadcaster conversion to the NRSC standard" and would "justify" receiver manufacturers' conversion to the standard in radio design.

Other benefits to be derived from adoption of the standard, the NAB maintained, are the reduction of interference to the AM band and an increase in "useful AM service areas."

The suggested change to the FCC rules "is consistent with the Commission's authority and its previous statements concerning the need to improve AM radio," the NAB stated.

To date, 422 stations have sent postcards to the NAB confirming conversion to the NRSC standard. But the NRSC estimates that number could rapidly double, based on sales of NRSC equipment from processing manufacturers.

### Review provision not included

Notably absent from the NAB petition is the five-year review provision which was part of the NRSC guideline when it was approved as a voluntary standard in September 1986. However, NAB Director of Spectrum Engineering Michael Rau said removal of the review made the petition "more credible."

Under the terms of the original standard, the review would go into effect in 1992, explained Rau, who is also NRSC coordinator. It would not be practical to have the mandatory standard activated in 1990, only to have it subject to review and perhaps suspended two years later, he commented.

If the review leads to future changes in the standard, the NAB can petition to have the rule changed, Rau added.

The move to make the NRSC AM transmission standard mandatory was applauded in a letter addressed to FCC Chairman Dennis Patrick by NTIA Assistant Secretary for Communications Al Sikes.

Sikes, in his 6 November letter, commented that "the deteriorating economic condition of AM broadcasting is largely due to the poor comparison of AM's sound quality with the FM service."

He suggested that the adoption of the NRSC standard by the FCC as a regulation would "ensure that all AM broadcasters will abide by its specifications."

"This improvement is too important to be left to voluntary compliance with by the AM industry," Sikes continued.

### Further NRSC action

The push for mandatory status of its preemphasis/deemphasis standard is not the only action taken by the NRSC in its search for improvements in AM broadcasting.

The committee is also involving itself in the FCC's review of its AM technical standards, as proposed in a Commission Notice of Inquiry adopted in mid-July.

The Commission's Notice of Inquiry was initiated to determine whether changes to its technical rules would improve AM service and competitiveness of the band in the marketplace.

Following a 4 November meeting of the NAB's Executive Board, Radio Board Chairman Jerry Lyman announced the NAB would allocate \$20,000 for a tech-

(continued on page 7)

## Rules On Lighting Prevail

Washington DC... RF lighting devices—which operate by stimulating gases with RF signals—will continue to be regulated by FCC standards regarding industrial, scientific and medical (ISM) equipment, according to a decision from the Commission which endorsed the status quo.

In a Report and Order released 2 November, the Commission concluded that the current ISM rules "have proven to be effective in deterring harmful interference to telecommunication services from the operation of RF lighting devices."

RF lighting has reportedly caused interference to the reception of AM signals on receivers in close proximity to the lamps.

Although the Commission closed the case without adding any standards for RF lighting, the FCC also announced its intention to "monitor the development" of the technology.

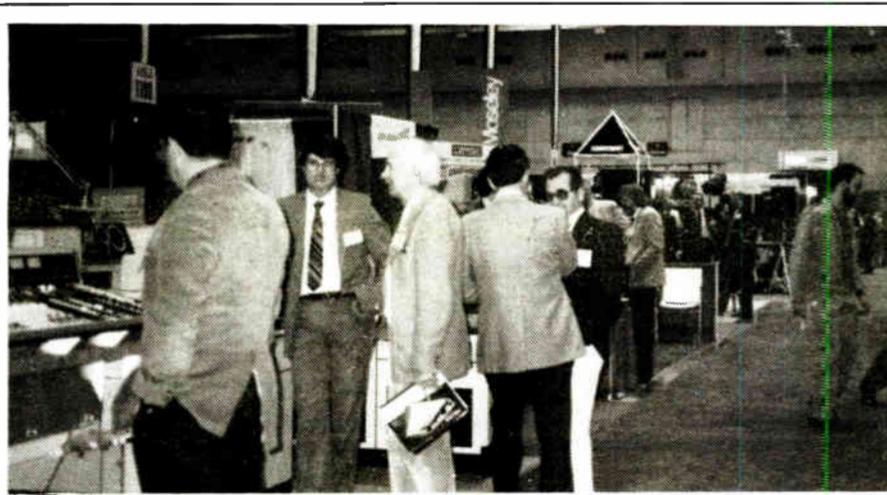
International standards for the devices, the FCC concluded, may be established through work in progress in the International Telecommunication Union and the International Electrotechnical Commission.

Developed for consumer use in the late 1970's, RF lighting had from the beginning fallen under the FCC's ISM standards. Manufacturers of the devices were required to recertify their products with the FCC every three years.

However, in 1983, the Commission allowed a waiver of the three-year recertification to any manufacturers who designed their devices to comply with more rigid emission limits than those set by the FCC.

The FCC also released a Notice of Inquiry to determine specific characteristics of the devices and to investigate whether the industry might be able to regulate itself.

(continued on page 12)



The SBE Convention in St. Louis gave attendees 178 booths to visit. See *Earwaves*, page 4 this issue; full coverage in 15 December *Radio World*.

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Circle Reader Service 37 on Page 22

## REGULATORY NEWS

# FCC Files

To file a petition or comments with the FCC, send an original and five copies of your filing to the Office of the Secretary, Federal Communications Commission, Washington DC 20554. When filing comments in support of another party's petition or comments, send a copy of your filing to the original petitioner and provide the Commission with a signed statement verifying that this has been done. For more information about a particular proceeding, call the contact person listed.

## Synchronous Transmitters

The comment and reply comment deadlines on the FCC's proceeding to authorize use of synchronous transmitters by AM broadcast stations have been extended by the FCC to mid-November and mid-December, respectively. This is the second such extension granted on the proceeding.

In filing its request for the latest extension, the NAB pointed out that technical data was still unavailable about several experimental synchronous tests being conducted at stations, including KROL in Laughlin, NV. The new deadline dates would "afford a reasonable amount of time for the receipt of the data," the NAB explained.

The issue is contained in docket MM 87-6. Contact Jay Jackson at 202-632-9660.

## AM Technical Deregulation

In August, the FCC released the text of a Notice of Inquiry aimed at reviewing the technical assignment criteria for AM broadcasting.

A formal review of the AM assignment standards was initiated by the FCC in July. The review addresses the question of whether to overhaul rules which set the degree of interference protection for AM stations, as well as those that establish service areas.

Other points addressed in the proceeding include co-channel and adjacent channel protection ratios, propagation models such as skywave curves, and emission limitations. The inquiry will also examine the methodology to account for multiple undesired AM signals at protected contours.

The wide-ranging inquiry will also ex-

amine antenna systems, man-made noise levels and receiver specifications. In addition, the FCC said it would look into the possibility of allowing stations to enter into private agreements to resolve interference conflicts.

The National Radio Systems Committee, an industry organization concerned with reducing interference to AM broadcasts, is developing a comprehensive status report as a comment in the FCC review. Likewise, the FCC's Radio Advisory Committee is also addressing the issue.

At press time, deadlines for comments and replies were set for 17 December and 17 February, respectively.

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

## AM Stereo

The FCC, which had been expected to issue a statement in early October regarding AM stereo, opted instead to defer action until later. Sources at the Commission declined to speculate on when such a statement might be issued.

The Mass Media Bureau's Bill Hassinger said FCC Chairman Dennis Patrick felt he was insufficiently prepared to make any statement about AM stereo during the FCC's meeting on 20 October.

The FCC was also expected to have ruled on two pending petitions. One, filed by Texar in September 1986, had requested that the Commission select a single AM stereo standard; the second, filed by Press Broadcasting in November 1986, asked the FCC to require multistandard circuits for AM stereo receivers.

The Commission was also asked by the National Telecommunications and Information Administration (NTIA) to develop criteria for AM stereo pilot tone protection and recommended protecting the C-QUAM pilot tone, but stopped short of suggesting the same for the competing Kahn ISB system.

Multisystem technology was labelled impractical in a report prepared earlier this year by the NTIA.

The FCC's AM stereo contact is William Hassinger at 202-632-6460.

## AM Daytimers

The FCC issued a proposal in early May that could allow daytimers on regional, and even clear channel frequencies, to add nighttime operations. If implemented, the plan would permit night powers similar to those now being used by US daytimers on Canadian and Mexican clear channels.

Comments on the proposal, which were due in mid-July, were mixed. Several parties indicated that the FCC should complete its inquiry into AM assignment procedures, unveiled 16 July, before moving to allow more daytimers to operate at night.

In addition to more hours for daytimers, the FCC's proposal also would make permanent a freeze on new daytimers. The FCC indicated in December 1986 that it would implement a freeze on the filing of applications for new daytimers. At the time, the FCC said this was a "temporary" measure. Pending applications for daytimers were not affected. No date has been set for FCC action on the plan.

In other news, the FCC in October authorized 21 of the 41 daytimers operating on Bahamian clear channel 1540 kHz for nighttime operations and adopted rules to allow some daytime-only stations to operate on 14 clear Class I-A channels at night.

In another development, the FCC has amended its rules to allow daytime-only AM radio stations to start daily pre-sunrise operations at 6 AM with a mini-

mum power of 10 W, as long as no interference is caused to groundwave contours of clear channel stations. For details on this rule change, see the article in this issue of RW.

Docket number of the fulltime plan for daytimers is MM 87-131. The docket number for the Bahamian clear channel issue is MM 84-281. Contact Louis Stephens at 202-254-3394.

## Dial-up remotes

The FCC, at a 15 October meeting of the Association of Federal Communications Consulting Engineers (AFCCE) unveiled a list of potential clarifications to its dial-up remote control transmitter rules.

The 11 points, which Commission officials say may be released as a public notice in the future, cover a wide range of remote functions. They specify that the use of dial-up circuits is legal for metering, adjustments and control. But they also indicate that EBS monitoring and backup control must be provided.

Contact John Reiser at the FCC: 202-632-9660.

## Broadcast Auxiliary

There has been no further action on an FCC proposal from late 1986, which planned "more flexible" operating and licensing procedures for a variety of broadcast auxiliary services, such as remote pick-ups.

The FCC is considering blanket frequency authorizations for mobile or portable operations on any frequency in bands the services are permitted to use.

Possible courses of action include a formal Notice of Proposed Rulemaking.

FCC docket number is MM 86-405. Contact Hank VanDeursen at 202-632-9660.

## RF Radiation

Already a month behind schedule, results of a joint FCC-Environmental Protection Agency (EPA) study of RF radiation levels emitted by broadcast towers in Spokane, WA were expected to be reported by the end of December.

The FCC had expected to receive the results from the EPA in October but did not.

FCC Physical Scientist Robert Cleve-  
(continued on page 6)

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# Committee Seeks Listener Input

by David Hughes

Washington DC ... The NAB's planned "psychoacoustic" tests of what consumers want in terms of technical quality from AM radio is being watched with interest by the Radio Advisory Committee (RAC).

Louis Stephens, the FCC's special advisory on international law, and chairman of the RAC's allocations subgroup which met 26 October in Washington DC, said that the NAB sponsored tests will provide information about the RAC's future course.

The RAC, composed of FCC and industry officials, advises the FCC on a wide range of issues ranging from AM improvement to the expansion of the AM broadcast band.

### Preferred SNR

The NAB's psychoacoustic study, which was approved by the association's executive board in early November, "will answer many key questions, such as what is the adequate signal level needed to overcome noise," Stephens said.

"People are now accustomed to FM quality and FM stereo," he added, "and

we have to determine what today's listeners want from AM."

NAB Counsel Barry Umansky said that the NAB has earmarked \$60,000 for the psychoacoustic test project which will get underway by early December. He anticipates a "late winter or early spring" completion.

"The FCC's (AM) technical rules were based on what listeners found acceptable in the 1930's and 40's," Umansky maintained. In the age of CDs, "we want to see if they should be updated," he stressed.

### AM improvement inquiry

In other news, the allocations subgroup and its companion, the technical subgroup headed by Wallace Johnson of the consulting engineering firm of Moffet, Larson and Johnson, will respond to comments filed on the FCC's AM improvement campaign.

In July, the FCC launched what it called a "comprehensive review" of AM's technical criteria, including interference contour and skywave propagation curves.

At press time, comments in the matter were due 17 December, with reply comments due 17 February.

According to both Stephens and Johnson, both RAC subgroups are continu-

ing their examination of the uses of the expanded AM band, from 1605 kHz to 1705 kHz. The RAC is scheduled to produce a report on its recommendations in early 1988.

### Geneva conference

The US will attend the Region 2 Administrative Radio Conference (RARC), to be held in Geneva, Switzerland in May and June 1988.

During this "second session" conference, which follows a first session held in 1986, delegates will finalize technical criteria plans for the use of the new AM broadcast band segment.

"Region 2" constitutes the western hemisphere—North and South America.

The next meeting of the technical subgroup was slated, at press time, for 17 November, while both the allocations and technical subgroups planned meetings 2 December.

All meetings were scheduled to take place at the NAB headquarters in Washington DC.

For more information on the RAC, contact Louis Stephens at 202-254-3394, or Wallace Johnson at 703-824-5660. For more information about the NAB's psychoacoustic tests, see the NRSC standard/NAB executive board meeting article in this issue.

## Holmes Tapped For FCC Slot

by Alex Zavistovich

Washington DC ... The FCC has come one step closer to solving the shorthandedness on the Commission panel since the departure of former Chairman Mark Fowler in April.

Bradley Holmes, long a frontrunner to fill the Commission vacancy, was nominated to that seat by the White House on 10 November.

Holmes, the preferred candidate of current Chairman Dennis Patrick, had for some months been rumored to be President Reagan's intended choice for the slot.

Currently Chief of the Policy and Rules Division of the FCC's Mass Media Bureau, Holmes joined the FCC in May 1984, serving as Patrick's legal assistant. At press time, no date had been set for his confirmation hearing by the Senate Commerce Committee.

Despite the nomination of Holmes, the Commission will still be understaffed. Commission member Mimi Dawson, who has been nominated to the position of deputy Secretary of Transportation, was at press time slated for a confirmation hearing on 17 November.

For additional information, contact the White House at 202-456-1414.



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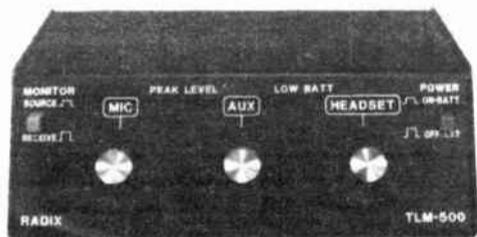


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# AM Stereo: Back on the Agenda

by Judith Gross

**Falls Church VA . . .** The FCC must realize that it can't dance around the AM stereo issue forever.

As we went to press the item was back on the agenda for the Commission's late November meeting, having been postponed from October.

By the time you read this, we'll know what, if anything, the FCC has done to help (or hinder) the growth of stereo AM.

On the Commission's agenda is consideration of three petitions. **Press Broadcasting** and **Scott Standiford** asked that multisystem AM stereo radios be a requirement.

The third, from processor manufacturer **Texar**, asks the Commission to select a single standard.



Commissioners will also take up the two NTIA studies on stereo, and the suggestion that went along with the second one: protection of the C-QUAM pilot tone.

The sense of things is that the Commission will turn thumbs down on petitions and such, but still come out with some sort of **all-encompassing statement** on AM stereo.

But how strong, or how mealy-mouthed will it be?

What would be really great, and take a lot of guts, is for the Commission to make some kind of strong statement in support of the dominant AM stereo system.

Then we could all put the matter to rest at last, and get on with the business

of improving AM in every other way.

But that may be too much to ask. Stay tuned.

☆☆☆

**MMB Chief Lex Felker** wasn't able to escape the AM stereo minefield at last month's SBE convention, where he was the luncheon speaker.

He talked about the Commission's current view on standards, saying "**standards is not a dirty word**," and that the FCC is now also considering the advantages, as well as the disadvantages of setting standards.

Then came Q&A, and consultant **Mark Persons** jumped up to voice what was on the minds of many.

"The Commission's marketplace approach to AM stereo didn't work," Persons said, "We need a standard."

Loud applause confirmed that the view is supported.

"Well," Felker replied, "if you all feel that way, then why didn't you just pick a system and go stereo?" Of course, no one bothered to point out that he was talking to engineers, not the GMs.

Felker went on to remind the group that initially the FCC did pick a system and "got beaten up for it."

He then said that if the Commission did pick a system "we aren't going to pick it by fiat, we're going to pick it by **rulemaking**, and maybe open it up to other systems," which he observed could take **two more years** (or longer).

Well, we've already waited five years and still the bickering and uncertainty prevail.

☆☆☆

This is your chance to show the industry how clever you are.

The NRSC wants to come up with a **trademark**, or some kind of nifty name for the **new high fidelity AM radios** that are expected to be the wave of the future.

The radios will incorporate the NRSC standard, and be stereo (non-specific as to system), and the NRSC wants to find



MMB's Felker fields AM stereo questions.



"Meet me in . . . . ."

some way to let the world know they are better than the old, narrowband low fidelity AM radios which have been on the market.

Someone at the last NRSC subgroup meeting suggested "AMX", similar to the FMX system being developed for FM . . . but I think RW readers can do better than that.

In fact, as Group W's Glynn Walden pointed out, we hope that "AMX" doesn't imply "AM" with a big "X" through it!

Anyway, *Earwaves* wants to hear your ideas for names for new, high-fidelity AM receivers with NRSC and stereo built in.

Make it clever, make it catchy, and send it to me at PO Box 1214, Falls Church VA 22041, or call 703-998-7600.

The best name (in our opinion) wins a coveted **Radio World** mug, and the runners-up get honorable mentions in a future column.

We'll forward all suggestions to the NRSC for consideration.

And, the NRSC should have some interesting discussions when it meets next at the CES in January. Some subgroup members have voiced an interest in **continuous tuning radios**.

That's an idea that has been kicked

around before, with the rationale being why should listeners even know whether they're listening to AM or FM? Why not have a radio that **automatically switches** from one band to the other?

It will be enlightening to hear what receiver manufacturers have to say about how tough or easy, expensive or cheap it would be to implement such an idea.

☆☆☆

**St. Louie, Louie . . .** A very successful show for the SBE got our "ears" away from an early snowfall last month.

Among noteworthy product introductions, **Delta** showed a **prototype splatter monitor**. It worked well and would go a long way to cleaning up the AM band. Delta wants to get more input from the industry before it becomes a final product.

**Vector Technologies** has entered the **FM transmitter market . . . Broadcast Electronics** has a new console; it carries the "Trak" name of the company's recently introduced phase-correcting cart machine.

**Harris** now offers single phase versions of its **SX transmitters . . . Gentner** had several new products including an **Antenna Monitor Interface Accessory** for DA array monitors.

The stereo **spatial image enhancer wars**, the latest round in the processing game, were going strong. **Modulation Sciences** started it all with the **StereoMaxx**.

Now **Orban** has one, using totally different technology, and then along comes a company called **Seven Seas** with a broadcast spatial image enhancer at its booth both at the October AES and in St. Louis.

At the SBE luncheon, outgoing president **Richard Rudman** warned against "entangling alliances" and talked about ethics. He said "The best bit of technical surgery we can perform is an ethics transplant."

And a woman named **Rambo**, (that's Ms. Rambo to you) representing officials of the city of St. Louis made some faces beam when she told the engineers gathered that they were "**the power behind the glory**."

She continued, "You hold in your hand the real transmission of energy in the broadcast industry . . . connection with people."

The truth, at last.

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.

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## 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).

## NRSC objections answered

Dear RW:

John Davis' letter in the 15 November issue of *RW* misreads the goals and objectives of the National Radio System Committee (NRSC). None of the NRSC participants, to my knowledge, wishes to unduly burden owners of small market AM radio stations.

The RF Mask draft standard is supposed to be the RF complement to the NRSC audio standard. It is designed to help, not hinder, AM engineers who are interested in reducing interference on the AM band.

No one suggests requiring modifications to existing transmitters. No one suggests requiring the purchase of new transmitters. And no one would require small AM stations to have spectrum analyzers on hand for monitoring.

As far as John's concern with submitting the NRSC audio standard to the FCC for rulemaking, it is the NRSC itself that urges such a submission.

As AM stations and engineers have gained experience with the NRSC standard, it now is clear that industry-wide adoption of the NRSC will bring significant improvements to the existing and future sound of AM.

And adoption of the standard truly must be industry-wide; we cannot expect a receiver manufacturer to build NRSC receivers only for the markets that have chosen to implement the standard.

The NRSC meetings are open and the minutes are available to any interested

party. Anyone may participate.

If John does not oppose progress, he shouldn't be concerned where industry-wide committees come to clear and practical decisions on how to move the industry forward.

I'd like to add a note on making policy in the AM industry.

As we often read in the pages of *RW*, there are many in our industry that comment, pro or con, on new ideas or proposals. It is a healthy thing for new ideas to run a gauntlet of critical review; we avoid making mistakes.

But there comes a time when to make an improvement requires a collective industry decision. In these circumstances the best that can be done is to solicit as many views as possible and move cautiously forward.

I believe the NRSC has done all that reasonably could be done to listen to and accommodate everyone's views. It took nearly two years and a lot of time. The standard works. Let's use it.

Michael C. Rau  
Science and Technology Dept.  
NAB  
Washington, DC

## More VOA renovation

Dear RW:

Your paper's important coverage of the VOA's modernization has been very interesting.

The big story is in the RF multi-hundred-million dollar sub-system contract. This never-equalled, historic, global commitment to super power HF short-wave is unprecedented and points up the importance of international broadcasting.

The complete proposal calls for super power shortwave relay stations in Sri Lanka, Thailand, Morocco, Botswana, Puerto Rico and Israel.

These stations will be built from scratch and use over fifty 500 kW short-wave transmitters plus antennas, feed lines and other pieces of necessary equipment.

The total costs could top the \$250 million mark, not including US modernization.

This US commitment is big news and should be very interesting for the owners, the US taxpayers, to follow. The contract is expected to be awarded soon.

For more data, contact the USIA at 202-485-6414.

H. Dickson Norman, Founder  
Global Radio Corp.  
Opelika, AL

## Who's to blame?

Dear RW:

I am a manager of a small market station in eastern Kentucky and I must say the last couple of years as manager of an AMer has been much like 50 years.

