#### Broadcast SULSE V Equipmen 9885 XI 8 Worldwide ... HADY NOILVIS CICER CHIEL ENCINEED

VOL. 3, NO. 7

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# New studio association for

Fort Launderdale, FL...The Industry Workshop held by MCI, Inc. June 13-16 in Fort Lauderdale was hailed by attendees as "the first time anyone had invited us to get together and asked us what we want-this workshop has been the most exciting interchange of information we've experienced in 10 years! The Workshop was hosted and chaired by G.C. "Jeep" Harned, owner and founder of MCI, whose guiding influence helped to make this unique meeting a very productive one.

Recording industry representatives at the Workshop were: Don Frey of A&R Recording Studios, New York City; Dave Teig and Jimmy Douglass from Atlantic Studios, New York City; Ross Alexander, Henry Saskowski, Mack Emerman, Steve Klein, and Karl Richardson from Criteria Recording Company, Miami; Norman Schwartz of Filmways Heider Recording, Hollywood; Angel Balestier of Group IV Recording Studios, Hollywood; Charles Conrad from House of Music, New Jersey; Howard Schwartz from Howard M.

Schwartz Recording Inc., New York City; Kent Duncan, Carl Yenchar and Maggie Garabedian from Kendun Recorders Inc., Burbank; Bob Stone of Larrabee Sound, Hollywood; Fred Porter from Media Sound, New York City; Chris Stone and Penn Stevens from Record Plant, Los Angeles; Bob Liftin of Regent Sound Studios, New York City; Joe Tarsia of Sigma Sound Studios, Philadelphia; Harry Hirsch and Lou Whittier from Soundmixers Inc., New York City; and John Stronach.

62 22580

#### **Topics** covered

The workshop was held in an informal atmosphere with industry representatives discussing their problems and the shortcomings of equipment now available. MCI's engineering staff explained some of the solutions and alternatives possible within the limits of current technology. These interchanges provided a balance between desired features, required capabilities, technical possibility and economic feasibility. The studio owners went home with a better

understanding of manufacturers' problems, and MCI with a better understanding of users' needs.

The studio owners also spent several hours in a closed meeting by themsleves which resulted in the formation of an association of studio owners-the Society of Professional Audio Recording Studios. MCI felt that the formation of this Society could have far reaching implications, all for the good of the professional recording industry.

Lutz H. Meyer, Vice President of Marketing for MCI, noted that "the intent of this meeting was not for sales action, but solely to provide a forum for discussion. If this meeting achieves nothing else but the formation of an association of recording professionals (to which we may never be invited again) the efforts were more than worthwhile. It is mindboggling to see the understanding which can be achieved when leading professionals come together in a neutral forum. At the conclusion of the workshop the consensus of opinion was that 'nobody left saying I accomplished this,' the feeling was 'collectively, WE accomplished this!'"

MCI felt that the audio recording industry as a whole-both studio owners and equipments manufacturers-will benefit as the results of the open dialogue and active exchange of ideas at this Workshop are realized in the future.

# Shure enters professional condenser microphone market

Evanston IL...Shure Brothers has announced its long-awaited entry into the professional condenser microphone market with the Shure



Model SM81, a cardioid condenser unit designed for mechanical and environmental ruggedness and reliability, as well as state-of-the-art electroacoustical performance.

The Model SM81 is a product of years of research and operational testing in a wide range of studio and field situation involving extremes in temperature, humidity, and physical punishment. As a result, the SM81 is capable of withstanding extensive use and abuse, while at the same time maintaining the high quality performance expected of the very best studio condenser microphones, not only in the studio, but in virtually any professional application.

Similarly, the electroacoustical performance characteristics of the Shure SM81 are the result of an extensive development effort. The outstanding signal-to-noise ratio and

#### (Continued on page 6)

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World Radio History

# New approach to modulation control

#### by Charles S. Wright Delta Electronics

Springfield Va... In recent years great emphasis has been placed on sustaining high modulation levels in AM broadcasting. A great variety of compression amplifiers, limiting amplifiers, and asymmetrical audio processing equipment has been developed and is presently in use to accomplish this end. While most of these devices are remarkably successful, they process the audio material only and do not directly make use of the modulation characteristics of the final transmitted signal. They alter, at least to some degree, the dynamic range and other qualities of the program material. It has been found by many broadcast engineers that when adjustments are made to obtain a very high modulation level with these devices, variations in the transmitter characteristics can cause overmodulation. If the adjustments are made to avoid overmodulation in the worst case, reduced modulation levels must be tolerated on the average. The equipment to be described here is intended to close the control loop around the transmitter in order to correct for these variations so that high modulation levels can be maintained for all operating conditions.

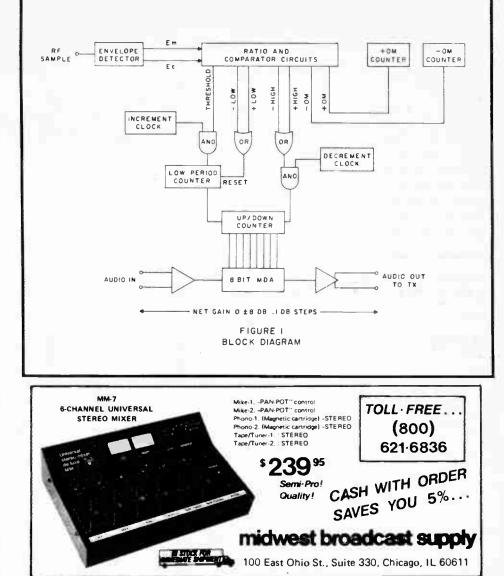
We call this device an Amplitude Modulation Controller. Basically, it samples the RF leaving the transmitter, makes measurements of the modulation characteristics, and by a digital logic process adjusts the audio level to the transmitter. It can be used in conjunction with all of the existing program processing equipment, and field tests have shown that under normal conditions a further enhancement of the modulation characteristics can be obtained. The audio control on this modulation controller is strictly linear so that no real time compression or asymmetry is added to the program.

#### Description of Equipment

The simplified block diagram in Figure 1 will illustrate the operating principles of the Amplitude Modulation Controller. A sample of the transmitter output is taken, typically with a toroidal current transformer, and supplied to the device. This sample is first demodulated by an envelope detector. The output of this detector contains a dc level proportional to the unmodulated carrier and a superimposed audio component from the amplitude modulation. This total envelope output signal is identified as EM in the figure. The second signal, EC, is derived with a unitygain, low-pass filter. The result is a dc voltage proportional to the carrier level. From the ratio of these two signals, real time modulation characteristics are determined. Typically, one of the signals is attenuated by a variable resistance divider and compared to the other with a digital comparator circuit. For example, the comparison marked "Threshold" on the figure is derived by taking 75% of Ec and comparing it to Em. When Em goes lower than the attenuated carrier sample, the comparator output goes high and indicates that a modulation in the negative direction exceeds 25%. A total of seven such comparisons are made simultaneously. In addition to the threshold comparison just described, negative low modulation and positive low modulation comparisons are made. These levels are typically minus 85% and plus 100%. The plus and minus high modulation comparisons are typically at minus 95% and plus 112%. The plus and minus over modulation comparisons are set by the FCC limits, minus 100% and plus 125%. The figures just given are typical only and the station operator is at liberty to set all of these levels at any desired value. I will use these typical values throughout to simplify the discussion. The comparator output signals are TTL logic level, that is, they are at a TTL low level when the condition for which they are set is not satisfied and at a TTL high level when the condition has been satisfied.

The threshold signal is used to determine when modulation is present. No corrections of the audio level are made when the modulation is below the threshold. This prevents the circuit from "pumping" as is common with most gain control amplifiers. The circuit works as follows. The threshold signal is used to gate an increment clock. This is a clock in the logic sense rather than in the normal time keeping sense. It is simply a pulse generator and its frequency is called the increment rate. The gated clock pulses drive a "low period" counter. A typical count period is 5 seconds. (This parameter is also available for adjustment by the operating engineer.) If this counter is not reset within five seconds of modulation time, the increment pulses will go to an up-down counter and cause it to count upwards. If either of these low modulation thresholds are satisfied within the five second period, the counter will be reset to zero and a new period will begin. Thus, if the transmitter has not had at least one modulation burst exceeding 85% negative modulation or 100% positive modulation within 5 seconds of modulation time, the counter will increment and increase the program level driving the transmitter. This gain increase will continue until the (Continued on page 22)





Circle 149 on Action-gram

Circle 118 on Action-gram

# Recorder care from Nortronics: Cartridge recorder maintenance

Minneapolis MN... Virtually every professional or consumer tape recorder requires regular preventive maintenance if long-term, optimum performance is to be maintained. This is particularly vital for broadcast cartridge machines, since they are subject to long hours of continuous operation along with frequent service and calibration.

The enemies, of course, are dust, dirt and oxide deposits; excessive humidity and, although less obvious, residual magnetism. Individually and collectively, these factors can sneak up to gradually degreade reproduction quality and even damage prerecorded tapes.

#### How It Happens

A spacing loss (separation between magnetic tape and tape head) approximating just 1/20th the diameter of a human hair can cause a noticeable loss in high-frequency response. As spacing becomes greater, so does the loss. Reproduction quality is noticeably lacking in highs....sound is, at best, dull and mushy.

Spacing losses result from the buildup of contaminants on heads, guides, capstans and rollers. These deposits are generally a combination of airborne dust, dirt, pollutants and tape oxide which breaks off recording tape. They can be of a gummy consistency or extremely hard, ragged and abrasive.

The solution is to prevent accumulations by regularly cleaning contaminants off recording heads and other tape path parts. Fortunately, there are a number of excellent products specifically formulated to dissolve and remove contaminant deposits without any possibility of damage to delicate machine parts. They are equally effective with broadcast cartridge recorders or any format of consumer recorder.

The best way to ensure freedom from contamination is to institute a

regular preventive maintenance program that includes inspecting and cleaning each broadcast cartridge machine you use. The key word, here, is *regular* which translates down to preventing contaminant buildup and spacing losses *before* they become a problem.

#### **Residual Magnetism**

While you can see dirt and oxide accumulations, you won't see residual magnetism that builds up in metal tape path components. Nevertheless, this residual magnetism will inheently induce a higher system noise level which will degrade the overall signal-to-noise level. Here, too, there is also a loss in high-frequency response along with the possibility that residual magnetism will partially erase pre-recorded tapes.

Residual magnetism occurs for a number of reasons. First, the use of a partially magnetized screwdriver or other tool used in service and calibration might be the source. In addition, the normal ON-OFF surges in recorder electronics can induce permanent magnetism due to undesireable retentivity characteristics of the metals used in head construction.

The degree of retentivity varies for different tape head materials. Nevertheless, all materials have his property to some degree and can retain residual magnetism that will severely degrade the quality of broadcast cartridge recorders and pre-recorded tapes.

The solution comes down to removing any traces of residual magnetism with a degausser or demagnetizer. This device generates a power flux density to completely remove unwanted magnetic fields.

