

AM Stereo Decision Up In Air

Las Vegas, NV ... The FCC's recent decision to approve the Magnavox AM stereo system was met with unexpected and heavy criticism from broadcasters at the NAB show. Up until the first workshop which concerned itself with the topic, the feelings expressed by those involved was one of disbelief that Magnavox, never considered by most to be one of the stronger proponents, got the nod from the FCC's Office of Science and Technology. This feeling erupted to the surface rather dramatically during the AM Stereo Implementation Workshop held on Monday, April 14th.

Workshop discussion

The workshop was moderated by Chris Payne of the NAB, and the panel consisted of Bob Streeter from Magnavox, Wilson LaFollette from the FCC, Robert Reymont from WGAR (one

Many Broadcasters React Unfavorably to FCC Decision for Magnavox

Commissioners May Reconsider

of the stations which had tested the Magnavox system previously). The session opened with brief statements from Payne and LaFollette followed by an in-depth review of the Magnavox system given by Bob Streeter. Throughout, there was hardly a murmur from the audience which filled the room. Things began to open up with Reymont's discussion of his experiences in testing the Magnavox system at WGAR.

As most people at the session seemed to realize, WGAR experienced significant difficulties in testing the Magnavox

system. This had to do with "clicks and pops" coming from the stereo receiver whenever the WGAR transmitter exceeded 95% modulation. Reymont did not try to minimize this problem, and described at some length how he tried to stop his 50KW transmitters from exceeding 95% modulation, so as to eliminate the problem. All he ended out doing, though, was burning up the various protective devices he tried to use! Both Payne and Streeter then commented that the "click and pop" problem was mainly a receiver problem which could

be "designed" away. As for full modulation of the transmitters, the comment seemed to be that most transmitters could be appropriately modified.

At this time, the workshop was opened for questions, and it was immediately apparent that the audience didn't like what they had been hearing. One after another, representatives of Meredith Broadcasting, KUIP, KHHO, KKUA, and others got up to question the performance of the Magnavox system. When Leonard Kahn got up, the audience cheered, but the discussion began to get out of hand. With time rapidly running out, Chris Payne ended the session with everyone milling around afterwards to see what would happen next.

Meeting with Commissioners

The following morning, during a radio workshop entitled "The FCC's Crystal Ball," the AM stereo decision was brought up again. This time the panel was moderated by Vincent Wasilewski, President of the NAB, and the panel consisted of four of the FCC Commissioners, Brown, Lee, Quello and Fogarty. After reviewing a variety of topics, someone from the audience brought up the AM stereo decision. With actually little prodding, two of the Commissioners (Quello and Lee), said they would change
(continued on page 6)

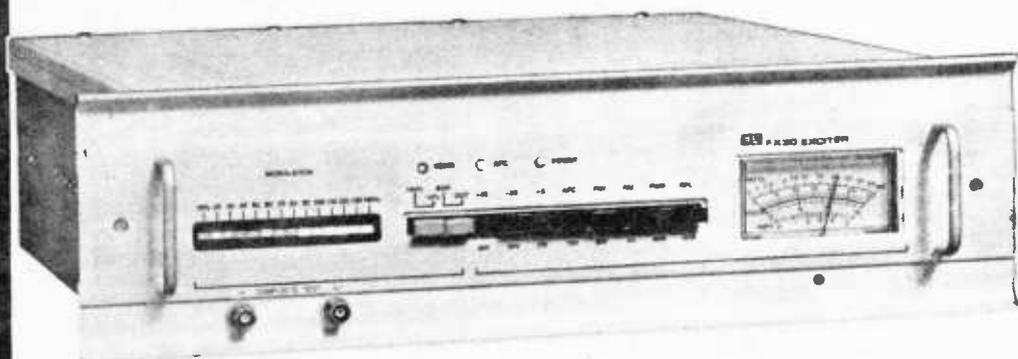
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Modifications On The Optimod-FM

By Robert Orban/Orban Assoc.

Part I of II parts.

San Francisco, CA ... It seems that there are a large number of suggested modifications for the 8000A floating around the industry. Let's try to clarify which modifications are legitimate, and which will simply result in a degraded 8000A.

In general the "good" modifications either update the unit with IC's which were unavailable or unproven when the 8000A was designed, or else change the loudness/brightness/distortion tradeoff designed into the 8000A to make it more suitable for a given format or special situation.

The "bad" modifications usually result from ignorance or naivete. They are often IC replacements which either

make no audible improvement or actually degrade certain aspects of the unit's performance (noise, or stability of 38kHz suppression, for example). Other modifications may result in the 8000A's performing poorly in high RF environments, or in other problems which were not immediately apparent to the engineer who first developed the modifications.

IMPORTANT

If any modifications are made, it is particularly important to follow workmanship standards described on p. V-4 of one's operating manual ("Replacement of Components on Printed Circuit Boards"). Recommended modifications will not necessarily void one's warranty. However, Orban Associates Inc. reserves the right to not

honor the warranty on modified units which, in its judgement, have been compromised due to poor standards of workmanship or other abuse.

IC Replacements

Recently, an almost hysterical concern has been expressed over "transient intermodulation distortion," distortion caused by the signal's being subject to slope overload or "slewrate limiting."

The 8000A, even in its earliest version, never subjected the signal to actual slewrate limiting anywhere in the circuitry. However, at certain points in the circuitry, the signal came close enough to the slewrate limit point to possibly induce "sub-slewing" TIM.

Before doing any modifications, it is useful to see if a signal degradation is due to audibly perceived TIM, or simply due to the high frequency limiting and clipping required to accommodate the signal to the 75us preemphasis while retaining competitive loudness. The latter is far more likely to be what one is actually hearing.

The best way to test this is to remove the 8000A from service and place it in the production studio or another environment which has a good monitor system and which permits accurate A/B comparisons between the processor's input and its output. Connect the TEST jacks on the rear panel of the 8000A to the monitor switching system through a pair of accurate 75us deemphasis networks. Play demanding music through the 8000A, and adjust the audio drive level into the unit about 2dB below the level where gain reduction is first exhibited on the meter. Put the 8000A in PROOF mode, thus defeating all hf limiting and clipping. CAREFULLY match monitoring levels between the console output and the 8000A output. (If levels are unbalanced by only a few tenths of a dB, this can introduce an apparent quality change.) What one is hearing when one switches to the deemphasized 8000A output is now *only* the effects of any TIM or other distortion in the circuitry; one's ear is not being fooled by processing effects or level imbalances. If there seems to be a significant degradation in TEST

mode, then proceed with the chip changes. Otherwise, leave well enough alone!

To avoid any possibility of sub-slewing TIM, later production units of the 8000A were fitted with faster chips which had been introduced since the original 8000A design, and which had proven to be reliable. These chips may be field-retrofitted into the audio processing part of the 8000A *only* (up to the "Audio Test Jacks"). Retrofitting the stereo generator demands that it be realigned. Most stations don't have the time, experience, or proper test equipment to do this right.

IMPORTANT

Replacing *any* chip after the 30Hz highpass filter (IC203, 204) requires that the 38KHz suppression be measured on one's calibrated stereo monitor, and that the "touchup alignment" procedure on p. A-1 of one's operating manual be performed if suppression is less than -45dB.

4558's: All 4558 dual opamps may be replaced with Texas Instruments TL072's or National LF353's. The Signetics NE5530 is *not recommended* because it has a class-B input stage.

1556's: Very early units used 1556 single opamps in a number of sockets. These may be replaced (in the audio processing section *only*) with Texas Instruments TL071's or National LF353's. The Signetics NE530 is *not recommended*. (NOTE: Middle-period 8000A's used RCA CA3140's in these sockets. These are fully adequate, and no benefit would result from their replacement.)

709's: The 709 single opamps should *not* be replaced. They were chosen for low noise. In their specific circuit configuration, they do not suffer from slewrate limiting, crossover distortion, or other problems sometimes attributed to them.

301A's: The 301A's are compensated for a slewrate of 5 v/us. This is fully adequate; these chips should *not* be replaced.

(continued on page 11)


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Modulation Analysis . . .

by Pamela W. Peterson

New York, NY . . . Many program directors and chief engineers find themselves, at some point in their respective careers, crouched over a console eyeing each other with barely concealed distaste, while the C.E. points at the modulation monitor and the P.D. gestures at the control room speakers. Both agree that some audio processing is necessary; they differ as to how much and what kind. The program director is yelling about "the station's sound"; the C.E. is trying to explain "100% negative modulation peaks."

Modulation Analysis

Modulation Analysis provides a common ground on which the two can meet. Briefly, Modulation Analysis provides a computerized analysis of a station's sound taken off the air. Not only can one see graphically what one's modulation characteristics look like, one can see what the competition's modulation characteristics look like. The information a Modulation Analysis delivers is exactly the kind of information which is not delivered by a proof of performance: how one's station's audio chain performs with the limiters, compressors, and audio processors in and working.

"How can this be," one asks skeptically, "since the instantaneous characteristics of the audio chain depend on the instan-

This work was done by Eric Small & Associates, New York.

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taneous characteristics of the music: loud, soft, high-pitched, bassy, etcetera?" (Very perceptive of you to ask.) Modulation analysis works *through a period of time* (says one record), showing the distribution of percentages of modulation.

Incidentally, since the analyzer looks at either composite baseband for FM or audio for AM and discs, one can play the same piece of music *directly* from the disc into it and see the difference between a

processed off the air signal and the unprocessed audio of the disc.

Modulation Analysis Tests

Let's look at some actual graphs. Figure 1 is a moderately processed rocker. RMS MODULATION provides a figure of "average" modulation for comparison with other stations, while INDEX OF PROCESSING is a number that decreases with increasing compression and

limiting. Figure 2 is of a disc played directly into the analyzer; compare the modulation and processing to that of Figure 1! For an even greater contrast check out Figure 3. This is another rocker, but here we have higher modulation and a lot more processing. The station also appears to be baseband clipping—note the very step drop at about 90% modulation.

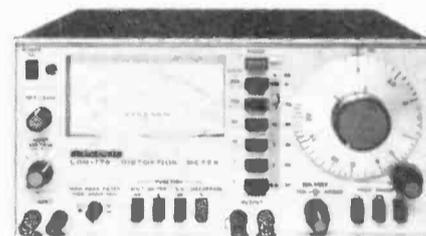
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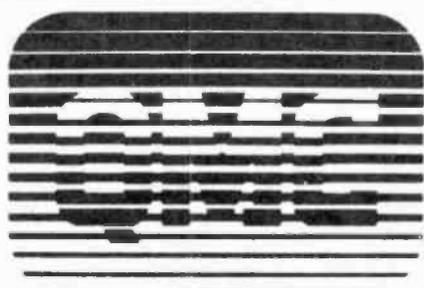


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More re VU Meter

Dear BEE:

I enjoy your (Bill Sacks') column in BEE and regret having missed the circuit I need badly, your VU meter amp. Could you see that I get a copy of that diagram and article?

Most Appreciately,
Hal Rogers
Parma OH 44134

BEE Replies:

No problem Hal, a copy is in the mail. See Bill Sacks' column again this month for more on this circuit idea.

On BEE

Dear BEE:

I'm what you might refer to as a rookie in the broadcast engineering field. Your publication has a goldmine of info and ideas. I've already used variations from your "Do we need transformers?" article to build a newsroom board. Keep those ideas coming!

Phil Wells/C.E.
KPSI
Palm Springs CA 92262

BEE Replies:

Thanks Phil, we've got more good "stuff" coming in the months ahead!

Topic—Composite Clipping

Dear BEE:

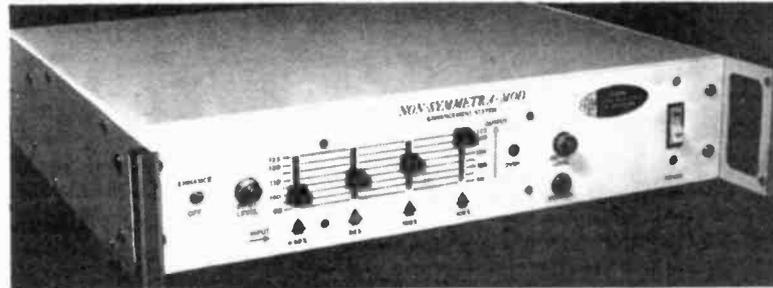
I am the designer of the Sta-Max composite clipper, which was the subject of heavy debate at the NAB, both in the technical sessions and on the Convention floor. Many individuals from large manufacturing firms spoke out against the technique, either because the devices

were being overused and abused, or because clipping was not necessary with their equipment. Since few people were at the show who could speak out and defend the technique with expertise, the consensus of opinion leaned heavily towards disfavor of composite clipping, whether for legitimate overshoot protection or for outright heavy signal clipping. I am sorry I was not present at the NAB show to debate the opponents, as no one there seemed to know enough about the concept to speak about it constructively.

The original purpose and design of the Sta-Max was for absolute overshoot protection, while maintaining the ultimate faithfulness and transparency to the program material and its stereo specifications. But then stations discovered that they got louder and louder with more and more clipping. Soon, many markets had full-bore loudness wars, each station trying to out-clip the other to the point of unacceptable distortion. Some secret reports found their way into the Commission, and soon the panic spread that the devices would be made illegal. Extensive testing and research has been done on the Sta-Max to show compliance with current FCC rules and regulations as an overshoot protection device, and believe it or not, including up to 0.5 db of continuous pilot clipping at any audio frequency or test mode. Regardless of what the manufacturers may claim or disclaim, I haven't seen a composite STL or stereo generator yet that didn't overshoot to some extent. In fact, I have personally filed data with the Commission showing the Sta-Max benefits

(continued on page 12)

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Bill Sacks on the Audio Process

Clipping & More on V.U.

Arlington, VA ... The recent FCC AM stereo decision and stereo baseband clipping were two of the hottest topics of conversation at the recent NAB convention at Lost Wages. Briefly, the AM stereo debate at the FCC and FCC's subsequent decision to use the Magnavox system showed me that the FCC needs more input from technical personnel. Personally, I think that this decision did not further the public interest in broadcasting.

Baseband Clipping

Stereo baseband (or composite) limiting (clipping) has been used for years by a few engineers across the country but the subject has never been openly discussed, mainly because all of the composite clippers were home-brew devices, hidden deep inside a hot-rodded stereo generator or exciter. Chief engineers using this technique treated it as a trade secret in the alchemy of competitive audio processing. They also feared disclosure of the technique would bring undue attention from the FCC. In all fairness, I must point out that a few engineers used their homemade clipper very conservatively (possibly out of fear of discovery). However, in the last two years or so a plethora of these devices have become available on the open market which unfortunately has opened the door to widespread abuses of the technique. The FCC is now faced with the problem of how to regulate these devices. There is talk of grandfathering the boxes now on the air and regulating

their construction and use in the near future.

A Little Advice

Personally, I would prefer to see a composite clipper marketed with a V.C.A. device ahead of the actual clippers. This proposed clipper device would have a sensor with a predetermined

(potted) limit circuit monitoring the depth of clipping. I would suggest 0.25-0.5 db as an absolute maximum and the threshold of gain reduction. Attempts to adjust the device for grosser amounts of clipping would be futile since the circuits would be designed to reduce output levels after the clipping threshold has been exceeded. The attack time

constants should be maybe 20-30 milliseconds or so. That should not interfere with any instantaneous overshoot protection. The release time should be about two seconds to make the protection limiter obvious and obnoxious sounding when functioning. This would prevent abuse of these devices by caus-

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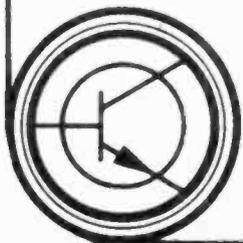
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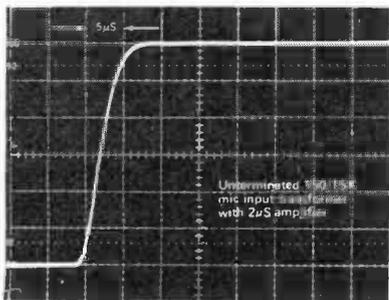
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The Marketplace & AM Stereo

Garden City, NY ... Since the FCC's decision to recommend the Magnavox AM stereo system has created such controversy, BEE felt that it might be worthwhile to re-evaluate the concept of the so-called "marketplace decision." As reported last month, the Broadcast Bureau's recommendation to the Commission was to set minimum standards which all 5 proposed systems could meet, and then let the broadcasters decide which system they wanted to buy. The Commission rejected this proposal and stated that they wanted a single system approved.

Why did the Broadcast Bureau recommend the marketplace and not the Commission as the place to decide this issue? Their arguments before the Commission on 9 April seemed weak to many people, and by the vote, they were obviously ineffective. To pursue this further, BEE has interviewed Leonard Kahn, President of Kahn Communications Inc, and perhaps what follows is a better attempt to explain how the marketplace would function for AM stereo.

BEE Who first introduced the question of "marketplace" in the AM proceedings?

LK I guess I did. I mentioned the matter in my August 1st, 1979 Reply Comments to the Commission. But the original idea is not mine. I just worked on the engineering part—it came out of the Broadcast Bureau and the basic concept comes from Chairman Ferris and Dr. Nina Cornell.

BEE Just how would this so-called "market procedure" work?

LK Very much like free enterprise works in normal commerce except in this case the Commission had to make a determination that none of the systems would increase interference and hurt other broadcasters. The Commission made that determination—they did require Belar to restrict his frequency response and change deviation—but they now believe all systems could enter the marketplace.

BEE But wouldn't that require the public to purchase 5 types of receivers?

LK This is where everything got mixed up. You and I are both engineers and you know how easy it is to jump to a false conclusion—we were taught that in school. The answer to your question is "no" for a number of reasons. First of all I am certain that there won't be 5 serious contenders in the marketplace. They just won't get off the ground. What is more, within three or four months—that is as soon as the proponents get actual transmitter exciters and sample receivers into the hands of the broadcasters, the rhetoric stops and the engineering starts. I am certain there will be only one survivor in the marketplace in three to four months before the receiver people tool up. I don't believe there will even be two types of receivers offered to the public and you know, if I am wrong and we have two or more marketplace survivors a "universal" receiver will take over in the marketplace.

BEE Before you discuss the universal receivers, let me ask you how the marketplace decision will be made. Just who

decides in the marketplace, the public?