So many things we see that we as AMers could do, but very little interest from the public as to what should we do.

The SBE should be congratulated for building on last year's success and drawing a good crowd to its second national show.

The number of attendees and exhibitors was up, and St. Louis again proved to be a good venue.

It's one show where engineers are treated like VIP's, and have the opportunity to talk one-on-one with equipment manufacturers.

But the show is still a young one, and the SBE will have to take extra pains to foster its future success.

Many exhibitors were dismayed at the time conflict with the sessions and other activities offered, after being assured by the SBE that there would be no such conflict.

## Build On Success

Late exhibit floor hours one evening, and early hours the next morning also failed to draw booth traffic as hoped.

Next year the show is being moved to Denver, and a new venue in a more westerly city carries its

share of unknowns. Next year's show is also scheduled very close to the NAB's fall radio show.

Although Radio '88 is designed to attract managers and programmers as well as engineers, it may be tough for a CE to sell station management on travel expenses to two shows within a week of each other.

Attendance at either show could suffer as a result, especially if GMs have to choose between sending their CEs to the SBE and attending Radio '88 themselves.

In addition, a dazzling amount of non-exhibit-floor activities is being proposed for next year's SBE show, and exhibitors need to be reassured that attendees won't be forced to choose between booths and sessions.

On the plus side, the SBE is seeking professional show management for next year and has set up an exhibitors' advisory committee.

The SBE should realize that the time to address these issues is now, before they become problems and before the fledgling show begins to suffer the growing pains of adolescence.

—RW

If you were to walk the streets of Louisa and say, "have you listened to stereo AM," you would no doubt get a laugh.

I, as a manager get a new gray hair everytime I read something on C-QUAM or Kahn.

And then of course there's all the talk of new FCC measures to allow nighttime broadcasting for several AMers.

First, we saw post sunset, now there's the talk of fulltime operations for AMers. Then comes the NRSC standard.

All this and yet nothing! What do I mean? Simple.

Where are all these great AM receivers that will make us sound so good?

Where are the advertisements for AM stereo?

Where's any news at all concerning the NRSC standards?

And of course let us not forget the 80-90 docket many of us are still waiting on, and let us keep in mind that if we do get on the 80-90 FM docket we the AMers will kiss our little AM station goodbye in two years after signing on our little FMer.

I see so many stories in your great paper begging us the AMer to do something now and do it quick, but I as a manager ask, can you give me all that again?

I wonder if anybody at all out there really knows the right answer, will AM live on or will we show our great-great grandchildren that old radio that had an AM band on it and how people use to listen to it years ago?

In closing, we the AMers have been asked to do tons of paperwork for improving AM; we have been asked to spend thousands of dollars to improve the quality of our sound including stereo; we have been asked to try everything on the market to improve our out-

put, our quality, and for those who are doing just that, where are the results?

Where is that choice of an AM receiver that will produce that sound, where is that *new and improved* AM receiver that will bring FM to its knees?

Now that I think about it, where is that person that started this whole mess?

Jim Bradley, GM  
WVKY-AM  
Louisa, KY

*Editor's reply: AM lost listeners to FM because FM was responsive to a changing audience and AM was not.*

*A hand-wringing, "now what?" negative attitude won't produce results.*

*As a broadcaster you have the most powerful promotion medium ever invented at your disposal.*

*If EVERY AM station would commit to the NRSC, get behind the dominant stereo standard and promote the dickens out of both, stressing their improved fidelity, on-air . . .*

*If they would do that and give their listeners what they want in the way of service and programming, then NOTHING could stop the success of AM.*

*If AM listeners, aware of the new sound of AM, and hungry for the programming and community awareness they can't get anywhere else, start demanding better quality radios, because your station has educated them, then receiver manufacturers would certainly want to grab that share of the radio listening pie.*

*The receiver makers have already pledged themselves to making better fidelity AM radios.*

*Tell the FCC you want an AM stereo standard; tell the NAB you're going NRSC, tell your listeners to demand more than the 2.5 kHz radios that have been forced upon them, tell anyone who will listen that AM is alive and well.*

*No one is going to do it for you.*

## Radio World

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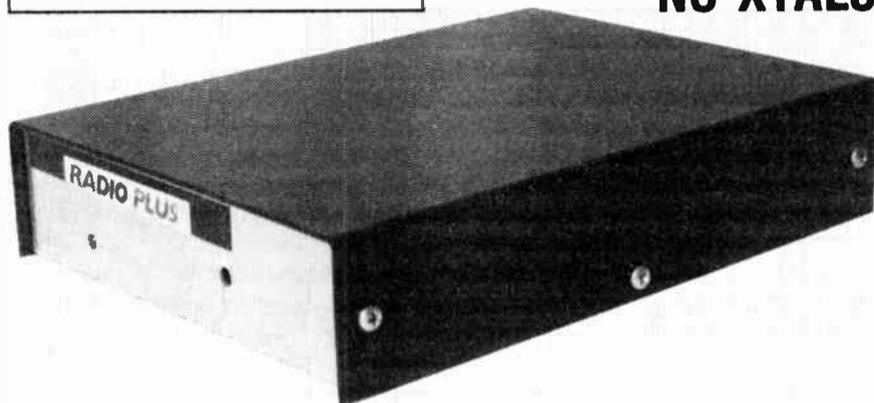
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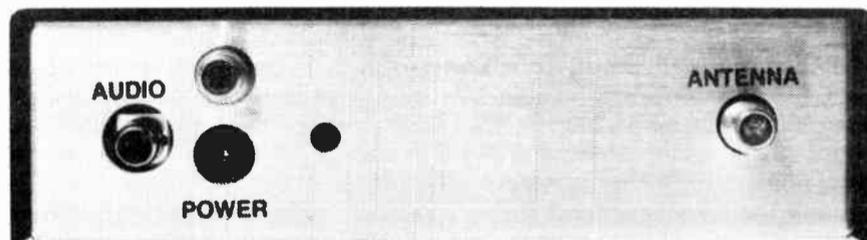
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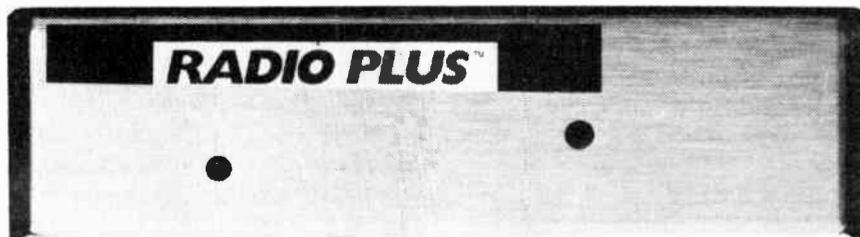
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## FCC Files

*(continued from page 2)*

land, of the Office of Engineering and Technology, attributed the delay to understaffing at the EPA, following the departure of Rick Tell, chief of the agency's Electromagnetics Branch, Office of Radiation Programs.

The Spokane survey, conducted 28 June to 3 July, monitored RF emission levels at Krell Mountain and Mount Spokane, two antenna farms in the vicinity of the city.

In addition to measuring emitted radiation from the towers, Cleveland said readings were also made of body current induced in tower climbers. Tell reportedly climbed towers in the study to record the measurements, using himself as a subject.

The FCC's RF radiation contact is Robert Cleveland: 202-653-8169.

### RF Lighting

RF lighting devices, which are believed to cause interference to AM broadcasting, will continue to be regulated by FCC standards for industrial, scientific and medical equipment, the Commission announced in October.

The standards, the FCC said, are sufficiently effective in preventing interference to telecommunication services from the lighting devices.

For more details, see the related article in this issue of RW.

Docket number is GEN 83-806. Contact Liliane Volcy at 202-653-7316.

### FM translators

There has still been no action on the FCC's Notice of Proposed Rulemaking to allow noncommercial FM translators to be fed by satellite or land-based microwave, after more than a year. The FCC's Marcia Glauber said "nothing is happening" with the docket—there is no timetable for action.

Released by the FCC in April 1986, the proposed rule change came in response to several previous requests from Chicago's Moody Bible Institute (MBI). Many broadcast groups oppose MBI's requests, maintaining such a change would produce "objectionable" interference on TV Channel 6 and might result in a "de facto" network of translators.

Docket number for the translator issue is MM 86-112. Contact Marcia Glauber at 202-632-6302.

### FM Regulations

In late August, broadcasters filed mixed comments on a plan to allow increased use of FM directional antennas in some short-spaced situations.

The FCC inquiry, issued in April, considers the authorization of FM direc-

tional antenna systems to reduce the distance separations between an FM station's transmitter site and adjacent and co-channel stations and allotments.

The NAB commented that the widespread use of directional antennas would increase clutter and interference on the FM band. However, other groups, such as the Association of Federal Communications Consulting Engineers, supported the use of directional antennas on a limited basis.

No date has been set for FCC action. The issue is contained in docket MM 87-121. Contact Bernard Gorden at 202-632-9660.

### Class A hike

A group of New Jersey Class A FM stations—the New Jersey Class A FM Broadcasters Association—in early September filed a request with the FCC to permit a blanket power hike to 6 kW for Class A FMers. The stations now face a 3 kW, or the equivalent, power limit.

The NJ group said that a previous FCC ruling, to allow Class A's to upgrade to Class B and C status without having to move off their reserved Class A frequencies, could not be put into use by most Class A stations because of interference considerations.

The FCC has not taken any action on the NJ petition. The docket number for the original Class A docket is MM 86-144. Contact Joel Rosenberg at 202-634-6530.

### Ownership limits

At press time, no further action had been scheduled by the FCC regarding its proposal to relax duopoly and one-to-a-market rules. FCC spokesperson Andrew Rhodes would not speculate as to when the Commission would address the issue.

In January, the FCC proposed allowing ownership of UHF stations with AM and FM stations in the same market. Ownership of AM stations with either UHF or VHF television stations would also be permitted.

Current rules prohibit cross ownership of radio or TV properties if the service contour of the purchasing facility completely encompasses the community of license of the station to be purchased.

The Commission's proposed relaxation of the rules has earned the support of a number of broadcasting concerns. Recommendations from broadcasters who filed comments with the FCC ranged from case-by-case evaluation of station combinations to lifting restrictions entirely.

Contact Andrew Rhodes at 202-632-7792.

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# Mandatory NRSC Rule Sought

(continued from page 1)

nical report on the FCC AM standards for the NRSC.

The study will be prepared by Harrison Klein, of the San Francisco-based consulting engineering firm of Hammett & Edison. Klein was also the author of a report on overmodulation and occupied bandwidth, which accompanied the original NRSC interim voluntary preemphasis standard in September 1986.

Discussion of the Commission's technical review was held during the 15 October NRSC AM Technical Subgroup meeting in Washington DC. During the meeting, Rau commented, it became clear that the issues involved in the review were too complex to be addressed adequately by committee, prompting the idea of a single-author study.

In announcing the allocation of funds for the AM technical standards study, the NAB's Lyman acknowledged the report would not be ready in time for the FCC's deadline on the subject, at press

time set for 17 December.

However, indications from the FCC are that the deadline might be extended, if necessary, to enable the Commission to consider the Klein study as well as work by the FCC Radio Advisory Committee (RAC), which is also addressing the issue.

Wilson LaFollette, of the FCC's Policy and Rules Division, commented that the Commission would be "interested" in analyzing the conclusions of the NRSC and RAC.

At press time, no requests for extension of the deadline had been filed. However, Rau noted that the NAB may file such a request in the future.

## Psychoacoustic testing

In addition to the allocation of funds for the Klein study, another \$60,000 was approved by the NAB Executive Board for psychoacoustic testing to determine the public's expectation of quality and to measure audience tolerance for a variety of interferences to

broadcasting.

The testing will be conducted jointly by the NAB's research and planning department and Bronwyn Jones, formerly of the CBS Tech Center, which closed in 1986.

According to a proposal for the testing submitted by Jones, "subjective audio judgments" are required for much of the FCC AM technical review. To that end, Jones established a number of test parameters which would establish those

subjective judgments.

Other aspects of the testing will involve "threshold of perception" studies to determine at what point a listener perceives interference to broadcasting, and at what point that interference would cause the listener to tune to another station.

At press time, the psychoacoustic experiments were scheduled to begin in late November. Rau would not speculate on a completion date for the project.

For additional information, contact Michael Rau at the NAB: 202-429-5346. Contact the NTIA at 202-377-1816.

# Stations To Protest

by Alex Zavistovich

Atlanta GA ... Early in 1988, broadcasters across the country plan to launch a grassroots campaign to focus listener attention on what event organizers call "attempts to censor, suppress or ban progressive art, artists, ideas, and activists."

Called Open Ears/Open Minds, the broadcasting campaign is slated to take place the week of 1-7 January, 1988.

According to event spokesperson Melanie Collins, executive director of WRFG-FM, Atlanta, the Open Ears/Open Minds concept was developed in opposition to the FCC's 16 April ruling on indecent language.

In that decision, the FCC ruled that it would issue warnings, and possibly fine or revoke licenses of stations which air material that refers to sexual and other so-called "indecent" topics at times when children might be listening.

Maintaining that the FCC should not be involved in deciding issues of indecency, Collins commented that the "best way for broadcasters to show their concern is through programming."

While no specific programming was mentioned, organizers say that individual stations will choose the topics of greatest concern to them.

The idea received "positive response" during the National Federation of Com-

(continued on page 11)



NAB Radio Board Chairman Jerry Lyman and Joint Board Chairman Wally Jorgenson announce funds for two NRSC studies.

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STUDER REVOX

# Overflow Exhibits Encouraged

by David Hughes

Washington DC ... The NAB, in putting the latest touches on its plans for the April 1988 convention in Las Vegas, will use the nearby Hilton Center for exhibit overflow.

But NAB Exhibits Director Rick Dobson vows things will be different from 1985, the last time the NAB show was held in Vegas.

That year, exhibitors who could not get space in the convention center and were located in the Hilton Center complained of very poor traffic.

Even though the Hilton Center will be used next year, Dobson maintains that space in it is "selling like hotcakes."

He indicated that, as of early November, in addition to the placement of many smaller booths, six firms have "with no argument" selected Hilton Center booth space larger than 20 by 20 feet.

The reason, according to Dobson, is that the overflow floor is being intergrated into the show's plans from day one, and not being added as an "after-thought," as in 1985.

## Moving registration

In order to encourage exhibitors to locate in the Hilton Center, the NAB plans to hold its guest registration operations there.

"Upwards of 15,000 people will have to

start their (convention floor) journey in that spot," Dobson said.

He also said that the Hilton Center floor, which will sport 35,000 square feet or about 12% of the total show exhibit space, will open a half hour before the main floor each day of the show.

But that's not all. The overflow floor will be the first stop for shuttle buses, and exhibitors located there will get a \$2 per square foot discount.

Also, the outdoor exhibits, which will feature aisles with carpeting and canopy tents, will be wedged in between the Hilton Center and the convention center. "We want to have a continuous flow of exhibits," Dobson maintained.

The NAB convention will remain in

Las Vegas through 1992, with the exception of 1990, when it will be held in Atlanta. Dobson says that while contracts beyond 1991 have not been signed, there is a good chance that the show will remain in Las Vegas.

## Guest passes

Another change from previous shows will affect the guest passes exhibitors hand out.

Dobson said, that in the past exhibitors ordered their passes in advance at \$7 each. If the passes were not used, the NAB would then refund the money as a credit to the exhibitor's account.

For next year's show, the NAB will not require exhibitors to pay in advance. Instead, they will be given all the passes they want and will be billed after the show only for those that are actually used.

Another change, Dobson added, will be a reduction in price for "exhibits only" passes.

At past shows, the NAB charged \$100 per day for the pass which admits the bearer to the floor but not the sessions and other events at the show. In 1988, the NAB will charge a flat rate of \$100 for a pass that can be used all four days the floor is open.

Dobson said that he hopes the reduced rate will "open up the floor for more people."

## SMPTE meeting

Exhibitors seem to be pleased by the changes, as witnessed by an NAB Exhi-

“

*The Hilton Center floor ... will open a half hour before the main floor.*

”

bitors Advisory Committee meeting held 2 November at the Society of Motion Picture and Television Engineers (SMPTE) show in Los Angeles.

Only about a dozen exhibitors attended the SMPTE show meeting, and Dobson, who was also in attendance, could not have been more pleased.

Unlike two years ago when more than 100 angry exhibitors crowded into a conference room during the fall SMPTE show to voice complaints about the 1985 NAB spring show, this year's meeting was, by contrast, tranquil.

Many of the exhibitors at the November meeting at the Los Angeles Convention Center had compliments—not complaints—for Dobson. He assumed control of the exhibit floor procedure last spring, immediately following the NAB show in Dallas.

Since then, Dobson has instituted a system allowing exhibitors to pick their floor space rather than having it assigned to them. As of press time, he said the booth selection procedure should be completed by late November.

Exhibitors committee member Jack Williams, of Pacific Recorders & Engineering, said that the committee had scheduled a 15 December meeting with NAB in Las Vegas. The NAB indicated that it will hold a pre-show meeting with exhibitors a day before.

For more information on the exhibit structure of the 1988 show contact Rick Dobson at the NAB, 202-429-5335.

# RADIO Classics

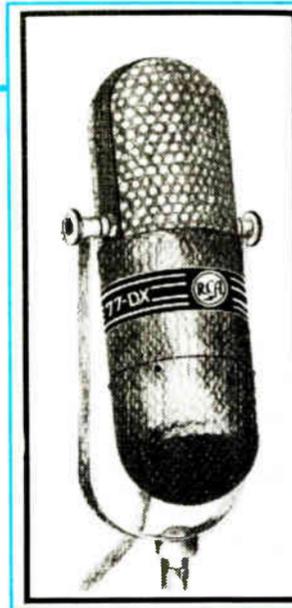
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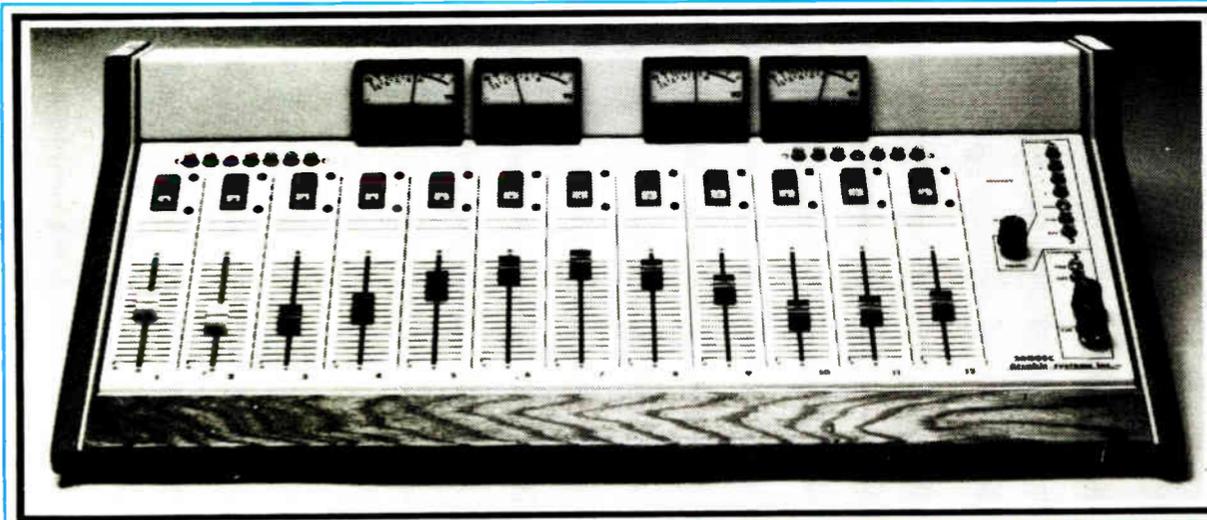


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**FORMAT CHANGES** ( # change accompanies new ownership)

		<u>formerly</u>	<u>becomes</u>
AK Anchorage	KLEF-98.1	new	to be fine arts
Homer	KWVV-103.5	KGTL-FM, ad. con.	ad. con. "The Wave"
FL Chiefland	WTBH-91.5*	new	to be religious
ID Meridian	KJHY-950	KKIC, silent	rlgs "K-Joy" to Boise
NH Hinsdale	WYRY-104.9	new	soft adult contemp.
Nashua	# WHOB-106.3	WOTW-FM, silent	AC "B-106.3 FM"
NM Los Alamos	KKBR-98.5	AoR to Albuquerque	silent
NY Brownville	WXIK-600	new	to be religious
NC Franklin	WFQS-91.3*	new	to be fine arts/jazz
Raleigh	# WCLY-1550	black	black gospel
OH Cleveland	WMJI-1260	WBBG, adult stds	AC // WMJI-FM-105.7
Ontario	WRGM-1440	new	easy listening
OR Florence	KLCX-104.7	KDUK, CHR	AoR oldies to Eugene
PA Lebanon	WADV-940	WVLV, country	remains country
Philadelphia	WUGL-98.1	WCAU-FM, CHR	rock "Oldies 98"
Philadelphia	WIOQ-102.1	AoR/AC mix	rock oldies
SD Rapid City	KPHR-93.9	KKLS-FM, CHR	CHR "Power"
UT Blanding	KUTA-790	silent	country
VA Mount Jackson	WSIG-FM-96.9	new	country // AM 790
AB Calgary	CISS-1140	CKXL, AC/CHR	CHR "Kiss"
PQ St.-Georges-de-Beauce	CIRO-99.7	new	country "CO-FM"

**NEW STATIONS:** **APPLICATIONS** ( \* non-commercial station)  
 (& reapplication) ( + competes with existing application)

AZ 97.1+	Green Valley	1640 w, 387 ft	Abundant Life Ministries
97.1+	Green Valley	3000 w, 128 ft	C. Ray Helton
CA 910&	Antioch	1700 w nights	synchronous w/KNEW-910
92.7&+	Avalon	316 w, 1066 ft	Luz Marina Gacharna
102.7&+	China Lake	3000 w, 12 ft	Roy William Mayhugh
GA 102.9+	Clarkesville	3000 w, 328 ft	Clara Morris Martin

New Stations: Applications (Cont'd)