The Model QM-380 Broadcast Cartridge Head Degausser manufactured by the Recorder Care Division of Nortronics Company, Inc., is an example of a product specifically designed to do away with residual magnetism in broadcast cartridge machines. This unit generates a powerful 400 Gauss A.C. field which is (Continued on page 5)



Circle 102 on Action-gram

World Radio History

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Computer Consultant: Larry D. Hughes

# Solutions to problems by the gold-plated ear

#### by John Price Radio Arts

#### Part II of 3 parts.

Nothing printed herein should be construed as a replacement for basic engineering knowledge and a wellworn instruction manual. But, just as any set of ears should hear the faults within our product, so any allotment of grey matter should contain some idea of the cures.

First, forget the magic phrase "proof of performance." Time after time, the classical "proof" required by FCC regulations can be run with Abe Lincoln honesty, and time after time it will completely bypass major problems. It's not that the "proof" is no good, it's just that, like most regulations, it is hopelessly out of date.

For starters, both AM and FM proofs still require that measurements be made starting with the input for the "main studio microphone." So that Fibber McGee will have adequate frequency response, distortion and signal-to-noise specs. But we don't originate Fibber any more. We orginate from tapes and discs and carts and cassettes, and our "main microphone" is on the air maybe one per cent of the time.

Secondly, most of the equipment that causes audio problems on a daily basis must be switched *out* of the chain when a proof is made. Not only do we bypass all of our source machines, but compressors, limiters and other audio processing gear is bypassed.

So use a proof for that which it will proof: the basic audio chain of console(s), STLs, phone lines and transmitter(s). But go beyond that, and check out all the other possible sources of bad sound.

#### Here are some hints.

Distortion: Today's crop of solidstate equipment can be both a blessing and a burden when used to create clean sound. Never has distortion been so low—and never has it been so audible! Thus, a new unit with distortion specs that can't be measured will sometimes *sound* worse than its retiring tube predecessor.

So take a hard stance on new, solidstate equipment. Make sure it contains circuits that are well-designed, and try to get an A-B demonstration



against your older unit, if possible.

Hint: Most of the continuous distortion heard on the air today comes from over-limiting. As I mentioned earlier, limiting can only be accomplished by distorting the audio. The more tactfully your limiter chops off peaks, the more of it you can do without bending ears. Money spent on a good limiter is an excellent investment. Not just a new one; a new, good one.

As with all problems, isolation is the better part of valor. Find the problem's source, then you know where to start troubleshooting. With distortion, you may find several sources. While harmonic distortion doesn't seem to add algebraically (or you'd never understand your network news), it may take several repair jobs to get it all out of an audio system.

Noise: Again, isolate and conquer. An immediate improvement may be noticed if unused pots on the console are closed. One station, faced with cart machines featuring an inbuilt hiss, wired the remote start function for each to the program key on the appropriate console channel. Since the machines started with a pop, this killed two birds with one key. Throwing it to "program" started the machine, then connected audio a millisecond later, after the pop.

When possible, the click-pophumbugs from starting buttons should be properly squelched with capacitors or diodes. The level at which audio is switched should also be investigated. Often, raising console pots and lowering the console master will instantly reduce pops, since the audio is hotter at the switching point.

Ground loops and long unbalanced lines aside, most continuous noise in today's station consists of hiss. Hiss can become hissstory if you:

\* Check the bias waveform of a tape machine that makes hissy recordings. If it, or the erase current, does not show as a nice smooth sine wave on a scope, that is probably your culprit.

\* Check high-frequency adjustments on pre-amps and tape record and play sections. Adjust to correct setting, and lock them away from those who think that high fi means high highs.

\* Reduce compession/limiting, especially in production studios and on network lines. An open compressor can ladle out lots of noise.

#### Watch your limiter

Compression/limiting: Maybe it was Mike Dorrough who first quoted the "dial full of sounds trying to get out" line, but it applies over and over again when compression/limiting becomes the point of a critical listening test.

Today's AM demands a narrow dynamic range, it is true. Although Jack Benny made it to the top even though every step down into his vault may not have modulated a full 125% positive. But noise levels from man-made sources were lower, and the horsepower race had not yet started.

For reasons stated earlier, today's rock music, especially disco discs, are best processed with a multi-band limiter, which looks at bass, midrange and highs separately. Even rock FM can benefit immensely from this technique, though the limiter should not work nearly as hard.

Where hard limiting is desired, the separate actions of each section tend to mask each other. And the bass notes won't punch holes in the rest of the orchestra. Multi-band limiting also acts as a dynamic equalizer: air a muddy tape and the high section will open up; follow with a squawky agency spot and the mid-range section will pull down the presence hump.

I have worked miracles with the Dorrough DAP units, and am getting nothing for this plug. Correctly used (and that means no adjustments without Mike Dorrough on the phone), it can turn a kilowatter into a 5kw, and make a Class IV reach the manager's house at night.

Asymmetrical AM limiting always upsets the music mix to some degree, since normally asymmetrical instruments (or voices) get attacked differently than symmetrical ones. But if you have 500 watts at 1580, you will probably want that extra db or two that 125% positive modulation will give you. Assuming that your transmitter will stand for it (and some absolutely will not), do it, but don't make me listen to it.

On FM, all this goes away. Amplitude modulation means the better the amplitude is modulated, the better they'lll hear you over the static in Dismal Seepage. The best reason for the AM style compression/limiting that is heard on FM throughout the land may be that turgid meters are easier to set and quicker to read—by the engineer with a tin ear.

(Just checked with my favorite L. A. FM station, and they are banging away tonight. If the music pauses, the turntable rumble modulates 100%. The deejay took a breath on the air and his heartbeats hit full level.)

First, solve the far-ranging levels from your control room that your compressor is making like a rollercoaster over. Then take it out. If you can't do that, turn down the input control so that it is in full expansion most of the time.

(Continued on page 8)

BROADCAST EQUIPMENT EXCHANGE 5

**3M**: Those dropouts

New York NY...Improvement in elical video tape imposes increased emands on studio engineers for roper equipment maintenance. This because any momentary loss of sigal when using today's tapes affects a reater signal area.

Higher density magnetic oxides on hinner, stronger backing materials ave made it possible to squeeze nore information onto a smaller piece of tape. Signal packing density as been compressed to 24 square nches per minute for today's Beta II helical recorders. That's 75 times nore signal per square inch than the quadruplex type of 20 years ago, and nearly a ten-fold increase since 1970.

As a result, any dropout today is proportionately more noticeable. It appears to viewers as a burst of snow that flashes across the screen from left to right.

What can engineers do to guard against such signal interruptions? First, learn the potential sources of the problem. Dropouts can be caused by equipment faults or by magnetic tape itself. Among the most common causes is dirt that builds up on recorder heads. Regularly scheduled cleaning will eliminate this source of the problem.

Proper machine adjustment is essential to preventing dropouts. A separation of tape from the head of less than 1/10th the thickness of a human hair will cause a loss of signal.

#### What To Do?

To prevent such dropouts, proper head-tip projection, tape tension and tape alignment must combine to maintain constant pressure of the tape against the head. Any increase or decrease in head-tip projection affects tape-to-head pressure. An optimum setting is more easily achieved with new than with old and worn heads.

Although video recorder heads are made of extremely hard materials such as ferrite, friction produced by tape passing across them will cause them to wear. This reduces head-tip penetration, lowers tape-to-head pressure and consequently results in increased dropouts.

Proper adjustment of hold-back tension is critical to the elimination of dropouts. As hold-back tension decreases, the pressure of the tape against the head declines. If hold-

CART MAINT.\_

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effective with severely magnetized cart heads and new heads made of long-life materials such as

- continued from page 3

back tension is reduced too far, dropouts will occur. Be sure to follow the tape manufacturer's specifications for proper hold-back tension.

When optimum tape-to-head pressure has been achieved, record drive may be adjusted. Optimum record drive results when RF drive to the video heads is set for the maximum play-back signal at the heads.

A worn head requires less record drive to produce a given signal level, because the head becomes more efficient. However, this condition also produces an increase in dropouts. Adjustment of record drive should be undertaken only by a qualified service technician.

When spinning heads meet moving tape, pressures equal to hundreds of pouds per square inch are developed. Even in a perfectly adjusted machine, the tape undergoes a rigorous workout

The binder system that holds the oxide particles to the plastic backing must combine the toughness to withstand these stresses with the smoothness to protect recorder heads from abrasion. It must not permit particles of the oxide coating to separate. Loose particles will bounce the tape away from the play-back head for an instant, causing a visible dropout.

To determine whether dropouts are caused by machine or tape error, re-record the tape on a machine that is properly aligned. If the dropouts disappear, the tape did not cause them. If the dropouts remain, check for tape damage such as creasing, fraying or crimping. These conditions may indicate that the machine is damaging the tape.

Some video picture irregularities are not caused by dropouts. It's useful to be able to identify them. Random noise generated by devices such as thermostats, electric motors or atmospheric static produces disruptions in the video signal that resemble dropouts.

Sometimes a tape will appear to contain many dropouts when, in fact, it is mistracked. Mistracking can be caused by improper adjustment of the recorder's tracking control, by misalignment of the record or playback unit, or by physical distortion of the tape.

Proper machine maintenance and tape care will continue to gain importance in preventing dropouts as magnetic recording tapes continue to improve. Also, experts expect basic oxide and particle research, and new coating and slitting techniques that permit closer tolerances, to enable broadcasters to get still more information per square inch of tape in the future, at lower prices per program minute.

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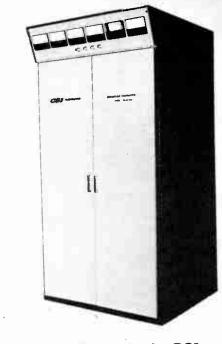
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Circle 134 on Action-gram

# **Report on June FCC** developments

by B. Jay Baraff Baraff, Koerner & Olender, P.C.

Washington DC...In an unprecedented decision, the FCC, in approving the transfer of control of Combined Communications Corporation to Gannett Company, Inc., placed a condition on the acquisition of six AM and FM combinations that they be separated if the FCC adopts rules prohibiting such acquisitions in the future. The FCC is preparing a Notice of Rulemaking to prohibit cross-ownership of an AM and FM in the same market. Any application filed after June 7, 1979, which would result in the creation, assignment or transfer of control of commonlyowned and co-located AM and FM stations would be subject to this condition. However, any applications that were pending as of June 7, will not be subject to this condition unless it is a major media concentration or a request for waiver of the FCC's Rule. Thus, if you are negotiating to purchase or sell such a combination, this new policy should be seriously considered as it may affect the price of the stations.

#### FCC Inquiry To Consider More AM Stations.

In a rather significant move, the FCC is now considering reducing the AM channel spacing from 10 kHz to 9kHz in order to permit more channels to meet requests for additional full-time facilities. If you are interested in filing comments, they are due October 1.

#### New Composite Week Dates.

The FCC has released its Composite Week for use in the preparation of renewal applications, which have expiration dates in 1980, and assignment of license and transfer of control applications in 1980. The dates are as follows:

Sunday, July 2, 1978 Monday, April 23, 1979 Tuesday, September 26, 1978 Wednesday, February 7, 1979 Thursday, November 9, 1978 Friday, January 26, 1979 Saturday, March 24, 1979

#### **Deficiency In Public Affairs Results** In Conditional Renewal.

FCC renewed the license of WPXY(FM), Rochester NY, but required the station to provide quarterly reports through 1981 of its public affairs programming, including subject matter and topics covered during each reporting period. In 1978, WPXY's public affairs commitment fell 33% below its promise (60 rather than 90 minutes). In 1975, the performance was 85% below the 1972 promise. This combination of facts resulted in their unusually stern conditions.