LK No, the public will not do the deciding, at least not directly. It won't work that way. The group that will decide will be the broadcasters. If they don't like a system they will not use it, and they move fast. Just try getting a broadcaster to use something that hurts their modulation or their coverage or makes strange noises. If you get them to put it on a minute you will be lucky. I can't imagine a broadcaster dropping modulation in this competitive world, and no way is he going to accept "clicks and pops." I have worked with broadcasters for over 25 years, they're tough, and they know what they are doing. We just put stereo on 13 or 14 stations all around the country (even Canada and Mexico) and every one of them insisted on full modulation and no funny noises and good push-button comparisons in their 0.5 mv contour; they are real careful. They must be to survive and keep their listen-

ers. Their interests are the same as the public's, otherwise they lose ratings and income.

BEE But wouldn't the receiver manufacturers have a say?

LK No, not really. All of the important receiver manufacturers have said they had designs for all five systems and they are not stupid. They will do as the marketplace commands. They are not going to mass produce receivers until they are certain the broadcasters are on-the-air in quantity with a system. And they will not move until they are sure that the broadcaster will stay on the air.

BEE But couldn't the receiver manufacturers, say in Japan, get together and force the decision for a single system that they want?

LK No, because number one, they would have some anti-trust problems, but more
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AM Stereo At NAB

(continued from page 1)

their vote regarding the Magnavox choice if they felt that the broadcasters, as a group, didn't agree. This astounded many in the audience, and of course, gave heart to the proponents who were rejected. The consensus of feeling was that the Commissioners have been hearing, loud and clear, many of the broadcasters' objections to the Magnavox system, and that it apparently was more

than just "bad-mouthing" by the rejected proponents' adherents.

After the session was over, all of the attendees felt that perhaps the issue wasn't dead yet. The FCC, in their 4-2 vote on April 9th, decided that they wanted one single system approved, and only recommended that it be the Office of Science and Technology's choice, Magnavox. If they can be convinced otherwise, they will go along with one of the other systems instead.

After the NAB show, both Harris and Hazeltine filed with the FCC for release of the Office of Science and Technology matrix which was used to rank the various systems. These requests have been turned down. Kahn Communications has filed a motion to grant an oral hearing where all of the proponents could make their case directly to the Commissioners, and some of the other proponents are supporting this motion. It is unknown as to whether the FCC will grant this motion anytime soon. A number of the proponents have done mailings to the stations asking them to write the FCC and let the Commissioners know where they stand on the issue and BEE supports this activity.

As Commissioners Lee and Quello stated, the choice of a system is in your hands. They will listen to your opinions. The selection of an AM stereo system is not meant to be a popularity contest, opinions should be backed up with technical and/or business reasoning. We urge all of you to write NOW to the Commission to express your views. The address is: FCC, 1919 M Street, N.W., Washington, D.C. 20554.

"I wanted to control my transmitter from three different points"

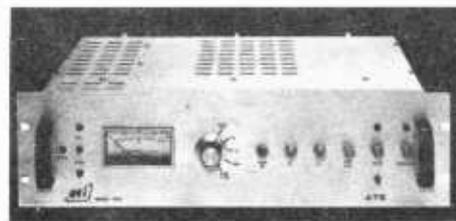
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More On VU Meter

(continued from page 5)

ing a loudness "peak" at the maximum tolerable clipping level. Increasing the input level beyond that point would actually reduce the clipping level. I would like to see all of this embodied in a FCC regulation. Well, there are a few seeds for thought—next month we'll discuss this issue in depth.

More on VU

I was pleased with the positive response on the VU meter build it project

(BEE March 1980). In that column I mentioned the National Semiconductor LED VU meter/bar graph IC and here are some tips on using it. The LM 3915/3916 devices are basically parallel (flash) analog to digital converters, that is voltage comparators which have their reference inputs tied to a series string of resistors which are connected to a reference voltage source. All of the individual comparators sense inputs are tied together and constitute the analog input.

The outputs are open collector transistors for LED drive.

Peak or Average Reading

Since the "Ballistics" of this flash converter are virtually instantaneous, and it responds only to DC, audio signals must be pre-conditioned before they can be displayed properly. Because the signal must be preconditioned anyway, choose the ballistic that suits your needs. The Precision Full Wave Averaging Detector is shown in figure 5 and has an integration constant (94 ms) which is somewhat faster than the standard VU meter. If you want a true VU response, use the circuit in figure 7. The Precision Full

Wave Peak Detector shown in figure 6 allows viewing of peak levels. A reader who is actually building this as a project will report on his experience next month.

Hot-Rod Optimods

This month's treat is a little goodie from Robert Orban on the subject of hot-rodding Optimods. Here is another helpful hint (approved by Mr. Orban). This modification immunizes the high frequency limiter against intermodulation by low frequency material. Simply disconnect one end of R263(R264) and insert a .1uf 10% polycarbonate or polypropylene capacitor in series with the resistor.

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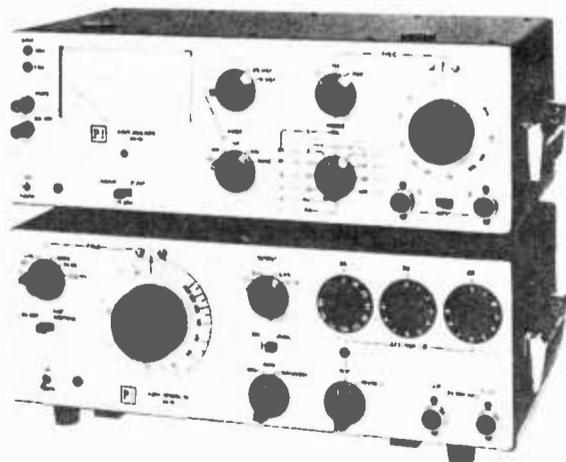
	Hewlett Packard 339A	Sound Technology 1710A	Potomac Instruments AT-51
AUDIO GENERATOR	Combined With Analyzer	Combined With Analyzer	Separate Unit
Intermodulation test signal	No	Option	Yes
Wow & Flutter test signal	No	No	Yes
Simultaneous L&R Outputs	No	No	Yes
600 ohms and 150 ohms Source	No	Yes	Yes
Stereo Matrix Switch (L,R, L+R, L-R)	No	No	Yes
Switch to remove signal and terminate line for S+N/N	No	Yes	Yes
10 dB, 1.0 dB, 0.1 dB Step Attenuators	No	Yes	Yes
AUDIO ANALYZER	Combined with Generator	Combined with Generator	Separate Unit
Harmonic Distortion Mode	Yes	Yes	Yes
Automatic Nulling	Yes	Yes	Yes
Automatic Set Level	Yes*	Option*	Yes
Intermodulation Distortion Mode	No	Option	Yes
AC Voltmeter Mode	Yes	Yes	Yes
Stereo Phase Meter Mode	No	No	Yes
L/R Amplitude Ratio Mode	No	No	Yes
Wow & Flutter Meter Mode	No	No	Yes

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² Total price for Generator and Analyzer including protective covers and 4 test cables.



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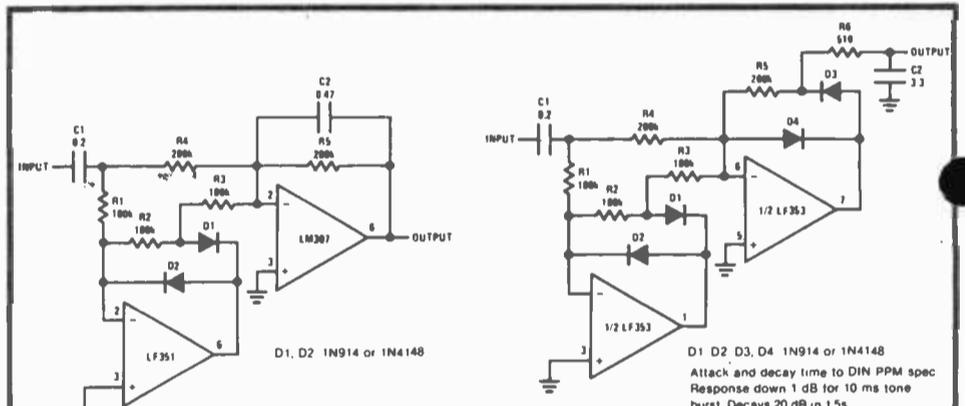
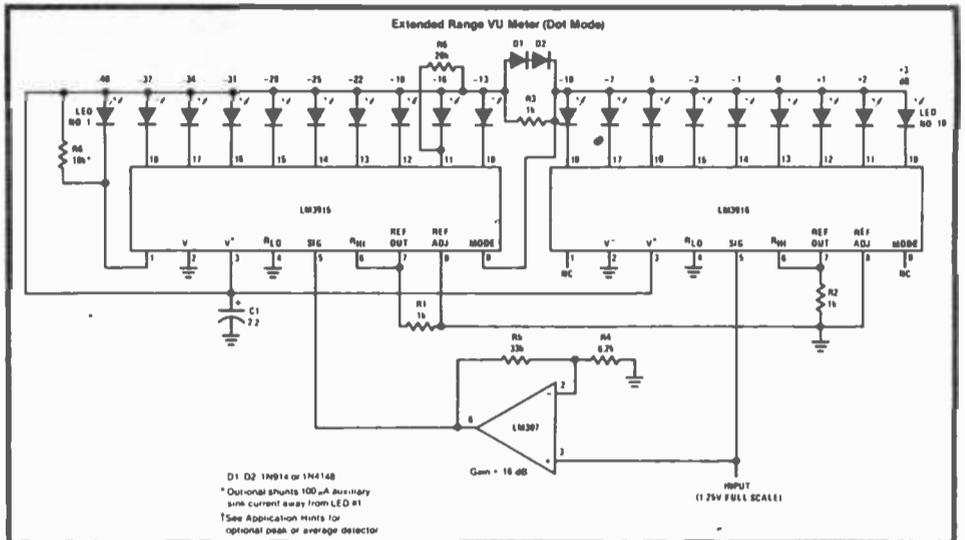


FIGURE 5. Precision Full-Wave Average Detector FIGURE 6. Precision Full-Wave Peak Detector

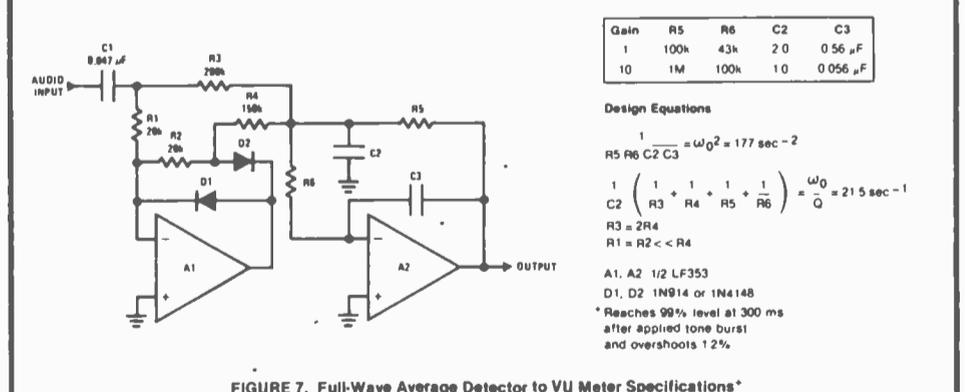


FIGURE 7. Full-Wave Average Detector to VU Meter Specifications*

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April FCC Developments

by B. Jay Baraff

Baraff, Koerner & Olender, P.C.

Washington, DC ... The FCC is proposing rules which would simplify applying for FM stations. The proposal includes eliminating population guidelines for channel assignments, deleting or modifying policy of basing class assignments on community size, re-examining preclusion standards and reviewing "Berwick" issues (arising when station is sought for smaller community when it appears its real purpose is serving a nearby larger community).

Large Settlement Fee

An FCC Administrative Law Judge approved reimbursement of \$1 million in the 18 year old proceeding for a new AM station in the Los Angeles-Long Beach area. A new corporation was formed in which five of the competing applicants participated. The Judge added that had the parties exercised a more determined effort toward settlement, this could have been resolved at an earlier stage by eliminating the heavy burdens of litigation which had been assumed.

Comply With Subpoena

The FCC required PTL to present

documents called for by an FCC subpoena as part of an on-going investigation from 1979 to determine whether PTL broadcast misleading and deceptive statements concerning fund raising for particular projects. PTL had originally refused to provide this documentation but it was submitted after agreement was reached between the Commission, the Justice Department and PTL's attorneys.

Equal Employment Requirements

The FCC has imposed equal employment opportunity requirements on 6 Washington, D.C., area stations including a short-term renewal for WHFS-FM, Bethesda, MD, for failure to employ an acceptable level of women and minorities. This is part of the Commission's increased efforts to ensure compliance with their equal opportunity requirements.

Suspension of Guidelines

The Commission has denied a request by the National Association of Broadcasters asking for suspension of the effective date of the FCC's new Equal Employment Opportunity guidelines for broadcast applicants. The FCC said that they do not consider these rules as a

sanction but just an opportunity for in-depth review of stations' equal employment opportunity programs and, therefore, procedural in nature. These guidelines became effective for renewal applications due on or after April 1, 1980.

AM Channel Spacing

The Commission's proposal to reduce AM channel spacing in the Western hemisphere from 10 to 9 kHz is still facing debate by 22 countries. The principal opponents are Canada and Argentina. Also, the NAB Radio Board has urged the conference for action on this proposal so a full factual record can be completed. Since this is inconsistent with the U.S. position, it has confused representatives of the Latin American countries.

Format Changes Reviewed

The Supreme Court has agreed to review the Commission's policy of allowing format changes to be left to the marketplace. The Court of Appeals has held that the Commission must consider diversity of programming in considering a renewal or assignment application that proposes abandonment of a format and that a hearing would be necessary if the format was unique and financially viable

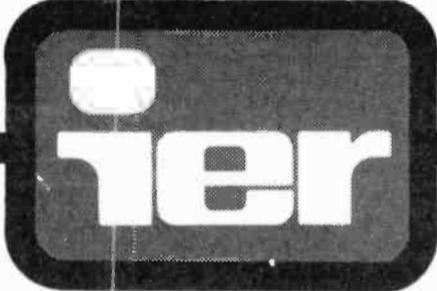
and if a threatened loss would cause public concern. The Appeals Court had rejected the theory of marketplace regulation which the FCC apparently is applying.

Financial Reporting Revision

The FCC is planning to revise its Annual Financial Report (FCC Form 324) as part of a current rulemaking. Some of the changes proposed are deleting the employment and tangible assets requirement on the last page, restructuring the income statements to conform with accepted accounting principles, revising the income summary for FM stations filing a combined report with commonly owned AM stations. The FCC also wishes to consider whether it should treat radio different from television with respect to the amount of data reported and to separate program expenses into local and non-local categories. If you desire to file comments, the Commission will be releasing a comment date at a later time.

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Kahn on the Marketplace

(continued from page 6)

importantly, they would have to be sure that someone in Hong Kong or (can you believe it) maybe in the United States will quickly come in and thwart their plans and make themselves a fortune. Free-enterprise works and it has worked

in our country for 200 years. It will work here if it is given a chance. The best system will survive.

BEE Some people have stated that General Motors will decide?

LK No way. GM knows what they are

doing. They will be the last group to make a rash move. They will wait and make certain which way the broadcasters go. They will not make a single receiver until they are certain that their customers will be able to tune in on stereo all over the country and they will want to be certain that stereo sounds good, no clicks or pops. They don't want the problem of having people bringing back Cadillacs to fix the radio, and then find they cannot fix it because they have clicks, pops, or stereo ghosts. The good businessmen at GM just will not put up with it. No, you can be sure that the broadcasters will make the decision.

BEE How will the public be represented in the "marketplace," who speaks for him?

LK The public's natural surrogate is the broadcaster, he speaks for them. The AM broadcaster is fighting for his economic life. He must do everything he can to satisfy his audience and even attract more listeners. He will do nothing that stands in his way to make his listeners happy. If his mono listeners suffer he will suffer; if he gets new stereo listeners and they don't like what they hear, he is in trouble. He is the public's natural

ally and he has the engineering expertise and experience to best represent the public. The foreign receiver manufacturers also wish to satisfy the public, but if they are wrong, it will not destroy them. They will end up selling something else next year. Actually, some receiver manufacturers may do better financially if AM Stereo and AM drops dead. They have already taught the American public that FM receivers get a better price and if they can get the public to buy new receivers at a higher price it is to their advantage. The AM broadcaster certainly doesn't feel this way. He knows what's in his best interest, satisfy the public. I believe that is why we are getting such strong support from major broadcasters. I don't know of a single major broadcast group that supports any other system.

BEE Then why does the NAB apparently oppose the "marketplace" concept?

LK That is an excellent question. It has been difficult for me to believe that NAB would do such a poor job on this matter. I recognize that they have other fish to fry (television has always been more important to them) and, of course, they

(continued on page 13)

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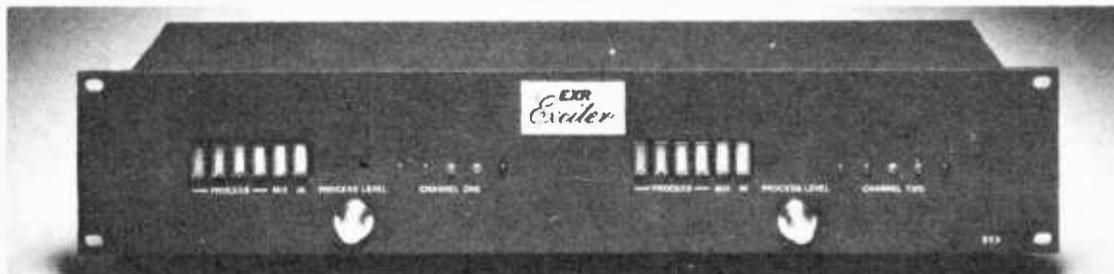
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Clint Free on VTR's:

Erase Amp Problems

Knoxville, TN ... In recent months I have had a more than usual amount of erase amplifier problems. The most interesting problem concerned an open by-pass capacitor on the -26V line on a TR-60 erase amp: minus 26V is applied to the output stage through a 0.5 microhenry choke, and bypassed by a 50 microfarad capacitor.

The machine's symptom was the erase would not turn off and the erase head overheated; although it was not damaged, it was very hot to touch. The problem was compounded by a faulty module extender. The symptom disappeared with the module on the extender because one of the lines to the erase transformer was open. After repairing the module extender, the problem was easily recognizable. Prior to that, the problem had led us on a merry chase! There were 38 volts of 110kHz pulses on the bypass capacitor (1 volt p-p is normal) for the -26V line supplying power to the erase output stage. The combined inductance of the output stage input coupling transformer, the 0.5 microhenry choke and the output coupling transformer, and the gain of the output stage produced a high level 110kHz oscillation.