	102.9+	Clarkesville	3000 w, 328 ft	Habersham Associates
	102.9+	Clarkesville	3000 w, 328 ft	Radio Habersham, Inc.
	101.9+	Cleveland	3000 w, 328 ft	Terry Wayne Barnhardt
	101.9+	Cleveland	3000 w, 184 ft	Linda B. Guest
	101.9+	Cleveland	2000 w, 394 ft	Newsic Inc. (corrects 11/2 listing as Cleveland TN)
	101.9+	Cleveland	1270 w, 502 ft	Saralyn B. Oberdorfer
	101.9+	Cleveland	3000 w, 328 ft	White County Bcstg Co.
	95.7+	Trion	650 w, 689 ft	Lynn S. Gwyn
	95.7+	Trion	600 w, 699 ft	Tri-State Bcstg Company
ID	91.7*	Twin Falls	1950 w, 490 ft	Idaho State Board of Educ.
IN	640	Battle Ground	380/250 w DA-2	Nu-View Associates, Inc.
LA	103.7+	Haughton	3000 w, 328 ft	Cary D. Camp
	103.7+	Haughton	3000 w, 328 ft	Louisiana Radio Associates
	103.7+	Haughton	3000 w, 328 ft	Simcott Bcstg, Inc.
	95.7+	Vivian	3000 w, 285 ft	North Caddo Bcstg Co.
ME	107.3+	Old Towne	38300 w, 561 ft	Penobscot Indian Nation
MI	95.7+	Oscoda	50000 w, 492 ft	Iosco County Comctns, Inc.
NE	105.3+	Lincoln	3000 w, 328 ft	Cornhusker State FM Assoc.
	105.3+	Lincoln	3000 w, 151 ft	Lincoln Broadcasting
	105.3+	Lincoln	3000 w, 72 ft	Lincoln Broadcasting, Inc.
	105.3+	Lincoln	3000 w, 328 ft	Spacecom, Inc.
	105.3+	Lincoln	3000 w, 328 ft	Star Broadcasting, Inc.
NM	95.1*	Corrales	3000 w, 328 ft	LV Bcstg Educ. Foundation
NC	1200	Atlantic Beach	5000/1000 w DA-2	Atlantic Beach Radio
OH	97.1+	Coal Grove	2450 w, 364 ft	Getz Broadcasting, Inc.
	95.7	Gibsonburg	3000 w, 328 ft	Buddy & Carolyn Carr
OK	105.1+	Perry	3000 w, 328 ft	The Andover Corp., Inc.
	105.1+	Perry	3000 w, 328 ft	Lee May Bcstg Services Inc
	100.3	Taft	3000 w, 220 ft	Taft Community Radio
OR	860&	Eugene	350/210 w DA-2	Bjornstad Broadcasting
	650&	Junction City	10000/1000 W DA-2	Jerry J. Collins
PA	95.7+	Olyphant	375 w, 922 ft	Cordaro Associates
	95.7+	Olyphant	540 w, 764 ft	J. Frederick Manning
PR	106.1+	Hormigueros	3000 w, 656 ft	Joseph Bahr
	106.1+	Hormigueros	3000 w, 807 ft	Guillermo A. Bonet
	106.1+	Hormigueros	3000 w, 1099 ft	Juan Galiano
	106.1+	Hormigueros	3000 w, 1092 ft	Occidental Bcstg Corp.
	106.1+	Hormigueros	3000 w, 830 ft	Renacer Corp.
VA	1200	Powhatan	25000/250 w DA-2	Golden Rule Org. Workshop

Returned/Dismissed Applications

AL	96.1+	Florence (R)	Bob Carl Bailey
CA	104.9	Mariposa (R)	Paul Bowman & Co., Inc.
FL	98.7+	Holmes Beach (R)	Saxton Communications
MD	96.9+	Crisfield (D)	Cablevision of Crisfield
MT	107.3+	Great Falls (R)	Radioworks, Inc.
NJ	89.7*	Freehold Township (R)	Faith Broadcasting, Inc.
NY	106.7+	Irondequoit (D)	Peter Wayne Leachman
OR	98.3+	Bend (D)	Clearwater Bcstg Co.
	98.3+	Bend (D)	Deschutes Bcstg, Ltd.
	98.3+	Bend (D)	Louise Alda McCourtney
	98.3+	Bend (D)	Suzanne Marie McLain
	98.3+	Bend (D)	Richard L. Oberdorfer
	98.3+	Bend (D)	J. & S. Spillane
TN	101.3+	Wartburg (D)	Marilyn L. Clark
TX	1520*&	Magnolia (D)	Family Stations, Inc.
VT	98.3+	Lyndonville (R)	Etta Dodge

WASHINGTON THIS WEEK

Brad Holmes was nominated Friday to fill the unexpired term of the FCC seat left empty by the departure of former Chairman Mark Fowler. Holmes is currently chief of policy and rules in the FCC's Mass Media Division.

ELSEWHERE

The CRTC has partially renewed the license of CHIP-101.5 Fort Coulonge PQ, ruling that it violated "almost every major element" of its Promise of Performance. CHIP is now licensed to operate only 56 hours per week.

\* \* \* \* \*

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With the new year, we also publish The M Street Radio Annual - our annual directory of station formats, facilities, markets, ownership, and other vital information for 11,000 stations in the U.S., Canada and northern Mexico. For a pre-publication price of only \$20.00, we'll make sure your copy arrives still warm from the printer this winter.

We hope you find this complimentary sample issue of The M Street Journal useful and informative, and hope you don't miss another issue. To order, just return the coupon below with payment  
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Call Letter Changes (Cont'd)

ME new-100.1	Skowhegan	becomes	WHQO
NC WCQS-FM-88.1*	Asheville		WCQS
new-91.3*	Franklin		WFQS
OH WBBG-1260	Cleveland		WMJI
WMJI-105.7	Cleveland		WMJI-FM
new-106.1	Niles		WNCD
OR new-90.9*	Klamath Falls		KSKF
PA WCAU-FM-98.1	Philadelphia		WOGL
new-91.7*	Summerdale		WUCP
TN WKIR-104.1	Jackson		WTNV
WQLS-1590	Jonesborough		WUSJ
new-1180	Knoxville		WHJM
WQZQ-1200	Lebanon		WQDQ
TX KMIA-1540	Fort Worth	#	KSVZ
KRIG-1410	Odessa	#	KRIL
WA KHWK-106.5	Richland		KOTY-FM
PQ new-104.5	Rimouski		CIKI
new-99.7	St.-Georges-de-Beauce		CIRO

PROPOSED STATION TRANSFERS

( r reorganization of existing ownership)

AL WHCM-1290	Sheffield		to Slatton & Associates Bcstrs
CA KMAK-1340/KBOS-94.9	Fresno/Tulare	r to	A. Sheftell, S. Miller et al
KIST-1340/KMGQ-106.3	Santa Barbara/Goleta	r to	A. Sheftell et al
FL WWAM-770	North Fort Myers	r to	Beasley Radio, Inc.
KS KCNW-1380	Fairway (Kansas City)		to Dick Marsh
MA WFXR-93.5	Harwich Port (Cape Cod)	r to	Mayjay Bcstg, Inc.
MI WIBM-1450/94.1	Jackson (Lansing)		to CR Broadcasting, Inc.
MN KUXL-1570	Golden Valley (Minneapolis)		to Dick Marsh
NC WRAQ-1380	Asheville		to Asheville Bcstg Corp.
WBMU-FM-91.3*	Asheville		to Asheville Rlgs Educ Ass'n Inc.
PA WIFI-103.9	Kane	r to	William Stallman
TX KTEK-1110	Alvin (Houston)		to Dick Marsh
KBOR-1600	Brownsville		to La Nueva KBOR, Inc.
KVOJ-1130	Edna (Victoria)		to Roger Ramirez
KWJS-1360	Fort Worth		to Dick Marsh
VA WDCT-1310	Fairfax (Washington DC)		to Dick Marsh
WI WYLO-540	Jackson (Milwaukee)		to Dick Marsh

DISMISSED STATION TRANSFERS

OH WMJI-1260	Cleveland		to Robinson Bcstg, Inc.
TX KFII-106.7	Granbury		to Metrowest Bcstg, Inc.

FM ALLOCATIONS: PROPOSED AMENDMENTS

new Dennis Port MA	93.9 MHz	A	comments Dec. 28, replies Jan. 12
WFXR Harwich Port MA	to 93.1 MHz	A	comments Dec. 28, replies Jan. 12
new Willmar MN	106.1 MHz	C	comments Dec. 28, replies Jan. 12
new Hartford VT	104.3 MHz	A	comments Dec. 28, replies Jan. 12
new Elkton VA	to 98.5 MHz	B1	comments Dec. 28, replies Jan. 12
WWMH Minocqua	to 95.9 MHz	C1	comments Dec. 28, replies Jan. 12
new Peshtigo WI	96.1 MHz	A	comments Dec. 28, replies Jan. 12

FM ALLOCATIONS: GRANTED AMENDMENTS

new Glen Arbor MI	98.1 MHz	A	window opens Dec. 22, closes Jan. 21
KLWT Lebanon MO	to 107.9 MHz	C2	from 92.1 MHz A
KTOZ Marshfield MO	to 104.7 MHz	C2	from 104.9 MHz A

Returned/Dismissed Applications (Cont'd)

NV KJUL-104.3 N. Las Vegas (D) 24500 w, 3730 ft, change xmtr location  
 NY WINS-1010 New York (D) change xmtr location, changes in  
 antenna system  
 NC WSNC-90.5\* Winston-Salem (R) 3000 w, 226 ft, change xmtr location  
 OR KBBM-850 Waldport (D) change xmtr location  
 PA WQWK-96.7 Univ. Park (D) 2440 w, 364 ft, change xmtr location  
 TX KTCO-1120 Manor (D) changes in antenna system  
 KKQV-103.3 Wichita Falls (grant resc.) 1015 ft, change xmtr locatn  
 WI WDUZ-FM-98.5 Green Bay (D) 822 ft, change xmtr location, changes  
 in antenna system

FACILITIES/PARAMETERS: GRANTS

AL WBAM-FM-98.9 Montgomery 1096 ft, change xmtr location, changes  
 in antenna system  
 AR KZOU-98.5 Little Rock 1286 ft  
 CO KTLN-930 Granby 4500 w days  
 KFEL-970 Pueblo 3200 w days  
 FL WGWD-100.7 Gretna change xmtr location  
 WXCR-92.1 Safety Harbor to 92.5 MHz; 50000 w, 489 ft, Class C2,  
 xmtr location  
 GA WEKS-FM-104.1 La Grange install auxiliary system  
 IN WZVN-107.1 Lowell 1290 w  
 MN WHLB-FM-107.1 Virginia to 99.9 MHz; 100000 w, Class C1, change  
 xmtr location  
 NH WJYY-105.5 Concord 1210 w, 496 ft (auxiliary)  
 NY WOKW-99.9 Cortland 24000 w  
 WGFN-99.5 Schenectady 14800 w  
 OH WCZR-107.3 Elyria use formerly auth. fac. as auxiliary  
 OK KRPT-FM-107.3 Anadarko 86400 w, 988 ft  
 OR KYQT-102.5 Newport 65480 w, 903 ft  
 PA WIEZ-1490 Lewistown to 670 KHz; 6000 w days, DA-N  
 PA WMGH-FM-105.5 Tamaqua 1300 w, 485 ft  
 PR WNRT-96.9 Manati 50000 w  
 TN WNAZ-FM-89.1\* Nashville new transmission system  
 TX KLSF-96.9 Amarillo 1006 ft, change xmtr location, changes  
 in antenna system  
 KVLV-107.9 Edinburg 987 ft, change xmtr location  
 KBNA-FM-97.5 El Paso 100000 w (h), 52100 w (v)  
 UT KUER-FM-90.1\* Salt Lake City use formerly auth. fac. as auxiliary  
 WA KOTY-FM-106.5 Richland 100000 w, 1075 ft, change xmtr location  
 WI WSUP-90.5\* Platteville 2500 w  
 WQJY-100.1 West Salem 1800 w, 426 ft, change xmtr location,  
 changes in antenna system

FACILITIES/PARAMETERS: CP ACTIVITY

WV WFGH-90.7\* Fort Gay on the air ex-89.3 MHz

CALL LETTER CHANGES

( # applied for by new owners)  
 ( effective date given if after 11/9/87)

AL WREZ-FM-103.3 Montgomery becomes # WSYA-FM  
 AK KGTL-FM-103.5 Homer KWVV  
 CA KHOT-1250 Madera KQMD  
 KQMD-92.1 Madera KQMD-FM  
 KBLS-990 Santa Barbara # KKSB  
 FL WEUS-1240 Eustis WLCF (11/16/87)  
 WPDS-93.3 Tampa # WFLZ

NEW STATIONS: GRANTS

GA	1160	East Point	10000/400 w DA-2	Darrell Spann
	91.5*	Vidalia	50000 w, 410 ft	Augusta Radio Fellowship
MD	96.9	Crisfield	3000 w, 328 ft	Leigh Sandoz Leverrier
MO	89.5*	Poplar Bluff	100000 w, 423 ft	Calvary Educ Bcstg Network
NY	92.7+	Garden City	1000 w, 521 ft	Jarad Bcstg Co., Inc.
OR	98.3	Bend	3000 w, 300 ft	Kitsap Comctns Corp.
SC	1120	Florence	1000 w ND days	Michael B. Gliner
TN	101.3	Wartburg	500 w, 770 ft	Group Three Bcstrs
TX	1520	Cypress	500 w DA day only	Matthew Provenzano
BC	88.3*	Fort Nelson	225 w	CBC English (CBU)
NF	105.3	Clareville	2400 w	Apache International
ON	89.7*	Manitouwadge	46400 w	CBC English (CBQ)

NEW STATIONS: CP ACTIVITY

AL	WQPR-88.7*	Muscle Shoals	requests extension of time
CA	KYAX-94.5	Alturas	requests extension of time
FL	WAPN-91.5*	Holly Hill	requests CP to replace expired permit
IL	WRYT-1080	Edwardsville	on the air; satellite rock oldies
IN	WOTD-100.1	Winamac	previous cancellation of CP & calls rescinded; extension of time granted
OH	WRGM-1440	Ontario	on the air; easy listening format
OR	KQIK-FM-93.5	Lakeview	requests extension of time
TX	KTCO-1120	Manor	app. denied for extension of time
UT	KSMH-92.1	Blanding	expects to be on "in about a year"
VA	WSIG-FM-96.9	Mount Jackson	on the air; country simulcast with AM
WV	WPBB-100.1	Romney	requests extension of time

FACILITIES/PARAMETERS: APPLICATIONS

CA	KYAX-94.5	Alturas	-194 ft
FL	WXCR-92.5	Safety Harbor	install auxiliary system
	WEXY-1520	Wilton Manors	3500 w days
IN	WINN-1460	North Vernon	direct measurement of antenna power
KS	KBUZ-99.3	El Dorado	1500 w, 459 ft, change xmtr location
LA	KNLU-88.7*	Monroe	3250 w, 166 ft, change xmtr location
MD	WANN-1190	Annapolis	25000 w, change xmtr location, changes in antenna system
MS	WGIN-102.3	Calhoun City	328 ft, change xmtr & studio locations
NV	KISK-1550	Reno	1000 w ND days
NJ	app-88.7*	Wayne	259 ft (reapplies)
NM	KLQS-107.1	Armijo	24500 w, 705 ft, Class C2, change xmtr location
	KLVF-100.9	Las Vegas	to 100.7 MHz; 10000 w, Class C2
	KBBU-102.3	Los Lunas	to 102.5 MHz; 50000 w, 492 ft, Class C2, change xmtr location
OH	WWSU-106.9*	Dayton	40 w, 203 ft, changes in antenna system
TX	KEPG-100.9	Victoria	2700 w, 312 ft, change xmtr location
WA	KTBI-810	Ephrata	50000 w days, 24000 w critical hours
WI	WLZR-FM-102.9	Milwaukee	50000 w, 433 ft, changes in ant. system
WY	KCEB-91.1*	Casper	-488 ft
PQ	CIKI-104.5	Rimouski	to 98.7 MHz; change xmtr location

Returned/Dismissed Applications

FL	WQBA-FM-107.5	Miami (D)	1007 ft, DA, change xmtr location, changes in antenna system
IL	WJIL-1550	Jacksonville (D)	direct measurement of antenna power

# FCC Approves New DST Limits

by David Hughes

Washington DC ... The FCC has approved a plan to allow extended pre-sunrise authority (PSA) for AM daytimers during the three-week extension of daylight savings time (DST) in April.

On 3 November, the Commission formally okayed a plan it proposed in June to provide a 6 AM PSA start with a 10 W minimum power during three weeks in April.

Last year, Congress voted to extend the beginning of DST from its traditional start on the last Sunday in April to the first Sunday in April. However, many AM daytimers complained that the DST advance created an extra hour of darkness—with lower powers—during their morning drive time period.

## Spacing Changes

by Alex Zavistovich

Washington DC ... Noncommercial educational FM (NCEFM) station applicants in the area of the US-Mexican border must now follow a new method of determining spacing from each other, owing to a change in FCC rules.

In a decision reached late October, the Commission ruled that NCEFMs within 199 miles, or 320 km, of the border can base their spacing to other domestic NCEFMs "on the non-overlap of predicted signal strength contours."

This so-called "contour method" for determining spacing requirements holds for all such station applicants, as long as the applicants also observe mileage restrictions to Mexican stations as set out in the Mexican Agreement.

FCC spokesperson David Workman, of the Mass Media Bureau, explained that the Mexican Agreement established a variety of spacing requirements for FM stations, based on classes involved.

From one Class B station to another Class B, he said, a separation of 240 km must be maintained; Class A to Class C separation is 210 km.

A 270 km distance must be kept between Class B and Class C stations, Workman added. Other mileages are cited for adjacent channels.

Workman stressed that the change in spacing requirements made by the FCC will not change the application procedure for the noncommercial stations affected. "(NCEFMs) have always been required to submit contour information," he stated.

As an outgrowth of the new spacing rules, the Commission also abandoned the use of a table of allotments for the US-Mexico border area.

With the change in spacing rules, domestic NCEFM spacing will have the same 1.0 mV/m protected service area for the Mexican border as in the rest of the country.

Workman said the rule changes should "make assignment policies consistent throughout the US and encourage the growth of noncommercial educational FM service in the border area."

FCC docket number is MM 87-140. For additional information, contact David Workman at 202-632-9660.

Originally, last January, the FCC proposed a 50 W PSA minimum for the three week period in April. However, after receiving comments from fulltime and clear channel stations that claimed the 50 W minimum limit would create interference, the Commission in June modified its proposal to a 10 W limit.

In its November ruling, the FCC said it approved the 10 W limit "provided there is no interference to groundwave (primary) contours of clear channel stations."

It said it approved the 10 W limit in-

stead of the original 50 W proposal after finding that "some daytime-only stations operating pre-sunrise with 50 W, or even 25 W, would cause significant co-channel interference to domestic Class I clear channel stations."

Even with the limit, many stations will be able to operate above 10 W for the PSA, the FCC said.

"Protecting the groundwave, but not the skywave (secondary) signals of affected stations would make it possible to provide powers greater than 10 W for a number of stations without causing un-

due interference to the groundwave service of affected stations," the Commission said.

David Palmer, chairman of the NAB Daytimer Committee, has criticized the FCC's decision to scrap the 50 W limit for the 10 W minimum limit. He said that the clear channel interests had "deep pockets" and did a better job at swaying the FCC's opinion.

He maintained that the interference generated by a higher PSA level would be more than counterbalanced by improved local radio service the daytimers would provide.

The issue is contained in FCC docket MM 87-3. For more information, contact Vicki Assevero at the FCC: 202-632-7792.

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Don Hobson, Engineering Manager  
KJQY, San Diego, CA  
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Ray Fisher, Program Director  
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(Contemporary Hit Radio)

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(Contemporary Hit Radio)

"Clean and natural without being strident. It gives you lots of adjustment capabilities, and will fit almost any format. The manuals are very good as usual."  
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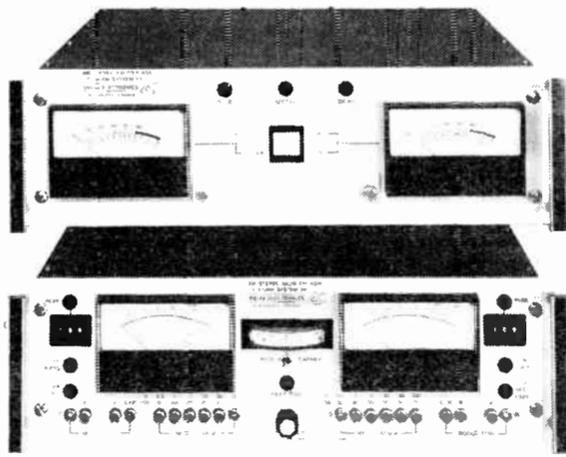
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Circle Reader Service 46 on Page 22

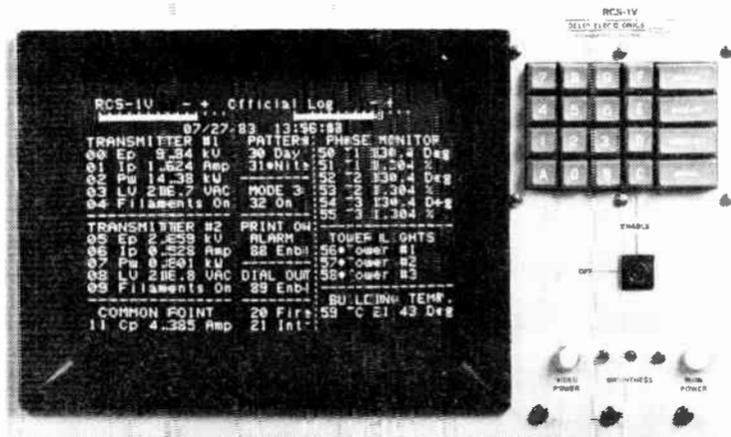
# DELTA BROADCAST PRODUCTS



## ASE-1/ASM-1

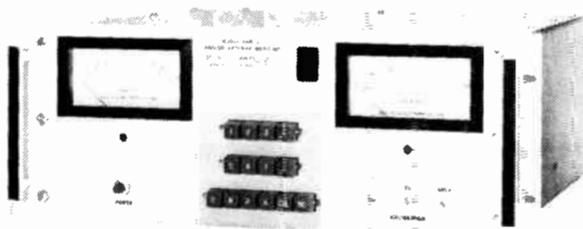
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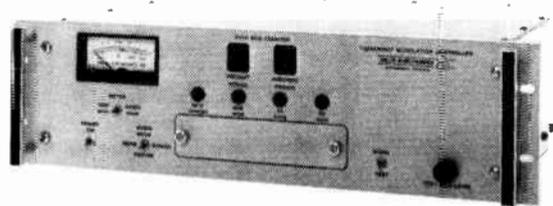
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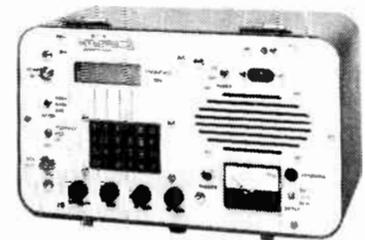
## DAM-1/AAM-1

**The Digital and Analog Antenna Monitors measure the parameters of directional antenna systems.** Readings are: relative current; and current ratio and current phase to a reference antenna. The DAM-1 accepts samples from 12 towers with a  $\pm 1^\circ$  phase and  $\pm 2\%$  current accuracies displayed on digital readouts. The AAM-1 can monitor up to 8 antennas with ratio and phase measurements displayed on front panel meters.