#### FCC Upholds Denial Of Renewal.

The FCC has affirmed an ALJ's decision to deny the renewal of Station WLBB(AM), Carrolton GA, for filing a strike petition against a pending CP in that city. The Commission clarified its definition of a strike petition as that filed for the primary and substantial purpose of delaying a competitor's application.

#### **Renewal Actions.**

The FCC granted the renewal of Station KAIT-TV, Jonesboro, AR, which had been denied because of involvement with network bribing on the basis that the other licensee had all their renewals granted or escaped further scrutiny altogether.

#### **Exspedited Processing For Minori**ties Challenged.

FCC has denied an appeal by Station WOOK-FM, Washingon DC, objecting to the expedited consideration given to the processing of two competing minority applications filed for its facilities. The FCC said this did not affect the comparative aspect of the case but only affected the timing (Continued on page 9) of the case.

#### SHURE \_

#### — continued from page 1

smooth and consistent cardioid pattern at all frequencies provide exceptional off-axis rejection of unwanted sound for improved separation and isolation. In addition to a precise cardioid polar pattern, the electronics section of the SM81 exhibits low total harmonic and intermodulation distortion below its clipping point, significantly lower than that of other professional condenser microphones, with no compromise in performance over an extremely wide range of simplex power operating conditions.

The SM81 also features a threeposition low-frequency response switch conveniently located on the microphone's case. The switch, which is adjustable without tools or disassembly, can provide the option of a flat response, a low-frequency rolloff of 6 dB per octave below 100 Hz, or a low-frequency cutoff of 18 dB per octave below 80 Hz. The switch can also be used to compensate for proximity effect.

Another major feature of the SM81 is a switchabe 10dB attenuator built into the head of the microphone to prevent high sound pressure levels from overloading the microphone's internal electronics.

The SM81 operates over a wide range of simplex (phantom) powering voltages and impedances. This includes the DIN 45 596 standard voltages of 12 and 48 volts.

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# TIN EAR \_\_

#### And let yor limiter rest completely, with an occasional, *tiny*, bit of action. It can be very happy acting like a safety valve, chopping just a little peak here...a little peak there.

If you have a production-studio compressor or limiter, consider throwing it away completely, especially if it, like many is a main-line cast-off. At worst, use it on the microphone only. That will be about the only source of un-pre-compressed audio. (Even most cassettes from the

#### - continued from page 4

field have been pre-compressed to some degree by the machine's automatic level control.)

Try to avoid any audio chain that puts several compressors in series. Their cumulative effect can be anywhere between comical and disasterous.

And finally, don't assume that any processor will work correctly forever. Put it through the cattle-dip regularly, and above all, *listen* to it critically with your gold-plated ears.

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#### **Response too!**

Frequency response: Here is another area open to vast wastelands of abuse. Too often, more highs are equated with better highs. This thinking is now permeating TV audio, too. Often, sibilance is so accentuated that it activates the station's limiter all by itself. Listen to ENG news reports and you will hear one fireman's "s" knock the entire department from audio view.

By contrast, listen to the Person To Person shows now being rerun on PBS. Even the remote audio is usually well-balanced, and the participants, not to mention Ed Murrow, sound like real people and not Artoo-Detoo. And even Ed could take a lesson from the tremendous audio (on location, yet) that is the norm during Masterpiece Theater.

Your basic chain must be flat. As flat as possible. What you will feed it will vary enough. Don't make it worse by adding more to something that is already bad in the source material. At the transmitter, that multiband limiter is a dandy way to provide a constant, gentle shaping of your response to make up for uncorrectable *minor* flaws in your chain.

Back in your comparative listening room, you'll even hear sound differences from different transmitters and even (on AM) different directional arrays. Here, the dynamic equalization of the multi-band limiter can be of real help.

coll can't leave the subject without dancing to the old "make AM sound good on bad radios" song. I've heard that song before, and the "bad radios" usually turns out to be one owned by the chairman of the board.

Trouble is, the NAB has never issued specifications for Bad Radios. Is a Bad Radio the beach portable with

### THE SUCCESSFUL CONSULTANT'S GUIDE TO AUTHORING, PUBLISHING & LECTURING

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You're a successful professional. You have many years of experience in your field and a wealth of specialized knowledge. But have you ever considered exploiting what you know? Marketing your expertise to a wider audience? You may be overlooking numerous opportunities to expand your career and earn more money—by becoming an author, publisher or lecturer.

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with a two-inch speaker, or the bass car set in a dashboard cavity tha booms away at 100Hz? Think abou this: No matter how cheap the set is the FM side of an AM-FM alway sounds best. So make your station sound as much like FM as possible. I will sound better on *all* radios.

There are two types of creative frequency response distortion that you may want to consider, but only after your plating job is complete and you trust your hearing to direct slightly bad from slightly better.

1. Stations at the low end of the AM dial spread out over more dial space than those at the high end, and many radios, when tuned dead center, receive very little sideband information (which contains the highs) from these stations. So if you're at 570, you may want to tip the highs up a bit to compensate for this. A bit. A quarter-bit at a time. Followed by another listening test.

2. In this country we operate from the same source material as that used for phonographs in homes. Cheap phonographs in homes. While we consider records to be cut with correct sound. "Defective product" often means "my needle jumps out of the groove," and the solution is to cut the low end. Barring special full-range records for radio stations, and assuming a turntable almost entirely free from rumble, you can effect a tremendous improvement by replacing some of the sub-bass missing on discs.

I'm being very careful not to say anything that translates as "Price says boost the bass." We're not going to *boost* anything, just replace what has been subtracted. And it's not bass, but that critical range below bass that contains all sorts of delicious concussion, fundamentals and warmth.

It must be done with a very good equalizer that can treat frequencies below 60-80Hz in octave (about 20Hz) ranges. It must also be done with a good set of speakers and ears. It can almost never be done "live" this is an act to be consumated in the production room.

Learn to "learn" bass lines on a VU meter. Watch for bass notes that occur during pauses in the rest of the instrumentation. You'll find many discs that have no bass higher than -10VU compared to the rest of the audio. Raise it to -50VU...never higher...working only the range below 80Hz...and listen to the sound that results.

I was amazed to find recently that many final-mix masters, headed for the disc cutting room, have no test tones below 100Hz. Since all fundamentals of a bass viol's music occur below 96Hz, you have just given some bass players their jobs back.

As long as you're this far into creative equalization, check the recordplay response of your cartridge recorder. You will often find a hump in the 100Hz range. It's caused by FCC To Clarify Impact Of Minority

Ownership.

The FCC is requiring further pro-

ceedings in a hearing for a new FM

come of this decision will determine

whether it is advisable to modify your

structure to include minority owner-

ship for purposes of a comparative

Commercial Time Standards.

The FCC has now made its com-

mercial policy into a rule allowing up

to 24 minutes of commercial time

over the 18 minute ceiling for politi-

cal broadcasting provided it is no

more than 10% of the station's total

operating hours in the applicable

period when lowest unit charges are

FCC Sets Policy On Part-Time

Integration.

The FCC stated in an application

for a new FM in Springfield IL, that a

proposal to intergrate a person for

less than 20 hours per week would be

given no consideration in the Com-

mission's comparative evaluation.

Although this was dissented to by

Commissioner Washburn, it now

preference.

in effect.

cations Act was unconstitutional in making this requirement.

#### FCC Site Policy Challenged.

The FCC denied a challenge to its policy which creates a conclusive presumption that a renewal applicant's transmitter site will be available to a successful challenger. The issue was raised by one of the applicants who had agreed to purchase the facilities of WFAB, Miami against the remaining 6 applicants. The FCC found that their reliance upon this site was in good faith since the towers, transmitting facilities and equipment were already there.

#### FCC Approves Citizens Group Reimbursement

The FCC has permitted reimbursement to a public interest law firm on behalf of a citizens group that had filed a petition against Stations WFVR-TV, AM and FM, Richmond VA. An agreement had been entered into with the citizens group warranting the dismissal of the complaint. Approval was specifically required for reimbursement because of the tax exempt status of the public interest law firm.

#### **Reporting Of Trade-Outs.**

Please be reminded that your Annual Financial Reports should include all, trade-out transactions which, although not prohibited, must be considered as income.

#### **EEO Reports.**

The FCC has directed 14 broadcast stations to submit periodic Equal Employment Opportunity progress reports because their minority/female employment was less than 50% of the available work force and 25% in the upper four job categories.

#### Pre-Sunrise Authority Denied.

The FCC denied a request for waiver of its clear-channel rules for Station WHLO, Akron OH, to permit pre-sunrise authority since this would affect the nighttime exclusivity protection given to clear channel KFI, Los Angeles.

#### TV Translator Station Authorized To Rebroadcast Programs In Spanish.

The FCC has allowed the unprecedented use of a TV translator station to import broadcast signals into urban markets containing a largenumber of broadcast stations for the purpose of fulfilling an unmet need for Spanish programming. Normally a translator is only used to reach rural areas and strengthen week coverage areas of regular broadcast stations.

#### Environmental Challenges.

The FCC is allowing parties to file a petition to deny challenging environmental consequences of an FCC action, provided that they can show that they have a legitimate interest in the environmental impact of that action.

#### Assignment Of Call Letters Denied.

The FCC denied the assignment of call letters KWK-FM for a station in Granite City, IL, because Granite City was east of the Mississippi.

#### station in Media PA, in which a grant Further Reregulation. was made to an applicant on the basis A. The FCC has amended 32 rule that 5% of its stock was owned by a black woman who would serve fulsections to eliminate conflicting proltime as business manager. The out-

visions and deleting various technical engineering sections. Examples include deletion of the requirement for annual skeleton proof of AM directional antennas used with remote control operation for all stations having approved antenna sampling systems; permitting AM stations to use the indirect method when there is a temporary malfunction of a remote reading, remote control or extension meter indication of antenna or common point current.

continued from page 6

appears to be the policy to give no

credit for part-time integration of

management and ownership if this is

less than 20 hours per week.

B. The General Accounting Office has presented to Congress a study which makes numerous recommendations affecting many changes in the FCC's operation. Some highlights are indefinite licenses; public right to petition for revocation at any time; elimination of comparative hearings; substitute lottery; examption of stations from ascertainment requirements.

C. Effective June 15, stations will no longer be required to keep for 60 days audio recordings of public affairs program in which issues of public importance were discussed. This is the result of the U.S. Court of Appeals holding that the Communi-

NOW-a reliable up-to-date console at a reasonable price

Circle 136 on Action-gram

World Radio History

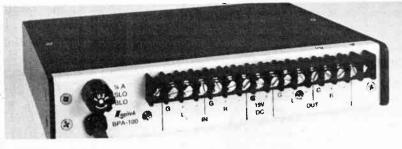
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Anunciado el fin de los problemas de sencibilidad y Hum en las tornamesas con este pre amplificador.

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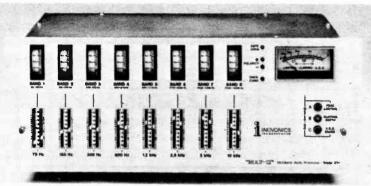
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EL "MAP II MULTIBAND AUDIO PROCESSOR" DE INOVONICS LE DA EL MEJOR GRADO DE MODULACION DE SU PROGRAMA SIN EMBARGO ES MAS ECONOMICO QUE OTROS SISTEMAS SIMILARES.