The most common erase problem has been low or no erase caused by an open or low value of the erase oscillator stage emitter bypass capacitor. The oscillator is a phase shift type producing a sinusoidal output. With the emitter bypass capacitor open, there is insufficient AC gain for the stage to oscillate. If its value decreases (the emitter bypass consists of a 1 microfarad electrolytic in series with

a 150 ohm resistor), the gain of the stage decreases.

Editing feature

There is now available an editing feature for RCA TR-60 and TR-70 VTRs which will speed up editing. Here is how it works:

1. The edit machine is rolled to the in edit point in play and stopped at the in edit time by the operator. The machine is then backspaced 12 seconds by counting control track pulses. When the machine stops, the actual number of seconds backspaced from the in edit time is in memory (stop is actuated by the 12th second but it takes several frames to actually stop).

2. The playback machine is stopped by the operator at the in edit time and it automatically backspaces 10 seconds and stops. The actual backspace time is in memory, as is the case with the edit machine, and the two numbers are compared. Whichever machine has the highest number will roll first.

3. The operator presses the edit push button, and the machine with the highest number rolls first. When this machine is passing the cue time of the second machine plus the start allowance, the second machine rolls. An edit command is produced at the appropriate time beginning the edit sequence.

4. An out edit can be activated manually or it can run a selected number of minutes, seconds and frames.

5. Third machine control can be added which will permit lap dissolves or effects by an operator. The first playback video is timed by the operator from

the in edit to the beginning of the lap dissolve, and this time is entered in memory where 10 seconds is subtracted. The second video source machine is then cued by the operator to the beginning of the dissolve. The machine then backspaces 9 seconds and stops. The actual backspace is then compared with 10 seconds and the difference, with start allowance, is added or subtracted to the adjusted time of the first video source. When the actual edit is in progress, the

Optimod Modifications

(continued from page 2)

Input Transformer

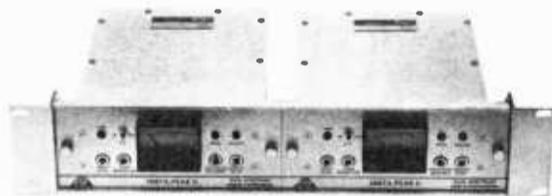
It has been suggested that the input transformer be replaced with a differential amplifier. This is OK, provided that one knows what one is doing. Any replacement must be a fully balanced instrumentation amplifier-type circuit with less than -123dBm equivalent input noise. In practice, such a circuit can be built with Signetics NE5534 opamps.

Be particularly careful about compromising RF suppression of the unit when this is done. If the 8000A is located in a high RF field, be prepared to fail, and make sure that the original RFI protection can be restored if the instrumentation amplifier doesn't work without buzz, noise, or other RF problems.

Editors Note:
See next month's BEE
for Part II.

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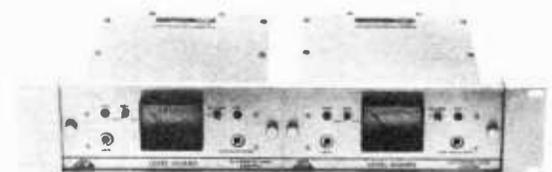
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... What Can it do for Me?

(continued from page 3)

A few cautions are in order here: interpretation of a modulation analysis is not as simple as reading a bar graph of oil prices or a road map of Taos, New Mexico. The program director is still going to need to rely on the technical expertise of his chief engineer, who is probably assisted by a consulting engineer trained in interpreting the data and graphs. And this method will not solve any problems with station sound: it's only a very sophisticated method of observation. But with a good analysis, one has the opportunity to make adjustments to one's audio chain and objectively analyze the result, rather than being forced into vague judgments of "sounds better" or "overcompressed." Being able to see the results of adjusting, for instance, the limiting threshold, is a major breakthrough.

Monitor vs. Analyzer

Let's again examine what's different about this technique. Current "modulation monitors" are devices which respond to the instantaneous modulation of the transmitted signal. In other words, unless one is airing pink noise or 1000 Hertz tone (useful signals, but not likely to increase one's market share), one's modulation monitor is bouncing all over the place, faster than the eye can follow. Under actual musical programming conditions, about all they're good for is to warn of an excess of peaks. A modulation analyzer, on the other hand, stores all those instantaneous modulation percentages and reproduces them so one can see how one's audio chain and transmitter are working through a piece of music.

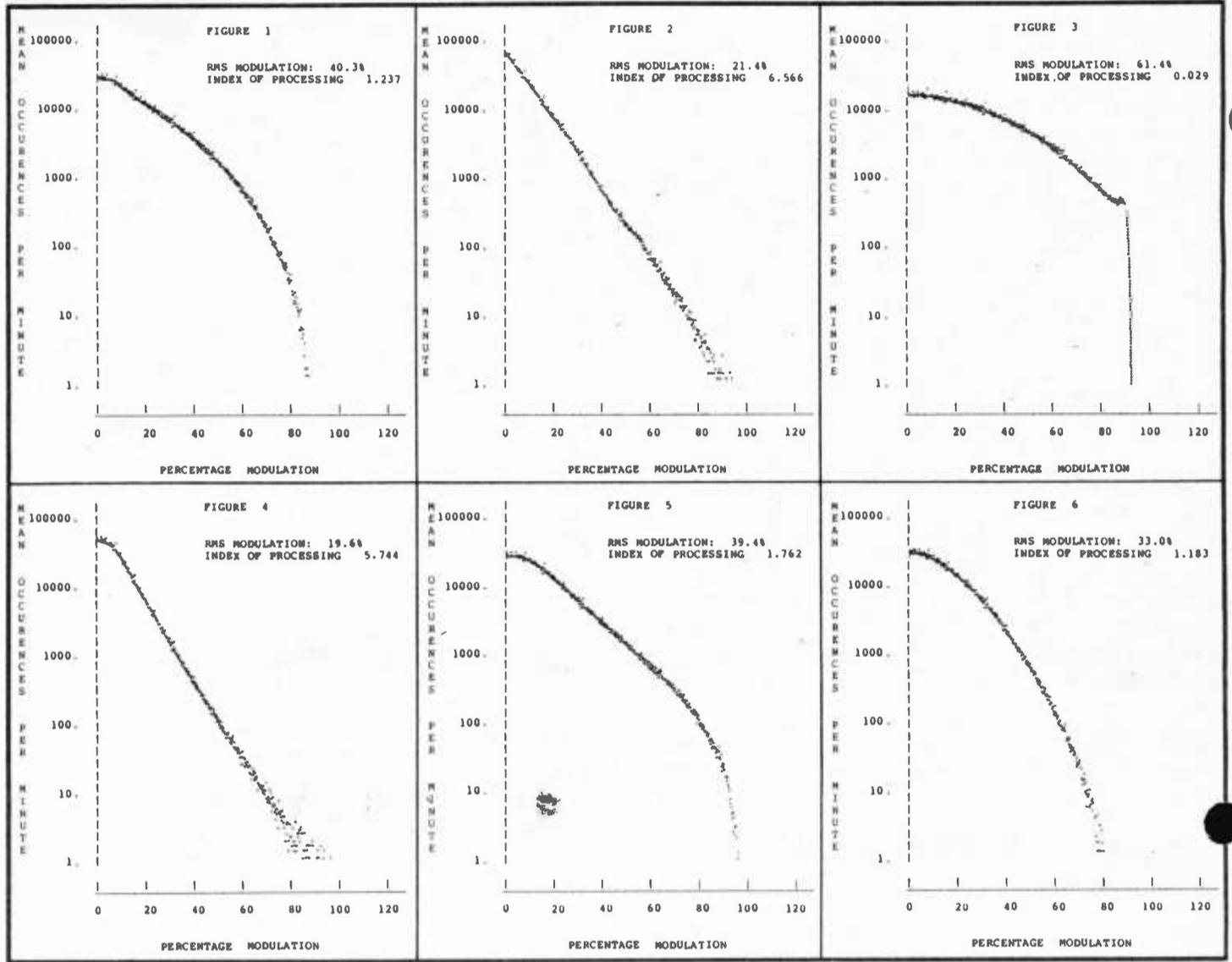
So far we've compared only two rockers and a disc; does this method produce significant visible differences between the modulation pattern of say, a classical music station and an AOR station? Look at figures 4 and 5. How about a beautiful

music station—see figure 6.

Future of Modulation Analysis

Further applications of modulation analysis await engineering development and the integrity of its users. But even in

its present form, it holds unmistakable promise of giving the broadcaster a better handle on the slippery workings of his audio chain, and a firm, rational basis for discussion of any station's air sound.



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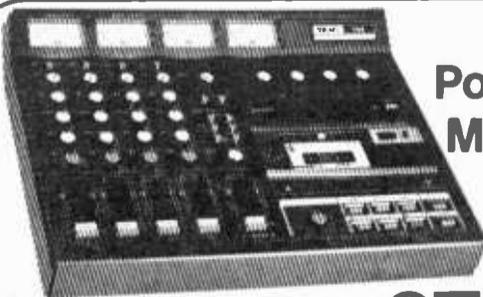
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Reader's Forum

(continued from page 4)

and measurements when used properly. The one advantage the Sta-Max has over other clipper designs is its amazing cleanliness at or below the clipping threshold—it's like it's not there at all.

The Sta-Max is probably one of the finest wideband DC amplifiers ever built but it's suffering from bad publicity, overuse, slander, and abuse. Had one of the opposing manufacturers come up with the product, wouldn't they be inclined to promote it as well? The industry is bad mouthing at its best and cut-throat at its worst. We should all cool down and save it before we lose it.

Very truly yours,
 Chris Hood
 Broadcast consultant &
 Sta-Max designer
 Pittsburgh PA 15205

BEE Replies:

Thanks for the letter, Chris. We intend to explore both sides of this rather controversial issue over the next few months. This month, Bill Sacks has a few comments on the topic in his column.

Kahn Interview

(continued from page 10)

have a problem in radio, the FM'ers are not too pleased about AM stereo. But anyway, I have had lengthy conversations with one of their two man engineering team. One of these chaps has been most effective in lobbying against this concept at the Commission, in fact he brags as having "done his thing" to the marketplace concept along with his friends at EIA and the receiver manufacturers. He bragged publicly, at the NAB Convention. We now understand, however, that a number of major broadcasters as well as influential broadcasters from smaller stations are putting pressure on NAB to think the matter out. Hopefully things will be changed real soon.

BEE But what reasons has NAB given you against the marketplace?

LK The main reason they gave us is that it is neater and simpler for the Government to make the decision. I was given the distinct impression that NAB, at least one spokesman, was not comfortable with the Broadcast industry making the decision. This chap is apparently under the impression that receiver

design engineers are better engineers than broadcast engineers and people who design broadcast equipment. As an engineer who has been in both fields, I know this is nonsense. There is very little innovation in AM broadcast receivers, they are just getting around to doing some of the things we did 20 years ago in communications receivers. Their main interest is in quality control and cost reduction. They assuredly haven't done a good job for AM receivers. Hopefully this will all change. But the point is, having dealt in both fields, I am delighted that the decision will be in the hands of the U.S. broadcast engineers, rather than receiver engineers outside the country. Even though I have run into some good ones from Sansui and Sony, they still do not know the broadcasting system. How NAB engineers would think anything differently is beyond me.

BEE So you believe that the "marketplace" decision will be made by the best qualified group to make the decision in the best interest of the public?

LK Absolutely.

BEE Therefore, you believe it is fortu-

nate that the AM broadcasters would be the marketplace judge?

LK Most certainly—absolutely.

BEE But won't the marketplace take a longer time than if the Commission decided to select another system. Wouldn't that be better in your opinion; what is wrong with that?

LK You might think I would be delighted with such a situation, particularly if they selected ours, but you have to think it out. I am reasonably certain that Magnavox and the other parties that would then be denied access to the marketplace will appeal and their appeals can take years. Therefore, the marketplace will be faster. It won't take long for the broadcasters to make up their minds. They are real quick and they are real tough and there is some serious dangers if proponents appeal.

BEE What dangers?

LK The danger is that a Federal Appeals Court may decide which system is best, and you know they have the full power to make their own system choice. Then who do you appeal to? I am not saying they will, but they can, and the best you can hope for is that they tell the Commission to go ahead with their plans or do a more thorough evaluation. The record isn't all that good and this could go on for years and years.

BEE But can't a party appeal a marketplace decision? I mean if the Commission OK's marketplace couldn't somebody appeal that decision?

LK Sure you can appeal anything, but that would be an admission that the proponent is afraid of the "marketplace," afraid of free enterprise. I believe that that appeal, if it were made, and I don't think it would be, would get quickly dismissed.

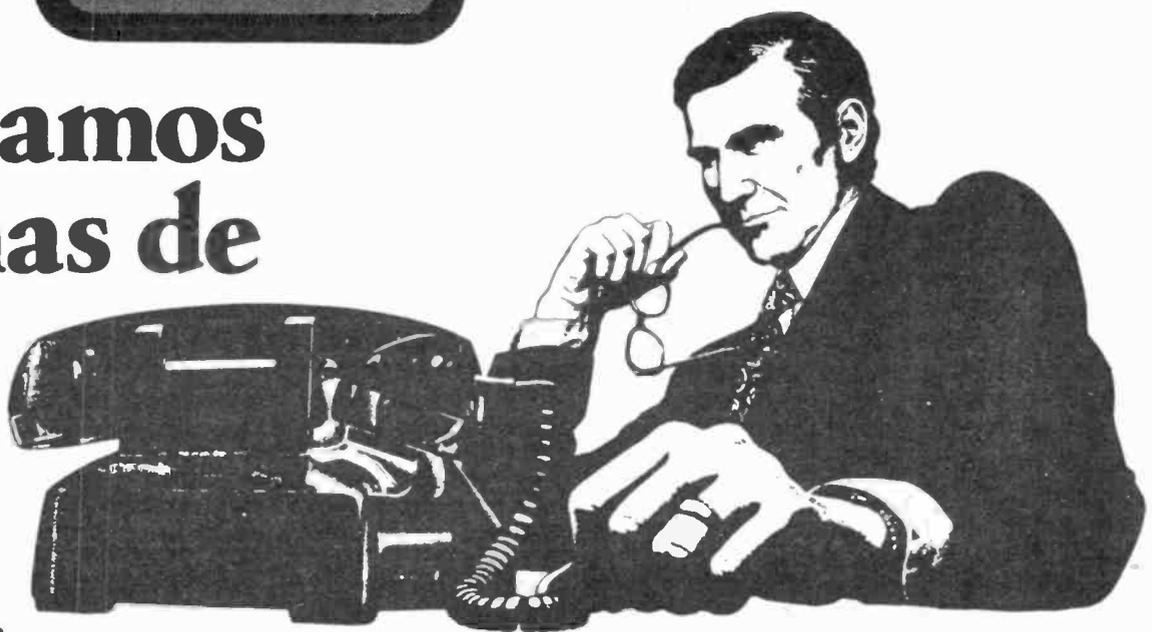
BEE Do you believe that the Commission will take heed to the apparent unpopularity of its April 9th preliminary action?

LK I do. If the broadcasters make their opinion known prior to a final decision, I am confident that we can get two more Commissioners to reverse their votes. FCC lawyers and engineering consultants, who know the history of the Commission, say there is plenty of precedence. Obviously, the Commissioners want to do what is best, but they got some poor guidance from EIA and, unfortunately, I have to say it, from NAB. Actually, it is in no broadcaster's best interest, and it is not really in the best interest of receiver manufacturers, at least if they only make AM sets to push the wrong system. The broadcasters have to get their opinions to the Commissioners. I note where one Com-

(continued on page 23)



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AMPLIFIERS

Want To Sell

MAC tubes, 30, 40, 75. Empirical Audio, 914-762-3089.

Crown D150A very clean, 3 yrs left on warranty. Key Code 5-29.

Crown M-600 (mono) 1000 watts into 4 ohms, mint cond. Key Code 5-69A.

Crown PSA-2 mint cond. Key Code 5-69B.

A-B Systems 205, 200 watt amp, new, reasonable. Key Code 4-31.

QRK Alpha II stereo pre-amp. Key Code 4-60H.

Marantz 240 stereo power amp, 250 watts, mint cond, reasonable. Key Code 4-31.

Cerwin-Vega Model A-3000I stereo power amplifier, need set of output transistors. Key Code 4-17.

Rust RF amplifier, model 0815A, serial #24, good for parts. Key Code 4-60G.

Dynaco 400 stereo power amplifier. Key Code 3-77C.

Gates utility amp. Key Code 3-72.

SWTP 210 A amplifier. 200w mono, solid state, excel cond, w/manual. Key Code 3-69A.

Dyna Co. amplifier stereo 70, also 75 mono. Key Code 3-53.

Crown D60 audio amplifier, rack mount. Key Code 3-32.

Kassino 200 amp and large built-in speaker w/matching extra speaker. Key Code 3-11.

Gates M5576 program amplifier. Key Code 3-53.

Marantz 240 power amp, 125 watts/channel, mint cond. Key Code 2-18.

MAC 30's and 40's w/tubes. MAC 2100, Crown D-75. Key Code 2-54.

Marantz 7T pre amp, mint cond. Key Code 2-18.

Johnson ST-4 SCA tuner, 67kHz, new. Key Code 2-41.

SAE XXXIB, SAE 2400, SAE 2500. Key Code 2-54.

Ampex 80-watt, new mono solid state. Broadcast type power amps that are new and in factory cartons. 19" R.M. Key Code 2-65B.

Op-amp Labs model SM 100 50 w/channel, like new. Key Code 2-25.

Altec 468 A equalizer amplifier. Key Code 2-61.

Want to Buy

McIntosh MI-75 amplifier, any cond. Key Code 5-48.

Marantz 1, 2, 5, etc, Mac and Quad II, tube amps/preamps, need to be operating, must be reasonably priced. Key Code 4-49.

McIntosh MC-3500, 350 watt tube amp, working cond. Key Code 3-78.

McIntosh MC-2300, 600 watt solid state, working cond. Key Code 3-78.

Fisher SA-100, 150 watt tube, working cond. Key Code 3-78.

Marantz 7T pre amp solid state, need many, working cond. Key Code 3-78.

ANTENNAS & TOWERS

Want To Sell

Scala Ch 80 UHF TV translator antenna, excel cond. Key Code 5-6.