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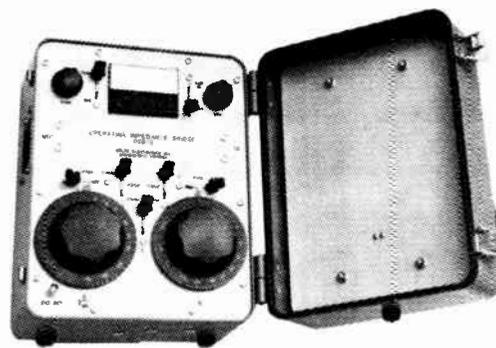
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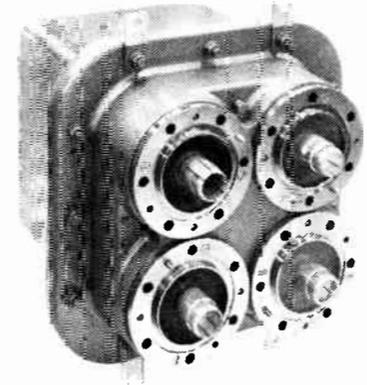
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World Radio History



# NABET Faces Massive Job Cuts

by Alex Zavistovich

**New York NY . . .** The National Association of Broadcast Employees and Technicians (NABET), which learned in October that at least 200 of its members employed by NBC will be losing their jobs, may have to gird itself for even greater personnel reductions at the network in 1988.

By some accounts, a business plan submitted by NBC to General Electric, the network's parent organization, has proposed the elimination of approximately 500 additional technical positions at NBC for the coming year.

The reduction in force is rumored to come primarily from the NABET membership employed in the television network, news and owned station divisions.

## Proposed cutbacks

NBC's proposed personnel cutbacks follow on the heels of a mid-October announcement that the network intended to lay off some 200 NABET members.

According to NBC spokesperson Dom Giofre, approximately 100 of those NABET technical and engineering jobs will be terminated by the end of the year, owing in part to the August sale of NBC's radio networks to Westwood One,

owner of the Mutual Broadcasting Network.

Approximately half of the total jobs affected will come from the network's news division, Giofre added.

Sources within NBC speculated that the four-month strike against the network by NABET may have contributed to the decision to terminate the technical positions.

NABET International Representative John Krieger commented that the union was "aware going into the (contract) talks that some jobs would be lost." That understanding had prompted the strong stand which NABET took in its discussions with the network, he said.

Krieger also speculated that the network may be taking discriminatory action against NABET members who took part in the union's strike activity. Since returning to work on 2 November, some union members have been "shuffled" into various positions, and others have found themselves on contract buyout lists.

The NBC maneuverings have occurred not only in New York, Krieger said, but in Chicago and Burbank as well.

Krieger admitted that the network's actions are permissible by contract. However, he stressed most of the employees affected by the action "are either union

officials or had participated in strike activity."

At press time, NABET was considering pressing discrimination charges against the network.

## Layoffs at other networks

The anticipated dismissals at NBC may not be the only layoffs of union personnel at the networks. By some reports, CBS is considering reducing its technical staff by up to several hundred once it concludes talks with International Brotherhood of Electrical Workers (IBEW) on a new master contract.

CBS' contract with IBEW expired 30 September. At the time, the network

presented its final contract offer to IBEW, which submitted the proposal to local memberships.

A media blackout has been instituted by both sides, making confirmation of expected layoffs impossible. Contract terms are also unconfirmed; however, the network is said to be offering 3% raises for each year of the contract's expected three-year term.

The contract dispute affects approximately 1,500 workers at CBS-owned stations in seven cities.

For additional information on the NBC staff reductions contact Dom Giofre at NBC: 212-664-4444. Contact John Krieger at 202-657-8420.

# Week of Protest Slated

(continued from page 7)

munity Broadcasters convention in July, Collins said.

Among those topics expected by Collins to be addressed by broadcasters during Open Ears/Open Minds will be the FCC's indecency ruling, and the work of the Parents Music Resource Center, a group which is leading a movement opposing certain lyrics in popular music.

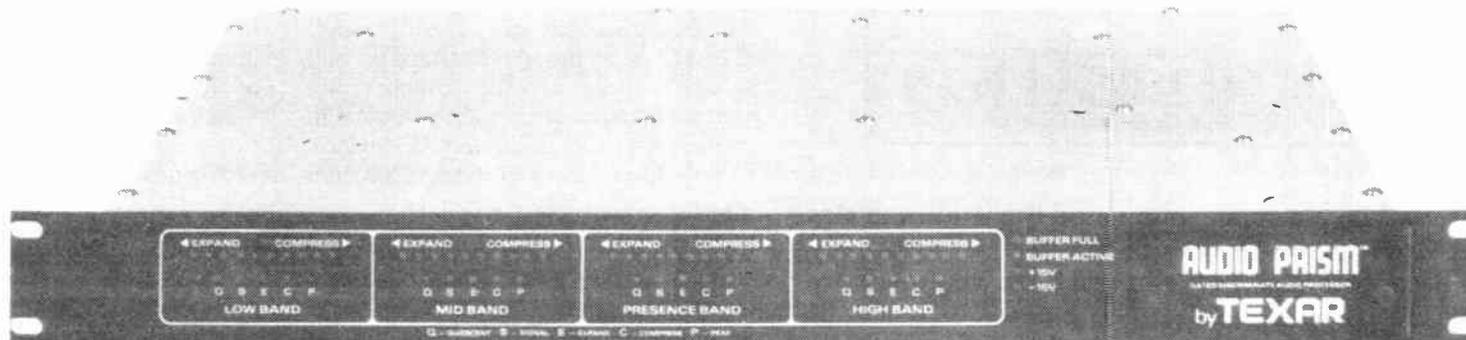
Other projected issues include Immigration and Naturalization Service

rules which Collins said limit the entry of international artists to the US.

Support for the Open Ears/Open Minds event has come from a number of broadcast-related groups. In addition to WRFG, KTUH-FM, Honolulu; WMPG-FM, Gorham, ME; WHRW-FM, Binghamton, NY; and the Women's International News Gathering Service had at press time endorsed the project.

For additional information, contact Melanie Collins at 404-523-3471.

## ALL NRSC PROCESSORS ARE NOT CREATED EQUAL!



On January 10, 1987, The National Radio Systems Committee (NRSC) approved a standard for high-fidelity AM transmission. When implemented by both broadcasters and receiver manufacturers, the standard will bring near-FM quality to the AM band. Many people are not aware however, that all NRSC processors do not sound alike.

The standard established a maximum audio response for frequencies at or above 10 kHz. In the common language of filter design, this is called the "stopband specification" but the NRSC elected not to establish a minimum "passband specification," electing instead to let the passband performance be dictated by competitive market pressures. The passband specification is the performance of the filter below 10 kHz.

Simply stated, while the NRSC standard requires response to be at least 15 dB down at 10 kHz, there is no minimum response requirement for frequencies below 10 kHz. One other NRSC processor begins its rolloff early so that its response is already down several dB at 9 kHz. The Texar Phoenix™ maintains flat frequency response to

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The Phoenix also implements a unique intermodulation-reducing pre-emphasis/clipper circuit to assure crisp, clear high-end response. The circuit is patent-applied for, so only the Texar Phoenix has it. The Phoenix is also the only digitally-controlled NRSC processor you can buy!

But high performance shouldn't come without convenience, so we added an internal 80 Hz square-wave generator to assist in setting the low-frequency tilt corrector. There is no need to disconnect the program line and connect an external oscillator. Just press the oscillator button and adjust the corrector. Release the button and program is back on air.

We could talk for hours about why we think our NRSC processor is better, but then so can any other manufacturer. The true test is to listen with your own ears. For a no obligation, 10-day trial of the digitally-controlled Texar Phoenix, call your favorite broadcast distributor or call Barry Honel at (412) 856-4276.

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## Lighting Rules Stay

(continued from page 1)

Based on findings from the inquiry, the FCC in 1985 made RF lighting subject to conduction limits below 30 MHz. Above that point, the devices were subject to radiation limits.

The new standards, however, were opposed by the NAB in October 1985 as being insufficient to protect AM broadcasting, which was said to be hampered by interference from the devices.

The NAB suggested that, below 30 MHz, RF lighting devices use emission limits of 25  $\mu$ V/m at a distance of 10 meters.

Comments filed with the FCC in response to its inquiry regarding emission limits below 30 MHz were mixed.

The NAB maintained that the potential of RF lighting devices to replace conventional sources exacerbated the problem of AM interference and required the establishment of minimum technical standards.

The association held doubts, however, over the usefulness of any RF emission limit for AM protection, claiming that current FCC AM technical standards may still permit interference by certain steady-state signals of co-channel AM station transmissions.

On the other side of the issue, North American Phillips Corporation, manufacturer of the SL-18 RF lamp, expressed concern that "excessively stringent" emission standards would limit innovations in RF lighting technology.

Phillips also urged the FCC to consider "less restrictive standards." The company suggested "an emerging consensus on voluntary industry standards... will provide all the protection necessary against objectionable interference."

However, Linear Corporation, a manufacturer of RF equipment, stated the FCC proposal was not strict enough. The FCC's proposed limitations on radiation "do not reflect the extreme potential for creation of harmful electrical interference to all co-located RF devices."

Anything less than the strictest limi-

tations on unintended radiation from RF lighting devices would "result in a harmful increase in floor noise, (and) creation of (an) extreme threat of harmful interference to licensed radio services and unlicensed intentionally radiating devices," Linear commented.

After evaluating the comments filed in response to its rulemaking proposal, the Commission noted that the public would best be served "by technical standards designed primarily to minimize interference problems in those situations where the interfering device and the victim receiver are not under common control."

The RF lighting standards currently in effect, the FCC maintained, "were developed in accordance with such objectives."

"They (the standards) are designed to protect a receiver from signal sources located at distances of 10 meters and separated by a wall."

The Commission said that, below 30 MHz, radiated emissions "are caused by the presence of high levels of RF energy on the power cords." In such cases, the FCC noted, "existing conduction limits imposed on RF lighting devices has proven effective."

At the NAB, the decision by the Commission to make no changes to standards regulating RF devices was not very well received. NAB Deputy General Counsel Barry Umansky said the FCC ruling was "disappointing."

"We (the NAB) had hoped that the Commission would not only enact more rigid standards for RF lightbulbs, but that by this time they would be initiating a larger proceeding that would impose similar limits on other kinds of electrical devices that cause interference to AM and other forms of communication," Umansky said.

He maintained that ambient noise levels affecting the AM band in urban areas are "so high that it should be one of the highest priorities" for the FCC.

FCC docket is GEN 83-806. For additional information, contact Liliane Volcy at 202-653-7316.



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# McMartin Staff Starts New Firm

by Alex Zavistovich

Gunnison CO ... As the dust settles following the collapse of Gunnison-based McMartin International, a group of former employees of the equipment manufacturer have entered into a new enterprise.

Led by former McMartin International Director of Engineering Bob German, Broadcast Technology of Colorado (BTC) has been in operation since early October. The company plans to manufacture subcarrier equipment, as well as field strength meters and generators, and will explore areas of new technology, German said.

Other former executives of McMartin International who helped found Broadcast Technology include Wayne Allen, who had been director of manufacturing for the now-defunct McMartin firm (not to be confused with McMartin Industries, under new ownership and still operating in Omaha, NE).

BTC got its start after the demise of McMartin International late this past summer. McMartin International was an effort on the part of the company's owner, Ray McMartin, to rebuild after his first company, McMartin Industries, filed for bankruptcy in 1985.

A public auction of the assets of McMartin International, seized after the company defaulted on payment of approximately \$5,000 in outstanding Colorado withholding taxes, was slated at press time for later in autumn.

Prior to the decision to auction McMartin's assets, there had been some

talk of having the business continue operating under employee management, German said. He added that the employees had also offered to sell off the company's assets for the creditors involved.

A consortium of area banks had subsidized McMartin International's development in Colorado. The Gunnison Bank and Trust, the First National Bank of Gunnison, and a third bank based in

“ the salaried employees ... went without being paid for a month.”

Crested Butte, a ski resort 20 miles to the north of Gunnison, lent the start-up capital to McMartin.

The consortium, however, opted against the employees' offers. German speculated the deal was rejected because bank officials feared McMartin might bring suit against it.

However, German expressed skepticism over a public auction of McMartin's assets to recoup the bank losses. He said the consortium "would be lucky to make 10 cents on the dollar—there's no market for electronics out here (in Gunnison)."

Cash flow problems at McMartin International were apparent "for four or

five months" before the company closed, commented German. "We were on credit hold with about every vendor you can name," he noted.

By the end of June, McMartin International was still able to meet the payroll for hourly employees, German maintained. However, the salaried employees—in manufacturing, engineering, and purchasing—went without being paid for a month.

When a Colorado state tax agent arrived at McMartin International in August to collect the unpaid withholding tax, he found the company's president had left. The agent subsequently closed down the company, German said.

German estimated that besides owing some \$250,000 to the consortium of banks which had subsidized the company's start-up costs, McMartin may also owe as much as \$100,000 to vendors for components alone.

The failure of the second McMartin business was attributed by German to Ray McMartin's own extravagances.

"If you only have a quarter-million dollars, you can't replicate Omaha, and you can't draw a salary of \$60,000," German said. He commented that McMartin family members were on the company payroll for a total of \$100,000 per year.

Within the McMartin International or-

ganization, McMartin's wife, Jane, served as VP/public relations. Their son, Robert, was VP/finance.

German, commented, however, that the titles were only nominal.

At last report, Ray McMartin had moved to Colorado Springs, where he is working as a consultant for TTC in that company's divestiture of the Ampro-Scully line.

Efforts to contact McMartin by RW have proven unsuccessful. A source at TTC contacted in mid-October acknowledged that McMartin had worked for the company, and that TTC understood McMartin's financial situation when he was hired.

Other spokespersons at TTC could not be reached for comment.

At its peak, McMartin employed approximately 30 people. Over time, many of these people will be hired by Broadcast Technology, German said.

No plans have been made by German or the other founders of Broadcast Technology of Colorado to put in bids in the auction of the McMartin gear. Most of the test equipment had been leased, German explained, adding that none of the other equipment was of any interest to them.

For additional information, contact Robert German at 303-641-5502.

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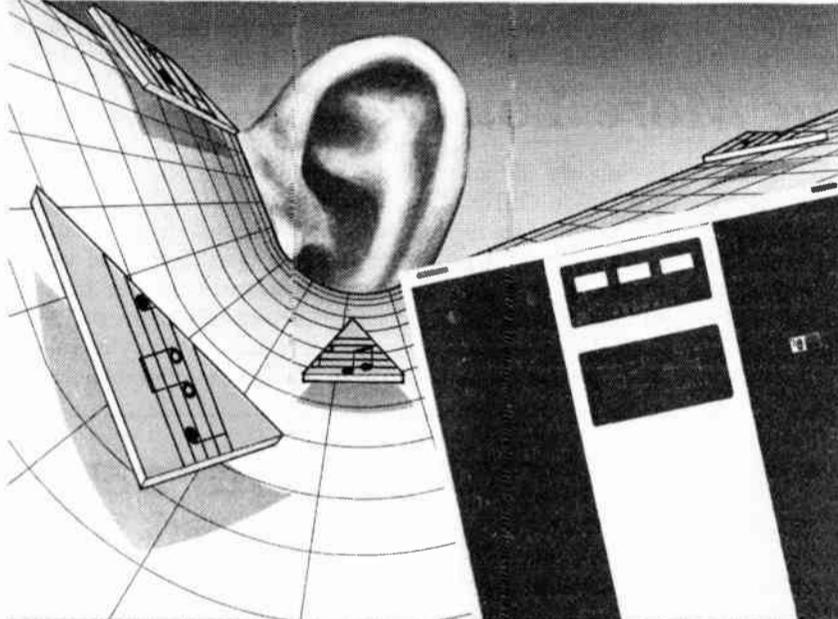


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# Engineer's Holiday Wish List

by John "Q" Shepler

Rockford IL ... Tis' the season to be giving and receiving.

Like most of us you probably have your hands full getting ready for special events at the station. With luck, you're squeezing in some secret shopping trips at lunch and after work. Your own list? Gee, who has time to really think about it?

"Oh, just get me a new shirt or something," you call to the family while bounding out the front door.

OK, maybe you don't feel right about asking for things. After all, it does seem a little childish to be writing up long lists for Santa. Better to give than receive, right?

Actually, you may be passing up a golden opportunity to make yourself a little happier this Christmas and a lot happier in years to come.

Why not take advantage of a perfect chance to acquire some of those things that can really do you some good?

## Tools of your trade

There is no such thing as too many tools—just toolboxes that are too small. How about a new toolbox or two? A plastic tackle box works great and doesn't cost much.

You get a big tray for screwdrivers and pliers and a bunch of little trays just right for sheet metal screws, fuses and assorted resistors and caps.

Want to get set for contract work or just class up your act?

Jensen (Phoenix, AZ) makes some great kits of top-notch tools. Expect to pay about \$500 for an attache set or \$100 for a pouch. Expensive, but you're worth it, right?

Maybe a few additions are all you really need right now. Xcelite nut drivers are a real treat if all you've known are the sale table specials.

How about a nice set of Vaco hex drivers for quickly removing those stuck-on knobs? Maybe some Diamond diagonal cutters or needle nose pliers

would make life easier.

Don't forget Sears. Craftsman still makes some pretty nice screwdrivers and its easy for the kids to pick out something in their price range.

Tell those older kids you are desperately in need of a cordless screwdriver. There are some nice ones that fit into their allowance budget.

When you're out at the mall, check out the novelty gift stores. An ideal gift that you'll use for the next 10 years is a small metal pocket knife with screwdriver, file and scissors.

## Q-Tips

They'll engrave your initials, nickname or Ham call for free. A very good item to hint around for.

One of the handiest things you can get for only a buck is a neon circuit tester. You should always have one of these in your pocket if you are working around AC circuits that may or may not be live.

For \$10 some kind soul can buy you a grounded outlet tester that tells everything there is to know about an outlet. It uses three little lights.

## Gifts with a spark

Speaking of electricity, how about a cord reel, which is an extension cord and outlets that wind up into a handy size to carry—for \$25 or less.

A fluorescent drop light is in the same price range and is a lot nicer than the old incandescent type.

Let's talk soldering irons next. The cordless type are handy in tight places and don't induce hum into live audio circuits.

Of course you already have a temperature controlled soldering station for PC work. If you don't have one yet or the old one is taped together from being dropped repeatedly, consider the new temperature adjustable style. Some even have a digital temperature readout.

What luxury!

A little bigger iron is useful around copper braid and strap. The 140 W Weller guns are handy if you're wiring under studio furniture or in racks.

Let go of the trigger and they cool off quickly—much less of a fire hazard if you forget and walk away from a hot iron.

Of course the ultimate in high power irons is a propane torch with a soldering tip. These are absolutely essential for 4-inch strap and copper pipes.

You can get a nice kit of tank and accessories in a metal carrying case at any hardware store.

If you have a rich aunt that is just tickled to see you in the electronics business, encourage her support.

A nice two channel scope for \$1,000 or so sure is handy for setting up stereo generators and checking clipping levels.

At a little lower cost, a digital multimeter is worth drooling over. You need the accuracy with some of today's tightly regulated power supplies.

What if the relatives have an absolute upper limit of \$20? For that price they can still get you a nice audible logic probe that may even come in handy when they need their home computers fixed.

Here's an item of test equipment that you probably don't even think of in that category: headphones.

A nice pair of lightweight high impedance stereo phones are as useful to an engineer as they are to a disc jockey. Add a couple of clip leads and you can find audio circuits or troubleshoot amps by ear.

## Listening in

You can hardly expect to fine-tune the station's audio without a great monitor. How about a new receiver and speakers for the car?

Is your station pioneering AM stereo? Then an AM stereo portable or car receiver will be a big boost for you. If AM, but not stereo, how about a Dymek receiver for super fidelity?

At home, a good monitor is essential.

It gives you a chance to listen for the nuances in the sound without a lot of station people hanging over your back.

Make sure you get a good set of speakers. The best would be a professional set of the same model the station is using in the studios.

A more grandiose monitor is a satellite receiver that picks up the audio sub-carriers. You can monitor the radio networks and make sure you're not losing quality through the broadcast chain.

Of course these dishes pick up TV programs, too. You don't have to be doing something practical all the time, do you?

For the most part, these monitors are pretty expensive stuff. Givers on tighter budgets might come up with FM antennas, an outlet surge protector, cassettes for air-checking or an FM listing guide for DXing.

## Personal necessities

Some of the most appreciated gifts are the ones you pass over buying for yourself because you can't justify an absolute need.

For less than \$25, somebody nice could get you a set of personal business cards, stationary, or memo pads. How about a rubber stamp for return addresses and identifying your personal books?