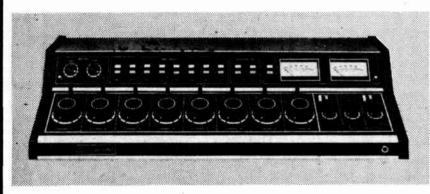
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# Elegant New Series 250 Consoles

For demanding control room or production use . . .



The Deluxe 250 Series Rotary-Mixer Consoles. Featuring ladder-type maintainable step attenuators with cue bus switching, telephone-type channel keys and control-free FET bus selection. Separate monitor, headphone and cue channels. Field proven 3600 Series modular plug-in electronics. Two-input pushbutton preselection and microphone or high level capability for each mixing channel. Mono/stereo mode switching optional on stereo models. Front panel graphics are under a laminated polycarbonate overlay for maximum durability.

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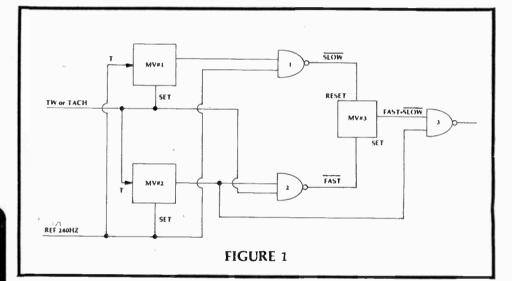
CHICAGO SALES Phone 312 - 784-2257 635 SOUTH E STREET - P. O. BOX 786 RICHMOND, INDIANA 47374 PHONE (317) 962-8596

# Clint Free on VTR's: More on headwheel servos

Knoxville TN...This article continues a discussion on headwheel servos. Methods used to control the speed and phase of headwheels vary, as most things do. Some of the more complicated methods have been steps backward from earlier, more simple ways, however, most newer methods improve either performance, reliability, or both. I will attempt to describe a velocity detector which in addition to having no adjustments, also performs as a phase detector when velocity is achieved.

Velocity detection is an essential component in a headwheel servo if fast locking and tight phase control are desirable or necessary. A phase detector will attempt to lock each time a multiple of the reference frequency is approached. quency. Reference vertical is 60Hz and reference 15,750 does not divide to 240 (tach frequency). The most popular method is to multiply 15,750 (15,734) to 126,000 (8x), and then divide this signal to 240Hz. This produces a more stable 240Hz reference than multiplying 60Hz vertical to 240Hz, and the divider to develop 240Hz from 126,000Hz (believe it or not) is 7, 5, 5, 3. Just a little nostalgia for us old-timers!

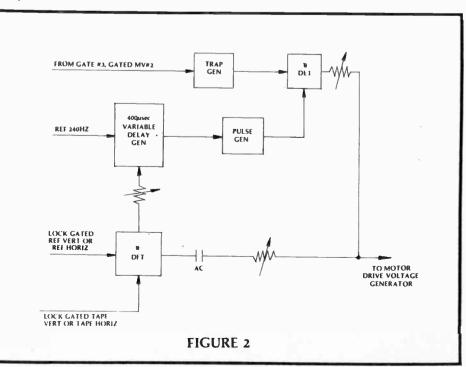
Figure 1 is an overspeed detector. When the velocity of tach exceeds the reference, MV#2 output is gated to a trapezoid generator for phase detection, and until velocity is achieved, the trapezoid output is a level which when sampled causes maximum power to be applied to the headwheel. The leading edge of MV#2 is refer-



Last month I described an early method of velocity control and although the method is fairly stable, adjustments need to be made as temperatures vary, components age to new values, etc.

By using bistable multivibrators and gates to compare reference and tach or tonewheel pulses, a detector with no adjustments can be made. One of the problems with this type of detection is that both reference and tach pulses must be at the same freence and the trailing edge is tach. The trailing edge is sloped for sampling.

The headwheel motor must be driven by a voltage which will not allow the motor to overspeed to a multiple of the reference for this detector to work properly. It works best using a fixed frequency of 260-280Hz. Power removal by pulse width modulation of the motor drive voltage allows the head to run at 240 rps.



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#### National Public Radio Chooses MCI Recorders

Audiotechniques is pleased to announce the receipt of a contract for 21 MCI JH110-A quarter inch recorders from National Public Radio, Washington, D.C. The contract for the MCI units was placed after an extensive, year-long evaluation of professional tape recorders by NPR.

Contract negotiations for Audiotechniques were conducted by VP Mike Faulkner, whose previous experience in successfully negotiating a similar contract between NPR and Scully nearly 12 years ago, held him in good stead. The new MCI recorders, slated for a late summer delivery, will have custom stainless steel deck covers and engraving.

Faulkner and Bob Cavanaugh attended a three day seminar of National Public Radio's affiliates in late May and there demonstrated the MCI products to more than 500 public radio station representatives.

#### SUMMERTIME IS

RENTAL TIME! A/T Rentals Manager Kurt Fleischer reports early bookings for summer rentals are heavier than ever. If you're going to need equipment for a remote gig or whatever, give Kurt enough advance warning to take care of your needs. A deposit (10%) works wonders.

#### Prime Times in stock for immediate delivery!

They're hard to get, but we got 'em! Lexicon's Prime Time special effects delay units are on the shelf at Audiotechniques and waiting for your call. Price is \$1660 with the Memory Extension Option (and that's the only way we stock PT's). Give Bob Cavanaugh or Lou Greto a call today.

# AND THE LEXICON DIGITAL REVERBS KEEP ROLLING!

Add Sigma Sound with 2 more (total 5); Sound Mixers 2 (total 3); Howard Schwartz 1 (total 3); House of Music; Media Sound 2; University of Washington; A & R Recording, NYC; Blank Tape, NYC; Aura, NYC; Christian B'casting Net; Sound Palace, NYC.



#### Sid Zimet joins Audiotechniques in New York City

Sid Zimet, well-known Metro area hi-fi and semi-pro equipment specialist, has

equipment specialist, has joined Audiotechniques' sales engineering staff. Zimet, who was the founder and owner or Audio By Zimet, pioneer Long Island audio outlet, has disposed of his interests in that company, and in Sound Workshop, which he also co-founded. Sid's initial assignment will be in the NYC offices of Audiotechniques Leasing and Rentals. We're pleased to have Sid Zimet with us, and feel that his years of experience will be a welcome addition to a growing Audiotechniques.

# And speaking of staff additions . . .

Tom Laughlin has joined Audiotechniques' technical service staff and can be found at our New York office. Tom comes to us with a good technical background and is specializing in MCI tape recorder installation and service.

Lou Greto, Greenwich, CT, has joined the Audiotechniques' sales department in Stamford. Lou, in addition to experience in hi-fi, is a brown belt karate guy (so better not argue about the price with Lou!).

Jamie Howarth, with a wealth of experience as a "Roadie" and studio engineer, is another new addition to Greg Hanks' technical services crew. Jamie is usually on the road, but he hangs his hat in our 1619 Broadway office.

#### 



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### MCI Hosts Industry Leaders Parley

# TARSIA HEADS NEW RECORDING STUDIO GROUP

### SHORT TAKES

Tom-Toms for Schwartz!

Tom Jung, President, Sound 80, Minneapolis, and Tom Cahill, Chief Engineer, Atlantic Recording Studios, NYC, have joined Howard Schwartz Recording in New York City.

Jung, who was a co-founder of Sound 80 and has been with the nationally-known Midwest firm for more than 10 years, will join the fast-growing New York studio complex shortly after Labor Day. Tom Cahill joined the Schwartz organization in mid-June as the Chief Engineer. With two nationallyknown engineers already on the roster, look for Howard to land another industry biggie as he staffs for a shot at the top.

#### Fist-O-Funk Studios!

Kevin Misevics' studio of the above name opened July 2 with a new, automated MCI 500 console, MCI 24 tracker, and all the associated gear, including a Lexicon Digital Reverb.

Kevin's taken over the Blood, Sweat and Tears complex that was formerly owned by Bobby Colomby in New City, N.Y. (just on the other side of the Tappan Zee Bridge). Our MCI installation crew, headed by Greg Hanks, put it all together, with sessions booked as the final solder joint cooled.

#### PCi goes 24

Another 16 tracker bites the bullet as Ted Hummel's PCI Recording (Rochester, NY) goes 24 with a new MCI installed by our usually-onthe-go technical crew. Keep your eyes and ears, too, on PCI... they've got it together!

#### More new stuff at Blank

Rapidly becoming one of the NY area's hottest studios, Blank Tape Recording took delivery of another new MCI JH 24 recorder, automation for their MCI console, and another MCI 2 tracker. These guys (Bob and Lou) are booked solid well into the fall with name acts!

#### More MCI for Blind Foundation

Nice to see American Foundation for the Blind's Peter Hanke and his two young sons at our recent Lexicon demo gig. And thanks to Peter and the foundation for their order of 5 more MCI recorders. We get a particular thrill out of playing a small part in the great work this group does every day.

World Radio History

Joe Tarsia, president of Sigma Sound Studios, Philadelphia and NYC, was elected temporary head of the Society of Professional Audio Recording Studios (SPARS) at the organization's founding meeting on June 13-15 in Ft. Lauderdale, Florida.

Other directors of the group, which is dedicated to achieving technical excellence in the recording studio industry, are: Bob Liftin, Regent Sound, NYC; Mack Emerman, Criteria, Miami; Glenn Snoddy, Woodland, Nashville; and Chris Stone, Record Plant, LA.

The more than 30 recording studio executives who founded the group were in Ft. Lauderdale as guests of MCI for a working seminar on technical directions for recording console design and manufacture. The formation of SPARS came at the suggestion of Don Frey of A & R Recording, NYC, who pointed out the continuing need for studio owners and managers to meet, exchange ideas, discuss problems and recommend technical standards.

#### Guest list and visitor's log

Our recent visitors include Bruce Bluestein, Sigma; Malcolm Addey; Jim Czeck, Nola; Mark Free, Chelsea; George Markunis; Jack Anthony; Tony Kalmen, Leasewell, NYC; Kevin Misevics; Charles Conrad; Jeff Kawalick; Stephan Glafas; Gary Rosen, House of Music, West Orange, NJ; Eddy Kramer; Bob Troeller and Tim Bomba, Sound Mixers; Gene Catani, RCA; Ray Weiss, NBC; Ace Frehley.

#### And a tip of the hat to ...

MCI's Jeep Harned for the PR coup of the decade and possibly the classiest industry meeting that's ever been held! The SPARS formation (covered elsewhere in "Mixdown") was only a small part of the accomplishments, as console concepts for the 80's were hammered out by a blue ribbon group of studio executives from across the country... and MCI picked up the whole tab. Which only goes to prove what we've been saying for seven years... MCI's on top of the heap when it comes to giving the recording industry what it wants... and in helping the industry decide what it needs. Well done, MCI!

### Studios represented at the MCi meeting were:

A & R Recording Studios, NYC; Atlantic Studios, NYC; Criteria Recording Co., Miami; House of Music, NJ; Filmways Heider Recording, Hollywood; Group IV Recording Studios, Hollywood; Howard M. Schwartz Recording Inc., NYC; Kendun Recorders, Inc., Burbank; Larrabee Sound, Hollywood; Media Sound, NYC; Record Plant, LA; Regent Sound Studios, LA; Soundmixers, Inc., NYC; Sigma Sound Studios, Philadelphia; Studio 55, LA.