RCA UHF filterplexer, ch 31, 12.5 KW rated 3 1/2" line, like new. Key Code 5-6.

Potomac PM 112-2 tower phase monitor, gd cond. Key Code 5-51B.

Andrew model 878 dry air pump, gd cond. Key Code 5-6B.

Andrew 1304 4-bay FM antenna, power gain of 3.6, horizontal, gd cond, complete. Deicers included, shipping weight 200 lbs, 3-1/8" input flange. Key Code 4-41.

ERI, 2 bay horizontal antenna, FMA-2, with heaters, tuned to 88.3. Key Code 4-43.

Andrew, 4 bay FM antenna #1304, tuned to 91.5. Key Code 4-43.

Andrew Hellax, 30' piece, new in orig box, HJ-5-50/RG-318/U. Key Code 4-2.

Phelps Dodge 6 bay HP, 94.1 MHz, used for 6 mos emergency. Key Code 4-48.

Shively 660, 6 bay horizontal antenna, tuned for 106.1 MHz, will handle 5kw RF input. Key Code 4-19.

Potomac Instruments, Model AM-19 (204), serial # 1363, day-night modes installed in unit, unit wired for 2 towers. Key Code 4-35.

Hellax 25' roll, Andrew #8414, 5/8" diam, slightly damaged outer insulation, no kinks or inner damage. Key Code 4-2.

RCA BTI-2H, 2 bay antenna, complete w/installation instructions, excel cond, tuned to 90.7 MHz. Key Code 3-29.

Cablewave coaxial cable 170 ft, 7/8" foam FCC 78-50J, new unused. Key Code 3-76.

CCA FM LP-2 antenna tuned to 91.5. Key Code 3-53.

Cablewave coaxial end terminal for FCC 78-50J cable (2), new. Key Code 3-76.

3 Bay FM antenna, vertical and horizontal polarization tuned to 103.1. Key Code 3-11.

Want To Buy

900' guyed tower for non commercial operation. Key Code 5-56.

TV antenna for ch 23, medium power. Key Code 5-44.

Guyed 160' steel tower for AM bdct. Key Code 5-27.

Hellax transmission line, 3"; Stainless G-36 tower sections (2 or 3, 20' sections), UHF TV antenna, ch 16, 17, 24, 33, 40, 45, or 55 and VHF TV antenna, any high band VHF antenna. Key Code 5-6.

Jampro, six or more bays CP antenna, prefer below 95MHz. Key Code 5-68.

Tower for UHF antenna, 600'. Key Code 5-44.

Channel 57 or channel 43 antenna, prefer slot type, 30KW rated input minimum. Key Code 5-65.

FM antenna 12 bay circularly polarized tuned to 88.1 MHz. Key Code 5-56.

Transmission line, 1/2" to 3/4", capable of 1kw at 103.1 MHz, any length, need 100-150'. Key Code 4-41.

RCA or Harris 8 bay circular polarized, tuned to or tunable to 106.1. Key Code 4-55.

Tower 50 to 300', self supporting or guyed, will arrange pickup, prefer on ground, but will disassemble also. Key Code 4-41.

8 bay circular polarized FM antenna for 98.3 MHz. Key Code 4-19.

RCA 8 bay circular polarized for 106.1 MHz. Key Code 4-19.

Tower, 80' to 100', any cond, for FM operation. Key Code 3-2.

AUDIO PRODUCTION (OTHER)

Want To Sell

Urel 1176LN mint cond. Key Code 5-69C.

Audio Development 706A SFX filter, case front looks nice, works great, no manual. Key Code 5-64N.

Audio patch panel, 3 double rows of 52 jacks each, in a 19" rack frame and wired to wire-wrap connection blocks, best offer accepted. Key Code 5-53.

Pultec EQP-1A, EQP-10S, \$500 each. Empirical Audio, 914-762-3089.

U.T.C. 3-A hi-low equalizer with cutoff and peak boost, very gd, no manual. Key Code 5-64O.

Tapco 4400 reverb, Teac AN-300, 4 ch Dolby, SAE 2800 parametric eq. Key Code 5-59.

Sound Craftsman audio frequency equalizer. Key Code 5-45.

Burwen Labs noise filter systems, Model DNF 1100. Key Code 5-43E.

Melcor AE-20, pre/eq, \$200 each. Empirical Audio, 914-762-3089.

Electrodyne 709L, modules, \$210 each. Empirical Audio, 914-762-3089.

Harris MSP-100 for FM stereo. Key Code 5-50A.

AKG BX10 reverb unit, excel. Key Code 5-46.

RCA BE-21B variable sound effects filter, clean, excel, manual. Key Code 5-64M.

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Mics MKH 815	918.00	585.00
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DBX 122, like new cond. Key Code 4-60D.

Garron stereo phase enhancer, model STE-100, gd cond. Key Code 4-76A.

Sound Workshop 262, Mic-Mix SL-305 reverbs, new, reasonable. Key Code 4-31.

Allison Gainbrains (2). Key Code 4-20B.

DBX 124, like new cond. Key Code 4-60E.

Mobile studio, 1975 Dodge Sportsman, has Gates Studioette board, turntables, monitor amp for outside speakers, gd cond, camper conv to studio, van all in gd shape. Key Code 4-16.

CBS reverb unit complete. Key Code 4-32A.



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SCA generator, Volumax 400, 100 tube-type receivers, two racks with 2 and 3 tape decks and switching gear, over 200 6-8 hr. tapes, everything needed for background music operation, all in gd to excel operating cond. Key Code 4-64.

DBX 158, new, reasonable. Key Code 4-31.

Farfisa VIP 345 organ. Key Code 4-20A.

DBX noise reduction, 8 trks 157 (rack mount). Key Code 3-15D.

Eventide Instant Phaser. Key Code 3-77F.

Pre-amp #M5530 (2), Gray model #602C (2) equalizers. Key Code 3-11.

Mellotron. Key Code 3-15E.

API equalizer 550A w/8 position API rack mount. Key Code 3-54.

DBX 142 noise reduction units (2), each stereo, used 1 yr. Key Code 3-12.

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Non-Profit, tax-exempt Christian Corp. building radio station from ground up. Needs used equipment. Best price or tax-deductible donation basis. Key Code 3-31.

Quad 8, RV 10 spring reverb. Key Code 3-77E.

Audio Jack panels, rack mount. Key Code 3-32.

Audio Technica AT-706 electrostatic headphones, never used. Key Code 2-8.

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Altec Lansing rotary attenuators, 600 ohm in and out. New and in factory cartons. RP series, 8-gang, 6-gang. RA series, 3-gang, single gang. Key Code 2-65A.

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Urel 813 speaker systems, like new. Key Code 2-25.

Urel 567 P.A. processor, new. Key Code 2-58.

Gates model SA-40, includes table and all acces, works well. Key Code 2-61.

Ivie Audio Analyzer, IE-30s and ID-10s in stock. Triad Productions Inc, 1910 Ingersoll, Des Moines IA 50309. 515-243-2125.

Want To Buy

Kepep 500 & RM 160 rack mounting unit. Key Code 5-12.

Urel LA4, LA3A, 1176N. Key Code 5-12.

Orban Optimod model 8000-A. Key Code 4-55.

Inovonics 355 or similar electronics for older (350) Ampex 2 ch. Key Code 3-22.

AKG BX-18 or BX-20 working or non-working. Key Code 3-8.

Orban dynamic sybillance controller. Key Code 2-33.

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Ottawa, Ontario K1B 3S4
Canada
613-741-5554

En Mexico: IER
PO Box 1142
La Jolla CA 92038
Tel: 714-459-3691
Telex: 181756

In Other Countries:

Broadcast Equipment Exchange
PO Box 1238
Arlington, VA 22210 USA

Tel: 703-525-0400
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In the U.S. call 800-336-3045
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LOW COST radio station traffic and billing. For any station that bills over 100 customers per month. Produces logs, accounts receivable and invoices on Radio Shack Model I, Model II low-cost computer. 20 pages of details, listings, screen dumps \$5.95. The Management, Box 111, Alledo TX 76008. 817-441-8045.

X **SMC DP-1** complete system w/8 carousels, time announce, 3 playbacks, remote and manual select control, clean text log-in system which includes encoder, cart recorder, decoder & model 33 teletype, includes all manuals & ready to go. Key Code 5-49.

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SMC sequential automation control system including controller, switcher, audio panel, dual 25Hz sensors, 4 equip racks, no source equip. Make offer. Key Code 5-52.

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Gates SC-48 programmer, gd cond, unused. Key Code 4-71.

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McCarta Automation system, 5 carousels & programmer, on line now and in gd cond. Will deliver on site, install and train buyer's staff anywhere in continental U.S. Key Code 4-32H.

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ATC 55 deck parts, gd worn gears, motors, elevator platform & rack, some parts missing, as is. Key Code 4-71.

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IGM 500 programmer, Scully playbacks (3), Carousels (3), cart playback (4), time announce, network join, logging encoder & printer. Very reasonable. Key Code 3-23.

Gates SC-48 programmer, TPG-2 time pulse generator, monitor & control panel, Stack-55 cartridge playback, RA-1 random select unit, time announce, network fader, very reasonable. Key Code 3-23.

Want To Buy

Harris or Gates complete automation system. Key Code 5-27.

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25Hz tone generator. Key Code 3-20.

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Sony 1610 color video camera and 3800 VCR. Key Code 5-66F.

GBC-CTC-5X color camera w/electronic viewfinder & power supply, Tamron zoom lens 1:1.9-F-14-140mm. Key Code 5-1.

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Phillips LDH20, 2 avail, 3 Tube Plumbicon, w/CCU, 500' cable ea, 1:10 zoom lens, 2X telextender, Video Control Unit, ITE cam head, tripod & dolly, excel cond. Key Code 5-62.

RCA TK-15 camera head, head only. Key Code 5-6.

GE PE-400 Color Cameras—Pedestals, racks, like new, ea. \$10,000
GE PE-350 Color Cameras—All accessories, good condition, ea. \$5,000
GE PE-240 Film Camera—Automatic gain & blanking, \$8,000
IVC 500 Color Camera—Lens, cables, encoder, \$4,000
RCA TK-27A Film Camera—Good condition, TP 15 available, \$12,000
RCA 1600 Film Projectors—New, factory cartons, TV shutter, ea. \$900
Norelco PC-70 Color Camera—16x1 200m lens, 2 available, ea. 16,000
Norelco PCP-70 Color Camera—Portable or studio use, \$4,000
Norelco PC-60 Color Camera—Updated to PC-70, new tubes, \$8,000

30 Brands of New Equipment—Special Prices. We will buy your used TV equipment. To buy or sell, call Toll Free 800-241-7878, Bill Kitchen or Charles McHan, Quality Media Corporation. In GA call 404-324-1271.

Sharp QC-35 color camera, portable shoulder style unit w/Fujinon 6:1 auto iris zoom lens, power supply and cables, brand new. Key Code 5-18A.

Hitachi FPC-1000 color camera w/CCU (2), new Vidicon tubes, 150' cable, two 5 and one 10X zoom lenses, one tripod w/head & wheels, Panasonic Color Sync Generator WJ-1100, Singer switcher. Key Code 5-3A.

Hitachi FP 1500 with CCU and 50' of cable (2), 5:1 zoom. Key Code 4-46A.

RCA TK 630's, w/10-1 Schneider lenses, ITE Pan heads, 300' camera cable per camera, tripods. Two avail. Key Code 4-26A.

RCA field chains (3), TK-14, cable, zoom lenses. Key Code 4-53.

Sony CVC-2100A-R1, 1" vidicon B&W w/3" electronic viewfinder, pan & tilt head, 4:1 zoom & 10' mini cable, very gd cond. Key Code 3-33B.

TV25TN B&W camera cable, 2 large reels. Key Code 3-52.

GE 4PC4A1-Rev 2, 3" L.O. B&W camera head (only) fair cond. Key Code 3-33C.

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RCA TK-42 color cameras incl, cam. heads & TD9 pedestals (2). Key Code 3-52.

Ikegami HL-77 Fujinon lens, 150 hrs, complete w/case & acces. Key Code 3-32.

Singer video camera, blk & white, Model T-1. Key Code 3-45.

Hitachi FP-40 saticon camera, new, complete w/factory warranty (\$23,500 list), \$17,750. SounDesign, PO Box 921, Beverly Hills CA 90213. 213-276-2726.

RCA TK-31A, 3", L.O. B&W chains ((2), gd cond. Key Code 3-33A.

Hitachi FP20 Saticon, new, factory warranty, latest model, \$8400, complete but w/o lens, incl, 3 Saticons, carrycase. SounDesign, Box 921, Beverly Hills CA 90213. 213-276-2726.

Norelco PC-70 cameras in good condition. Complete except for lenses. Available from R&B Industries, 629 Grove St., Jersey City NJ 07302. 212-924-7910.

Want To Buy

RCA TK-42 camera pedestals, TD9 or equivalent. Key Code 5-60.

Ikegami, HL-35 and HL79A. Key Code 4-11.

RCA TK11 camera control, either studio or field version. Key Code 4-6.

IVC-500 camera cable. Key Code 3-24.

RCA/Walker, Electra-Zooms, Studio zoomars, Universal zoomars, GPL-PYE/Watson zoom 75 series, need several of these, any cond. Key Code 3-67.

RCA/HF TD-1A studio camera pedestals, need 4, any cond. Key Code 3-67.

RCA/HF TD-30BT, TV studio camera crane, need one, any condition. Key Code 3-67.

RCA TK-40A, TK-41A, TK-14, GE PC-15, PC-25, PC-11, DuMont TA-124B MK 1, GPL PA-600A, EMI 2001B, Marconi Mark II, need one of each. Key Code 3-67.

CART MACHINES

Want To Sell

Sparta cart players and recorders 800CR-P (2). Key Code 5-45.

Remote control units, new, for 3 cart machines (3 stops and 3 starts), low price. Key Code 5-40.

BA-27, used with RCA RT-27 transport, very gd, works great, looks great. Key Code 5-64K.

Sparta CD-15 Cart Delay-echo record/play. Like new, hardly used, cosmetically and works super excel. Key Code 5-64L.

RCA playback. Key Code 5-15B.

RCA rec/play in gd cond, now in service. Key Code 5-15C.

Harris 90-2, stereo r/r, new evaluation sample, used only 5 hrs, 1,000 & 150 Hz cue tones. Key Code 4-23.

Collins R/P cart decks, runs, as is. Key Code 4-65A.

Spotmaster 500C mono record-playback (2). Key Code 4-33.

Spotmaster Ten Spot with two audio switchers. Key Code 4-68D.

Sparta mono playback cart machine, excel cond. Key Code 4-76E.

ATC-4 playback, 1 record playback, all complete and in working cond. Key Code 3-79A.

Tapcaster R.P. gd cond. Key Code 3-70A.

ITC R.P. goödd cond. (2). Key Code 3-70B.

Spotmaster 5 spot, gd cond. recond by Spotmaster. Key Code 3-70C.

Rapid-Q, 3 in a row cart machine. Key Code 3-72.

Tapcaster playback. Key Code 3-70D.

RCA RT-7 audio cart P.B. deck. Key Code 3-52.

Spotmaster triple deck mono playback machine, new motor and all 3 recue, gd shape, recently removed. Key Code 3-37.

Sparta 4625 broadcast cart stereo record & play, gd cond, new r/p heads, new motor. Key Code 2-27.

Spotmaster cart machines, new and used. Send for literature. Best package prices on trade-in of surplus equipment. Autodyne. Box 13036, Orlando FL 32859. 305-855-6868.

Gates Carritape II w/record package, record amp is tube-type, fair but working. Key Code 2-14.

ITC RP-004 stereo record/play machine, all 3 tones, good cond. Key Code 2-41L.

Want To Buy

Single play record/playback and triple-decker, need all mono, gd cond. Key Code 5-32.

Cart machines, retired, junk cond, barely working, etc, like Spotmaster 500, 505, etc. play/record anything you have sitting around gathering dust and taking up your room, stereo or monaural. Key Code 4-41.

Cartridge recorder-reproducer & 3 playback units, mono or stereo, any cond for reasonable price or tax-deductible donation to educ sta. Key Code 4-57.

Cart machines, 1 record/play and 2 play only, in gd. cond. Key Code 3-64.

CASSETTE & REEL-TO-REEL RECORDERS

Want To Sell

Ampex 1260 in Mahogany case, excel cond, w/manual. Key Code 5-57C.

Revox reel to reel recorder. Key Code 5-45.

Wollensak 2770 A/V high speed cassette duplicators (2), each has master and 2 slaves, copies both sides simultaneously and rewinds. Key Code 5-43D.

Revox A-700 w/¼ trck and ½ trck head assemblies. Key Code 5-37B.

Recordex CS-2000 cassette duplicator, 5 slaves, cassette or reel-to-reel master, 2 ch mono. Key Code 5-35A.

Telex cassette duplicator 300, 3 slaves, mono, works great. Key Code 5-29.

Scully 280-2, excel cond. Key Code 5-24.

Ampex low spd elect stereo. Key Code 5-22.

Stancil-Hoffman reel-to-reel tape recorders (2), 3.75 & 7.5 ips, 2 ch, solid state, rack-mounting, presently in carrying cases, excel. Key Code 5-6.

3M, MCI and Ampex 24 trk machines, mint cond, \$30K and up. Empirical Audio, 914-762-3089.

3M56-16 w/spare 8 trk heads, 15/30 Selektake I, spare cards etc. \$12,500. Empirical Audio 914-762-3089.

Magnecord 1028/1048, four channel audio tape recorders with solid state electronics, very gd cond (low mileage), several available at \$350 each. Leonard Healy, 710 E State St, Delmar DE 19940. 301-896-2000.



FULL COMPASS SYSTEMS

MX-5050-B 1/4" Recorder

Otari reel to reel full track, 2, 4, 8, 16 and 24 track and highspeed duplicators. Available from Full Compass Systems, 6729 Scybold Rd, Madison WI 53719. 800-356-5811

In Canada call United Video
613-741-5554

In the U.S. call 800-336-3045
For any Key Code Names and Addresses.

In Mexico call IER
714-459-3691

The Exchange The Exchange The Exchange

CASSETTES ... WTS ... CONTD. *530*
Revox A77, half trk stereo, recent factory recond. Key Code 5-67B.

Viking 220 Retromatic transport only, works but needs attention w/manual. Key Code 5-57D.

Sony stereo cassette recorder TC165. Key Code 5-45.

Audiolronics AV132B, hi-speed open reel duplicator, makes 2 stereo or half-track copies on each pass, bias osc needs work. Key Code 5-35B.