Speaking of books, any of the SAMS or TAB technical books would help keep you up to speed with technology.

Some business books or personal development books could also spark a new interest or help you brush up on those non-technical skills that can help your career.

A pre-recorded audio tape on investing or negotiating is only about \$10 and could be worth 10 times that in benefits.

How about an NAB Engineering Handbook? Big bucks, but a handy reference. Maybe just a new set of FCC rules would be a help.

Speaking of big bucks ... the big buck item on your list could be a personal computer.

You can start small if all you want to do is learn Basic. However it's probably worth the expense to go with something that is compatible with Apple or IBM.

There is a lot of useful engineering software out there, including schematic drawing and PC layout packages, word processors, spread-sheets, RF circuit design and communications hookups to bulletin boards of interest to people in broadcast.

You need to have a standard operating system, such as MS-DOS, to be able to run these discs.

Don't let any more time slip away before you get your list put together and posted.

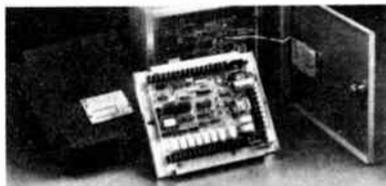
After all, there is less than a month to go and they're probably getting desperate for ideas. Of course, you can continue to dilly-dally around and wind up with a panic present ... such as another unwelcome necktie.

No need to make a fancy list. If you see something you like in this column, circle it with a red felt tip pen and tape the page to the nearest refrigerator, mirror, door, etc. They'll get the hint.

Oh, there is one last present that should go on the list, just in case Santa owns the station. That's a new transmitter that will stay on the air while you are off enjoying the holidays.

Best wishes for the season!

John Shepler (aka Santa's helper) is an engineering manager, broadcast consultant, writer and regular RW columnist. He can be reached at 815-654-0145.



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# Stemming Station Takeovers

by Tim McCartney

**Boise ID** ... Engineers are talking a different game now than just a few months ago.

Instead of new technologies and difficult GMs, the topic is now corporate takeovers and the new owners of their stations.

Overnight, the days when engineering departments were ignored after an ownership change have vanished into nostalgia. Now, engineering budgets are being slashed and some engineers are being fired.

For what it's worth, engineering is not the only area taking a beating. It's the entire station—anything or anyone who shows up as an expense item on the ledger sheets.

At the annual Broadcast Engineering and Management Conference in Madison in September, engineers talked about the serious problems they face in this new era.

Long-time, dedicated station owners are finding it impossible to turn down the high prices being offered to them for their holdings. So, they sell.

The new owners—usually a pizza company with no prior broadcast ownership experience (as in one case)—set out to acquire just one thing in the purchase.

It's not ratings, a good balance sheet, a profitable station, good programming or a strong physical plant (engineering).

They are looking only for a coveted FCC station license, which they can sell again within a year for monumental profit. In the interim, starvation is in store for the station itself.

We used to think things were bad, but now they are far worse.

In the past a station was purchased with plans to keep it for at least three years, since the FCC used to require this as a minimum.

Thus the new owners were forced to develop an effective mid-range strategy which called for keeping at least three areas going well: ratings, profit and the physical plant.

Then after three years a handsome profit could be realized as a result of these modest investments.

The problem with this was that personnel at the stations were rarely paid better than slave wages while they watched new, state-of-the-art broadcast equipment being installed.

This deflated any hopes of good station morale or a serious career at that station.

Today's new owner, often by takeover, buys an FCC license and slashes the entire station budget while the FCC license is put up for resale.

So we go from very bad to even worse. And two of the previously sacred areas—ratings and the physical plant—are now ignored.

That's why engineers are concerned like never before. So are announcers, salespeople and GMs. And if the PD still has a job, he/she is also concerned.

Inevitably the engineering portion of this chaos can only last a while.

Over the next two or three years stations living under this umbrella will not be able to stay on the air and will need massive infusions of dollars for equipment and engineering.

In the interim no electronics student who can read the short-term writing on the wall would even *think* of entering

broadcast engineering as a career.

Then when engineers are finally needed again, very few will be around.

That means that the fly-by-night owner can expect to pay top dollar to find any kind of engineering expertise.

Let's hope that engineers in this situation in a few years will "seize the moment" and charge them the highest price ever imagined.

This will clearly demonstrate that hand-to-mouth station management really is the most expensive strategy in the long run.

At the Madison conference a suggestion was offered which deserves serious discussion.

Press the FCC to go back to its former

three-year ownership rule requirement.

That would take the steam out of the strategy which says owners need only buy an FCC station license and sell it for great profit.

This is not restraint of free trade, since the dispute is over a public commodity—an FCC station license. Since the problem is already an FCC problem, the Commission itself should seek to resolve it.

As engineers, we need to encourage our organizations to publicly support a return to the three-year ownership requirement. That means working with local, regional and national groups such as SBE and NAB.

It also means writing the FCC our-

selves as private citizens, not broadcast station employees.

Our argument is *not* that engineers are losing jobs.

Our argument is that communities are losing their stations to unknown financial wizards who know nothing of the public trust they have acquired.

We are not in this alone. We have allies in the other departments of our stations, including (in many cases) the GM.

Let's get some discussion going and get SBE and NAB to take a public position aimed at returning some form of dignity to the local station.

*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 in human resources development. He can be reached at 208-385-3760.*

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# Shifting Remote Control Policy

by Harold Hallikainen

**San Luis Obispo CA . . .** The Commission is looking into issuing clarifications of its rules on dial-up remote control, which we have been discussing in the last few columns.

It appears to be an effort to clarify the rules because of confusion caused by recent advances in the technology.

I'd hope that the Commission would issue rules that are clear enough to stand on their own.

Last month we attempted to determine what FCC policy is regarding transmitter remote control "fail safe", or continu-

ous carrier control.

It appears that although the rules have changed, policy hasn't changed much. Let's try to finish up a look at the various options in control and their compliance with FCC policy.

## Non-traditional fixed control

As stations automate programming or rely on nationally distributed programming (typically by satellite), they've looked for ways to reduce transmitter operation costs.

This has usually taken the form of an employee or contractor operating the transmitter from a point other than the

studio or transmitter.

Rule 73.1860(d) allows operators to be employed for other duties, provided these duties do not interfere with the operation of the broadcast transmitter.

Some stations have allowed these operators to answer phones (answering service operators), watch alarms (alarm service companies), check in guests (hotel desks), or sleep (the manager at home).

These appear to comply with FCC rules and policy provided several requirements are met.

First, the operators must be licensed; they must be fully instructed in the

operation of the transmitter and other duties of the operator must not interfere with operation of the broadcast station.

Also the operator must *at all times* be able to immediately terminate the operation of the transmitter (continuous carrier control or fail safe), according not just to the rules, but to FCC policy.

## Attention to EBS

The operator must also monitor an EBS receiver (either manually, or have a receiver automatically un-mute on reception of the EBS attention signal).

The operator must be able to transmit the EBS attention signal, air the appropriate announcement (from the EBS Checklist) and rebroadcast the EBS emergency message (if participating) or shut down (if non-participating).

A non-participating station *must* air an announcement and run the EBS tones, then shut down (not merely shut down).

And finally, remote control of the transmitter must be from an FCC notified control point.

The requirement concerning non-interference of other duties raises interesting questions regarding sleeping operators.

In some stations, the transmitter is put on "autopilot" and instructed to phone the manager at home, waking her/him to report any problems.

We assume, of course, that there is a "continuous carrier control" link from the manager's home to the transmitter.

## Varying opinions

To get an idea of FCC policy on sleeping operators, we look again to the NAB panel discussion on new technology held 15 April 1986.

The discussion refers to Ralph Haller of the FCC, who was instrumental in the writing of the current remote control rules.

John Reiser of the FCC said that the operator is supposed to be "consciously" in charge of the transmitter.

Gentner's John Leonard asked Reiser if a remote unit's ringing phone, which typically wakes everyone up, would fulfill such a need.

Reiser replied that "If it's capable of waking him up, and it doesn't get a response it'd better do something."

To which Leonard added "It goes on and calls somebody else."

## Immediate termination

Regarding the ability to immediately terminate transmitter operation, I have made the assumption that the Commission is requiring a continuous dedicated link from the operator to the transmitter to comply with the "immediate shut-down" needed.

A letter from the Commission indicates that sole reliance on a dial-up system is not **(continued on page 21)**

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# Put a Chill On Cooling Costs

by Dave Hebert

Pasco WA ... These are hard time we live in. Costs are up ... revenues down.

How do we as engineers know that we are doing our part to help keep these costs in line?

As engineers, we do all we can to help cut costs wherever possible.

It takes some rather unconventional thinking to come up with better and more effective ways of cutting the operating cost per hour and still maintain an effective engineering program.

Let's look at the transmitter and see if there are some ways we can maximize operation to provide the most efficient use of cooling costs and still keep the rig operating efficiently.

### How much cooling?

Several years ago, I conducted a study on a popular FM transmitter to determine the cause of premature tube failure and to correct any and all maladies which could be responsible.

Since then I have looked closer at causes outside of the transmitter which can shorten tube life and contribute to more expensive operation.

We all know that it is important to provide adequate cooling for our transmitters. But how much is enough and how much is too much?

When we don't provide enough cool ventilation tube and component life is shortened and the transmitter is unreliable.

But, on the other hand, how much cooling can we afford?

And further, what does operating temperature really mean?

In my operating log every week I check what I call "delta T."

As you know the Greek letter  $\Delta$  indicates change, so I am concerned with the change in air temperature as fresh air enters the transmitter room and is subsequently heated by the final and exhausted.

There are two thermometers for this

purpose. One is mounted along the wall near where the fresh air is brought into the room.

The second is inserted in the exhaust plenum, directly in the air stream to measure the heated air from the tube.

In my case, the specifics of this study only apply to this installation, but the concepts can apply to any station.

### Most effective

My study consisted of analyzing all the entries for one year to see if there is an optimum air temperature that seems to be most effective in cooling the final.

We are defining "most effective" in a unique way.

When I subtract the input air temperature from the transmitter exhaust temperature, we arrive at the delta T, or the amount of heat generated by the final tube and the other power components within the final cavity.

I then compare the delta T with the input temperature to compensate for the way that cooler air will remove more heat than warm air.

In effect, I want to know if there is a most efficient temperature that will remove the most amount of heat.

For my purposes, I define "most efficient" as the point where delta T is equal to the amount of heating that the transmitter is causing to this fresh air.

Consider this example. The incoming air to the transmitter is 70° F.

The exhaust coming from the transmitter to the outside world is 142° F. In this case, delta T is 72° F.

Now we compare the delta T (72°) to the incoming air temperature (70°) and arrive at a net difference of +2°.

For my purposes, this would be almost ideal.

But you will find that this figure can vary from a minus figure (for colder incoming air temperatures to a much higher positive temperature (for higher incoming air temperatures).

So I define maximum efficiency as *(continued on page 21)*

**WATTS UP?**



**3.5KW**



**5KW**



**10KW**

Figure 1.

Column "N" is the temperature of incoming air each day. Column "Δ" shows the "delta T" that was logged. "Diff" is the difference between the incoming air temperature and the "delta T." The closer the difference is to zero, the more efficient the use of incoming air temperatures.

N	Δ	Diff
82	57	25
79	58	21
69	60	9
77	55	22
75	60	15
80	55	25
53	63	-10
52	60	-8
65	60	5
65	60	5
72	60	12
54	64	-10
51	73	-22
59	61	-2
66	62	4
50	66	-16
59	69	-10
68	69	-1
72	63	9
70	68	2
68	70	-2
70	66	4
70	64	6
83	57	26
82	58	24
81	57	14
82	58	24
87	54	33

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Circle Reader Service 26 on Page 22

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# Learning Live Recording Ropes

by Chris Durso

**Fredonia NY . . .** Music recording is a delicate synthesis of science, skill and black magic.

A lot of the science, including the physics of music, characteristics of microphones and such, can be learned from text books on recording.

Skill only comes from doing. The third ingredient however, is best learned from the recording gurus at National Public Radio's Music Recording Workshop.

This year the workshop was held in late July at the State University of New York at Fredonia. One part emphasized jazz music recording techniques and the other stressed classical music recording.

Classes were held in the music department in specially designed reflection-free listening zone classrooms.

Each long day consisted of session on basic electrical theory, practical methods of troubleshooting and solving problems in the field recording process and "hands on" exercise.

Each morning started with what I found to be the most useful (and grueling) part of the workshop: the ear training drill.

## Trust your ears

The most important equipment in the control room during a recording session is the pair of ears of the engineer doing the mix.

All technical decisions made during the recording are based on what those ears hear.

After listening to pink noise the class

was asked to identify which of the 10 octaves was boosted or cut by 24 dB. The same 24 dB boost or cut was also applied to program material.

Next the boost and cut levels were changed to 12 dB for both pink noise and program material.

In the final exercise two octave bands were either cut or boost or both, for pink noise and program material. Try this in your control room and see how quickly you can notice and correct these kinds of audio signal problems.

## Mics basics

One of the most information packed sessions of the workshop dealt with the design, physics and practical uses of a variety of high quality condenser and dynamic microphones.

The off-axis response of different mic patterns was demonstrated to the class. The discussion examined ways to identify off-axis coloration problems (comb filtering) and how to properly place a mic to take advantage of either the lobe or null of the pattern.

Understanding how a microphone acts in the recording environment was the basis for a discussion of stereo mic techniques.

Coincident, near-coincident and spaced microphone placement techniques were studied for their strong points and weaknesses, then actual recordings made by NPR using these techniques were carefully critiqued.

Other recordings displaying mic selection and placement technique were also auditioned.



Attendees got a chance to explore mixing techniques in Paul Blakemore's hands-on workshop.

Most of the workshop participants were not from the technical side of the house.

In smaller markets it is frequently the nontechnical staff, however, that is actually faced with typical everyday engineering problems encountered during a recording.

Neil Muncy, an independent consultant who has been with the workshop since its inception, demonstrated why common technical problems arise and how to fix them quickly.

His demonstrations ranged from ground loop problems to record equalization adjustment.

In his technical sessions Neil was able to address the practical side of the technical realm as it applies to record-

ing music.

As with any workshop it is the hands-on experience that drives home lessons learned in the classroom. At this point the class was segmented into small groups for hands-on labs.

For one of the labs the participants were asked to bring their own recordings to be reviewed in light of past experience and recent teachings. "Oh yeah, that happened to me once, too," was a common phrase heard during this lab session.

In the hands-on recording lab participants recorded a number of different chamber ensembles to experiment with mic techniques.

Mics were moved about in near and far  
(continued on page 20)

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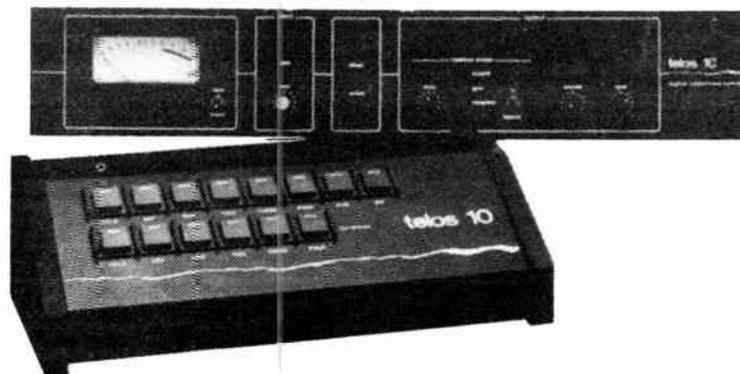
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# NPR Music Recording Workshop

(continued from page 19)

fields in an attempt to zero in on the best sound for the recital hall.

The effects of mic selection and placement as well as stereo mic techniques (X-Y, M-S, spaced omnis, etc.) were the variables in this experiment.

Another lab focused on post-production, or as Paul Blakemore, moderator of the lab put it, "We'll fix it in the mix."

Using a reverb unit the group was able to give warmth and depth to an otherwise acoustically dry performance.

Recordings which suffered from technical problems of some sort were used for this lab.

In one recording it was clear that an instrument had a spot microphone.

The sound from the instrument arrived at the spot mic sooner than at the main stereo pair in front of the orchestra, leading to a localization problem in the stereo image.

Through the use of a delay unit the group was able to move the instrument back in the image while retaining the enhanced presence of the spot microphone.

The post-production lab stressed careful attention to the surface qualities of a recording.

One of the most important aspects of recording music performances for broadcast is still the way it sounds from a mono listener's standpoint.

As stereo mic techniques were discussed during the course of the workshop, serious consideration was given to the "mono compatibility" of each technique.

Whenever more than one mic is used for a recording (absolutely necessary of course, for stereo) there will be phase differences at some frequencies.

Since these phase differences are usually in the high frequencies (due to the physical distances between the left and right mics) the mono listener hears a lack of high frequency energy from his speaker due to cancellation.

Typically in a radio production room we check the phase scope or pop the monitor system into mono to check for compatibility.

Listening to mono from two speakers is not the same as listening to mono from one speaker as the listeners are doing.

All instructors agreed that mono compatibility monitoring must be done using one speaker only.

## Digital recording

Digital audio is the new wave in the recording industry and public radio has been a leader in field digital recording for some time.

Skip Pizzi, NPR's Training Coordinator, presented a session on digital audio which covered all the popular digital processing techniques currently being

used for recording.

Advantages and limitations of the current formats were discussed along with demonstrations of digital recording problems and how to solve them.

A dramatic demonstration showing the effects of a 10th generation dub from analog and a 10th generation error-processed digital tape convinced the class that digital field recording is superior to analog recording.

## Putting it to work

The final project for the workshop was the "big remote." The plan was to do a recording using every stereo microphone technique studied during the workshop.

On the stage were PZMs placed on the floor at the front, front and rear M-S pairs, crossed "figure eights" center stage, an X-Y pair center stage and ORTF (non-coincident X-Y) center stage.

There were also spaced cardioids left and right, three spaced omnis, (left, center and right), and a Calrech Soundfield mic center stage.

All signals were recorded on a 24-track analog recorder for later playback and analysis.

After the performance of the Chautauqua Youth Orchestra the participants gathered for the playback.

The 24-track was rolled back through an eight-input switcher providing a stereo and mono sum output to the monitoring system.

All eight stereo microphone techniques were compared against each other and examined for localization, fidelity, stereo image and mono compatibility.

The class judged the front and rear M-S pairs as the stereo microphone technique that best fit the above criteria.

The front M-S was used for pickup of the orchestra and the rear M-S for the ambient sound of the room.

## Mic method of choice

As it turned out the M-S technique was also the preferred method of the recording engineers/instructors at the workshop.

The configuration consisted of a single point stereo microphone (Neumann SM-69 or AKG C422) with a forward facing cardioid and side facing "figure 8" array.

By controlling out of polarity information from the side microphone, the width of the stereo image could be varied.

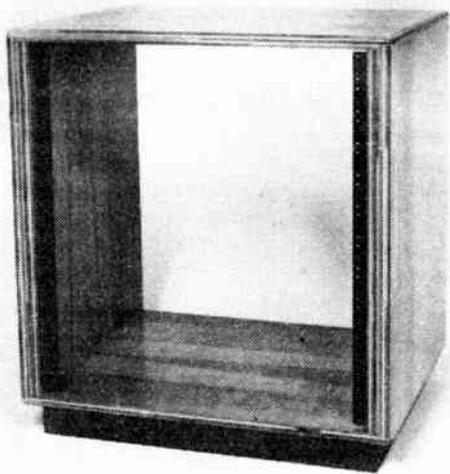
With the image control available the engineer can create a sound that puts the listener on the conductor's podium or in the center of the seventh row.

When summed to mono, the out of polarity side mic information cancels and leaves the front and center cardioid mic.

The microphone signals can be matrix encoded during the recording or recorded as M and S (instead of L and R) and matrixed later in post-production in a controlled listening environment.

At the conclusion of the Music Recording Workshop I felt that I had absorbed more science, refined my recording skills, and had some insight into the black magic that the gurus use to get great recordings.

*Chris Durso is assistant CE at KPBS-FM, San Diego, and a frequent contributor to RW's Buyers Guide. He can be reached at 619-265-5025.*



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# Reducing Costs of Cooling Air

(continued from page 17)

when the net difference is close to zero.

Negative difference figures indicate too much cool air and high positive figures indicate that the transmitter is just not getting enough cool air.

Certainly it is not bad to provide

oceans of cool air for the transmitter, but it is simply not cost effective to provide more than the transmitter really needs.

### Listings for a year

For the purpose of my study, I charted the incoming air temperatures from 50° F to 88° F.

Then, I charted all the delta T figures for every figure of incoming air temperature.

Whenever there was more than one figure for each incoming air temperature, I would average them together for a net figure.

You will find that there is no smooth progression of temperatures, but it will be obvious where the crossover point is.

In my study I found that the optimum incoming air temperature is 67.5°, but

this will be different in other installations.

In short, how you look at your situation is up to you, but it is worthwhile to see if everything is at peak efficiency.

### Charting conditions

The next question is, "What does the exhaust temperature mean?"

As you begin this study you find that there is a definable range in the exhaust temperatures of the transmitter.

A new tube, properly tuned up, with blowers running at full speed is one that can be considered as optimum.

As the tube ages, tuning slips out, or blowers get tired, and this figure will probably rise.

Keeping an eye on the exhaust temperature will also help in tuning that tube.

Be sure to keep in mind that this heat is coming not only from the final tube, but any tuning and loading components near it as well.

Of course, knowing this figure can help you spot other problems before they get too carried away (such as blowers running slowly or dirty air filters).

Nonetheless, keeping a log of this delta T is useful when spotting trends of conditions changing slowly that you may not otherwise notice.

Proper ventilation management, as well as other factors, can provide much benefit at little cost.

The time spent charting the delta T is worthwhile, and the GM will appreciate the effort.

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

Figure 2.

I have organized all the "N" figures, and added the diff numbers. When more than one diff is listed, I have averaged them together.