### SCAMP DEMOS

Our Bob Cavanaugh is now demonstrating A&D's remarkable SCAMP rack of special effects devices to unbelieving ears in northeast studios. From the same people who give us the Compex Limiter, its an incredible array of auto panners, filters, limiters, eq and lots more. Call Bob and get your check book ready.

# BUILDING A RECORDING STUDIO? Make us your first call. Audiotechniques

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We re not only the biggest, we whink we re the best, by far! we ve been building studios for nearly eight years and have more years of combined professional audio engineering experience than we like to admit. Initial planning, financing, designing, equipment installation, maintenance . . . they're all our business. If your business is recording, you should be talking to us.

# New linkup for MCI/EMI

Fort Lauderdale FL...MCL Inc. and EMI, Ltd. have entered into a licensing agreement under which MCI will manufacture digital recording equipment, based on technology developed by EMI.

A prototype of the first machine to be developed under the agreement, the MCI JH-220 two channel stereo tape recorder, went on show at the Association of Professional Recording Studios Exhibition in London on 20 June.

Production models of the JH-220 will be available by the end of this year. The first of these will go into EMI recording studios and be immediately available to artists using those studios.

Future joint projects under the licensing agreement will include development of an editing system as well as multichannel digital tape recorders.

Development work on both these projects is nearing completion at EMI's central research laboratories at Hages in Middlesex, England, and prototypes of both will be completed by MCI by the end of this year, and will go into production early in 1980.

EMI's central research laboratories have developed a digital system which makes the EMI/MCI machines competitive with any digital recording systems in the world.

'In fact," says Bhaskar Menon, chairman and chief executive of EMI Music Worldwide Operations, "we have no doubt that the EMI/MCI system is the very best in the world.

'Our central research laboratory has been involved in digital technology research for as long as anybody in the world, but in addition to having achieved a tremendous level of technical excellence we have also researched the requirements of our

# **BEE Employment Service**

#### For Help Wanted

Any company or station can run technical Help Wanted ads at the flat rate of \$12 per month, per insert (for each 50 word increment). Payment is preferred with insert, but if invoice is necessary, there will be an extra \$1.00 charge. Blind box numbers can be provided at an extra charge of \$10.00 per insert, and the responses will be forwarded to the listee, unopened, upon receipt.

1

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Positions Wanted
Without Box Number
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industry.

"We are confident that the technology that the EMI/MCI venture will offer the music industry will dovetail very precisely with their requirements.

"Ours has the unique advantage of being an affiliation between the equipment manufacturer, MCI, and an equipment user, EMI. Clearly, this fact alone gives us a head start in what is becoming a very hotly contested technological race."

Jeep Harned, president of MCI, Inc., says, "I think that the cooperation between our two companies has been very fruitful to both parties, in particular because of the way it has brought American technology and British ingenuity together.

"Ours is a partnership that is well equipped to give the music industry the very best in recording equipment."

### Improved outer-rotor cartridge tape machine motors

Elmsford NY...Cartridge tape machines present demanding challenges for the motor drive system. The magnetic tape medium is heat sensitive and life is appreciably shortened if exposed to temperatures exceeding 135 degrees F. Japan Servo motors combine specially designed windings with a high-precision, close-coupled air gap, yielding the high torque required by tape cartridges while providing coolest possible running. These motors actually produce more torque output with only 17 watts input than other designs provide with 24 watts input. Running temperatures, measured under continuous operation, are typically 20° F. cooler than competitive motors.

Japan Servo motors have lower magnetic hum, lower electrical and mechanical noise incorporating dualplane micro-balanced rotors.

To facilitate repair and service, lifelimited parts such as shafts and bearing are interchangeable and easily replaced in the field providing lowest operating costs to the ultimate customers. Standard replacement parts are available from stock.

Hitachi high-cobalt hysteresis

materials, world renowned for their excellent magnetic properties and homogeneity of dispersion are used exclusively and precision shrinkfitted into the die cast rotors. The assembled rotors are then dual plane micro-balanced to eliminate vibration.

Japan Servo motors are guaranteed to meet all of the new NAB cartridge tape motor standards including DIN measured wow/flutter.

Each motor is installed in a cartridge machine actually playing tape, and must meet 24 stringent operating tests before being accepted for shipment.

Advanced design, engineering and construction excellence, combined with rigid quality control are the main reason why virtually all of the world's leading cart machine manufacturers including ITC, Spotmaster, Harris, Sono-Mag, Schafer and Sparta use Japan Servo motors exclusively as original equipment in their highest performing machines.

Japan Servo Company is the largest manufacturer of high precision fractional horsepower motors and gearmotors and is a subsidiary of Hitachi, Ltd.

#### **EMPLOYMENT CLASSIFIED** POSITIONS WANTED POSITIONS WANTED

Sales Manager, 5 years Industrial/Residential Video Sales, Rentals, and Industrial Production. Basic technical understanding all phases of Video Equipment willing to relocate. Resume available upon request. Kenneth Cheek, Personal, Southern Video Systems, Inc., 4019 W. Kennedy Blvd. Tampa, FL 33609. (813) 379-5094

1st class, 3 vr's TV and Radio, currently chief at backwoods station, desires maintenance or Asst. Chief with quality-conscious AM-FM. Have gold-plated ear; will travel. Can jock. Send replies to Box

AM, FM or combination owners. Thinking of selling? Upgrading? Experienced broadcast executive seeking first owner/operator venture in medium or small market. Let's talk. No brokers, please. J.U. Steele/Editor, NAB Code Authority, 477 Madison Avenue (#1405), New York, New York 10022, (212) 759-7020.

1st Class. Experience includes: 2 years directional, 6 years with noncommercial stations, fund raising, management, programming, instruction, complete design, operation and installation of 2 stations, CCTV experience. Prefer school station position but will look at others and will re-locate. Box PW 6-1.

Chief Engineer at Midwest AM/FM (stereo) automation station looking for advancement from a small-market facility to medium or large-market station. Love the station/work but I have to eat. Send replies to Box PW 6-2 for mutual exchange of information.

For listings with Box numbers, reply to , c/o BEE, PO Box 1238, Arlington VA 22210 Box\_



Usted ahora tiene acceso a la lista de equipo de radiodifusión mas extensa en el mundo.

Ofrecemos mas de 1,000 referencias en cada publicación.

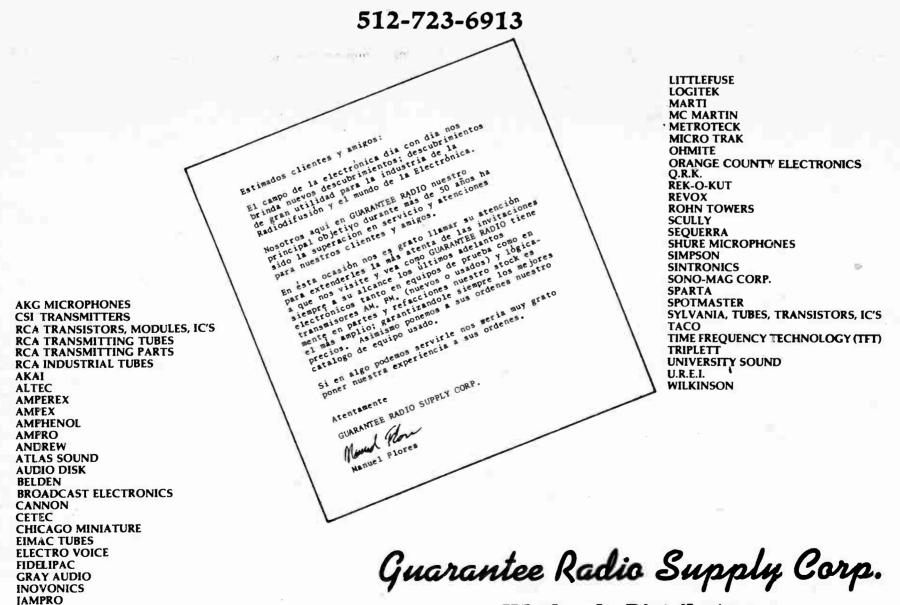
Debido a un acuerdo exclusivo con esta publicación. Broadcast Equipment Exchange (BEE). Guarantee Radio se complace en ofrecerle a usted y a los demas radiodifusores de México esta gran oportunidad.

En las siguientes paginas usted encontrară, convenientemente catalogadas, mas de mil referencias de equipo usado de radiodifución.

Con esta extensa selección. Guarantee Radio le permite comprar equipo de uso con la misma facilidad como si lo comprara nuevo.

Examine nuestra lista y convénzase de que este servicio que le ofrece Guarantee Radio le ahorrara largas horas y dinero en su búsqueda de equipo usado.

Para mas información, incluyendo precios llamenos al telefono:



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The Exchange The 125 MZC

#### **AMPLIFIERS** WANT TO SELL

Heathkit AA-111 stereo amp (tube) \$35. SP-2A stereopreamp, \$40. Eric ST-100 solid state MPX tuner, \$25. Key Code 7-5.

JBL Model 6233 power amplifier 200 watts per channel 8 ohm, 300 watts per channel 4 ohm, JBL 510 professional mic pre amp, new. Key Code 7-66.

Western Electric 22D remote amplifiers (five) (2-suitcase variety). All work. Some less VU meters. Make offer. Key Code 7-35.

Pioneer 4 channel amplifier. Best offer. Key Code 7-64.

RCA BA-12A Line Amp, 3 units. \$25 each. Key Code 6-20.

RCA 8X-1E Power supply for 8A11 pre-amps, 3 units. \$20 each. Key Code 6-20.

Sparta stereo preamps TEP-3, 2 available at \$50 each. Key Code 6-79.

RCA BA-4C Line Amp. \$20. Key Code 6-20. Altec P518A power supply. Key Code 6-42. Dyna 120 Basic Amplifier, 60 watts per chan-

nel, excel. cond. Best offer. Key Code 6-59. McMartin LT-80-B, 4 each \$75. Key Code 6-70

Phase-Linear model 2000 preamp, excellent cond. with manual. \$80. Key Code 6-19. RCA BA-13 Line Amp. 6 Units. \$40 each. Key Code 6-20.

GE Uni-Amp BA9-B. \$20. Key Code 6-20 RCA BA-14 Monitor Amp. 7 units. \$60 each. Key Code 6-20.

Altec 1569A amplifier. Key Code 6-36.

RCA BA-2C Line Amp. \$20. Key Code 6-20. RCA BA11-A Pre-Amps. 13 units. \$20 each. Key'Code 6-20.

G.E. model 48A10A utility amp. Key Code 6-42

Spotmaster AD-1B Audio D.A., 1 in, 5 out, excel. cond. \$256. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

McMartin TBM-2500 RF amplifier, good cond. Key Code 5-27.

Gates M6Z44 pre-amplifier, two available, good cond. Key Code 5-27.

Spotmaster PLA-20/Marti PGM-20 line amp, mint cond. \$95. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Gates M6442 pre-amp, two available, good cond. Key Code 5-27.