Infonics RCC-4F stereo cass duplicator & cassette plus reel master, 4 slaves. Key Code 5-29.

Ampex 354-2 (2), 2 trk stereo recorders in consoles, gd cond, one extra reel motor and 3 or 4 remote controls. Key Code 5-28.

Dokorder 1140-4tk, Sony TC-388-4. Key Code 5-17.

Ampex 350 tape recorder carrying cases (2), 2/set, fair cond. Key Code 5-6.

MCI JH-45 SMPTE lock, like new. Empirical Audio, 914-762-3089.

PASS FCC EXAMS

The Original FCC Tests-Answers exam manual that prepares you at home for FCC First and Second class Radiotelephone licenses. Newly revised multiple-choice exams cover all areas tested on the actual FCC exam. Plus "Self-Study Ability Test" Proven! 99.95 Moneyback Guarantee.

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Name _____
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 City _____ State _____ Zip _____

JH-100-16 w/AL II. \$15,000. Empirical Audio, 914-762-3089.

Ampex 350/351/354/440 drive motors (Capstan), 7.5/15 ips, 50Hz, unused. Key Code 5-58.

Soundscribe, looks complete, no book, as is. Key Code 5-64P.

Magnacord S36B, gd for spare parts, make offer. Key Code 5-58.

Viking 95 transport only w/stereo heads. Key Code 5-57E.

Otari MX7300, 8 trk recorder w/CR-704 remote, excel cond. Key Code 5-46.

Technics M-85s (2), Fisher CR-5120. Key Code 5-17.

Ampex FR-1100, 2 trk P.B. w/3-350 style electronics, \$500. Empirical Audio, 914-762-3089.

Ampex AG-350-2, 2 pcs, \$1000 each. Empirical Audio, 914-762-3089.

Ampex 3200/3300 duplicators spare parts, new and used. Key Code 5-71.

Magnacorders, 3 PT-6 type, working but as is for parts only. Key Code 5-64Q.

Ampex 601-2 mint cond. Key Code 5-57A.

Ampex AG440-B reel to reel (2). Key Code 5-45.

Ampex AG350 Mono FT, in Ampex console, excel cond, Ampex 300 w/351 Electronics, new heads, in Ampex metal console. Key Code 5-43AB.

Magnacord 1021 (2) transports & amplifiers, rack mountable, manual. Key Code 5-38.

156-16 trk, 3M56-2 trk, \$18,500 the pair. Empirical Audio, 914-762-3089.

Scully 4 trk P.B. 280 style 7 1/2-15 ips, \$708. Empirical Audio, 914-762-3089.

Ampex AG-300-2, \$1000 each. Empirical Audio, 914-762-3089.

Crown BX800 full trk deck w/RP-3C electronics and manual and case, heads excel & works but need some attention. Key Code 5-57B.

Sony TC10-AV cassette recorder. Key Code 5-45.

Ampex AG440, 7 1/2-15 ips F.T. w/remote control, very low hrs, will trade for RCA BC7A 10ch audio console, or just complete shell, pots, switchers. Key Code 5-51.

Curtain Infonics high speed (30 ips) reel-to-reel duplicator, mdl 74-2, makes 3, 1/2 trk stereo copies simultaneously. Key Code 5-43C.

3M-M-79 4ch recorder-reproducer. Key Code 5-37A.

Ampex 351-2 w/Inovonics 375 electronics, excel cond. Key Code 5-24.

Ampex 600, 1 rack mt, 1 port case. Key Code 5-22.

Ampex AG-440-B in cabinet, \$5780. Empirical Audio, 914-762-3089.

Scully 280B-4, 1/2", new mounted, mint cond. Key Code 4-78C.

3M 56, 16trk, 15/30 w/16 chs of relay operated dbx noise reduction. Key Code 4-74A.

Tascam 80-8, w/DX-8 DBX floor mount cabinet & remote control, like new cond. Key Code 4-27.

Ampex 601 reel to reel recorder, presently in use in control room, gd cond. Key Code 4-21A.

Ampex AG 440-4, with 2 trk & 4 trk heads in portable cases, very gd cond. Key Code 4-18A.

Berlant/Concertone 30 bdct recorder, 7-1/2-15 ips, 1/2 trk, green finish, excel cond w/manuals. Key Code 4-6D.

Torque and capstan motors for TEAC R310 transport, miscellaneous extra parts list, best offer. Key Code 4-4.

Heads, 16 trk ERP for Scully 100, also 8 trk conversion kit for 100, new. Key Code 4-78.

Crown 800, stereo (fair). Key Code 4-68C.

Metrotech slow speed logger (4 pass), 3 yrs old, needs head. Key Code 4-65.

Nortronics 1/2 trk stereo playback head for Ampex 300-2, never used. Key Code 4-60C.

Sony reel to reel recorder, portable needs work, but is operating. Key Code 4-32C.

Ampex 351 full trk E/R/P head assembly, factory rebuilt, never used, cosmetically mint, best offer. Key Code 4-4.

Ampex AG-500-2, mint cond. Key Code 4-78D.

Scully 280-B, 7 1/2/15, AC motor, in console. Key Code 4-74B.

Tascam 70-4, 1/2", 4 trk recorder, new, excel cond. Key Code 4-52.

Ampex 601, not operating, needs work, but basically sound. Key Code 4-32E.

Ampex 300-1 (bad capstan motor). Key Code 4-60A.

Tascam 70-4, 1/2", 4 trk recorder, used 8 hrs, excel cond. Key Code 4-52.

Ampex 300/350 head stacks & housings, gd cond (2), orig. part of 3200 duplicator w/FT erase, 1/2 tr V & L heads. Key Code 3-22.

Ampex PR-10 circuit board & faceplate. Key Code 3-22.

Otari MX 5050 FLT, prof. model tape-recording unit, full trk mono, reel-to-reel, excel. sound reproduction, own set-up for editing, wood finish. Key Code 3-10A.

Ampex 601-2 recorder/reproducer, 1/2 trk stereo, low hrs, no bdct use, needs belts, otherwise mint cond, in portable case. Key Code 3-65A.

Sankyo STD 1700 front loading cassette deck, new head, needs alignment. Key Code 3-69C.

Akal X-355, 1/4 trk reel to reel. Key Code 3-53.

Ampex 351-2 (needs) electronic work. Key Code 3-54A.

Otari 5050-8, 1" 8 trk full size recorder, very little use, sel-sync, remote capability. Key Code 3-36.

Ampex AG-440-B in console, 2 trk & full trk, gd cond. Key Code 3-41F.

Crown reel to reel rec/pb, 700 SS, w/20 watt amp & carrying case, super cond. Key Code 3-45.

Ampex slant console for 350 transport, adaptable to any 19" equip. Key Code 3-22.

Ampex AG350 recorders, solid state electronics, recently rebuilt. Key Code 3-28.

Magnacord, rack mounted model 1022, 1/2 trk stereo, gd cond. Key Code 3-43B.

Teac A-33405, 4 trk w/sync in Anvil flight case. Key Code 4-34.

Tape-A-Thon 702-10 decks (5), with 3 3/4 ips motor, excel cond. Key Code 4-64.

Ampex 300 meter panel & bathtub electronics. Key Code 4-60B.

Scully 280B in console, low hours, nice cond. 2 trk. Key Code 3-41D.

Conceptone 3 motor recorder, parting out. Key Code 3-22.

Teac A500 stereo cassette deck w/memory and Dolby. Key Code 3-27A.

Magnacord reel to reel (1), old. Key Code 3-11.

MCI 16 trk master recorder w/auto locator. Key Code 3-17.

Magnacord PT 63 transport and amplifier (2). Key Code 3-72.

Ampex 300C motor Hysteresis Synchronous #4590068 (motor #), Mfg Electric Indicator Co., less than 1 yr service, with capacitor checked out o.k. Key Code 3-58.

Ampex 354 stereo electronics, 2 ch, tube type electronics, fair cond, w/manual. Key Code 3-69B.

Wollensak 1520AV full trk portable reel to reel tape recorder, excel. cond. Key Code 3-50.

Scully 280B, 2 trk, mounted in console w/casters, 7 1/2/15 ips, 14" reel capacity. Key Code 3-34A.

Otari 5050, stereo 1/2 trk recorder, 1 yr old, 7 1/2 ips and 15 ips, 1/4 trk and 1/2 trk heads. Key Code 3-36.

Scully 280, 8 trk in console, low hours, remote control. Key Code 3-41E.

RCA RT-21B, reel to reel tape decks, rec/pb, super cond. (2). Key Code 3-45.

Teac A4010 reel-to-reel stereo deck w/auto reverse, 3 3/4 to 7 1/2 ips. Key Code 3-27.

Ampex AG-300, 1 tk. Key Code 3-57H.

Teac Tascam 40-4, 1/4" trk, great cond, full specs, includes 1 roll of Scotch 250, biased for 250. Key Code 3-62A.

Ampex 352-2 electronics. Key Code 3-53.

Ampex AG-350, 2 tk. Key Code 3-57G.

Scully 280, 2 Ampex AG600, all excel. cond. Key Code 3-59.

Metrotech 552A, 4 trk, 96 hrs per 3600 ft of tape, excel cond, shipping included. Key Code 3-68A.

Ampex 300/350 head stacks & housings, gd cond (2), orig. part of 3200 duplicator w/FT erase, 1/2 tr V & L heads. Key Code 3-22.

Ampex PR-10 circuit board & faceplate. Key Code 3-22.

Otari MX 5050 FLT, prof. model tape-recording unit, full trk mono, reel-to-reel, excel. sound reproduction, own set-up for editing, wood finish. Key Code 3-10A.

Ampex 601-2 recorder/reproducer, 1/2 trk stereo, low hrs, no bdct use, needs belts, otherwise mint cond, in portable case. Key Code 3-65A.

Sankyo STD 1700 front loading cassette deck, new head, needs alignment. Key Code 3-69C.

Akal X-355, 1/4 trk reel to reel. Key Code 3-53.

Ampex 351-2 (needs) electronic work. Key Code 3-54A.

Otari 5050-8, 1" 8 trk full size recorder, very little use, sel-sync, remote capability. Key Code 3-36.

Ampex AG-440-B in console, 2 trk & full trk, gd cond. Key Code 3-41F.

Crown reel to reel rec/pb, 700 SS, w/20 watt amp & carrying case, super cond. Key Code 3-45.

Ampex slant console for 350 transport, adaptable to any 19" equip. Key Code 3-22.

Ampex AG350 recorders, solid state electronics, recently rebuilt. Key Code 3-28.

Magnacord, rack mounted model 1022, 1/2 trk stereo, gd cond. Key Code 3-43B.

Teac A-33405, 4 trk w/sync in Anvil flight case. Key Code 4-34.

Tape-A-Thon 702-10 decks (5), with 3 3/4 ips motor, excel cond. Key Code 4-64.

Ampex 300 meter panel & bathtub electronics. Key Code 4-60B.

Scully 280B in console, low hours, nice cond. 2 trk. Key Code 3-41D.

Conceptone 3 motor recorder, parting out. Key Code 3-22.

Teac A500 stereo cassette deck w/memory and Dolby. Key Code 3-27A.

Magnacord reel to reel (1), old. Key Code 3-11.

MCI 16 trk master recorder w/auto locator. Key Code 3-17.

Magnacord PT 63 transport and amplifier (2). Key Code 3-72.

Ampex 300C motor Hysteresis Synchronous #4590068 (motor #), Mfg Electric Indicator Co., less than 1 yr service, with capacitor checked out o.k. Key Code 3-58.

Ampex 354 stereo electronics, 2 ch, tube type electronics, fair cond, w/manual. Key Code 3-69B.

Wollensak 1520AV full trk portable reel to reel tape recorder, excel. cond. Key Code 3-50.

Scully 280B, 2 trk, mounted in console w/casters, 7 1/2/15 ips, 14" reel capacity. Key Code 3-34A.

Telex Model 235/300 Mod reel to reel master (stereo) to stereo cassette slave three position copy. Master play speed of up to 30 ips on reel master. Key Code 3-7A.

Ampex 400 series transport. Key Code 3-22.

Ampex 600, tube type, (2) 1 in case, 1 with 19" rack mount. Key Code 3-30.

Teac Tascam 702-703A series 70, 1/4", 4 trk audio tape recorder. Key Code 3-32.

Ampex AG 440C-2 tape recorder, 30 hrs, in portable cases, perf. cond. Key Code 3-3A.

Ampex 350 full trk mono machine. Key Code 3-15A.

Scully 280 FT mono in console, w/automatic lifters. Like new, \$1895. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex 354 stereo 2T, reconditioned, \$1095. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex AG-350, 2T stereo, 7 1/2-15, rebuilt, like new, \$1995. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex 351 mono, reconditioned, \$1095. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex 350 mono, 1/2T, reconditioned, \$995. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex 350 mono, 1/2T, reconditioned, \$995. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

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Ampex 350 mono, 1/2T, reconditioned, \$995. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex 350 mono, 1/2T, reconditioned, \$995. Autodyne, Box 13

The Exchange The Exchange The Exchange

CONSOLES

Want To Sell

X 25
RCA MI-4223-E tube type 4 ch, new VU meter. Looks complete but listed for parts or museum. Key Code 5-64C.

Yamaha PM-1000 board 16 in, 4 out, Master Room reverb, like new. Key Code 5-32.

Yamaha PM-1000, 16x4 with shipping case; Optronics 3030 16x8+2 & 12x4+2. 3030s with 4 stage EQ+solo+2 cues+pan per ch, program sub-grouping, remix, VU meters. All consoles w/table system, patch bay, digital stopwatch, 4 remotes, producers desk. Key Code 5-17ABC

X 75
Collins 12Z remote tube mixer, works great, looks great, case is primed for painting, 1948 model, one owner, manual included. Key Code 5-64D.

RCA mono/mod-76C, Raytheon mono/mod-RC-11. Key Code 5-22.

88
Production and/or remote board, includes Ramko DC 5MS stereo console, (2) CB1200 Gates turntables, Gray Research tone arms, Stanton 500 carts, 2 mono pre-amps, 700P & 700RP Tapecaster, Luxo boom, RE10 Electro-Voice mic, orange formica board w/short legs & long legs, in full operation w/manuals. Key Code 5-8.

X 100
Heath TM-1626 stereo mixer, low Z bal XLR mic inputs (4). Hi Z-hi level unbal inputs (2). Mixbuss in/out, stereo out 150 ohms, manual, excel. Key Code 5-64E.

Chu
Sparta monoboard, RCA stereo console BC18AS. Key Code 5-45.

RCA console, type BC-3C mint cond. Key Code 5-33.

Audiotronics 501, 28x24, 4 yrs old, w/NE5534. \$25,000. Empirical Audio, 914-762-3089.

Urei Mod 1 stereo console, 12 modules, 22 inputs, new no-lite lever switches, very excel cond, best offer or will trade for new or like new Ramko SC-5R and DC-8M mono consoles. Key Code 5-64V.

260
Altec 230-B mono 6 ch, 12 in, 1 out. Needs minor repair and a few switch knobs, fair cond/manual. Key Code 5-64A.

Panacoustic series 200 bdct console, 5 ch, tube-type, w/power supply. Key Code 5-58A.

Kelsey 8+3 like new w/road case & pwr supply. Key Code 5-29.

Hi quality 16 channel console, 20x16, X16, Melcor eq, Gotham faders, full patching, needs some work, \$7500. Empirical Audio, 914-762-3089.

Customote consoles (2), small type, one tube, one solid state, minor repair needed, gd sm boards for beginning school or small market station/manuals. Key Code 5-64B.

Huge 24x16x16 Electrodyne, Gotham, Audio Designs, 1200 pt patching, needs some work, \$7500. Empirical Audio, 914-762-3089.

Neve 8048 16x16 mint, discrete! \$35,000. Empirical Audio, 914-762-3089.

Gates Stereo Executive 10 ch solid state, excel cond. Key Code 4-65.

Peavey 8 ch. stereo board modified for 8 trk recording, excel cond. Key Code 4-52.

Shure SR 101 console. Key Code 4-46B.

Microtrak complete System D stereo mixer, TT's, cabinetry, excel cond, 1 yr old. Key Code 4-67A.

Altec 1220, 10 in mixer w/reverb, monitor mix, limiter, in flight case. Key Code 4-34.

Ramko 8 ch. stereo console, 32 inputs, includes interface for TT & tape remote starts, less than 2 yrs old, includes built-in digital clock and timer. Key Code 4-30.

Altec 9300 console, 16 input x 16 output, echo send/receive, eq, pre & post, XLR input & output. Key Code 4-78A.

Sound Workshop 1280B, new, reasonable. Key Code 4-31.

Altec 250T3 prod console, 8 rotary mic inputs, 4 stereo rotary line inputs. Key Code 4-78B.

RCA Audio console, old, no schematic, but in gd cond, eight ch plus master, Daven attenuators. Key Code 4-32G.

Gates Stereo Yard. Key Code 3-53.

Shure M675 bdct prod master used only two months, excel cond. Key Code 3-55.

Ampex MX-10 for parts. Key Code 3-57B.

Urei Model 1 console with 3, #13220 modules and 7, #25320 modules, like new. Key Code 3-34D.

Atlanta Electronics, 16 in, 16 out, recording console, slide faders. Key Code 3-41C.

Yamaha PM-1000, 16-in, 4-out, EQ, excel cond. Key Code 3-32.

RCA "New Look" consoles (6). Key Code 3-52.

Ashley 16x4 monitor board w/2-3 way crossovers, multipin connector, Anvil case, LED cliplights, variable gain etc. Key Code 3-57N.

Shure M-68 microphone mixer about 2 yrs old. Key Code 3-55.

Audio Concepts, Concept 1, 16 in, 8 out w/submasters, 6 pt eq, echo, cue, talkback, full patch bay, producers desk, 78" long oak, excel cond. Key Code 3-36.

Vanco MM-7 brand new in box. Key Code 3-46.

Gates 12 ch. Dulax w/split capabilities. Key code 3-11.

Gates 8x1 for parts #994-6699. Key Code 3-57J.

Ramko 5 ch. production console, new w/manual. Key Code 3-25.

Altec 1567. Key Code 3-57K.

RCA console. Key Code 3-72.

Ampex MX-10 mixers (2), four mic, two line in, two line out, tube type, gd cond. Key Code 3-69D.

CCA Futura 6S audio console. Key Code 3-53.

Ampex MX-10, gd cond (2). Key Code 3-57A.