N	Diff(s)	Av.
50	-16	-16
51	-22	-22
52	-8	-8
53	-10, -16	-13
54	-10	-10
59	-2, -10	-6
60	-8	-8
62	-5, -7	-6
63	-6	-6
65	5, 5	5
66	4	4
67	-3	-3
68	1, -1, -6	-6
69	9, 10	8.5
70	10, 2, 4, 4, 6	5.2
71	7	7
72	13, 12, 9	11.3
74	17	17
75	15	15
76	20	20
77	22, 13, 20, 17	18
78	23	23
79	21, 12, 26	19.6
80	25, 23, 21	23
81	29, 23, 14	22
81.5	23	23
82	25, 24, 24	24.3
83	26	26
85	28	28
87	33	33
88	34, 35	34.5

It can be seen, that, by my standards, the best "N" figure is 68 degrees.

# Changes in FCC's Dial-Up Attitude

(continued from page 16)

acceptable, and some "independent means" of shutting down the transmitter must be available.

I made the assumption that this must be a dedicated circuit, such as a leased telephone line or a continuous (or frequently verified, perhaps once a minute) radio link.

In a recent telephone conversation with Leonard, he pointed out that the Commission has not used the word "continuous" as I have but instead used the word "independent."

Possibly, a P channel UHF radio that is brought up only in the event of a failure of the dial-up system would meet the

Commission's "independent means" requirement while not being continuous.

### Floating control to come

In January, we'll discuss network control of affiliate or subscriber transmitters. We'll also try to cover "floating" control points, and move on to operator requirements.

I'd be interested in having readers send

copies of any FCC violation notices and their comments on these notices.

I'll send a copy of any documents mentioned or rules referred to in this series of articles on request.

*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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# DIGITAL DOMAIN

## Prioritize for Digital Conversion

by Skip Pizzi

Washington DC ... A typical broadcast facility's audio chain can be classified into four broad categories: transducers, signal paths, storage media and transmission devices.

Let's apply the "squeaky wheel theory" to see which is/are the limiting factor(s) to audio quality of the system.

In my mind, the latter two, storage media and transmitters, are the first targets for improvement.

The first stumbling block is, of course, that final piece, the broadcast transmitter, in which compatibility to the existing listenership is essential.

Plus there's the small matter of regu-

lation.

Our old friends at the FCC might have something to say about firing up a digital audio transmitter on some vacant frequency, especially given the several megahertz of bandwidth you'd probably require.

So let's leave that one to the task forces and committees to bat around for awhile.

### Digital transmission

There are other transmitters that might exist in our chain that we can do something about though. How about STLs and RPU's?

A few stations have already put digital STLs on line, using "pseudo-video"

PCM systems, on the 23 GHz band.

The 18 GHz band looks even more promising in this regard. Sure beats an aural STL (if you can get one) or telco.

On the horizon are more bandwidth-efficient formats, such as Dolby Labs' proposed ADM (Adaptive Delta-Modulation) system, and others.

Laser transmission for short hops and fiber-optic technology will probably also play a part in such point-to-point arrangements of the not-so-distant future.

But even more immediate are the storage media.

### CDs and beyond

Many stations have already taken their first step into digital audio with CD players.

A few have implemented digital recording using the same pseudo-video formats mentioned above, with conventional VCR's as the recording devices.

Carts are veritable sitting ducks here and plenty of hardware types are taking their pot-shots.

So far, a wait-and-see attitude has prevailed in the marketplace mostly, but probably not for much longer.

An important point to consider is that audio hardware manufacturing is a *business*.

The digital systems on the market today and in the near future have to be good enough to be considered an improvement over what they are designed to replace, but still be economical.

As far as storage media is concerned the systems on the market already, or those coming soon, satisfy these requirements when compared to analog.

But the same cannot be said when one attempts to use these same technologies (16-bit PCM for example) to replace analog signal paths.

Here state-of-the-art analog audio meets or exceeds existing digital systems, so in order to be successful, digital replacements for signal path application (consoles, amplifiers, etc.) will have to go one better.

Various systems of anywhere from 18- to 24-bit PCM have been proposed to meet this need, and these second-generation systems will begin to appear soon.

### Pros and cons

What other advantages and disadvantages will come along for the ride when digital audio goes beyond storage media?

Freedom from interference pick-up, the ability to multiplex many signals on a single wire, reducing repetition of devices on multi-input consoles and easier automation are a few in the plus column.

Higher electricity bills, start-up/conversion costs, possibility of total system crash and operator retraining are a few on the down side.

And once there are several digital pieces in the chain, how will the digital systems interface without going back down to analog in-between?

Proper planning will build from digital storage media in the center of the *(continued on next page)*

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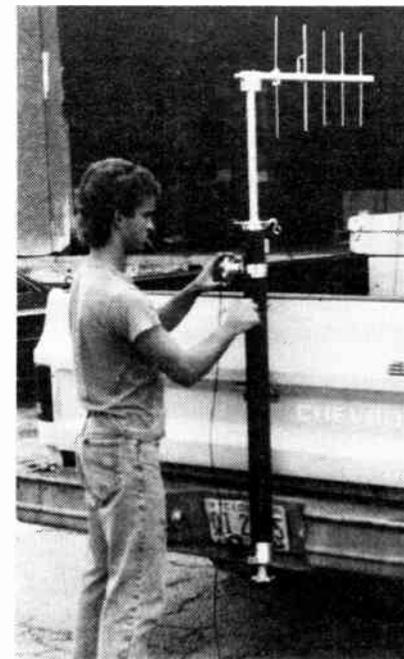
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006	026	046	066	086
007	027	047	067	087
008	028	048	068	088
009	029	049	069	089
010	030	050	070	090
011	031	051	071	091
012	032	052	072	092
013	033	053	073	093
014	034	054	074	094
015	035	055	075	095
016	036	056	076	096
017	037	057	077	097
018	038	058	078	098
019	039	059	079	099
020	040	060	080	100

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# DIGITAL DOMAIN

## Timetable for Buying

(continued from previous page)  
chain outwards in both directions.

The idea is to keep the signal in the digital domain as much as possible, until there is eventually only one A/D conversion (at the microphone) and one D/A conversion (at the listener's speakers).

But that's a long way off . . . or is it?

### Priorities

Let's get back to today's reality, and formulate a plan in which we prioritize the digital conversion process over the next few years.

The accompanying tables show one approach to areas that should be examined at your station, to see if replacement or upgrading is warranted, and financially possible.

If so, a digital replacement product should be considered within these time frames.

The time frames shown take into consideration the qualitative improvements, reliability and cost-effectiveness of digital products in each category, as expected during these upcoming periods.

Tables 1, 2 and 3 show priority lists of digital conversions that can be expected to occur in the next five years and into the future.

### Timetables

The items listed in Table 1 include those digital products which have already been established (or are about to be) as audible improvements to the traditional bottlenecks to audio quality at broadcast facilities.

These match or improve upon the convenience, reliability and long-term cost-effectiveness of existing analog units.

Note that storage media and transmission are heavily featured here.

Something not mentioned as a digital product, but worth considering within this time frame, however, is the addition of a high-quality noise-reduction system to whatever analog recording devices re-

main in use during this period.

In Table 2 we begin to see more sophisticated storage media and manipulation devices, along with some signal path improvements.

More and more of the production process remains in the digital domain.

The terrestrial services of the T-1 and ISDN formats should become widely available from local telcos, allowing improvements in program circuits for short-hop applications.

<p><b>Table 1</b> Priority I - Now through 1988</p> <p>CD Players Pseudo-video/PCM and R-DAT recording systems Cart replacement systems (recordable disk, small format) Digital telephone interfaces Digital automation systems Digitally-controlled routing switchers Digital STL &amp; RPU (using existing pseudo-video PCM on 18 &amp; 23 GHz)</p>
<p><b>Table 2</b> Priority II - 1989 through 1991</p> <p>Open-reel digital recorders (2-track and multitrack) Digital editing systems Digital transfer systems Digital audio processing (for production and air signal) Digital satellite and terrestrial program circuits</p>
<p><b>Table 3</b> Priority III - 1992 and beyond</p> <p>RAM/hard-disk editing &amp; production systems Digital mixing consoles Digital audio switching systems Digital broadcast transmitters</p>

Table 3 envisions an almost totally digital audio chain, with signal path becoming fully digitized.

In addition to qualitative improvement, this will allow great flexibility and efficiency in audio manipulations.

For example a mixing console need not have an equalizer on each input; the console may have one or two equalizer "control surfaces" assignable to any input, with its settings for that input stored in memory.

Updating and recall of any process will

be achieved with a few keystrokes. Routing will be handled similarly.

In fact, the entire operation can be "soft"-configured, allowing future improvements and expansions to be handled by software—rather than expensive hardware—upgrades.

Digital tape may even go away, as chips and bubble memory allow cheap mass storage of digital audio directly in RAM.

Recordable "magneto-optical disks" may also play a cost-effective part here. And our delivery to the listeners may also be in digital form.

### Getting started

Is this all science-fiction? Maybe so, but as the saying goes, "the longest journey starts with a single step . . ."

Many of us have already taken that step with one or more of the items in Table 1.

We've seen the prices drop on CD players since their introduction. Currency fluctuations notwithstanding, the same will occur on other digital product lines as well.

And remember, it's not just higher quality audio that we're getting here, but often an improvement in utility or ergonomics as well.

The productivity increase that these fringe benefits engender should be considered when measuring cost-effectiveness.

For example, a CD sound-effects or production music library not only sounds good, but takes up a tiny fraction of the storage space, doesn't deteriorate audibly over time or multiple playings, and provides greatly reduced access time to any selection.

You should be comforted by the thought that this rapid pace of product introduction should not continue forever.

We are in the midst of a true revolution in audio, and the scrambling of R&D and marketing departments is unprecedented in our industry.

Once digital audio becomes commonplace things should settle down a

bit . . . until the next revolution comes along. In the meanwhile, we should be prepared for the onslaught.

To that end, in the next several installments, we shall explore in detail each of the product categories listed in Table 1, examining the current marketplace, and try to leave a little time for some applications advice and brainstorming on future prospects, too.

I've started to hear from a few of you on these topics, and I'd love to hear more.

*Skip Pizzi is the training coordinator for National Public Radio's Program Engineering Department. He can be reached at 202-822-2483.*

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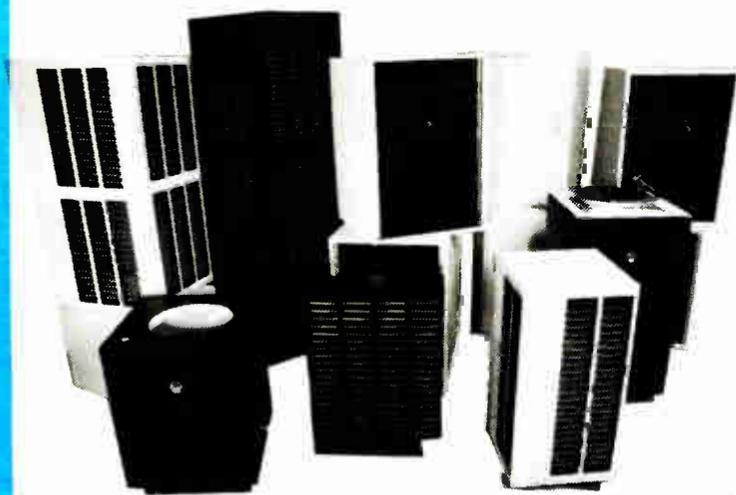


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## AMPLIFIERS

### Want to Sell

**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. 606-864-7643.

**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.

**Shure M64** phono preamp, \$50. P Cibley, Cibley Music, 138 E 78th, NY NY 10016. 212-966-2219.

**PR&E SDA-8** rack mount stereo audio dist amp, new w/manuals (2), BO. R Royster, 8922 Valencia Dr, spring Valley CA 92077.

**Phase Linear 400 & 4000** preamp, extel cond, as pair, \$400. W Laughlin, KDCV, 2636 N 56th, Lincoln NE 68504. 402-466-8670.

**Rane HC6** 6 chan stereo headphone amp, like new, \$200. G Ernst, Bayside Snd, POB 166, Lincoln City OR 97367. 503-996-6020.

### Want to Buy

**Dynaco Stereo 70**, P Hans, Mainline Comm, 100 Poplar St, Portage PA 15946. 814-736-3883.

**McIntosh, Marantz, Dynaco Quad**, Audio Research, etc, amps; WE, Tannoy, Altec, EV, JBL, Hartfield, Olympus, Harness, Laguna speakers, Thorens, Fairchild turntables; WE tubes & microphones. Lapine, 10919 Oasis, Houston TX 77096. 713-723-5281.

## ANTENNAS & TOWERS

### Want to Sell

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

**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.

**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/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.

**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.

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

**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.

**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.

**AM tower** for 1430 kHz, 150-170', 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 Bdcg, 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 Muso, WGCN, 165 Harris St, Chester SC 29706. 803-377-1111.

**Phelps Dodge CPMF-8** 8 bay CP antenna, tuned to 101.1 MHz, BO, twenty sections of 3-1/8" rigid coax, 20' length, including bullets and non-insulated hangers, BO; Stainless 3000 feet of 1" guy wire on reels of 1000 feet, approximately two years old, BO. R Goodman, WCKN, PO Box 650, Anderson, South Carolina 29621. 803-226-1511.

**Cablewave FCC 38-505** 510' phase stabilized cables (3) electrically phase matched to ±1° at 930 kHz, \$1000. T Fernandez, WKXY, POB 2500, Sarasota FL 33578. 813-366-4422.

**SWA dual audio matrix system & XLR** cable sets for simultaneous encode & decode of a stereo signal, made for Lexicon Inc, list price \$995, now \$395, new! Call Lexicon sales, 617-891-6790.

**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.

**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 Bdcg, 115 NW Oregon Ave #18, Bend OR 97701. 503-389-7885.

**Shure M-625 Voicegate**, one new, \$100 plus ship, one used, \$75 plus ship. S Sibulsky, KVNI, POB 308, Coeur d'Alene ID 83812. 208-664-9271.

**Symetrix SE-400** parametric EQ, excel cond, \$350; Soundcraftsmen SE-450 10 band/chan EQ, gd cond, \$100. C Fries, KSQY, Box D, Dearwood SD 57732. 605-578-3533.

**Harris Phase Fixer** audio TBC, w/3 encoder units, 18 mos old, BO. T Bryan, KARO, 503 Old Hwy 63, Columbia MO 65201. 314-442-3116.

**UREI 530** stereo full octave EQ, gd cond, \$300. R Dietterich, WAMO, 411 7th Ave, Pittsburgh PA 15219. 412-471-2181.

**dbx 150** type 1 NR, \$140/BO. R Branske, WLOO, 875 N Michigan, Chicago IL 60611. 312-440-3100.

**Furman RV-1** reverb w/limiter, mint cond, \$180. R Coates, KJUG, 724 2nd Ave E, Spencer IA 51301. 712-262-8036.

**Fisher stereo reverb**, \$50. R Coates, KJUG, 724 2nd Ave E, Spencer IA 51301. 712-262-8036.

**Dorrough 310 FM DAP** tri-band compressor/limiter, matched pair FM, mint w/manuals, BO; PR&E MX FM, AM Multimax tri-band compressor, matched pair FM, new & two AM models, one new, one used, mint cond, \$1000 for FM pair, \$500 for AM model w/manuals. R Royster, 8922 Valencia Dr, Spring Valley CA 92077.

**SAE 5000A NR**, mint cond, \$150; Phase Linear 1000 single-ended NR, expander, limiter, excel cond, \$125; ADC SA-1 spec analyzer, \$85. W Laughlin, KDCV, 2636 N 56th, Lincoln NE 68504. 402-466-8670.

**White 1/4 oct** passive EQ, high end & 1 kHz boost modules, rack mt, excel cond, \$90. B Busetti, Lizard Elect, 1124 W 2nd St, Florence CO 81226. 303-784-3540.

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**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, WBDG, 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.

**ERI 25 kW isocoupler**, 102.9 MHz retunable, \$2000. P Jellison, WBLV, 117 S Fountain Ave #301, Springfield OH 45502. 513-324-5643.

**Andrew H850A**, 8-1/8" heliax, 700' on spool, 12 yrs old, BO. G Velker, WMCU, 2300 NW 135 St, Miami FL 33167. 305-681-4689.

**Tower**, 309', 24" face insulated for AM, will hold FM & STL, 10 yrs old, \$3000 & you remove. P Jellison, WBLV, 117 S Fountain Ave #301, Springfield OH 45502. 513-324-5643.

**Comm Products 3-1/8"** transmission line, 20' sections (10), \$90 ea; Kline 1000' guyed tower, standing near Albion NE, BO; GE chan 8 transmit antenna, TY-52B, 4 bay helical on tower, BO; Prodeline type 100-847 6 1/8" 50 ohm transmission line, (50) 20' sections on tower, BO. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

**Collins 37CP FM**, 12 bay, 12 yrs old, rebuilt in 1986, BO. G Velker, WMCU, 2300 NW 135 St, Miami FL 33167. 305-681-4689.

**Phelps Dodge**, new in 1977, hi-power, 10 bay FM, 104.7 MHz, w/deicers, \$8000/BO. D Fields, KUFO, POB 1713, Big Spring TX 79721. 915-263-7326.

**Four tower phaser**, Ohm's Law design, day/nite patterns w/2 ATU's, \$15,000. T Fernandez, WKXY, POB 2500, Sarasota FL 33578. 813-366-4422.

**ERI Super Power 6 bay FM** on 94.7 MHz, \$1000. WFBQ, 616 Fallcreek Rd, Indianapolis IN 46220. 317-257-7565.

**Tower**, 70' self-supporting, \$1000. D Fields, KUFO, POB 1713, Big Springs TX 79721. 915-263-7326.

**Continental/ERI 12 bay CP antenna**, 93.1 MHz. L Dupree, KOID, POB 7057, Alexandria LA 71301. 318-445-1234.

### Want to Buy

**S-A or Fairchild** satellite dish & digital receiver, for ABC Network. D Fernquist, WBRB, POB 288, MI 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.

**Nitrogen regulator** & fittings for pressurization of transmission line. S Streitenberger, WFCB, 45 W Main, Chillicothe OH 45601. 614-773-3000.

**High band VHF TV antenna**, tuneable to chan 10 or 12, will re-harness & rebuild. J Powley, KIHU, 1536 Logan Ave, Altoona PA 16602. 814-944-8571.

**Bogner or Scala UHF TV translator** or LPTV antenna, for low end of UHF band, 1 kW input rated or more pref. J Powley, KIHU, 1536 Logan Ave, Altoona PA 16602. 814-944-8571.

## AUDIO PRODUCTION OTHER

### Want to Sell

**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.

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Circle Reader Service 41 on Page 22



# Broadcast Equipment Exchange

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### Want to Buy

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

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

## AUTOMATION EQUIP.

### Want to Sell

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.

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

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

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.

Harris 995-7867-001 R-R source interface cards (2) for System 90/9000, \$150 ea. C Bryson, Conserv, 93 Robinhood Dr, Zelenople PA 16063. 412-776-5204.

Schafer system, (4) Ampex 440 R-R's, (2) McCarta cart machines, presently in use, gd cond, avail aft 11/1/87, \$5000. C Steinbacher, WWPA, 230 Market St, Williamsport PA 17701. 717-323-7119.

Instacart 48 PBS stereo, used less than 50 hrs, mint cond, \$7500 firm. D Jenkins, KCLB, 50 Mark West Springs Rd #3, Santa Rosa CA 95403. 707-528-9236.

MEI 100MP microprocessor control programmer, w/latest factory mods, run 8 sources plus net input, \$2000. T Saunders, WSBH, 56 Tagger Ln, Southampton NY 11968. 516-283-9500.

IGM Instacart 24 tray, mono, BO over \$2000. K Harnack, KWLN, 88 Union Cntr Ste 309, Memphis TN 38103. 901-529-0098.

### 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 Bdcg, 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

JVC KY1900U camera, 10 x 1 w/AC adapt/bat pak/case, \$1995; JVC KY1900U camera 6 x 1 w/AC adapt/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.

Sony DXC-1640 single tube camera, \$900. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

Hitachi FP40S Saticon camera w/access & lens, BO over \$3000. Kosack, 516-489-1071.

Panasonic NV9400 w/2 battery's, Porta Brace, battery charger & service manual, like new cond, \$2850. R Nimitz, Univ of Notre Dame, POB 542, Notre Dame IN 46556. 219-239-6423.

Norelco PC 70 w/10:1 Angenieux lenses (11) all need work, \$3000/all. N Macrae, Technichrome, 1212 S Main, Las Vegas NV 89104. 702-386-2844.

JVC KY1900 w/case, battery & charger, excel cond, \$2200. R Larson, Metropolis Video, 316 S Maple, Oak Park IL 60302. 312-848-3172.

### 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.

Bdct quality chip camera, anything reasonable priced, possibly compatible to Betacam. Kosack, 516-489-1071.

## CART MACHINES

### Want to Sell

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.

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

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, SRG120, 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 Hotchkiss 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) Spartatic PB, (1) Spartatic record, SMC Carousel, several work well, others may be fixed or used for parts, also approx 1500 Fidelipac Master carts w/mono country library. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

Orrtronics cart tape replater, \$175. W Ditzel, Ditzel Prod, 933 Shroger Rd, Dayton OH 45419. 513-298-5381.

Telex Viking 230 (2), \$125 ea. M Preace, Foothill Deanza Comm Coll, 12345 El Monte Ave, Los Altos Hills CA 94022. 415-960-4260 or 408-773-9793.

Spotmaster 5 spot cart machine, \$500 plus frt or trade for Tapecaster RP plus \$200. B Brown, Pro Bdct Serv, 3720 Greenwch Rd, Louisville KY 40218. 502-459-8792 aft 5 PM.

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

Collins Twin-Tape R/P, in service, \$250. L Houck, Rollin Recdg, 210 Altgelt, San Antonio TX 78201. 512-736-5483.

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

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.

### Want to Buy

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

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.

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

ITC splicefinder. S James, Re-nu Carts, Rt 6 Box 127, Ottumwa IA 52501. 515-684-7012.

## CASSETTE & REEL-TO-REEL RECORDERS

### Want to Sell

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.



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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.



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Panasonic, cassette deck, gd cond, \$75; Wollensak R-R, \$75. M Banks, WSTH, 208 Main, Alexander City AL. 205-234-2566.

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.