Dvnair DA-230A Video D.A., 1 in, 4 out, like new \$175. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Fairchild / Robins DA-1520, Audio D.A., 1 in 15 out, good cond. \$195. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868. Sony 100 watt stereo amp in road case. Used by former Beach Boy for instrument amp. \$500 or best offer. Key Code 4-85.

#### WANT TO BUY

McIntosh MC-3500 (need two) working 350 350 watt tube. Key Code 7-7.

Marantz #9 70 watt tube mono (need four) working. Key Code 7-7.

McIntosh MC-275 tube stereo 150 watt working. Key Code 7-7.

General Electric Model 4BA3A3 transcription amplifier and equalizer rotary switch for same (one). Be reasonable, or no go. Key Code 7-35. Harmon Kardon Citation II stereo 120 watt

tube working. Key Code 7-7. Dyna Kit Mark III 60 watt tube mono (need

many) working or not working. Key Code 7-7. Fisher SA-1000 working. Key Code 7-7.

RCA type BR-2 or 36-B rack shelves wanted. Key Code 6-19.

Turntable preamp, working, reasonable price. Key Code 5-58.

Marantz Model 5, any condition (need one). Key Code 5-8.

In the U.S. call 800-336-3045

For any Key Code Names and Addresses.

#### ANTENNAS & TOWERS

WANT TO SELL

Delta Electronics transformer (new, never used coupled antenna ammeter. Model used) coupled antenna ammeter. Model TCA5EX and TCA5EXM3 remote meter. Original price of \$380. Key Code 7-38.

GE 502 Gravel Bottom Guy Insulators 50¢ ea., volume 20% discount. Key Code 7-65.

400' or 800' Cablewave 1-5/8" Foam Low VSWR Transmission Line. Brand New on Reel. Wellflex with Connectors. 400' \$2,000, 800' \$3,990. H.M. Holzberg Associates., P.O. Box 322, Totowa, NJ 07511, 201-256-0455.

Andrew Heliax 7/8" transmission line (100 feet). Gates FM-2 Educational Ring Antenna. Make offer. Key Code 7-31.

Tower sections (to form 100 to 200 ft. towers), 24" face or larger, Key Code 6-16.

Crouse-Hinds DCB-24R rotating beacon. \$100. Key Code 6-83.

Rotary Joints 2 each, for 7/8" complete with Andrew fittings \$100 each. Key Code 6-4.

Tower, 320 ft. heavy duty, 36 in. triangular, lighted, immediately available. Key Code 6-17.

Harris FMC-2, two bay antenna tuned to 100.1 mHz, circular polarized. \$750. Key Code 6-29

Self-supporting tower, 200 ft, 4 leg. Includes base insulators, top light and flasher. Former use-AM and FM on ground. \$6000 f.o.b. Key Code 6-82.

Jampro 4 bay FM antenna. Key Code 5-36. Collins 4 bay FM antenna. Key Code 5-36.

Guyed Tower, 150 ft, on ground, good condition. \$800. Key Code 5-11.

Andrew 10.7-13.2 GHz rigid waveguide type WC-109, (54346-240), new, unused, /hardware, 190 feet, best offer, plus shipping. Lists at \$2,544. Key Code 5-31.

Utility Tower 200 ft. guyed Type 2201. Key Code 5-36.

329 feet Andrew 1%" HJ7-50A Heliax with connectors. Good condition, Key Code 4-43. Windcharger tower, 300 feet, with 20 ft. pole

at top. Lights and wiring for lights and deicers. Tower to be available on the ground April 1, 1979. Key Code 4-43.

Tower lighting chokes. 3 Wire, 2000 watts AC. Some new, some used. Some used available in weatherproof metal boxes. 6 available \$25-\$100. Key Code 4-24.

ing relays, small AC contactors, indicators, etc. Well worth \$15 each. Key Code 4-24.

Parts chassis. Were part of antenna switching-failsafe system. Many relays, latch-

Crouse-Hinds Tower light flasher unit. Mercury bulb type. In working condition, but dirty. \$25. Key Code 4-24.

Shively 6810 CP Antenna. 8 Bay turied to and 102.1 used for duplexing. Deicers 101.1 open. Key Code 4-12.

Harris FMC-2, Two Bay FM Broadcast antenna with deicers, tuned to 100.9 Mhz. Excellent condition. Station moved to new frequency. Key Code 4-43.

#### WANT TO BUY

Guyed tower (300'), Base insulator, A-3 lighting & ground system. Key Code 7-40.

Tower 200 plus ft, 3 leg. Key Code 6-63. Heliax 3" Transmission Line-150 to 250 feet. Will consider longer line. Key Code 6-16.

TV antenna for Channel 29 or 45. Key Code 5-50.

Six bay antenna or four vertical antenna for 106.1 with power divider. Key Code 5-51.

Wincharger Type 101 tower or 20ft sections of Type 101. Key Code 5-36.

Collins 37M-8 antenna tuned to 99.1 MHz with 1-5%" coax or other horizontally polarized antenna, 6 or 8 bay on 99.1 MHz in good cond. Key Code 5-38.

FM Circularly polarized 4 bays tunable 88 to 90 Mhz, that will accept 1KW R.F. Maximum. Key Code 4-38.

#### MAUDIO PRODUCTION (OTHER)

WANT TO SELL

Eventide instant phasor. Good condition. \$300. Key Code 7-30.

Dorroughs model 310 Audio Processor, excellent operating condition with full factory overhaul. \$1000, will ship continental USA. Key Code 7-42.

GLI 3880 Disco Mixer, \$375. Audio Techniques Inc., 652 Glenbrook Rd., Stamford CT 06906 203-359-2312.

ROH audio modules, 1-DA212 1x6 dist amp, 1-AG219—AGC amp. to fit ROH enclosures, about 1 year old, never used. List \$620, asking \$400 or best offer. Key Code 7-34.

Eventide Clock Works Omnipressor, two each/both new. Key Code 7-66.

Ampex hi-speed reel to reel duplicator. 1 master, 3 slave units: 1, half track and mono, 2, half, quarter, and mono. Key Code 7-22.

Langevin 251 type program equalizer. \$250. Brand New . Key Code 7-27.

DBX 187, 4 channel; Lexicon 93; Spectrason ics Complimiter. The Audio Group, 1780 B'way, New York, NY 10019, 212-765-7790.

International Contact Section

For more information on any product listed in BEE contact the following companies:

In Canada:	United Video L	td	Norbec Video	o Ltee
	1485 Triole Str	eet	4315 Giroua	rd
	Ottawa, Ontari	o K1B 3S4 or	Montreal, Q	uebec H4A 3E5
	Canada		Canada	
	613-741-5554		514-481-348	3
En Mexico:	Exclusivo, para	mas informaci	on, llamen:	
	Guaran	tee Radio Supp	ly Corp	
1314 Iturbide Street				
	Laredo	TX 78040 E.U.	Α.	
	512-723	3-6913		
In Australia: Contact the closest office of Audio Telex Communications,				
Svdnev (He	ad Office):	Melbourne:	Brist	ane:
54 Alfred Street		7 Essex Road	394	Montague Road
Milsons Point 2061				
		Tel: 277-5311	Tel:	44-6328
	In C	<b>Other Countrie</b>	5:	
Broadcast E	quipment Excha	nge Tel: 70	03-525-0400	
PO Box 123		TELEX	: IMASINC 6	4593
Arlington, V	A 22210 USA	Cable:	IMASINC AF	RLINGTON VA

Accounting and a second and a

800-336-3045

World Radio History

\$20000. Key Code 7-21. A.P.I. S25 Limit comp, de-esser (six). \$150 ea. Excellent condition. Key Code 7-30. Advent Dolby B model 100 noise reduction

system. Excellent condition. \$150. Key Code 7-32. Pultec EQP-1A Program Equalizer. Mint

Gates KSP-10 stereo automation, meticu-

lously maintained, 5 Scullys, 4 Carousels, 2 single plays, logging, etc. Guaranteed,

cond. \$500. Key Code 6-51 Dorrough Discriminate Model 310 with

most recent updates made. \$1200. Key Code 6-1.

Collins 116F equalizer, exc. cond. \$25. Key Code 6-2

AK6 BX20E stereo reverb excellent cond. \$3500. Key Code 6-66.

RCA amplifiers (2 sets) and audio processors available each set contains 2 RCA BA-43 program amplifiers with BA46 limiter and BA47 clipper. Each set is contained in wired rack mount unit, \$500 per set or best offer. Key Code 6-79.

Telex CS-45 headsets (3), like new, \$49 each. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

2 UREI 813 Time Aligned Control room monitors. Brand New. \$2200. Key Code 6-66.

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

MIC MIC Master Room II Reverb like new cond. \$875 or best offer. Key Code 6-66.

Sony S777 SM audio mixer four mics instereo two lines in-stereo \$75. Key Code 6-73. Lang PEQ-2A program equalizer, \$195. Auto-dyne, Box 13036, Orlando FL 32809. 305-

855-6868 One pair Altec 604E Control room monitor

speaking in cabinets. \$550. Key Code 6-66. MXR Compander Noise Reduction Unit, \$75. D. Abercrombie, Coyote Sound, 4318 Pan American Frwy. NE, #252, Albuquerque NM 87107. 505-883-0163.

Dolby A301, good cond, two available at \$500 each. Key Code 5-33.

Spotmaster, sound brightner. CLE-500 compressor-limiter-expander. Excellent con-dition. Quant 2 for \$500 each, or both for \$900, or best offer. Key Code 5-84.

Ampex AM 10 mixer, good cond, \$350. Key Code 5-33

Fairchild 658A reverb-rarely used, good cond. Key Code 5-27

Orban Optimod F.M. in exc. cond. Key Code 5-34.

Kepex module with enclosure and manual. New, still in original package. \$290. Key Code 5-15

Garron Phase enhancer, Model STE-100. \$400/offer/trade for stereo modulation monitor/or???. Key Code 5-41. Inovonics, Orban, Technics, DBX, Lexicon

Eventide, production tools, equalizers, reverb,

limiters, amplifiers, monitor speakers, digital delay, broadcast mixers and more, New, demo and used equipment. Full Compass Systems,

55 N. Dickinson, Madison WI 53703, Tel. 608-

Orban parametric equalizer. Rack mount, 2

channel. \$637. Only a few hours use. Key

WANT TO BUY

EMT 140 reverb plates, mono or stereo. EMT

Patch cords, twin-plug style, College Class D

station will accept donation. Key Code 6-38.

Tape delay, Electronic delay or cart. Key Code

Quad Eight NS-120: Noise Gates (in any con-

DBX 160 Compressor/Limiters. Key Code 4-

AUTOMATION EOUIP. -

WANT TO SELL

Harris System 90 automation, full stereo

w/logging package, \$35000. Key Code 7-20.

New Listings are in Italics.

dition for good price). Key Code 4-10.

257-7722 or TWX 910-268-2745.

240 gold foil reverb. Key Code 7-2.

Code 4-85.

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BROADCAST	EOUIPMENT	EXCHANGE	1
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BROADCAST
EQUIPMENT
EXCHANGE

# <u>ACTION-GRAM</u>

JULY 1979 USE BEFORE OCTOBER 1979

5

Instructions: Use this form to take advantage of any of the services provided by *Broadcast Equipment Exchange*. Always fill in the Contact Section below first, then fill in the appropriate service section(s). Remember, BEE provides a FREE listing service for end-users. Listings are printed *without* the listee's name and address... A Key Code is used instead. Paid subscribers receive their issues of BEE with the matching Key Code list. Non-paid subscribers do not; they pay for the Key Code only when they order it (see the Subscription Section below).