Tascam Model 5 console, used very little. Key Code 3-34C.

Soundcraft 24/8 mixing console, 8 months old, used very little. Key Code 3-35F.

Cetec Series 10 stereo console, ten ch, extra mono program output, new, never used. Key Code 3-9A.

Ampex AM-10 Mixer, excel cond, \$395. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Ampex MX-35 Mixer, excel cond, \$195. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Spotmaster Consoles, new. Send for literature. Best package prices on trade-in surplus equipment. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Want To Buy

RCA 7A, 10 ch audio console with or without amps, must be repairable. Key Code 5-51.

Russco 505 mono or BE 4M50, must be in gd working order. Key Code 5-15.

GoBoes, Sugarloaf View, Criteria or equivalent design. Key Code 5-12.

API components. Empirical Audio, 914-762-3089.

Mixer 5 channel stereo, minimum, need not be solid state, must work. Key Code 5-63.

Russco 505 or similar, at least 8 input in gd working cond. Key Code 5-15.

Pultec 4 ch. line mixer. Key Code 4-69.

Stereo 5-ch board, at or near junk cond. Sparta, or similar, any brand for parts. Key Code 4-41.

Stereo broadcast consoles, one or more with 4 or 5 inputs, one with 5 or more, all with stereo output. Key Code 4-42.

Solid State Console, 8 mixer stereo. Key Code 4-19.

Altec 230B. Key Code 3-21.

Stereo console, 5 or 6 channel, in gd cond. Key Code 3-64.

Stereo console in working cond, for new FM. Key Code 3-2.

Collins 212B. Key Code 3-21.

DISCO & SOUND EQUIP.

Want To Sell

RCL Echo, spring, \$200. Empirical Audio, 914-762-3089.

Oberhelm OB-1 synthesizer. Key Code 5-37C.

DBX 187 w/front panel controls, \$787. Empirical Audio, 914-762-3089.

Altec 604E's, w/wo 612, some N1500A's, \$200 up. Empirical Audio, 914-762-3089.

Fender Rhodes suitcase piano. Key Code 5-37D.

Peavey PA-700 mixer/amp/graphic stereo unit, versital buy. Key Code 5-29.

Studio for sale, MXR digital delay, Space Station, Model 15, EV Sentry V's, JBL 110's, SAE MK31B, Peavey CS400, Crown D60's, RE-10, Senn 416, Sen 413, SM7, AKG 422, Model 1, Urei 10 band eq, MXR 10 band, Beyer 2X200's, Patch bay, Perc, Orban stereo synthesizer. Key Code 5-59.

Mixer, stereo with 2 mic, tape, 2 turntables and aux inputs, 1 yr old. Key Code 5-15A.

Super "C" Masteroom Echo 2 in/2 out, \$2000. Empirical Audio, 914-762-3089.

Fisher K-10 spring type, very excel, manual. Key Code 5-64R.

Lexicon 224 digital rev, 9 mos old, mint, \$5500. Empirical Audio, 914-762-3089.

EMT 240 Gold Foil, \$8000 each. Empirical Audio, 914-762-3089.

Eventide instant phaser. Key Code 4-72B.

Eventide omni-pressor, excel cond. Key Code 4-72D.

JBL 4341 monitor speaker system, 4-way, walnut cabinets, (pair). Key Code 4-74C.

Quad Eight RV-10 variable decay reverberation unit. Key Code 4-72A.

Sonn (2) 115 RH bass speaker cabinets, like new, excel. cond. Key Code 4-52.

Sensory-System custom built studio monitor speakers, 2-way system w/all Altec components, including active Altec crossover, sell as pair only. Key Code 3-65C.

Tascam 5 & 10 consoles, 8 trk and Ampex 2-trk, microphones, noise reduction system, limiters, compressors, everything. Key Code 3-35A.

Ampex & Scully recorders, 16 in 16 out console, complete recording studio, & all related equipment. Key Code 3-41H.

Portable Disco Console contains 2 Telex Viking 1/2trk stereo tape players, mixer w/2 mic and 2 phone/tape head inputs and headphone cue system. Key Code 3-1A.

Hammond B-3 modified for road use. Key Code 3-77A.

Altec 811B sectoral horns, no drivers, sell as pair only. Key Code 3-65D.

JBL 075 ring radiator, 2 to a box & twist lock connectors. Key Code 3-77B.

JBL 2440 drivers. Key Code 3-77.

MXR digital delay, brand new. Key Code 3-63A.

Fairchild 662 pre amp cards (20). Key Code 3-63B.

Emilar EH800 horns (12), like new. Key Code 3-34B.

LP Jacket Fabricating Plant, or will trade for electronic gear or video. Key Code 3-41A.

Burwen DNG 1100 noise reduction unit, prof model w/XLR connectors. Key Code 3-73A.

JBL 2350 (4) 90° radial horns. Key Code 3-77.

Altec 605, 15" two-way, just like 604. Key Code 3-57L.

Fairchild 664 equalizers. Key Code 3-63C.

Voice of the Theater copies (2), better made than Altec's A7's, includes Altec LF driver and E-V HF driver, sell as pair only. Key Code 3-65B.

Want To Buy

EMT 140 reverb plates, mono or stereo, EMT gold foil reverb, Pultec EQP-1, MEQ-5 tube type, Teletronix LA-2A limiters. Key Code 4-74.

Altec 604's or 515's, blown, must be reasonably priced, also blown Altec or JBL hi-freq drivers, large or small. Key Code 4-49.

Altec 604 series raw speakers, blown, Altec hi-freq drivers, blown. Key Code 3-34.

Reverb, reasonable. Key Code 2-5.

Electro Voice #700 or #800, (Patrician) spk system, working cond. Key Code 3-78.

LIGHTING EQUIP.

Want To Sell

G.B.C. LK3 portable light set, 600 watt lights per set (3), w/stands and case (2 sets). Key Code 3-46.

LIMITERS

Want To Sell

Gates Sta-level compressor amplifiers (3), 2 excel, 1 fair, all operational, no hum and smooth specs, manuals. Key Code 5-64H.

Shure Level-Loc, excel, Hi-Z, hi level output modified to 600 ohm bal out, XLR connectors, in rack panel with manual. Key Code 5-64J.

Fairchild 666 with Auto-Ten, excel cond. Key Code 5-24.

CBS mono Volumax model 4300 in gd cond. Key Code 5-54.

Urei 176 tube type, excel cond. Key Code 5-24.

Collins Mod-26-U-1. Key Code 5-22.

RCA BA-146 AM sym/non-sym peak limiter, L.E.D. indicators, RCA's very latest design, super excel, manual. Key Code 5-64F.

CBS Audiomax 4440, ALC/Compressor, and Volumax 410, peak controller, all original packaging, manuals, and schematics, mint cond. Key Code 5-10A.

Collins 26W-1, tube type, new tubes, clean, very gd, manual. Key Code 5-64G.

CBS Volumax 400 w/manual. Key Code 5-38.

Harris ME-1 modulation enhancer, mint cond. Key Code 5-4.

Urei LA-3A, excel cond. Key Code 4-75C.

Urei LA-3A audio levelers (4), gd cond. Key Code 4-14.

Kahn Symetra-peak, cond unknown. Key Code 4-33.

CBS 4110 stereo FM. Volumax, excel cond. Key Code 4-76C.

Gregg Labs audio active filter network, series 2350, gd cond. Key Code 4-14.

Spectrasonics model 610 Complimiters, excel cond. Key Code 4-76D.

Collins mono limiter, works. Key Code 4-65B.

CBS Volumax 400, gd operating cond. Key Code 4-64.

CBS Volumax 411, excel cond, stereo. Key Code 4-54A.

DBX RM-160, new, Symetrix CL-100 (2), new, reasonable. Key Code 4-31.

C.B.S. Laboratories 4440 Audiomax and C.B.S. Laboratories 4110 FM Volumax, factory record. Key Code 4-73.

C.B.S., newer Thomson FM Volumax 4111, excel cond. Key Code 4-51.

CBS FM Volumax 4110, excel cond. Key Code 4-7A.

ITA LA-1B limiting amplifier (2). Key Code 3-53.

In the U.S. call 800-336-3045
For any Key Code Names and Addresses.

800-336-3045

New Listings are in *Italics*.

The Exchange The Exchange The Exchange

LIMITERS ... WTS ... CONTD.

Spectra Sonics complimiter model 610 factory checked an calibrated to specs. Key Code 3-54.

Gregg Labs tri-band limiter and AM peak limiter combo #2431/2612, like new, w/ manual. Key Code 3-4A.

Urei 1176B. Key Code 3-57C.

RCA limiter BA-6A, ML-11225B like new. Key Code 3-45.

Universal audio compressor limiter LA-5. Key Code 3-32.

Gates 3924B, tube limiter, w/schematic. Key Code 3-65E.

Stromberg-Carlson AN-GSA/33 limiter compressor, 4 units and power supply in one rack mount, with schematic. Key Code 3-65F.

CBS FM Volumax, connected stereo pair. Key Code 3-66A.

Urei BL40 modulimiter w/polarity controller, manual, 1 yr. old. Key Code 3-51A.

CBS 4450 Audimax AGC unit, stereo. Key Code 3-12.

Shure M-62V Level-Loc limiter. Key Code 3-65G.

CBS 4000 Audimax w/AGC and factory modifications. Key Code 3-51B.

CBS 4450 Audimax, Volumax stereo 411. Key Code 3-53.

CBS FM Volumax 4110, excel. w/manual. Key Code 3-16A.

Want To Buy

Teletronix LA-2A, RCA BA-6A. Key Code 5-59.

Durrough "DAP" audio processor for AM use in gd cond. Key Code 5-13.

CBS Volumax, tube type preferred. Key Code 5-58.

Teletronix LA-2A; Universal Audio 175, 176, 177; Fairchild 660, 670; UREI 1176LN, LA-3A, 4; RCA BA-6A. J. Mandel, Triton Prod, 38 Brooks St, Brighton MA 02135. 617-787-2220.

Audimax stereo model 4450-A. Key Code 4-55.

Gates Sta-Level (2) and/or Gates 39-B or equiv peak limiter, any cond or junk, or any model, age of equip not important, Level-Devil type apparatus. Key Code 4-41.

CBS mono-Volumax, late model, gd cond. Key Code 3-38.

DBX 162, stereo comp/limiter. Key Code 3-8.

Urei BL40 modulimiter in gd cond. Key Code 3-13.

Automated Processes 525 compressor/limiters, need 12 in any cond., new or old. Key Code 3-8.

MICROPHONES

Want To Sell

Western Electric 633A; **Western Electric 639A** w/new Altec "cage" & boom suspension, sell pair. Key Code 5-25.

HME wireless microphone, 1 xmtr & 1 receiver, 3 hrs of use, new cond. Key Code 5-20A.

RCA BK-5A, works great, looks great, manual. Key Code 5-64U.

Starbird Mike Boom, excel cond. Key Code 5-43F.

Mike stands, assorted gd to excel cond. Key Code 5-46.

Electrovoice RE15 microphones (2), Atlas microphone stands (2), Ultrasound microphone stand. Key Code 5-45.

AKG C-24 works but needs work on cable & phase box, will sell cheap. Key Code 5-29.

RCA 44BX and 77DX, very gd; **RCA BK-5B** & 74B, look gd, but need rereibboned, will sell as group. Key Code 5-25.

Various tube and other microphones. Key Code 4-74.

Synchron, AV-7a's (2), one new, excel cond, one older for parts, w/cables and pwr supply. Key Code 4-51.

RCA BK-11B, small new version of 44BX w/bass roll off switch, very gd cond. Key Code 4-1D.

AKG 414 EB mikes, new, reasonable. Key Code 4-31.



FULL COMPASS SYSTEMS

AKG, Audio Technica, Beyer, Calrec, Clear-Com, Edcor, ElectroVoice, HME, JVC, Sennheiser, Shure, Sony and Vega. All available from Full Compass Systems. 6729 Seybold Rd, Madison WI 53719. 800-356-5811

Shure SM-33 "Johnny Carson" mic., needs ribbon. Key Code 4-1A.

Electrovoice RE-11 (2) microphones. Key Code 4-75B.

EV-643 giant shotgun, gd electrical cond., windscreen deteriorated, case included. Key Code 4-1B.

Shure (2) SM-81, new, reasonable. Key Code 4-31.

Sennheiser cond mikes, Moviola Pix. Key Code 4-22C.

Sennheiser MKH-404 condenser mic and cable, less P.S. "as is". Key Code 4-1C.

Sennheiser MKH 816T shotgun, mic w/windscreen. Key Code 3-57M.

Altec 656A cardoid dynamic (3), as is. Key Code 3-65H.

Shure 588SA, new cond. Key Code 3-46.

AKG 451 (4) w/CK1 capsules. Key Code 3-15B.

E-V 1711 cardoid condensers (2), as is. Key Code 3-65J.

AKG 414 (2). Key Code 3-15C.

Sony ECM-22 condenser cardoid, as is. Key Code 3-65K.

Sony C-37 microphone and power supply. Key Code 3-53.

Sony C37A. Key Code 3-57D.

Sony C17B. Key Code 3-57E.

649B mikes (2). Key Code 3-43A.

Shure SM61 in gd cond. Key Code 3-76.

Neumann KM86. Key Code 3-57F.

Electro Voice RE-20 (4), new; Neumann U-64 w/power supply (4); Sony, AKG, RCA mics. Key Code 3-41G.

Want To Buy

Neumann U-87, U-47, KM84. Key Code 5-12.

Neumann tube U47, 67, Telefunken 250, 251, also Neumann U48, 64, M49, KM53, 54, 56, RCA 44, 770X, BK-5, AKG C12, 12A, 60, Sony C37A, C500, ECM50PS, 377, Beyer M160. Key Code 5-59.

Neumann M49, 249, U47, U48, U67, M50, 269, SM-2, KM53, KM54, KM56, 256, KM63, KM64, KM66, KM84, KM86, U87. AKG C-12, C-12A, C-24. Telefunken M-251 and VF-14 tubes for U47-48. RCA 44, 77DX, BK-5, 10001-KU3A. J. Mandel, Triton Prod, 38 Brooks St, Brighton MA 02135. 617-787-2220.

Sony ECM-21, C-55, C-55P, ECM63, ECM33, C-22, ECM-22, microphones. Key Code 4-31.

RCA and W.E. early studio mikes, also need stands, conn, parts, etc. Key Code 4-22.

Sennheiser, need 2 each MD421 and 2 each MD441. Key Code 3-8.

Altec 639-B, RCA BK-5, RCA 44, RCA 77DX, RCA BK-11, or any ribbon in working or repairable cond. Key Code 3-78.

RCA 44 series, cosmetics more important than workability, also looking for vintage desk stands, name plates, and accessories. Key Code 3-80.

AKG414, need 2 in good used cond. Key Code 3-8.

Electro-Voice V-2 or 3, cosmetics more important than workability. Key Code 3-80.

RCA 77 series ribbon mics, blown. Key Code 3-34.

MISCELLANEOUS

Want To Sell

Equipment rack, about 2' high, has hinged top & back doors, looks OK. Key Code 5-7.

Transformer, 6.6KV, 3 phase plate, 18.3 KVA. Key Code 5-21.

Bud enclosed rack (36" high) w/six double patch fields complete with connected xmas trees, offers accepted. Key Code 5-43.

Amphenol Blue Ribbon connectors, #26-4301-32/26-4401-32, new. Key Code 5-71A.

Balloon, helium, gigantic 6', sell remotes-promotions easy, put call letter on side, adv message on net hanging down, all access lines, material for call letters, valves, patches, extra filler valve for give away balloons, brand new. Key Code 5-34.

Patch Bay, 1/4", totally wired for 16 trk studio in equip rack. Key Code 5-12.

UHF/VHF varactor tuners, solid state TV IF strips, etc. Key Code 4-77.

Rack, 1-6', 1-7', both in gd cond. Key Code 4-33.

Mod transformer, gd for 1600 watts, to match 4-400's to pr. of 810's in modulator. Key Code 4-16.

Switchcraft jackfields, several, new, unused. Key Code 4-76.

Racks (2), accommodate 2 and 3 decks, with switching gear. Key Code 4-64.

Extel printer, excel cond ribbon-less, uses ink treated paper or multicopy. Key Code 4-7B.

Wilkinson FM transmitter power amplifier tuning bar, also air blower. Key Code 4-75.

PCS Beldon 9741, 250' (2), 12 pr, 18 gauge, all sep insltd, control purposes. Key Code 4-2.

GE filament transformer, 115 VAC primary, 6.3 VAC (3 sec windings), secondary 0.0259 kva. Key Code 4-60F.

RCA BTF-10B transmitter tubes, unit is out of srvs, tubes are brand new, sell or swap for cart machine. Key Code 4-24.

Beldon 9776, 100' roll, 18 gauge 12 pr, Beldfoil-Shielded. Key Code 4-2.

Rack cabinets, 19", hold one 8 1/2" panel, gd cond. Key Code 4-70.

Equipment racks, patch panels, patch cords, assorted tape decks, and audio amplifiers, any reasonable offer. Key Code 4-65.

RCA 7.5 henry 400A reactor. Key Code 3-72.

GE voltage stabilizer. Key Code 3-53.

Extel Printer, excel. uses ink, impregnated paper. Key Code 3-16B.

Blimp, giant 20' helium, unmarked, brand new, all accessories included. Key Code 3-75A.

Supply, 12 volt, 50 amp DC. Key Code 3-53.

Collins power supply 409U2 (tube type). Key Code 3-72.

Western Electric 20 B2 power unit. Key Code 3-53.

Want To Buy

Rack cabinets, 19", approx 78" high. Key Code 5-15.

Catalogs on pre-1960 RCA, W.E. and other bdct equip, also microphone stands for pre-1960 RCA & W.E. Key Code 4-22.

RCA MI-21200 plate current & calibration meter, also TK-11 lenses & transistor preamp. Key Code 4-1.

RCA catalogs & instruction books, Audio & Video, RCA Bdct News from 1950's & 1960's. Key Code 4-1.

RCA bdct catalogs, sales brochures, wanted, or borrow same to copy, both audio & video. Key Code 4-6.

20-25 KW water cooled, dummy 50 ohm load, 3" fittings. Key Code 4-48.

MONITORS

Want To Sell

GE BM-1-A FM mod monitor, 98.9 MHz xtals, very gd, manual. Key Code 5-64T.

Gates MO-2890 freq monitor, gd cond, make offer. Key Code 5-58.