Otari ARS 1000 w/25 Hz detector, never used, \$1200/will ship. J Young, KIBS, POB 757, Bishop CA 93514. 619-873-6324.

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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.

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.

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Scully 280-B 1/2 trk stereo, gd cond, Ruslang 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 Echoplex 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.

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Ampex 602, 2 speed, \$225. B Diffee, WRXO, POB 1176, Roxboro NC 27573. 919-599-0266.

Otari MX 5050B2 2 trk (2), one in Ruslang 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, Earedo TX 78040. 512-722-6832.

Revox A-77 21k sell/trade for IBM compatible PC, 14" reels IGM prerecorded easy listening tapes (30). F Anderson, Anderson Assoc, 3801 5th Ave S, Great Falls MT 59405. 406-452-2810.

Metrotech logger, gd cond, BO. Kosack, 516-489-1071.

Sony 501PCM 2 chan digital recorders (2), one \$700, one \$500 as is. R Sanchez, Lincoln Fine Arts Radio, 3800 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 440C mono in factory cabinet, \$1200. D Green, Waves Snd Rcdrs, 1956 N Cahuenga, Hollywood CA 90068. 213-466-6141.

Otari MX5050BII 2 trk, \$1200. R Sanchez, Lincoln Fine Arts Radio, 3800 S 48th St, Lincoln NE 68506. 402-486-2520.

Tascam 122B w/RC90 remote control, \$325. J Travis, WCIC, POB 506, Bath NY 14810. 607-776-4151.

Pentagon cassette duplicators, 1 master, 3 slaves, mono. N Macrae, Technichrome, 1212 S Main, Las Vegas NV 89104. 702-386-2844.

Ampex AG500 2 trk in Ampex shipping case, gd cond, \$300. G Sive, Video Connection, 31844 Ranch Amigos Rd, Bonfai CA 92003. 619-749-7662.

Ampex AG 350, gd cond, \$300/BO. L Houck, Rollin Recdg, 210 Altgelt, San Antonio TX 78201. 512-736-5483.

Sony 777, (5) some mono, 2 trk, 1/4 trk, some rack mt, some case, call for specifics, \$75 ea. M Preace, Foothill Deanza Comm Coll, 12345 El Monte Ave, Los Altos Hills CA 94022. 415-960-4260 or 408-773-9793.

Ampex PR10 & 600, \$125/BO. M Kantor, WPOB, 50 Knickerbocker, Plainview NY 11803. 516-822-6915.

Ampex 351-2, \$500 or trade; Echo Echoplex 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 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.

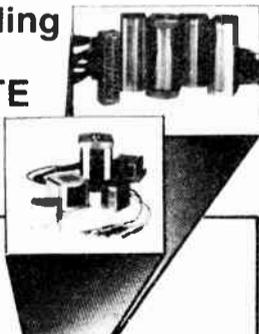
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Ampex single chan chassis tube elect, \$50 ea. M Preace, Foothill Deanza Comm Coll, 12345 El Monte Ave, Los Altos Hills CA 94022. 415-960-4260 or 408-773-9793.

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.

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**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.

**Technics RS-B100** studio grade cassette deck, rack-mount, 1 yr old, \$395. J Ripley, KORD, POB 2485, Tri-Cities WA 99302. 509-547-9791.

**Crown 801 FT** portable w/case & 4 chan mic mixer, vgc; Crown portable amp/speaker, matches above; Crown 1/4 trk stereo reproducer, unmounted, \$500/all. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

**Ampex PR-10 (2) FT** unmounted, working, \$300/both. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

**Ampex PR10 w/manual**, \$100; Crown 700, 2 trk, w/manual, \$150. R Nirtz, Univ of Notre Dame, POB 542, Notre Dame IN 46556. 219-239-6423.

**Ampex AG440C 1/2"** 4 trk, mint cond w/metal roll-around cabinet, DC servo capstan motor, 7.5 & 15 ips w/AG440 remote control, complete service manual & STL test tape, \$3200. J Block, The Prod Block Stds, 906 E 5th, Austin TX 78702. 512-472-8975.

**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.

### Want to Buy

**Late model R-R w/10-12"** reel capability. D Jackson, WPRN, POB 566, Butler AL 36904. 205-459-2835.

**MCI/Sony capstan & reel motors**, any cond., recdg heads, most mtgs. machines, new, used. Relapped then sold. Amp Services, 224 Datura St Rt 614, W Palm Beach FL 33401. 800-826-0401, in FL 305-659-4805.

**Revox A77** remote control. G Sive, Your Video Connection, 31844 Rancho Amigos, Bon-sall CA 92003. 619-749-7662.

**Head stock for Ampex AG 600**. J Schloss, K1CD, 2600 Hwy Blvd, Spencer IA 51301. 712-262-1240.

**Pioneer RT701** or 707, working & in gd shape. 2 or 4 trk. J Ripley, KORD, POB 2485, Tri-Cities WA 99302. 509-547-9791.

## CONSOLES

### Want to Sell

**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.

**Ampex DCS10B** 40 chan, dual stereo, talk-back, 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 Holchiss Rd, Prospect CT 06712. 203-758-4769.

**Quantum 16x16**, 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, 16x8x2, direct coupling & 5534 IC's, has noisy pots, BO, D Petrik, KACE, 1710 E 111th St, LA CA 90059. 213-564-7951.

**Gateway 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, KTFK, 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 212-72 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, KFXK, 3222 S Richey Ave, Tucson AZ 85713. 602-748-1450.

**API console parts**: amps, faders, meters, old-er 2061 type input modules, 4 chan/assembly, 24 chan monitor mix 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; Ampex 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.

**Ampex 5 chan mono**, fair cond, operating, \$175. P Wolf, WRCC, 2600 Pine Island Rd, Cape Coral FL 33909. 813-574-5548.

**Neotek Series 1**, 16x8x2, \$5000; BEM 100 dual mono bdct console, \$895; Teac mdl 3, 8x4, \$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** 8x2 portable mixer, mint cond, \$700. B Weiss, KLSI, 1722 Main, Kansas City MO 64108. 816-474-6400.

**Harris Stereo 5**, BO. B Mishkind, KFXK, 3222 S Richey, Tucson AZ 85713. 602-296-3797.

**Ramsa URTA-20**, 20x8x2 studio board, mint cond in teakwood console, \$5500 incl 3 patch bays. J Block, The Prod Block Stds, 906 E 5th, Austin TX 78702. 512-472-8975.

**Harris Stereo 80**, gd cond, \$1000. H Gibbs, College of Wooster WCWS, Box 3177, Wooster OH 44691. 216-263-2000 X2767.

**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 Greenway Rd, Louisville KY 40218. 502-459-8792 aft 5 PM.

**API console parts**: amps, faders, meters, old-er 2061 type input modules, 4 chan/assembly, 24 chan monitor mix section. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**Auditronics 110-8** 16x8x2, 16 VU's, 16 trk monitor & foldback system, built-in timer, spares, \$5000. N Burke, Burke Sound, 50 Mendell #11, San Francisco CA 94124. 415-285-8800.

**Optimix disc based automation system**, 40 chan capacity, w/32 VCAs presently installed. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**RCA 8 chan**, dual bus tube type console, BO plus ship. S Ami, WRRS, 317 E 5th St, Cincinnati OH 45202. 513-621-4545.

**API console parts**, EQ's, line amps, mic amps, blank panels, faders, input modules, card cages, opamps. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**Sparta A-16R** rack mountable console, 5-chn, 15 input, 2 chan output, \$600 plus ship. S Sibulsky, KVNI, POB 308, Coeur d'Alene ID 83814. 208-664-9271.

### Want to Buy

**Gates Yard**, stereo, immaculate cond, have parts, want complete console. B Bartoli, New World Bdct, Rte 2 Box 749B, Mt Shasta CA 96067. 916-926-3273.

**Teac 2A** mixer. R Coates, KJJG, 724 2nd Ave E, Spencer IA 51301. 712-262-6036.

## DISCO & SOUND EQUIP.

### Want to Sell

**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.

**Hohner clauinet keyboard**, gd cond; Mellotron keyboard, 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 wirecord, 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.

**Echoplex 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 Lr, Greenwich CT 06820. 203-531-6075.

**Orban 622B**, parametric EQ, stereo, 4 bands/chan, excel cond. K MacGregor, 38 Talbot Lr, Greenwich CT 06820. 203-531-6075.

**Mic splitter**, 3 space rack panel w/3 Audisair transformers plus 1 Hi Z to Lo Z instrument transformer, ground lift switchers, \$125, Scams mini rack w/power supply, TT patch-bay, 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.

**Fairchild 359** spring reverb, \$250. D Flynn, Continental Recdgs, 102 South St, Boston MA 02111. 617-426-3131.

### Want to Buy

**Ibenez MSP 1000** limiter/EQ. D Wade, Collegiur: Snd, 3541 72nd, Jackson Heights NY 11372. 718-426-8555.

## LIMITERS

### Want to Sell

**Orban 8100** Optimod, excel cond; (2) Gates Sta-Level compressors; Spectra-Sonics comp/limiter. 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; Dorrugh 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.

**Dorrugh 310** DAPs (3), gd cond. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

**Telex Audio Prism**, stereo, pair w/RFC-1 card for Optimod, excel cond, \$3000. P Christenson, 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.

**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.

**CRL 300A** peak mod controller, in use, vgc. \$380/BO. E Hudson, WIYD, 900 River St, Palatka FL 32077. 904-325-4556.

**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.

**Collins 26U-2** FM limiter. P Knies, WBDC, POB 95, Madison IN 47250. 812-265-3322.

**CRL SPP-800/SMP800/APP-400**, gd cond \$1200/all. P Wolf, WRCC, 2600 Pine Island Rd, Cape Coral FL 33909. 813-574-5548.

**Aphex Compellor** in excel cond, \$850. B Stephens, WQCB, POB 273, Brewer ME 04412. 207-989-5631.

**Orban 9000A** excel cond, w/manual, \$2200. A Caswell, C&G Bdctg, POB 171, Linden MI 48451. 313-735-4545.

**CBS 411 Volumax** tested, fully operational, excel cond, w/manual, \$300 plus ship. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

**Dorrugh 310 AM**, gd cond, \$850; UREI BL40 Modu-limiter, gd cond, \$300. M Persons, KASM, Old Highway 52, Albany MN 56307. 218-829-1326.

**DAP 310**, excel cond, \$800. C Tarkenton, WCOH, 154 Boon Dr, Newnan GA 30263. 404-253-4636.

**UREI 1176-N** needs minor work, \$120 w/book. N Allebaugh, WICE, 100 John St, Cumberland RI 02864. 401-725-9000.

**Orban Optimod 9000A AM**, \$1500. S Conley, WSPF, Box 1709, Hickory NC 28603. 704-328-1731.

**Gates Solid Statesman** limiter, needs work, BO. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

**CRL AM4S** stereo AM processor, SPP800; (2) SEP400B; SMP900, 2 yrs old, new cond, in rack, working, \$3800/BO. L Jones, WKIE, 6001 Wilkinson Rd, Richmond VA 23227. 804-264-1540.

**CBS Labs Volumax 411** stereo processor w/manual, cond unknown, \$200. S Kuiper, WFMR, POB 147, Menomonee Falls WI 53051. 414-255-3100.

**CBS Audimax** automatic gain control, needs work, BO. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

**Dorrugh 310**, \$700; Gates Solid Statesman (2), \$50. J Vriesen, KBEW, Hwy 169 N, Blue Earth MN 56013. 507-526-2181.

**Orban 8000A**, mint cond (2) w/manuals, \$1750 ea; PR&E ML FM Multimeter, single chan FM limiter/compressor, 4 matched pairs, new w/manuals, \$1200/pr; CBS Labs 4110 slimline stereo audio compressor, very low hrs w/manual, BO. R Royster, 8922 Valencia Dr, Spring Valley CA 92077.

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# Broadcast Equipment Exchange

**LIMITERS . . . WTS**

**Pye stereo compressor**, discrete transistor design from early 70's, spare parts & doc. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**Want to Buy**

**Sony PCM's**, all models. T McCartney, KBSU, 1910 University Dr, Boise IA 83725. 208-385-3760.

**Limpaender**, prefer complete, any cond. P Beckman, Philbec Audio, 2001 N 35th Ave, Hollywood FL 33021. 305-989-4680.

**Optimod studio chassis**. J Scaggs, Chr Bdcig, 542 Butternt St, Abilene TX 79602. 915-676-1405.

**Orban 8000A**. J Stromquist, WNCB, 2816, Hogberg St, Duluth MN 55811. 218-722-3017.

**Orban 8000A**. E Sutton, WOKI, 114 Tulsa Rd, Oak Ridge TN 37830. 615-483-8451.

**MICROPHONES**

**Want to Sell**

**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 xmr & 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 Recdgs, 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.

**Sennheiser 404 & 405**, both need work, have spare cables, PS, BO or trade. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**Superscope EC12B (6)** electret cond lapel mics, gd cond, \$22 ea/all six \$120. E Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

**AKG D1000E (3)**, \$50 ea; (3) SM33 Shure ribbon mic, \$100 ea. C Fries, KSOY, Box D, Deadwood SD 57732. 605-578-3533.

**Beyer M260** dynamic ribbon, like new, \$250. G Wilson, WGLE, 7519 Dorr #196, Toledo OH 43617. 419-865-7289.

**Neumann U47** power supply & stand, \$2250. L Oliver, Lynn Oliver Stds, 304 W 89th, NY NY 10024. 212-874-7660 aft 12.

**AKG D1000E (3)**, excel cond, \$50 ea; Shure SM-33 ribbon mics, excel cond, \$100 ea or all for \$250. C Fries, KSOY, Box D, Dearwood SD 57732. 605-578-3533.

**Want to Buy**

**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**

**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 rcvr; 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 or dered; 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 xmr, \$10. John. 315-487-2393.

**Kelik voltage reg**, 3 phase 103 A, from 208-250 V, \$1700. J Scaggs, KGNZ, 542 Butternt, Abilene TX 79602. 915-673-3045.

**WECO 94N & 120E** repeat coils, \$10 ea. R Kerbawy, WTJN, 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, WTJN, 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, WTJN, Box 1127, Beckley WV 25802. 304-877-5592.

**Square D 100 A 3PDT** safety switch, \$100 plus ship. R Kerbawy, WTJN, Box 1127, Beckley WV 25802. 304-877-5592.

**S-A SAT-32**, trade 15 kHz audio card for 7.5 kHz card. G Awey, KHSI, POB 489, Chico CA 95927. 916-893-8926.

**Sears air compressor w/tank**, \$200; Code-a-phone 180 automatic phone line message player (3), \$100. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**MCI comm bldgs (3)**, 8 x 10 x 16 w/cable racks, heat, AC, lights, \$3495. R Wurst, Wuster Tower, POB 227, Gainesville TX 76240. 817-665-0485 aft 6PM.

**HSC-1 video hum stop coil**, never used, \$50. R Kerbawy, WTJN, Box 1127, Beckley WV 25802. 304-877-5592.

**ITT phone system w/amps**, will trade 12 telephones business systems w/amps etc for good tripod w/floating head. Maine Reel Comm, 67 Green St, Augusta ME 04330. 207-623-1941.

**Clarostat 73JA 90-2K** ohms, 10 turn precision pots, \$200 ea or \$100 for all. G Wilson, WGLE, 7519 Dorr #196, Toledo OH 43617. 419-865-7289.

**Ruslang 237A1058** cart rack, Lazy Susan for 148 carts, like new, \$120. AH Bott, BHP Inc, 340 S 24th St, Quincy IL 62301. 217-224-1076.

**Sola line voltage reg**, input 208 V single phase, 5 kV. J Turner, WMIN, Mt Carmel PA. 717-339-1600.

**Harris dummy load 50 kW**, new, BO. A Anderson, KBMR, 3500 E Rosser, Bismarck ND 58501. 701-255-1234.

**Beau motor**, new for Ampex AG-440, 3-speed/7.5-15-30, \$275. D Flynn, Continental Recdgs, 102 South St, Boston MA 02111. 617-426-3131.

**Geiling vacuum tube console module**, mic pre, EQ & line amp, BO. R Robinson, TNA, Box 57, Wallingford CT 06492. 203-269-4465.

**Anvil case**, 27" x 22" x 17" deep, heavy duty casters, twist latches & ball corners, gd shape, \$300. B Deakin, Village Sports, POB 3300, Chapel Hill NC 27515. 919-968-4811.

**Teletype 33 (2)**, ASR, w/punch & reader, w/or w/o stands, take one or both, \$250 ea or BO & you pick-up; many 16mm projectors to sell, Fairchild Galaxy (rear screen) salesman's projector. DMT A/V, Box 9064-RW, Newark NJ 07104. 201-484-5291.

**Jack Strip**, 52 RTS, dbl closed-circuit jacks, all grounds normalled, gd cond, \$100; UTC xmrs A21 500/500 ohms; (2) A22 50,200,500/50,200,500 ohms; (2) A24 15K/500,333,200, 125,50 ohms; (2) A39 600,150/2K,500 ohms, \$20 ea/all 7 \$120; (2) UTC A33 20 dB magnetic shields, \$10/both; line xmrs (2) EV 502, EV 502B, Shure A86A, \$12.50 ea/all for \$40. E Helvey Prod, POB 1357, Winchester VA 22601. 703-877-1191.

**Plate transformer**, 3-phase 240 V primary, 4000 V, 1 A nominal sec, unused, \$450/BO/trade. S Strettenberger, WFCB, 45 W Main, Chillicothe OH 45601. 614-773-3000.

**Want to Buy**

**Book for Magnecord 1028**, dry air pump & econoload (20 kW). J Schloss, KICD, 2600 Hiway Blvd, Spencer IA 51301. 712-262-1240.

**Software & hardware** for computer logging & traffic for radio station. C Alexander, WYTW, Box 669, Cadillac MI 49601. 616-775-1071.

**Motor for Sparta-matic** cart-time delay & reverb, model CD-15, motor D162H, or equiv. T Heathwood, Heritage Radio, POB 16, Boston MA 02167.

**Advise & info on accounting & or logging** software for IBM PC's. C Alexander, WYTW, POB 669, Cadillac MI 49601. 616-775-1071.

**MONITORS**

**Want to Sell**

**Nems-Clarke 108E** antenna monitor, \$40/BO; Gates M5240 remote xmr monitor, \$50/BO plus fr. 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 xmr, \$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.

**Traid 16mm hot splicer** \$125; Zeiss Movie-scope viewer Pro Jr tripod/head plus case, \$275; 16mm Moviola 4 gang sync counter, \$175; (2) Moviola rewinds, \$150; 16mm 400' Mitchell mags, \$50 ea; 16mm Arri mags, \$150 ea; 35mm Arri mags, \$300 ea; 35mm Mitchell mags, \$175 ea. C Crawford, 8 Piedmont Dr, Cranbury NJ 08512. 609-799-1382.

**Harris FT-80/FS-80**, gd cond on 92.1 w/RF amp, \$750/all 3. P Wolf, WVHG, 329 S Main, Labelle FL 33935. 813-574-5548.

**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**

**CCA AMM-1D** AM mod monitor; CCA AMF-1D AM freq monitor. B Barry, WAMB, 1617 Lebanon Rd, Nashville TN 37210. 615-889-1960.

**MOVIE PROD. EQUIP.**

**Want to Sell**

**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.

**Athena 4000** film projector, gd cond, \$800; B&H 2592 16mm projector, excel cond, \$300; Visual Graphics graphics camera, pos one, 320, \$2000; Eastman 16mm projector, 275 w/spare parats, \$700. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**Beaulieu R16 12-120** zoom, 2 battery pks charger, 2 magazines, AC adaptor, case, mint cond, BO; Canon Scoopic 16MS, 2 battery's, charger & case, mint cond, BO. C Crawford, Photec Inc, 8 Piedmont Dr, Cranbury NJ 08512. 609-799-1382.

**Bolex camera body**, 16mm C mount lenses w/Beaulieu access. W Ditzel, Ditzel Prod, 933 Shroger Rd, Dayton OH 45419. 513-298-5381

**RECEIVERS & TRANSCEIVERS**

**Want to Sell**

**Jerrold Modline shelf asmbly (4)** M-AM, (3) M-MP, (2) M-AA modules, \$200/lot. M Holladay, WCOS, POB 748, Columbia SC 29303. 803-256-7328.

**Soundcraftsmen 6200** rack mount, AM/FM stereo digital tuner, 16 presets, 1 yr old, \$195. J Ripley, KORD, POB 2485, Tri-Cities WA 99302. 509-547-9791.

**Kenwood R1000** comm receiver, \$275. J Ripley, KORD, POB 2485, Tri-Cities WA 99302. 509-547-9791.

**Motorola TPN 1154A** base sta. power supply 14.1 VDC, approx 5 amps, BO. 516-489-1071.

**Want to Buy**

**Old tube type McMartin SCA** receiver, any freq. K Smith, Smith Engr, RR3 Box 483, Gorham ME 04038. 207-929-6129.

**REMOTE & MICROWAVE EQUIP.**

**Want to Sell**

**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 & xmr units, set up for telco, gd cond. B Simmons, KRRV, POB 1598, Winston OR 97496. 503-679-8185.

## Consultants

**R.L. HOOVER**  
Consulting Telecommunications Engineer  
11704 Seven Locks Road  
Potomac MD 20854  
301-983-0054  
Member AFCCE

**BROADCAST TECHNIQUES** BT  
Applications & FIELD ENGINEERING SERVICES  
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Phoenix, AZ. 85068  
602-242-2211

**R.J. GRANDMAISON, P.E.**  
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Fairfax Station, VA 22039  
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Hilton Head Is., SC 29928  
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## 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 for 5000 watt** directional AM & 100kW FM, must have exper, send resume to Paulette Lundberg, KWMT, Box 578, Ft Dodge IA 50501.

**CE, NE major mktg** FM, need results oriented person w/gd people skills & top level construction & maint. abilities. Send resume to

**Xmtr Design Eng**  
If you are an exper AM/FM xmtr design eng w/at least a BSEE, totally familiar w/current solid state & vacuum tube tech & capable of a leadership position, we'd like to hear from you.  
We are a well known & respected company but not known as a xmtr mfg. We offer an excel opportunity for self-growth, ample comp & benefits, and an atmosphere of appreciation for your contributions.  
Send resume & salary requirements in strict confidence to: Box FW 11-3, Radio World, PO Box 1214, Falls Church VA 22041.