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World Radio History

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#### AUTOMATION ... WTS ... CONTD.

IGM full stereo 600 system (complete) Inc-Brain, 4 Carousel, 3 Singer play cart, 2 Scully 270 R-R, Network switches, 2 IBM printers, 2 card readers, IBM 26 card punch, assorted parts, etc. Key Code 7-39.

Schafer 800-S stereo brain/two each/mint condition. Key Code 7-66.

SMC SSP 30-60 stereo automation with 3 carousels, random select, 4 Scully 270s, logging with 33RO. \$7000. Key Code 7-33. Schafer remote controls for Model 800-S, four

each. Key Code 7-66.

Schafer Model 903 computerized automation system with ITC reel to reel playback units (4), audiofile units, cartridge playback units, 2 of which are set up for time announce. Extel logger printer teletype encoder, tone generator. System is capable of stereo operation and has studio manual control unit. Key Code 6-14.

Harris System 90, with 4 ITC 750 players, two random access 350 Carousels, and one Harris Criterion Compact III cart player. Key Code 6-26.

Schafer 903 with 3 Revox reels, 3 carousels, time announce with 2 ITC decks \$24,000. Key Code 6-43.

IGM Ram automation. 16 months old. All updated modifications made. Includes 4 ITC reel desks, time announce, 3 carousels, 4 racks. Original cost new \$24000. Replacement cost \$27000. Asking \$20,000. Key Code 6-49.

Shaffer SA100 spotter control unit minus reel to reel. Make offer. Key Code 6-62.

Schafer 903, with 4 Ampex players and solidstate electronics, two random access Carousels, and one ITC RP cart player. Key Code 6-26.

Model 250 carousel. Good cond. Key Code 6-40.

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Gates RA-10 1000 event, 10 source random access system, 2 each model 252 random access carousels, stereo. 2 each Scully model 270 playback decks, 14" reels, stereo 10 source model SSC control center, silence sensor, AA-1042 audio control (4) DCU-3 tone sensors, digital logging system with encoder. In two racks: \$12,000. (Station buying expanded system). Key Code 6-11.

Gates SC-48, with TPG-2 time controller, 25 Hz. filter, and silence sense. With three Revox A77 players and two Carousels, one random access. Key Code 6-26.

Sparta 726 automation brain. Good condition. \$450. Key Code 6-81.

Shafer 800 equipment including: tube type control panel w/clock; switching panel; silence sensor; automatic switcher w/digital clock; time gate; network switcher; spot locators w/M-50 memory; audio clock; power supply; detector; remote control boxes; cables. Most working when removed from service. Make offer, sold as a lot or separately. Key Code 6-11.

SMC 20 Hz High pass filters. Key Code 6-69. IGM 400 control unit. Key Code 6-10.

Two SP-10 programers w/cart machines. 1 AMS-10SB logging switcher, 1 GC-24 decoder (SCM), 1 AS-12 Audio switcher including remote control panel (SCM). Would rather have cash-or-Revoxes or VCR or 16mm cam-/projectors or TT1UB or Field strength meter or other test equip. Key Code 6-33.

CD-24-R Kartel. Less than 2 yrs old. Used for only 3 months. Two available. Key Code 6-45. SMC, DP-1 system, 4 each 250 carousels, 4 each Revox 77, time announce, remote control, teletypes & encoders. Good cond, & in service. Key Code 5-55.

Harris SP-10 Automation System (complete) (no tape or cart eqmt), with manuals. Best offer. Key Code 5-89.

#### WANT TO BUY

Cart carousel. Key Code 7-11.

IGM 400 Programer, excl. cond. Key Code 6-40.

In the U.S. call 800-336-3045

For any Key Code Names and Addresses.

### WANT TO SELL

**GE PE350** Plumbicon cameras (2), some power supply rework needed. Pedestals included. Offers. Key Code 7-53.

**GE PE400** with enhancers, no monitors or console racks. Key Code 7-1.

**RCA TK42** CCU unit remote control, 100' of cable & RCA pedestal. New tubes. Best offer. Key Code 7-64.

*Cinema Products* Steadicam, demo. \$16,950. Key Code 7-36.

Visual Horizon 3" IO B&W camera. 100' cable CCU unit & pedestal. Best offer. Key Code 7-64.

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.

RCA TD-1 MI-26044 pedestals and cradle heads MI-26203, 2 each. Key Code 6-13.

RCA model TK-60A studio B&W in like-new condition with complete CCU, solid-state power supply, remote control, and 1%", 3", 5" lenses, cables. \$1,300. Key Code 6-74.

Nikor Zoom Lens for IVC 90 cameras, 2 each. Key Code 6-13.

Many feet B & W camera cable, many con-

nectors. Sell or trade. Key Code 6-48. Asaca 7000 cameras complete. Never used.

Four at \$39000 each. Best cash offer or will trade. Key Code 6-57.

Yoke assembly for 3" I.O. camera. New. Sell or trade. Key Code 6-48.

Shibaden tv cameras, 2 each, (FP 1200 & FPC 1000 AU) includes CU<sup>-</sup>S, 3-50 ft. cords, one carrying case. Total \$13,000. Key Code 6-12. Ikegami HL-77A w/13:1 lens, 3 mos. new. Key Code 5-42.

RCA Vidicon Cameras MI-3623A, \$75 ea, \$120 or best offer for two. Key Code 5-8.

RCA TK-60 with lenses, no CCU, gd cond, best offer. Key Code 5-47.

Varotal V, F4, 40-400 manual zoom lens with control, best offer. Key Code 5-47.

Hitachi/Shibaden FP100D, B & W cameras, 2 each, 10:1 lenses, cables, sync gen, CCU's cases, and manuals, reasonable. Key Code 5-57.

Sony AVC-4000A monochrome camera with 5-1 zoom lens and manual, perfect, \$750 or best offer. Key Code 5-68.

RCA TK-42, 3 each, complete with manuals, sealed bid for opening June 20. Mark envelope "TK 42 Bid". Minimum \$750/each F.O.B.

Further info on request. Key Code 5-48. RCA TK-60A studio B/W cameras, 2 each, zoom lenses, fixed lenses, manuals, many extras, in perfect shape, work gd, \$1250 or best offer or trade. Key Code 5-68.

TK-42 camera. Best offer. Key Code 5-25.

#### WANT TO BUY

**Panasonic WV-2200** portable color camera and NVA-610 color camera adapter. Key Code 7-15.

Cameras, old color and black and white with lenses. Key Code 5-40.

#### CART MACHINES

#### WANT TO SELL

Sono-Mag Model 560 record/reproduce cart machine with manual. Fair condition. Make offer. Key Code 7-56.

**Spotmaster 2000** PS stereo playback unit \$400, and 2000 RPS stereo record/playback unit \$600. Good condition. Key Code 7-57.

ATC-PT2 playback & TB201 record amp, condition looks like new, but not working. Best offer, one or both. Key Code 7-34.

Gates M-5944 Cart Machines, 3 good units, 1 for parts. Plus Gates M-5952 rec. amp. \$125 total. Key Code 6-16.

**RCA RT-7** cart machine with BA-7A record amp. Key Code 6-54.

800-336-3045

<u>World Radio</u> History

**Tapecaster 700 PS** stereo-play-back, 5 yrs old; needs new heads for top quality perf. Make offer. Key Code 6-65.

**Collins tape cartridge system.** Units are complete. Appear to work but replaced with new equipment. Make offer. Has manuals. Key Code 6-55.

Spotmaster 400 series record/play, good cond, \$150. Spotmaster 400 series play, 2 available, good cond, \$100 each. Key Code 6-10.

Tapecaster 700P lever release. Two at \$150 each. Key Code 6-27.

Spotmaster 500 rec-play mono. Has new heads & extensive mods. Hums on play; otherwise ok. \$100 or trade for audio equip. of equal value. Key Code 6-52.

Tapecaster and ATC machines and ATC record amps. Key Code 6-17.

Collins Model BP-190 cart player. Key Code 6-42

Collins 642A-1 cart machine with 216C-1 record amp. Key Code 6-54.

Spotmaster (older model) record/playback unit. Appears complete. Rack mount type. no manual. Make offer. Key Code 6-55.

Tapecaster 700 RPS, stereo, 5 yrs old, needs new heads for top quality perf. Make offer. Key Code 6-65.

Spotmaster 5300A triple-Deck mono PB machine. Brand new motor \$950. Key Code 5-1.

Gates Cartritape II playback unit. Out of service for 7 years. Works, best offer. Key Code 5-9

Harris Criterion compact (four). Key Code 5-21.

Tapecaster R.P, in gd. cond, heads like new, \$425. Key Code 5-70.

Tapecaster stereo 700 in gd. cond, \$300. Key Code 5-70.

Spotmaster, Gates, ITC, Tapecaster, Ampro, etc. Call or send for current information. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

#### WANT TO BUY

 Tape Delay Unit in good condition. Key Code

 7-51.

RCA RT-7A or RT-7B Cart machine. Does not have to be working, needed for parts only. Key Code 6-38.

Spotmaster "5 spot". Prefer a unit that needs repair. Key Code 6-28.

Collins 642 Record unit. Key Code 6-35. Collins 642 Record Amp in any condition. Key

Code 6-35. A T C AB190 Record Amp in any condition. Key Code 6-35.

ITC 3-D with record, all tones. Key Code 5-49. Rack mounting for oldATC or Gates Criterion.

Key Code 5-49. ITC 303DS stereo cart machine. Key Code 5-51.

Record-Playback (mono) cart machine, inexpensive. Key Code 5-43.

Anything working or close to it. Preferably not rack mounted, but I'm flexible. Key Code 5-58.

Cartridge machines. Key Code 4-38.

# CASSETTE & REEL-TO-REEL

#### WANT TO SELL

Crown reel to reel 700, \$100. Key Code 7-4. Ampex 351-2 stereo. 7.5 and 15 ips. Excellent condition. \$1250. Key Code 7-16.

Ampex MM 1000, 8 track recorder reproducer w/master sync 7½/15 good cond. \$6000. Key Code 7-30.

**TEAC A-3300** HS-27 Low Hours, top condition. \$650. Key Code 7-47.

Scully 282-4, Mech lifters, adj guides. In console. \$2100. Audio Techniques Inc., 652 Glenbrook Rd, Stamford CT 06906. 203-359-2312. **Revox A-700**, new condition, \$1800. Key Code 7-66.

Scully 280-B 2 track, in console. 7.5-15 ips synchronous motor. \$3000. Key Code 7-2. 3M 56, 16 TK, 15/30 ips w/16 channels of

relay operated dbx noise reduction. \$15000 or will consider offers separately. Key Code 7-2. Ampex 350 parts, torque motors & brakes, 550 oc 550 parts, torque motors \$125 tor

\$50 ea, head ass., \$100, Idler ass., \$125, tension arm, \$25, pinch roller ass., \$50. Key Code 7-5.

**Crown** reel to reel 800, \$450. Key Code 7-9. **Ampex 300**, 2 track w/tube electronics (351 type w/AME) in console. New Heads. Excellent condition. \$1200. Key Code 7-27.