TFT Model 701 digital TV frequency and audio modulation monitor, \$3400. Price includes factory frequency conversion and calibration on your channel. TFT 704 remote metering panel and instruction book included. Dave Castellano, Capitol Broadcast Exchange, 209-957-1761.

Gates M4990 freq monitor, gd cond. Key Code 5-51.

Collins FM mod monitor stereo, 900C-1; Collins FM freq counter, 96.7MHz; RCA stereo gen BTS-1-A. Key Code 5-22.

Telemet Model 4501 TV demodulator. Includes separate audio monitoring feed and loss of carrier alarm, \$2200. Price includes factory frequency conversion and calibration on your channel, instruction manual included. Dave Castellano, Capitol Broadcast Exchange, 209-957-1761.

RCA frequency monitor. Key Code 4-32D.

HP-335B tuned to 91.5 MHz. Key Code 4-53.

McMartin TBM-3500. Key Code 4-68A.

McMartin TBM-3000. Key Code 4-68B.

Radio Engineering Labs, model 600-A modulation & FM frequency monitor, gd cond. Key Code 4-41.

Gates 4990 frequency monitor w/manual. Key Code 4-3A.

McMartin FM TBM 3000 freq. monitor, McMartin TBM 3500 modulation monitor, Gates AM #2639 frequency monitor. Key Code 3-11.

McMartin AM RF amplifier, factory tested, presently tuned to 810 kHz, excel cond w/manual. Key Code 3-25.

Harris GTM 88S stereo modulation monitor w/GTA-19, 19 kHz pilot freq. monitor, in service 107.1 MHz w/manuals. Key Code 3-25.

H.P. 335B FM monitor. Key Code 3-53.

Gates AM-80 modulation monitor, recently factory calibrated, gd cond. Key Code 3-42.

Visual MF1A frequency monitor. Key Code 3-72.

McMartin TBM 3619 pilot frequency monitor. Key Code 3-53.

GTM-88M FM mod monitor, M5693 AM mod mon, GTM-88F FM and M4990 AM frequency monitors, all gd cond. Key Code 3-59.

Nems-Clarke type 112 phase monitor, set up for three towers. Key Code 3-46.

Want To Buy

EBS decoder/encoder unit, receiver not needed. Key Code 5-6.

McMartin TBM3500A or B, must be solid state A or B model. Key Code 5-55.

Stereo mod monitor, working or not, solid state preferred, will pay cash or trade, have lots of misc bdct equip to swap. Key Code 4-76.

EBS encoder/decoder, 2 tone, FCC acceptable, any cond. Key Code 4-41.

In Canada call United Video
613-741-5554

In the U.S. call 800-336-3045
For any Key Code Names and Addresses.

In Mexico call IER
714-459-3691

The Exchange The Exchange The Exchange

MONITORS . . . WTB . . . CONTD.

Stereo Modulation Monitor, any condition, even junk for experimental purposes, or parts, age unimportant, tube type fine. Key Code 4-41.

MOVIE PRODUCTION EQUIP.

Want To Sell

Mitchell 35mm "high speed standard" camera outfits (5), GC camera body w/ rackover, 1000' mags, 110V & 220V hi-speed motors, cases. Key Code 5-5A.

Keystone 16mm proj, Bell & Howell slide proj 35mm, up, all working, sell low. Key Code 5-42.

Bell & Howell 200EE 16mm movie camera w/case, 50' mag load, inop elect eye, fair-to-poor cond, good for parts, as is, case fairly gd, missing viewfinder obj. Key Code 5-7.

Bolex V-180 editor. Key Code 4-45.

Eastman VPX video players (2). Key Code 4-45.

Stellavox SP7 mint, Magnasync 602-16mm, Reves 16mm recorder. Key Code 4-22B.

Beaulieu 5008S sound cameras (2) with f/12 Angenieux 6-80 mm electric zoom, batteries, charger and heavy duty case. Key Code 4-45.

Kodak VP-1 video player, Sanyo 8mm projector, Kodak 200 sound camera (case), Magnon Instadual view. Key Code 3-61.

Mitchell 16mm 1200' magazine. Key Code 3-54.

De Ury sound projector 35mm. Key Code 3-54.

Want To Buy

Bolex camera, 8mm. Key Code 3-54.

16mm "soundless", reverse image or normal OK, ans. immed, reasonable. Key Code 5-42.

Bell & Howell magnetic playback kit complete for 300-series 16mm optical sound projectors, gd cond, reasonable. Key Code 5-7.

Bell & Howell owner's manual for 399-AV 16mm optical sound proj, will also accept clear photocopies of same. Key Code 5-7.

Bell & Howell Filmovara zoom lens, to fit 399-AV 16mm proj, gd cond only, reasonable. Key Code 5-7.

Neumade-Grissold R-3, 16mm film splicer with 1/16" splice bar, in gd cond, well-used OK, should be complete and reasonably priced. Key Code 5-7.

Ampro 16mm sound proj and for parts (any cond), answered immed. Key Code 5-42.

RECEIVERS & TRANSCEIVERS

Want To Sell

Browning tube type receivers (85), all in gd operating cond. Key Code 4-64.

RCA series 900 transmitter/receiver, 950-960 MHz, solid state, mint cond. Key Code 4-77.

RCA solid state 148-174 MHz, base station transmitter/receiver, power supply, like new. Key Code 4-77.

250 watt link model 250-UFS transceiver on 26.13 MHz. Key Code 4-33.

RCA solid state 450-470 MHz base station transmitter & power supply, like new. Key Code 4-77.

Elco HF-32 receiver. Key Code 3-53.

GE transmitter/receiver MT 42N8. Key Code 3-53.

Two way 30-75.95 MHz FM, 920 chs, runs on 12-15VDC and 3VDC. Key Code 2-55B.

R-390A receiver, to 32 MHz, 32 bands, excel cond. Key Code 2-55C.

Astro Com Labs System, 30-1000 MHz, AM, FM, CW, Video w/SDU, ready to use. Key Code 2-55D.

Military type R-808 receiver 2-32 MHz w/built in TTY converter. Key Code 2-55A.

Want To Buy

Motorola Motrac for 160 MHz, hi or low power, age no matter as long as meets specs. Key Code 4-16.

UHF - FM two or five watt handheld transceivers for use in the 450-460 MHz frequency range. Key Code 4-59.

Motorola VHF HT220, all models, need Slimlines or Omni multi ch units, w/without "PL", need accessories also, cond no matter. Key Code 4-16.

REMOTE & MICROWAVE EQUIP.

Want To Sell

Moseley PBR-15 remote control can be used wire or wireless, excel cond. Key Code 4-75A.

Lenkurt Model 76 STL receivers (2). Fully solid state, 5.925-13.250 GHz. Easily re-tunable. Includes Audio Subcarrier Demods, power supplies, IB and waveguide, \$1600 each. Complete units. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton CA 95207. 209-957-1761.

Moseley PCL 303C composite tuned for 950.0 MHz and Scalla 950 antennas. Key Code 4-75.

Moseley PCL-404 STL transmitter/receiver on 949 MHz, factory recond 1978, like new. Key Code 4-62A.

Microwave dish antennas, (2) 10' 950 MHz, Decibel Products model DB-496, make offer. Key Code 4-44.

Marti SCA telemetry link for use with STL system. Key Code 3-12.

Microwave System, 2 hop, 2GHz, complete w/dishes and other related accessories. Mint cond. Key Code 3-60.

Moseley PC 404 STL, in excel cond, used 6 mos ago. Key Code 3-5.

Transmitter combiner for STL's. Key Code 3-12.

Receive splitter for STL's. Key Code 3-12.

Marti STL-8 systems (2), dual ch/stereo, 950 MHz band, excel cond, in use, used 18 mos, less antennas and feedline. Key Code 3-12.

Moseley PBR-15 remote control w/67kHz & 110kHz micro-wave boards, needs new stepping switch; new switch, non-installed, will be included. Key Code 3-66B.

Raytheon KTR-100, 3 portable transmitters & receivers, audio channel. Key Code 2-30.

Moseley RPL-1 remote pickup system, fixed and mobile power supply, rack mount receiver unit RPL-1R, transmitter RPL-1T. Key Code 2-48A.

Continental Elects. transmitter (2) remote control unit, will operate two xmtr's each, gd cond. Key Code 1-8.

Gates remote control system, type M-5240. Key Code 2-61.

Want To Buy

STL Transmitter, receiver and antenna. Key Code 5-56.

Moseley remote control for AM, must be in gd cond. Key Code 3-38.

Marti M-25C/MR-30, 150-170 base station or M-25C transmitter module. Key Code 3-46.

Moseley or Marti, STL, stereo FM, 150 MHz. Key Code 3-47.

STEREO GENERATORS

Want To Sell

Cl:A SG-1D stereo generator, will work with almost any FM exciter, excel cond, 9 yrs old. Key Code 4-76B.

Wilkinson SG1E stereo gen, excel cond. Key Code 4-75.

Gates M-6146 stereo generator. Key Code 4-68.

Moseley SCA generator, tube type, gd operating cond. Key Code 4-64.

Wilkinson SG1E stereo generator, excel cond. Key Code 4-55A.

Collins 786M-1 stereo generator. Key Code 3-66C.

Gates FM TE-3 exciter-stereo generator 91.5 MHz. Key Code 3-53.

CCA stereo generator SG-1D, gd cond. Key Code 3-49.

Want To Buy

Gates M-6095 exciter stereo generator, any cond, any compatible unit will do. Key Code 4-41.

SWITCHERS (VIDEO)

Want To Sell

Viscount Video TV3FE, 5 inputs, plus 2 non-sync, int & ext keying, fair. Key Code 5-36.

Dynair 12X10C Routing Switchers (2), 12 in - 10 out, 0 D.G., 1% D.P. Rackmount includes switches and power supply, IB, fully solid state, \$1100 each. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton CA 95207. 209-957-1761.

Telemet 490 special effects system w/positioner. Key Code 3-52.

3M bridging video switchers (2), 10 inputs. Key Code 3-32.

3M 1114 prod. switcher, ISI chromakeyer accessory. Key Code 3-32.

TAPES CARTS & REELS

Want To Sell

Scotch tape stock, 1" for Ampex and IVC machines. Key Code 5-66A.

Videocassette plastic housings, 60's and 30's, can be used for loading your own tape for spots, etc. Key Code 5-66G.

Audio tape, several thousand reels, 3600x1/4", ten inch plastic reels, slightly used but in very good condition, erased. \$1.50 each or 18 for \$18. Leonard Healy, 710 E State St, Delmar DE 19940. 301-896-2000.

Videocassettes soft plastic cases, 60's, 30's or mini 20's, never used. Key Code 5-66H.

Videocassettes, 3/4" 30 minute lengths, like new, hardly used. Key Code 5-66C.

U-matic videocassettes, 3/4", 60 min. used. Key Code 5-66K.

Reels, empty, plastic 10 1/2" with small hole ctr, in plain white box also. Key Code 5-43GH.

1/4" magnetic tape on 10" plastic reels, 250, very few passes, excel. Key Code 5-6.

Reels of tape, 10", 16 each TDK S3600P. Key Code 4-37A.

10" reels, over 200, 6-8 hr tapes, gd to excel. cond. Key Code 4-64.

Ampex 641 tape. 1 mil, less than a yr old, used once, no splices on 7" clear reels. Key Code 4-13A.

Reels of tape 10", 16 each TDK L3600P. Key Code 4-37B.

3M 250-1/4"-2400' Blk packed, sealed cartons, 25% less net price, also empty 5" reels and/or boxes. Key Code 4-22.

LBC video tape, 30, 60, 90 min., 2" reels, gd cond. (40). Key Code 3-33E.

Scotch one inch, one hr videotape, 360-1-3000-R97C87, 5 rolls. Key Code 2-6.

Karex half inch, one hr videotape, SC2-3, 20 rolls. Key Code 2-6.

Want To Buy

Cartridges in gd cond, any brand. Key Code 5-15.

Transcriptions 16", vert. or lat. pref. band & jazz music. Key Code 4-22.

TEST EQUIPMENT

Want To Sell

H-P 353A audio patch panel & attn, like new w/manual. Key Code 5-57H.

Amplifier Corp of America wow and flutter meter, gd cond w/manual. Key Code 5-23.

H-P 175A oscilloscope w/1755A and 1781B and 1040A plug-ins, like new, w/manual. Key Code 5-87J.

Tektronix, type 422 dual trace scope, excel cond with very little use. Key Code 5-53.

Leader LCG-388 color dot bar generator, like new. Key Code 5-23.

Millivac DC-voltmeter, MV-17C. Key Code 5-6.

Krohn-Hite 310ABR-12 variable band pass filter, like new. Key Code 5-57K.

Tektronix 1D1S1 time mark generator. Key Code 5-23.

H-P 400LR, AC VTVM, like new w/manual. Key Code 5-57F.

Signal Generator model 80, and model 65B. Key Code 5-23.

H-P 205AG audio oscillator, like new w/manual. Key Code 5-57G.

Scott 830, FM MPX signal generator, gd cond. Key Code 5-23.

Exact lin/log sweep gen. Key Code 4-72C.

HP 1700B oscilloscope, Tektronix 501 monitor, Heathkit Mod 10-10 oscilloscope. Key Code 4-35.

Hickock 209-A VTVM, very gd cond, with probes & manual. Key Code 4-6A.

EICO 460 wideband oscilloscope, gd cond with manual. Key Code 4-6B.

B&W audio oscillator & distortion meter models 200 & 400, gd cond w/manuals. Key Code 3-76.

Trav-ler Radio Corp. AF 33(038) 29558 audio oscillator. Key Code 3-53.

Hewlett Packard 211A square wave generators. Key Code 3-54.

Tektronix 545 scope, 50 MHz, w/dual trace module. Key Code 3-34E.

Vectorscope 526, very good cond. Key Code 3-60.

Tektronix 527 waveform mon. Key Code 3-52.

Leader LCG-396 Colorbars/Test Signals Generator, new w/warranty (\$1000 list), \$775. SounDesign, PO Box 921, Beverly Hills CA 90213. 213-276-2726.

Exact lin/log function sweep generator. Key Code 3-77G.

Tektronix RM45A/CA oscilloscope. Key Code 2-70D.

H/P 330B distortion analyzer in carry case. Key Code 2-31B.

Sencore MU-150 tube tester, excel, factory calibrated. Key Code 2-8.

Byrd 25 KW RF load, wattmeter, water cooled. Key Code 2-11.

H/P 206A audio oscillator (2) rack mount. Key Code 2-31A.

Weinschel pulse power calibrator, M/N: PCS-1B, 925-1225 MHz, gd cond. Also, precision step attenuator, M/N:70, 4 watt max. Key Code 2-35.

Nems-Clarke 120E field strength meter, recently calibrated, excel cond. Key Code 2-41H.

GR-1602B UHF admittance bridge. Key Code 2-70B.

Want To Buy

Spectrum analyzer, solid state, doesn't have to work—priced right. Key Code 4-77.

Field Intensity meter, Nems-Clarke, or similar, any cond or junk, 540 kHz-30 MHz or so. Key Code 4-41.

Tektronix 1410 or 146 test and sync generator and Tektronix 1420 vectorscope. Key Code 4-39.

In the U.S. call 800-336-3045
For any Key Code Names and Addresses.

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New Listings are in *Italics*.

The Exchange The Exchange The Exchange

TRANSMITTERS

Want To Sell

Gates 250-C modulation transformer, and other spares & assorted parts for the 250-C, make offer. Key Code 5-58.

RCA BTF3B w/spare exciter & stereo generator, 96.5 MHz. Key Code 5-39.

Sparta SS1000A Solid State AM transmitter operating on 970KHz, currently in operation, 1000/500W adaptable to 1000/250W. Key Code 5-14.

RCA TV model TTU-1B w/filterplexer, ch 24, HP freq monitor, dummy load. Key Code 5-41.

RCA-5-D transmitter modulation transformer & reactor. Key Code 5-21.

Gates FM-5B transmitter, w/exciter, no filter or instruction book. Key Code 5-30.

UHF TV translators, Adler 100 watts, UST-10M20 with RA-7 amplifier, EMCEE 100 watts, HTU-100 with remote receiver. Key Code 5-6.

Collins 20-V-3, 1KW, AM, excel cond, on the air. Key Code 5-19.

RCA BTA-IL, 1KW transmitter w/spare parts and tubes, gd working cond. Key Code 5-11.

RCA BTA-1R AM transmitter avail aft April 15, now on air 1580 kHz, complete w/4 new finals and many spare parts. Key Code 4-58.

RCA-250G, fair cond, used as stand by, AM bdc 250 watts, 110VAC, make offer. Key Code 4-41.

RCA BTA 10u, 10kw on 1080 kHz, available about April 1. Key Code 4-29.

Power transformer, 3280VA, secondaries, 3480/0/3480 and 2900/0/2900, 0.72 amp. Key Code 4-8A.

Collins 820-E power choke, Electro Eng works #668-0070-01/E-14299. Key Code 4-2.

Gates M-6095 exciter tuned to 88.3, and another tuned to 103.1 MHz, removed from 500 watt FM transmitters. Key Code 4-41.

Western Electric 10kw transmitter, 508 B-2 (mod), needs paint, working when stored, with spares including 3CX10,000 A3 final, 3-400Z drives, manuals, diagrams. Key Code 4-36A.

Collins 20V-2, mint cond., 1kw on 1080 kHz, available about April 1, with assorted spares. Key Code 4-29.

Collins 20V-2 mod xfmr & reactor, mfd by UTC. Key Code 4-2.

Radio Engineering Labs, 518B-DL FM transmitter, 1kw driver plus 10kw amplifier and power supply, gd cond, used as standby. Key Code 4-41.

Electro Mod Reactor #CPN 668-0080-010, Rev C. Ratings, 5KV peak, 30h @1.35 ADC/400V peak @ .3ADC, type E14271, for Collins 820-E. Key Code 4-2.

Western Electric 500 watt transmitter. Key Code 4-63A.

Gates BC 250 GY transmitter, 250/100 watts tuned to 1230 kHz, excel cond, sold w/manuals, spare tubes, complete set of extension meters. Key Code 4-3.

Collins 732-A 1kw re-built FM transmitters (2), \$1600 each less exciter, 25kw dummy load with the purchase of both. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton, CA 95207. 209-957-1761.

Single phase plate xfmr for CCA FM-1200E transmitter. Key Code 4-68.

Collins 20T, 1KW transmitter w/3 phase converter, gd cond. Key Code 3-72.