Radio World, POB 1214, Falls Church VA 22041. Attn: Box 11-1.

**POSITIONS WANTED**

**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 & ISCT 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, very exper**, small to major market, high power AM/FM, D-As, turnkey installations, studio designs, automation, hard working team player, in Michigan. Write: RW, PO Box 1214, Falls Church VA 22041. Attn: Box 10-1.



# Broadcast Equipment Exchange

**REMOTE . . . WTS**

ESP-2 programmer, (3) 450 bi-directional Carousels, (5) A.R.S. 1000 R-R, 721 mono dual cart playback, T.G. 25S.F. tone generator, for more info call or write Jerry Hafner, 1st Federal Savings & Loan, 202 State St, Madison WI 53703. 608-256-8311 X215.

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, Covenant 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, KQWB, POB 1301, Fargo ND 58107. 218-236-7900.

Farion 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 Svcs, 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 Kaminiski, 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 Svcs, 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.

Moseley PCL 505 mono STL w/antennas, \$4500. S Allen, 7356 35th Ave NE, Seattle WA 98115. 206-525-8089.

Gates M5862, remote control, \$250. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

M/A-com 23 GHz microwave system for TV. J Carroll, Carroll Bldg, POB 549, Tawas City MI 48764. 517-362-3417.

Microwave passive reflector, \$200; Wegener 1602 mainframe w/PS & 2012-01 data demod/demultiplexer, \$450. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

Pinzone/Comtech 5 meter TVRO sys, motor driven, 8250 rcvr, \$20,000. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

Potomac RC-16T, 2 yrs old, like new, avail immed, in serv, BO. P Wahl, WWIB, 3155 S Woodard, Chippewa Falls WI 54729. 715-726-1226.

S-A DAT-32 trade 15 kHz audio card for 7.5 kHz audio card. J Genike, KWIX, 300 W Reed St, Moberly MO 65270. 816-263-1500.

Moseley 505C composite STL system, complete \$7000, Moseley 505C composite STL system, complete \$15,000 w/dishes & hardware. T. Trott, 305-323-0472.

**Want to Buy**

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.

Moseley TRC15 xmtr remote control wired w/meters. G Avey, KHSL, POB 489, Chico CA 95927. 916-893-8926.

**STATIONS**

**Want to Sell**

Richmond VA, 5 kW AM sta at 1410 kHz in 10th fastest growing county in the country, most divest immed. 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.

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**

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.

RCA BTS-1A stereo gen. P Knies, WBDC, POB 95, Madison IN 47250. 812-265-3322.

**SWITCHERS (VIDEO)**

**Want to Sell**

VIX 114 AZ Vital prod switcher w/dual chan Squeeze-zoom, \$20,000. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

ISI 902 switcher, \$1750. E Denke, American Motion Pictures, 7023 15th Ave NW, Seattle WA 98117. 206-789-8273.

Telemation switcher trade or sell. JB Salazar, Gods Missionary Revival Crusade, 102 E Lyon, Laredo TX 78040. 512-722-6832.

**TAPES, CARTS REELS**

**Want to Sell**

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.

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 Svcs, 7914 Fegenbush Ln, Louisville KY 40228. 502-239-1010.

**A&D**  
**Cartridge Rebuilding Service**  
We clean, load & pack. Serviced within 10 work days! Work guaranteed!  
**3380 Blakey Ave., Eau Claire, WI 54701**  
**(715) 835-7347**

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.

3M-Scotch 206, 208 & Ampex 632 1/4" on 5", 7" & 10 1/2" reels-repro. Also available Ampex 406, 456, 3M 250 & Agfa 469 2" audio tape w/no splices & with one splice. Also avail Ampex 406 & 456 1" audio tape with no splices. Call for prices. Burlington Audio Tapes, 106 Mott St, Oceanside, NY 11572. 1-800-331-3191 or in NYS 516-678-4414.

Record collection, original oldies rock-n-roll, LP's & 45's. M Jazmin, KJEM, 216 N Main, Bentonville AR 72712. 501-273-9039.

Aristocart carts, (800+) need rewinding, \$1 ea/BO. M McCarthy, KGRC, Box 1017, Hannibal MO 63401. 314-221-2221.

Recortec 1" video tape eval; also Recortec 3/4" video tape eval. N Macrae, Technichrome, 1212 S Main, Las Vegas NV 89104. 702-386-2844.

Album Beautiful Music Library, 2400, complete list; upon request, BO. C Bryson, Comserv, 93 Robinhood Dr, Zelienople PA 16063. 412-776-5204.

Fidelipac carts wound w/Scotchcart tape, various lengths, 50" ea. B Musso, WGCD, 165 Harris St, Chester SC 29706. 803-377-1111.

**Want to Buy**

ITC WFA record unit Premium line, w/all tones, mono pref, but will consider stereo. B Surratt, WINA, POB 498, Charlottesville VA 22902. 904-977-3030.

Clean 1/4" dub of the Source's Whamco gag commercials, circa 1982-83, will provide tape & compensate for time spent dubbing. KM Richards, 2670 Vancouver Ave, Ventura CA 93003. 805-643-7607.

Jingle demo reels & pkgs to trade. D Ferreira, WFCR, POB 416, Sunderland MA 01375. 413-665-8536.

**TAX DEDUCT. EQUIP.**

16mm equip for developing educ & ecological films, any equip accepted. Dr R Gerber, College of St Joseph, Windham ME 04062. 207-892-6766.

Eng student desiring donation of bcdt equip (anything), EE student at Purdue. C Gill, POB 371, Indianapolis IN 46206. 317-923-2800.

School needs 250 W FM xmtr & mod monitor, any make, any model, can provide tax deductin 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.

Equip wanted for educ FM, new non-comm 200 W, seeks donations all bcdt equip, tax receipt provided. J Rauch, WSCO, Fairfield Chr Academy, 590 Lake Rd SE, Lancaster OH 43130. 614-654-5550.

SCA receivers for non-commercial college station. G Bready, WUVU, 100 N Main, Blacksburg VA 24060. 703-951-1642.

Donations needed for college station, main needs are R-R's, anything gladly accepted. M Cohen, KDUR, POB 7339, Durango CO 81301. 303-247-7261.

**TEST EQUIPMENT**

**Want to Sell**

Bird Thurline 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.

GR 1606A RF bridge, excel cond, \$400. M Matthews, Rockwell, 3318 Shield Ln, Garland TX 75042. 214-996-6844.

Potomac FIM 41 field meter 540 kHz, 5 MHz, excel cond, \$1000; 1606-A RF bridge, excel cond, \$1300; 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/elect 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, AmComGen, MRS, APO NY NY 09108-0002.

Potomac SD-31 RF synth/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 Bcdt Plaza, West Ave, Saratoga Springs NY 12866. 518-584-1610.

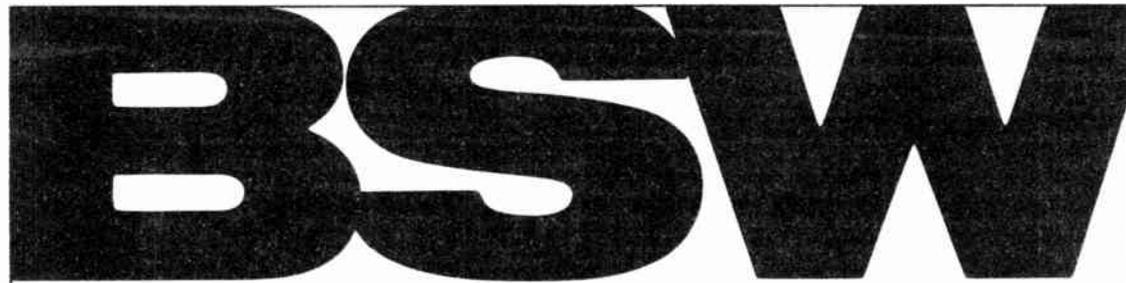
B&W distortion meter, \$75. J McGinty, WEKC, Jackson Mall, Williamsburg KY 40789. 606-864-7843.

Bird 460 wattmeter, gd cond, duel port unflanged, \$300. J Schloss, KICD, 2600 Highway Blvd, Spencer IA 51301. 712-262-1240.

GR 1001, GS250; 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.

Tek RMS29 rack mount waveform monitor, \$500; Tek 529 cabinet mount waveform monitor, \$500. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.



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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.

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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 a 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  With Box Number  
 Positions Wanted  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**

**MLS Touch-Test 20** multimeter; Heathkit impeded bridge; Heathkit transis 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.

**B&K 820** portable digital cap meter, \$130. C Zaleski, EDS Comm, 9 River Terr, Johnson City NY 13790. 607-798-7111.

**Fluke 8050A**, excel cond, standard plus dB & relative, \$285. R McMillen, Cascade Recdg, 3809 SW Marigold St, Portland OR 97219. 503-293-1170.

**Heath SG-18A**, Heath assembled, gd cond, \$100/BO; Heath IM-58, gd cond, \$100/BO. P Wolf, WVHG, 329 S Main, Labelle FL 33935. 813-574-5548.

**Matec exponential gen.** \$200; Delary 48 VDC power supply, new, \$60; HP diff volt-meter & ratiometer, \$200; Tek 547 scope, dual trace, \$95, + UPS on all. Maine Reel Comm, 67 Green St, Augusta ME 04330 207-623-1941.

**Want to Buy**

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**

**Harris/Gates Type M 6095** stereo exciter, tube type, also stereo gen M6146, in working cond, BO. R Farrelley, 815-963-6080.

**Harris FM10G** xmtr, 101.9, avail mid Nov. D Wipala, WLDR, 118 S Union St, Traverse City MI 49684. 616-947-3220.

**RCA 1R1 AM** xmtr, avail 30 days. 1000/500 W, buyer arranges shipping. A Armen/J Thomas, WLEW, 935 S Van Dyke, Bad Axe MI 48413. 517-269-9931.

**Gates FM1C** 1 kW xmtr + 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, KVSF, 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 AG800, \$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, Gloverville NY 12078. 518-725-7175.

**SUPER-GEN**

This high-performance FM Stereo Generator has selectable pre-emphasis, overshoot controlled lowpass filters, digital pilot/subcarrier synthesis and built-in overmod protection. CBS/NAB's "FMX" system is available as a plug-in option.

**Inovonics**  
SANTA CRUZ, CA (408) 458-0552

**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.

**OVER 115 AM AND FM TRANSMITTERS**

AMs: 50kw, 10kw, 5kw, 2.5kw, 1kw, FM: 40kw, 25kw, 20kw, 10kw, 5kw, 1kw. All Manufacturers, All powers, All working, All spares, All inst. books.

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**BESCO INTERNACIONAL**  
5946 Club Oaks Drive  
Dallas, TX 75248  
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214-276-9725

**Gates FM5G w/MS15** exciter & low pass filter. S Delay, WCVS, 3055 S 4th St, Springfield MO 62703 217-544-9855.

**Collins 20V-2 AM**, 1 kW/250 W, \$2000. R Crandall, WDNG, 1115 Leighton Ave, Aniston AL 36201. 205-236-8291.

**LPB 20 W AM**, gd shape, 1020 kHz, \$485. A Caswell, C&G Bdtg, POB 171, Linden MI 48451. 313-735-4545.

**Collins AM Type 20 Mdl 3 AM** 230 V, single phase, 60 Hz; RCA FM xmtr, mdl BTF-1E, 1 kW; RCA BTE 10c exciter. P Knies, WBDC, POB 95, Madison IN 47250. 812-265-3322.

**RCA TE 444** 250 W FM xmtr, older design, mono only, rewired & rebuilt, working cond, mint cond, \$750 + load ship. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

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100, 200, 250, 400, 500 and 1000 W solid state amplifiers.  
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San Diego, CA 92101  
619-239-8462  
Telex 229882LJMLUR

**Wegener 1691** cable FM xmtr cards/Wegener 1693 stereo synthesizer cards, set for \$475. T Trott, 305-323-0472.

**RCA BTA 5F** 5kW AM, excel cond, recently removed from serv w/floor layouts & manuals, \$10,000 + load/ship. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

**RCA BTA-5F** mod transformer, new in crate, \$600 plus ship. G Heidenfeldt, 2880 W Lake Rd, Wilson NY 14172. 716-751-6187.

**GE VHF TV xmtr**, TT-23a, 20 kW visual on chan 8, \$4500. J Fuehrer, NTV Network, Box 220, Kearney NE 68868. 308-743-2494.

**Continental 315B** 5 kW AM, \$9000. R Chase, WPRQ, POB WPRQ, Kingsport TN 37663. 615-239-8787.

**RCA TTU60A** 60 kW, chan 33 xmtr w/TTUE 44 exciter, pulser & filterplexer, visual klystrons low hrs, aural klystron 4 yrs old, avail Jan '88. J Fletcher, WCFT, 4000 37th E, Tuscaloosa AL 35405. 205-553-1333.

**RCA BTF-1D** 1 kW xmtr w/RCA BTE-10B exciter in gd working cond, \$3500. Shane or John, WCIR, 21 Airport Ind Pk, Beaver WV 25813. 304-252-6452.

**VHF 10 W LPTV** xmtr, ch 3, never used. J Carroll, Carroll Bdtg, POB 549, Tawas City MI 48784. 517-362-3417.

**CCA FM40E/SC1E** FM exciter & stereo gen. J Kennedy, WGEL, POB 177, Greenville IL 62246. 618-664-3300.

**Visual DVFM3** 3 kW oper w/factory exciter & QEI exciter, all tuned to 106.3, \$3500/BO, you ship. JR Cox, KRZK, Box S, Branson MO 65616. 417-334-6003.

**Want to Buy**

**Gates 2.5 H3** or other 2 to 5 kW FM xmtr. J Ganley, WWWW, 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 Springs FL 32433. 904-892-4038 (collect).

**FM xmtr**, 2.5 or 3 kW w/exciter. T Driggers, Driggers Bdtg, 818 Quail Ct, Healdsburg CA 95448. 707-433-9370.

**Collins 20V xmtr**, R Smith, 2245 Felspar St, San Diego CA. 619-483-9331.

**Non-Profit Christian station** needs 2.5 kW 90.3 FM xmtr & 6 chan console, 2 TTs, etc. D Snyder, Adonai Comm, Box 426, Cowder-sport PA 16915. 814-274-8085.

**FM, 3 kW solid state**, 3 bay antenna 102.3 MHz & solid state exciter. C Franklin, Franklin Bdtg, 237 Western Blvd, Jacksonville NC 28540. 919-353-3131.

**Standby FM xmtr**, 3-5000 watts for Panama City FL. Peter Bardach, 201-827-2525.

**FM xmtr**, 5 kW, prefer circa 1960's RCA. C Bryson, Conserv, 93 Robinhood Dr, Zelienople PA 19063. 412-776-5204.

**Low-band chan 4 + VHF** xmtr, 10-30 kW w/VSB filter, harmonic filters: low-band VHF xmtr, 10-30 kW retunable to chan 4 +. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**Wilcox VHF 500 W xmtr**, need someone to change to FM xmtr, will ship anywhere for conversion, serious inq only. R Smith, WGSP, POB 406, Summersville GA 30747. 404-857-5815.

**AM xmtr**, 1 kW, any make, any model. Fox Radio, POB 3387, Cocoa FL 32924 305-799-3306.

**TUBES**

**Want to Sell**

**RCA 6166 (10)** 10 kW tubes for FM or TV \$1500. G Torres, GT Int L, 48 W 46th 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; (4) Amperex 4-125A, \$30; (2) Amperex 4-125A, \$70; 892R, \$1200; (3) 892R, \$300; 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.

**Tubes, 833A (2)**, '83 date code, never used, \$125/pr. R Kerbaw, WTNJ, Box 1127, Beckley WV 25802. 304-877-5592.

**Want to Buy**

**Diodes, HVCA 1.5HV12K**, 1 x 1 x 7" diode, need 2, want 6. L Griep-Ruiz, KRZA, 528 9th St, Alamoso CO 81101. 303-589-9057.

**TURNTABLES**

**Want to Sell**

**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, also misc preamps. A Somers, KBBY, Box 5600, Ventura CA 93003. 805-656-6300.

**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.

**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; ORK 12", \$75. M Holladay, WCOS, POB 748, Columbia SC 29202. 803-256-7328.

**ORK 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, one for old transcriptions & one for regular recordings, 45, 78 & 33-1/3 speeds, vgc, \$250. L Bergman, Universal Snds, POB 18716, Spokane WA 99208. 509-328-0766.

**Harris CB-1201 (2)** w/Micro-rak tonearms, BO B Mishkind, KFXX, 3222 S Richey, Tucson AZ 85713. 602-296-3979.

**RCA 16"** transcrp players, 3 sp, 16" tonearm vert & lat playheads (2), \$500/both, you pick up. R Bellavia, WSBG, 4949 W Belmont, Chicago IL 60641. 312-282-9722.

**Technics SH-15B2** TT bases (2), prime cond, \$100 ea. P Remaker, WQHS, 3905 Spruce St, Philadelphia PA 19104. 215-898-9553.

**ORK Studio Pro's (2)** w/Micro-Trak arms, \$125 ea. N Allebaugh, WICE, 100 John St, Cumberland RI 02864. 401-725-9000.

**QRK 12" studio TTs (2)**, w/Rek-O-Kut arms, gd cond, \$150 ea. P Combs, Only Son Prods, 2316 Forrest Home Ave, Dayton OH 45404. 513-236-2340.

**Technics 1500MKII** w/factory arm, like new, \$245. J Ripley, KORD, POB 2485, Tri-Cities WA 99302. 509-547-9791.

**Technics SL1800 MK 2**, needs chip & minor repair, \$75. P Wolf, WRCC, 2600 Pine Island Rd, Cape Coral FL 33909. 813-574-5548.

**Want to Buy**

**Tonearm, & 16" TT**, 78, 33-1/3, 45 speeds, in working order, compatible w/home stereo unit. D Barlow, AG Edwards & Sons, POB 93, Columbia IL 62236. 618-281-5588.

**TV FILM EQUIP.**

**Want to Sell**

**Projector, 16mm**, Singer Graphex, TV shutter, like new. N Macrae, Technichrome, 1212 S Main, Las Vegas NV 89104. 702-386-2844.

**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 Humphreys, Utah St University, Dept of Telecomm, Logan UT 84322. 801-750-3133.

**RTI film edit/evaluator**, TV2000 w/quick-trac & defect evaluation, \$5400; RTI film editor, Cinescan II, \$2700; RTI film cleaner, \$1600. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**GE PE-24** color film camera (2), \$1000; RCA TP-6 projector w/spare TP-6 for parts, \$1000; RCA ENG camera, TK-76C, \$3000. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**VIDEO PROD. EQUIP.**

**Want to Sell**

**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 control, \$1650; total editing sys, \$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.

**Channel Master 7408B** ch 8 RF AGC amp, \$50; Quanta character gen, Sel 7-3, \$4000; Microtime TBC T-100, \$3500; Microtime video processor 2100, \$2700; custom news set, anchor desk, credencha, etc, \$3500. J Fuehrer, NTV Network, Box 220, Kearney NE 68848. 308-743-2494.

**Power supply** for BVU-800, used, BO or trade. 516-489-1071.

**Audio Kinetics 310** synchronizer, \$4500; BTX 4500 synchronizer, \$400. Eldo, Natl Vid Ctr, 460 W 42 St, NY NY 10036. 212-279-2000.

**Edutron CCD 2h-4** TBC, \$1500; DPS-1 TBC freeze frame & posterization, \$2250; Sony PVM 1900 color monitor, \$350. E Denke, American Motion Pictures, 7023 15th Ave NW, Seattle WA 98117. 206-789-8273.

**Panasonic NV8170 & 8200** video camera w/access, \$500 for set. M Russell, Sherwood Comm, 1310 Industrial Hwy, Southampton PA 18966. 215-357-9065.

**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**

**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.

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**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.

**Panasonic NV8170 & NV8200** VHS rec/player, gd cond, \$500 firm. M Russell, Sherwood Comm, 1310 Industrial Hwy, Southampton PA 18966. 215-357-9065.

**Sony VP2000 3/4"** player & VO1800 recorder, \$95 ea. L Grapziplene, Grailen Research, 3532 N Main, North Java NY 14113. 716-535-7251.

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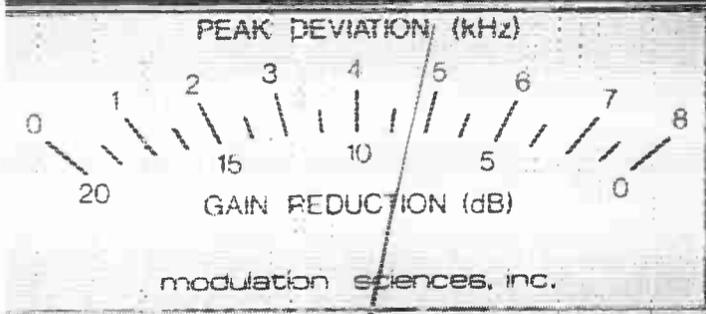
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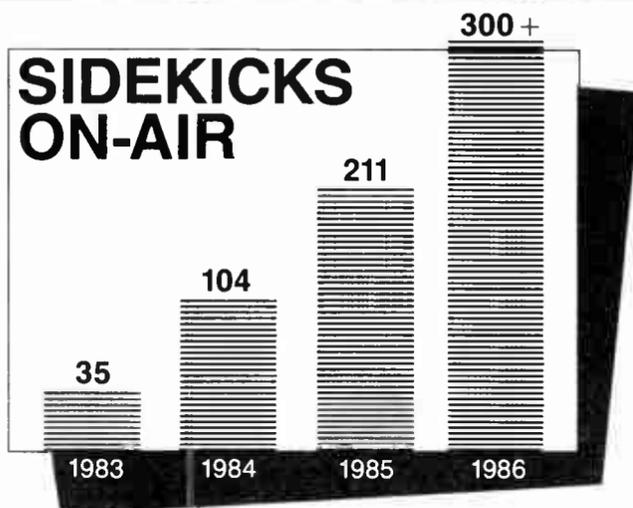
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