RCA BTA 10F transmitter for gd 1 KW standby 850kHz, want to trade. Key Code 3-44.

Raytheon RA-250 Am transmitter, 250 watts complete with manual. Key Code 3-29.

Collins 21E, 1HP blower for AM transmitter, never used. Key Code 3-40.

Visual DFM-15K-B FM transmitter, factory rebuilt w/extras, type accepted to 20KW. Key Code 3-18.

Gates TE-3 Solid Statesman FM exciter, excel cond. Key code 3-59.

Want To Buy

FM mono and stereo 10 to 100 watts exciter, transmitter, tube or transistorized. Key Code 5-26.

20KW FM transmitter for non commercial public radio operation. Key Code 5-56.

UHF transmitter ch. 23. Key Code 5-44.

Background music unit, sub-carrier on bdc FM. Key Code 5-42.

TV VHF and UHF 10 to 100 watts exciter, transmitter, tube or transistorized. Key Code 5-26.

Gates or later model other brand 10KW FM transmitter, plus AM 5KW w/cutback. Key Code 5-27.

Gates AM transmitter model 250GY in gd cond. Key Code 4-68.

General Electric or similar television transmitter, low band, any age, junk ok for parts. Key Code 4-41.

AM transmitter, 1 KW type approved, high level modulated, in Southeast. Key Code 4-47A.

Collins 830-1D 1kw FM xtr, must be in on-air cond. Key Code 4-19.

AM transmitter 250 to 5,000 watts, junk for parts or rebuilding to standby status, age not important. Also need FM transmitter for same. Key Code 4-41.

FM transmitter, 3 KW or less, tuned to 100.1 MHz, will consider units good for parts only, prefer working equip. Key Code 4-42.

Harris 1kw FM-1H xtr. Key Code 4-19.

AM transmitter, 1KW, must be in gd cond. Key Code 3-38.

Gates, RCA or McMartin, late model 10KW, FM transmitter. Key Code 3-47.

FM transmitter, 250 watt. Key Code 3-20.

TUBES

Want To Sell

Equivalents for VF-14, \$500 each. Empirical Audio, 914-762-3089.

GE-673, new (6), 4-125A new (6), sell or swap for cart machine. Key Code 4-24.

Elmac tubes, 4CX1000k (2). Key Code 4-75.

RCA 4CX250B, never taken out of original boxes (4). Key Code 3-42.

3CX1500A7 (2) tubes, one brand new, one about 1/2 used. Key Code 3-48.

5672's (3) and 4-125's (3), cash or will trade for cart machines, turntables, speakers, studio mic stands, 25 Hz gen, Urei stereo graphic EQ, phono pre-amps, 7/8 or bigger coax, Rohn 45G tower sections, other items. Key Code 3-6.

25, 30 ml, and 2/3" plumbicon tubes, used in good condition, fair price. Call United Video at 613-741-5554.

Want To Buy

GL-6942 in gd cond. Key Code 5-16.

Telefunken VF-14 for U47-48 microphones, Telefunken AC-701. Key Code 4-74.

TURNTABLES & LATHES

Want To Sell

Rek-o-kut R-16H, 16" recd turntable in fl cab, Rek-o-kut Master Pro M-5S 16" overhead lathe w/2 leadscrews 120-10, two cutting heads for lathe, Rek-o-kut R-8B cutting head amplifier/equalizer, all as a package only, with complete manuals. Key Code 5-64S.

RCA BQ2B, 16" T.T. with Shure M236 arm and cabinet/manual. Key Code 5-51A.

QRK 12" w/Rek-o-Kut tone arms (2), and Stanton 500AL cart & Styli (extra parts). Key Code 5-9.



FULL COMPASS SYSTEMS

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Technics Direct Drive SP-10, SP-15, SP-25 and SI-1200 Mk II. In stock and available from Full Compass Systems, 6729 Seybold Rd, Madison WI 53719.

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Sparta turntables (3), Gates Harris in console. Key Code 5-45.

Gates CB-100, 16", & Gates CB-500, 16" w/Gray arms, turntables rebuilt, very gd. Key Code 5-25.

Grey 602 turntable eq (2), gd cond, make offer. Key Code 5-58.

Wilkinson stereo turntable preamps (2), model TTP-1-A. Key Code 4-19A.

Wilkinson stereo, solid state preamps (2). Key Code 4-55.

Scully lathe auto pitch, 6 speed Westrex mono F.B., head to amp, excel cond. Key Code 4-22A.

Fairchild 523 variable pitch disc cutting lathes (2), one three speed, one two speed. Complete with microscopes, Grampian mono heads, Gotham amps, suction, extra heated styli, and many blank discs, located in N.Y.C. make offer. Key Code 4-79.

Wilkinson TT-P1-A stereo (2), solid state, preamps. Key Code 4-75.

Gates CB-500, 16" turntables (2) w/arms and preamps. Key Code 4-33.

QRK turntables (2) w/Gray arms, Shure cartridges. Key Code 4-32B.

Gates CB-500, 16" turntables w/2 mono preamps, used 5/6 times, new. Key Code 3-45.

Gates CB-500 turntable, with tonearm, base & pre amp. Key Code 3-30.

Gates 16" turntables (2) w/Gray viscous damped toe arms and cartridges. Key Code 3-11.

Sparta turntable with tonearm and base. Key Code 3-30.



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SC-30ED List \$100, Sale \$64

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800-356-5811

Russco Studio-Pro model B turntable, arm and cartridge. Key Code 3-32.

Russco & QRK accessories, reconditioned, call or write for current listings. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

EMT-930ST turntables and arms (2 ea), with new Stanton 500AL carts, less preamps, excel cond. \$790 pair. Cabinets & preamps avail. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868

Want To Buy

Russco or QRK turntables (2) with pre-amps in gd cond. Key Code 5-15.

Turntables (2), any model/age, must be complete and operational. Key Code 5-63.

Gates CB-500, 16", 2 speed TT, very gd to excel cond, late mfg preferred, need one only w/o arm, reasonably priced. Key Code 5-7.

RCA, Presto, Grey, W.E. Fairchild, 16" arms, T.T., carts, also 16" transcriptions. Key Code 4-22.

QRK 12" turntable in good shape. Key Code 3-64.

TV FILM EQUIPMENT

Want To Sell

RCA TP-3 (Grey) slide proj (2), with 8 slide holders, for spare parts & RCA (Grey) 7" lens and optical spares for proj, new. Key Code 5-6.

Magnatech 31 compressor, \$300. Empirical Audio, 914-762-3089.

I.T.V. Lens, 75mm, Cosmicar, F1:1.9. Key Code 4-10.

WANTED: 16 & 35 mm telecine projectors; Eastman, RCA, Brenkert, GPL, Norelco. FOR SALE: RCA TK-42 color cameras, two RCA TR-3, one RCA TR-4, one RCA switcher, two RCA effects generators, one Eldaphor TV projector. Priced to sell. International Cinema Equipment Co., 6750 N.E. 4th Court, Miami, FL 33138 — 305-756-0699

Kodak Projection Lens Ektanon F12, 3". Key Code 4-10.

RCA TK-28 color camera, mounted internally to the TP-55 multiplexer. TP-66 projector w/200 hrs and TP-7B slide projector, included is a 6" high steel base to maintain optical rigidity on uneven floors. Key Code 4-12B.

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I.T.V. Lens, 150mm, Soligor, F 1:3.5. Key Code 4-10.

RCA TP15B multiplexer, RCA TP15 extension for TP-7. Key Code 3-52.

Buhl multiplexer, stand and Graflex 16mm sound TV projector. Key Code 3-32.

RCA TK26C color film camera. Key Code 3-52.

Want To Buy

Film chain (color), slide proj, multiplexer, RCA TP-12 or 15, 16mm film proj (2), RCA TP-6 or B&H 614. Key Code 5-6.

VIDEO PRODUCTION EQUIP.

Want To Sell

RCA TA-9 video stab amps (2), gd cond. Key Code 5-6.

Vital processing amps, V-500 and V-1000. Key Code 5-6C1&2.

RCA UHF TV demodulator, MI-3402/MI-34004. Key Code 5-6.

Advent Videobeam-100, 7' color projection TV, excel cond, very little used. Key Code 4-66.

RCA TG-31 in field case. Key Code 4-53.

RCA TG-2. Key Code 4-53.

Telemet 3200 series video DA's (2), 8 DA's per tray, 4 outputs per video DA, 4 pulse DA's interchangeable also available, includes rackframes and power supplies, \$1100 per tray. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton CA 95207. 209-957-1761.

Telexecutive with mtg brackets. Key Code 4-53.

RCA BW-4 demodulator. Key Code 3-52.

Vidicon pan & tilt head, gd cond. Key Code 3-33G.

Setchell Carlson monochrome video monitor, model 10M915, mint cond. Key Code 4-28.

Remote Truck, JBE Olson aluminum body (Grumman), step van style, includes 3 13,500 Btu air conditioners, vehicle has approx 10,000 miles, originally planned for efficient 3 camera/2-AVR-2 system. Circuit breaker power dist installed, extra aluminum bracing on side walls & rooftop shooting platform, call for more information. Key Code 4-12A.

Ampex TASSB UHF Transmitter—55kw, good condition, ea. \$120,000
CVS 504B Time Base Corrector—Recently reconditioned, \$6,000
CDL VSE 741 Switcher—12 input, chroma key, \$4,000
Eastman 250 Projectors—Recently removed from service, ea. \$2,000
Eastman CT-500 Projectors—Optical and mag sound, ea. \$7,000
RCA TP-8 Projectors—Reverse, good condition, ea. \$1,000
RCA TVM-1 Microwave—7 ghz, audio channel, \$1,000
RCA TR-22 VTR—RCA Hi-band, DOC, one with editor, \$18,000
RCA TR-4 VTR—Hi-Band, velcomp, editor, \$12,000
Ampex 1200A VTR's—Amtec, colortec, West Coast location, each \$24,000
IVC 980C VTR's—Portable model, working good, ea. \$4,000

30 Brands of New Equipment—Special Prices We will buy your used TV equipment To buy or sell, call Toll Free 800-241-7878. Bill Kitchen, Quality Media Corporation in GA call 404-324-1271.

Chyron III System Font Compose Unit, including Keyboard, Disc Drive, Power Supply, Font Compose Unit, Easel, Camera Sync Generator & Monitor. Key Code 4-56A.
 3M video distribution amplifier. Key Code 3-32.

Rank zoom & focus control w/o cables, gd cond. Key Code 3-33H.

Gray Eng. Labs time code generator and reader. Key Code 3-32.

RCA XL-100, new, unlimited supply, complete RF circuits and board, video. Key Code 3-56B.

Video Data Systems T-100 character generator. Key Code 3-32.

Setchell Carlson triple 5 black & white monitor. Key Code 3-32.

RCA 21" master monitor, fair cond. Key Code 3-33F.

Want To Buy

Non-bdct quality equip for ITV, B&W or color, new or used. Key Code 5-70.

Color Video monitors, Black Burst generator, Ball Bros Mark VII color special effects generator card no. 3 & 4, color synthesizer card, Manual for CBS 526 NTSC Program Line Image enhancer (Photocopy OK), extender board for CBS 526 Image enhancer. Key Code 5-6.

RCA portable master monitor, contains 8" mono pix mon & 3" w/f monitor in portable case combo, gd cond, reasonable. Key Code 5-7.

VIDEO TAPE RECORDERS

Want To Sell

Ampex VR-7500 VTRs (3), color, 1". Key Code 5-6A.

Sony 2600 ¾" U-matic recorder players. Key Code 5-66B.

Sony SLO 340, portable ½" recording deck, used 10 times, mint cond. Key Code 5-61A.

JVC-VCR CR6100U, ¾" cassette. Key Code 5-1.

Sony 2000 VCR ¾" U-matic player. Key Code 5-66J.

Sony 1000 VCR ¾" U-matic player. Key Code 5-66D.

Sony EV-310 (5), 1" VTR's, rack-mount, gd to fair cond. Key Code 5-36.

Sony 2860 VCR ¾" U-matic modified for Convergence editing system, like new cond. Key Code 5-66E.

Panasonic 3020C, best offer or swap for Betamax, call BEE at 800-336-3045.

Recortec VTT series digital timers (2) for Ampex VR-1200 or 2000. Hours, minutes, seconds, frames, up-down counter, \$290 each. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton CA 95207. 209-957-1761.

Ampex 3000, spare head excel cond. Key Code 4-80.

RCA TR-5 VTR, low hrs, two head wheels. Key Code 4-53.

Ampex VR1200-2000 Capstan Motor with balanced flywheel. Brand new, \$275. Dave Castellano, Capitol Bdct Exchange, 3469 W Benjamin Holt Dr, Ste 525, Stockton CA 95207. 209-957-1761.

Ampex 1100 highband, 1200 electronics, DOC. Key Code 4-80.

RCA TR-50 VTR, Cavec, DOC, Editor, 5000 hrs, two head wheels. Key Code 4-53.

Norelco EL3401-A 1" B&W VTR, with accessories and reels of tape, very low hrs. Key Code 4-6C.

Ampex VR-3000 portable backpack qu LB/HB Color Record, mono playback, no batteries, battery charger(s) are available, currently in use by major prod house, 3 avail. Key Code 4-12.

JVC CR8300 ¾" machines (2) and one RM83V edit controller, gd cond, new heads. Key Code 4-9.

RCA Quad, TR-4, high-band color video tape machine w/electronic splicer & auto guide srvs, best reasonable offer. Key Code 4-5.

RCA Tr-2, two headwheels. Key Code 4-53.

RCA TR-22 factory high band electronic splicer, excel cond. Key Code 4-50.

IVC VCR 200XN, monochrome, plug-in color conversion avail, gd cond. (2). Key Code 4-38.

Ampex 1200 B, editor, sidecar monitor, spare head. Key Code 4-80.

IVC 600, VTR, colour 1", (2). Key Code 3-45.

IVC video head, new. Key Code 3-39B.

GE VTR, b&w, ½", Model 4 TD1B2, needs work. Key Code 3-45.

Sony 2850 convergence ECS-1 editor, read-out and interface (2). Key Code 3-32.

CVS 520 digital time base corrector. Like new. Key Code 3-32.

Ampex VPR 7900A like new. Key Code 3-39A.

VO-2860 color video cassette recorder with full electronic editing. Key Code 3-41B.

Want To Buy

Scanner for 800 series IVC color video recorder. Key Code 5-33.

RCA TR-3 or TR-4 tape recorders, hi/lo band color, 2" similar units at or near junk status, for parts also needed. Key Code 4-41.

Editing System, ¾" videotape, gd cond, all or part. Key Code 4-15.

Panasonic editing unit, complete, would consider other brand. Key Code 3-14.



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Kahn Interview

(continued from page 13)

missioner says if he receives enough letters he will turn around. I note that Harris is writing to all of the broadcasters to get them to support a change. The only thing that worries me about that is that it may look like they are supporting Harris instead of the "marketplace". In any case, the Commission will listen.

BEE Now gettin back to your "universal" receiver concept. What can you tell me?

LK First of all I want to stress the fact that I am almost certain that universal receivers will never be built because I am positive that only one system will survive marketplace competition. But let us assume I am wrong. That two or even three systems survive, so that in say a few major cities there are at least one or two stations using different systems. Then the receiver marketplace will force superiority of the universal receiver and it will take over.

BEE How will it work? How does it take over the marketplace?

LK The public will make this decision directly and we should never underestimate their intelligence. They will go into a store and obviously the salesman will want to sell them a slightly more expensive device, and I mean slightly, and his sales pitch will be simple but effective. "This receiver gets you three stations but you never can hear the 4th station in stereo. So for a few dollars more I would recommend the universal receiver." I believe assuredly the universal receiver will take over. Nobody need worry about single system receivers under those conditions. I further believe that the set manufacturers will not even try to sell single system receivers under such conditions.

BEE But how will the universal receiver work? Will the listener have to switch modes?

LK No, the receiver will operate automatically. Fortunately all proponents have selected significantly different frequencies for their pilot tones. For example, Magnavox chose 5 Hz, Belar chose 10 Hz, we chose 15 Hz, etc. Therefore, it is easy to distinguish which mode the receiver should switch to, and this can be done economically.

BEE How cheap are you talking about?

LK Well, for example, an inexpensive car receiver, say \$100, would be increased (over the single system stereo mode which already would have the two speakers and the two audio amplifiers and one stereo decoder) by say \$4 to \$6. That is for this example 4% to 6%. By the way, that is about the cost of a single hair cut in big cities, excluding the tip.

BEE But I hear much higher prices.

LK I guess anybody could think of how to do it at a much higher price, but I can't conceive of the receiver designers not knowing better. If you are dealing with consumer items you must know how to do things economically, either they are not using their best engineers, or they have an axe to grind. In any case, we have done our homework. We have priced every single additional part required, and have had good cooperation from a major firm in the industry who gave us an IC price. It takes two for the universal, as opposed to one for the single, plus some ingenuity. We spent considerable time on the ingenuity bit and the price range is accurate. We even

went to the effort of reverse pricing a catalog receiver, an inexpensive unit. We bought the set and did a parts list and pricing, and actually our pricing was slightly higher than the catalog price. The standard price, not a sale price. We used the same techniques for the universal receiver, and therefore we believe our prices are somewhat conservative. I have to stress this is all academic because the marketplace will narrow it down to one system so nobody will ever make a universal receiver.

BEE If the Commission goes along with you on this marketplace concept, goes back to the recommendation of the

Broadcast Bureau, how long will it take Kahn Communications to get going and deliver units?

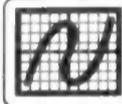
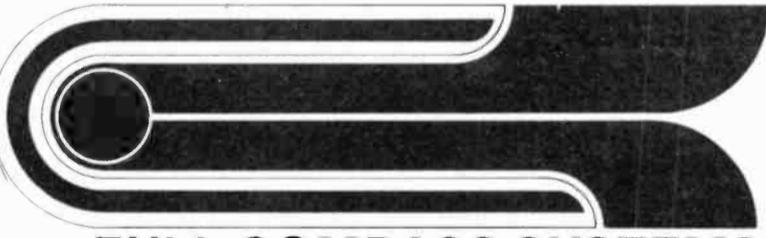
LK Two or three months. If the broadcasters get their letters in right away, two or three months after the Commission makes their vote in favor of free enterprise. It is possible that by the end of the summer AM Stereo will be going strong and there would be some receivers on the marketplace by Christmas. That would be a nice gift for AM broadcasters and the public.

BEE Thank you, Mr. Kahn.

LK Thank you.

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