Ampex 350 Overhauled & good condition, 3-3/4 & 7½. \$700. Key Code 7-47.

**Pentagon model #RCC 1120-3.** Reel and cassette master, three slave positions. Duplicates over 80 C-60 cassettes per hour. Used only 50 hours. Excellent condition, save over \$1,000. Price \$3,700 complete. Key Code 7-60.

Scully 270-2 stereo tape player/4 each. Key Code 7-64. 3M 64. 4 track w/cards for 2 channels only.

Half inch and quarter inch quides. 4, 2 & 1/4 TK

heads. 15/30. \$2400 or best offer. Key Code

**PR-10** Capstan ass. w/motor \$100, PR-10 Head ass. w/set of FT & set of HT stereo heads,

Ampex 300 mono recorder w/351 tube elec-

tronics (AME) unmounted. \$500. Key Code 7-

Metrotech Model 552A (two) Four track. 96

hrs per 3600' tape reel. Excellent operating

condition. \$750 ea or \$1400 for the pair. Key

Sound Scriber Model S124 Tape recorder/re-

producer used as logger until recently. Needs

work. Also includes manual & 4 cartons of

Tape-Athon Model 702-10 tape players,

three each, new condition. Key Code 7-66.

Scully 280-2, S/N 939 Mech lifters, in con-

sole, Good condition. \$1750. Audio Techniques Inc., 652 Glenbrook Rd., Stamford CT

Reel to reel VM full track tape recorder, model

Magnecord 1048 updated with solid state

electronics (very clean), \$400. Key Code 7-9.

Wollensak (3M) Cassette duplicator. Model

6030 reel master and three model 2760 Cassette slaves. Full operating condition.

Pioneer RT707 automatic reverse reel to reel

Scully 280-2, S/N 893, Mech lifters. In Con-

sole. Good condition. \$1700. Audio Techniques Inc., 652 Glenbrook Rd., Stamford CT

Scully 280B 1/2 track, stereo, 71/2-15, AC

motor, with console, new \$3100 FOB. Key Code 7-4.

Ampex 601 in brown simulated leather case,

full track, needs work on motor. Key Code 7-

AKAI Pro 1000, new in original box, \$1400.

Scully 282-4, S/N 2916, Motion sense, ATL,

Adj guides. In console. Looks Good. \$2900.

Audio Techniques Inc., 652 Glenbrook Rd.,

Uher 4000 Report L, 5 each, some parts miss

ing, all for \$100. Autodyne, Box 13036.

Ampex 600 full track recorder in portable

leather case. exc. cond. \$250, Key code 6-2.

Ampex 351-1, stereo \$1300. Ampex AG-

350, full track, \$1000. Shafer model SL330

two chennel logger, \$850. All now in use. Key

New Listings are in Italics.

Stamford CT 06906. 203-359-2312.

Orlando FL 32809. 305-855-6868.

Magnecord 748, \$450. Key Code 7-9.

audio recorder. Best offer. Key Code 4-64.

tape. Make offer. Key Code 7-56.

727. Make offer. Key-Code 7-3.

06906. 203-359-2312.

\$500. Key Code 7-42.

06906. 203-359-2312.

18

Key Code 7-66.

Code 6-11.

3M Prof. deck, \$600. Key Code 7-8.

7-2.

27

Code 7-42

\$150. Key Code 7-5.

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#### CASSETTES ... WTS ... CONTD.

Ampex 403 electronics with power supply in good working cond. \$60. Key Code 6-19.

Nakamichi 1000-II cassette recorder 3 months old. \$1650 new, sacrifice for \$1150. Key Code 6-34.

**3300-2S-2 trk** stereo decks (2 each); salvage quality; Make offer over \$50. Key Code 6-65. **Revox A777** half track  $7\frac{1}{2}$ -15 with sel sync, vari-speed, remote control, rack mount and portable case. \$900. Key Code 6-66.

Scully 280-4 track-mod. 502-400-400 (no motion sense or servo motor) has sync-sync master, \$2900. Key Code 6-70.

UHER 4000 report, \$100 w/leather carrying case and accessories. Key Code 6-73.

Sony TC-252 stereo, with speakers, works OK, \$50. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

UHER 9500 slow-speed logger ¼ track, 7½-15/32 I.P.S. stereo or 4 mono channels. \$300 or trade. Key Code 6-6.

Ampex 354, stereo, 2 track, single unit tube electronics, good cond, \$975. Key Code 6-8. Ampex 350 Tape Recorder carrying cases, 4 each. Good cond. Key Code 6-16.

**Tascam 80-8** w/DX-8 and roll-around console (mtd); 60 hrs use. \$4000. Key Code 6-65. **Ampex headbox** with 2 PB headcables. Key Code 6-69.

Magnecord 1022 stereo transport, 3¾-7½, excell cond, \$395. Autodyne; Box 13036, Orlando FL 32809. 305-855-6868.

**Revox A77** ¼ track stereo 3¾-7½ with remote control, rack mount and portable case. \$600. Key Code 6-66.

Sony S777, \$250. Stereo-2 track (4 track record). (\$300 w/mixer unit). Key Code 6-73. Ampex 601 very good condition, leather case

excellent. \$275 or make offer. Key Code 6-76. Wollensack portable model 10W tape

recorder-5" reels-counter 1%-3%. Key Code 6-42. Sony TC-357-4 monophonic tape recorder,

good cond. \$100. Key Code 6-7.

Ampex FR-1100, ¼ in. tape transport; 7½-15 ips two 2-chan. hds., 10½ in. reels only, no elect. As-in in short rack. \$300 you pick up. Key Code 6-52.

Sony TC-850-2 and Sony TC-850-4, 150-200 has mixdown mstr. use; Exc. cond. \$600 each. Key Code 6-65.

Crown-10½ reel deck for stereo playback, manual only, can be modified for mono record. Best offer. Key Code 6-73.

Ampex 351 Mono, Reconditioned. \$1195. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Ampex 351-2 transport rebuilt like new with new capstan and new stereo head stack assembly, \$1450. Key Code 5-15.

Scully 280 SP, 2 track recorder, with remote control, exc. cond, \$1850. Key Code 5-26. Ampex AG-600 stereo tape recorder, two available, good cond. Key Code 5-27.

Magnecord PT6-6 tape recorder, works o.k., except for brakes, \$100. Key Code 5-30.

Ampex AG440-4 in portable cases with 2 and 4 track head stack, good cond, \$3500. Key Code 5-33.

Ampex AG500, exc. cond, 2 tracks,  $7\frac{1}{2}$  and 15 ips,  $\frac{1}{2}$  track stereo, \$1000. Key Code 5-46. Magnecorder 1024, needs some work, in cases, quarter-track stereo,  $7\frac{1}{2}-3\frac{3}{4}$  ips, four heads, \$550. Key Code 5-54.

Ampex AG 300-4, walnut cabinet, exc, \$1100. Key Code 5-61.

Ampex 351-2 tape transport only, \$600, gd. working cond. Throw in repairable mono electronics free. Key Code 5-62.

**Revox 8 77** demonstrator, 2 track stereo,  $7\frac{1}{2}$ -3<sup>3</sup>/<sub>4</sub> ips, cabinet, \$1200. Revox A 77, 2 track stereo,  $7\frac{1}{2}$ -3<sup>3</sup>/<sub>4</sub> ips, new heads, \$700. United Tapes of America, 303-242-0405.

Ampex 351 full track recorder, new heads, exc. cond, \$995. Key Code 5-26.

Magnecord 1028-24 Stereo 2T, 7.5-15, excel cond. \$750. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Ampex AG-500 2HS tape recorder, good cond. Key Code 5-27.

Ampex PR-10 mono transport and electronics, fair cond, \$200. Key Code 5-30.

**Tascam 701-4**, half inch 4 track recorder (works fine but sold as-is) includes home-built roll-cabinet if wanted, was \$2000 new, complete with ALL manuals (bound) for \$1200, excel. prod. machine. Key Code 5-74.

Ampex 351-1 stereo, tube type, 7½-15 ips, original and perfect, \$1500. Key Code 5-76. UHER Teaching Machine, Model 5500, New \$350. Model 4000, complete \$90. Key Code 5-80.

Ampex 602-2. \$720. Key Code 5-87.

Magnecord PT6 Decks \$35, Electronics \$35, both \$50, clean, low mileage, need some work or excellent for parts. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Crown SX-824 Stereo/Quad (Special), 10½ in. reels, 3.75-7.5, with extra Crown stereo preamp, presently set up for: 2ch, 4T pbk & record (FT erase); 4ch, 4T pbk; 2ch, 2T pbk; and can be set up for Delay mode (for telephone talk shows, etc). In portable case (can be rack mounted). Excel cond. \$1375. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Technics RS 1500, RS 1520, RS M85, etc. Reel-to-reel and cassette, portable and rackmount. High performance pro gear, \$200-2300. Also demo and used recorders. Full Compass Systems, 55 N. Dickinson, Madison WI 53703. Tel. 608-257-7722 or TWX 910-286-2745.

stereo; new ½ trk play head, \$350. Key Code 5-49. Head stack for Scully 380, 3 heads, two-track

Ampex 300-1 full track with electronics for

stereo, exc. \$250. Key Code 5-54.

Magnecord 1024 quarter track ERP Rack Mount \$400, Excel. Key Code 5-76. Scully 284, 8 track recorder, Key Code 5-81.

Sony 777-4 portable professional 3¾-7½ ips machines excel. cond. \$250 each. Key Code 5-82.

Otari Reel to Reel full track, 2, 4 and 8 track and highspeed duplicators. MX-5050B in stock. Authorized service. Also demos and used recorders. Full Compass Systems, 55 N. Dickinson, Madison WI 53703. Tel 608-257-7722 or TWX 910-286-2745.

Roberts 192 HT, mono. excel. cond. \$125. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Magnecord Model 1021 R-R recorders (four), gd. cond. Key Code 5-21.

Ampex 602 mono tape recorder, fair cond. Key Code 5-27.

Roberts 1770 D, 4 track, Key Code 4-40.

**Tascam 70H2**, 2 track stereo  $7\frac{1}{2}$  & 15 ips Master recorder, set up for Scotch 250, excel. cond., new heads. \$1,100. Key Code 4-10.

Scully 250-2 track, rack mount. Showroom machine. Warranty. \$1900. 7½-15 ips, half track. Key Code 4-85.

Scully 2808-2 track, rack mount. Excellent cond. Showroom machine. \$3000, firm. Key Code 4-85.

Ampex 351 Master electronics. Very clean, were working when removed from service. 3 available. \$150 each or all 3 for \$400. Key Code 4-24.

Roberts 720A, 4 track. Key Code 4-40.

TEAC recorders. Demo units. 20% off A2300SX, 3300SX & SR. Warranty. Key Code 4-85.

#### WANT TO BUY

Crown CX-822, 3 speed, half-track stereo recorder. Key Code 4-5.

Ampex AG-440 record/play electronics (Ampex pt. #4020260-01) and other parts to convert a mono to 2 channel machine. Tax exempt University Radio Sta. Key Code 4-19. Viking stereo electronics, or any other good quality stereo electronics. Key Code 4-5. Studer, Ampex, 3M, 2TR thru 24X. New & used. The Audio Group, 1780 B'way, New York, NY 10019, 212-765-7790.

**Berlant** Concertone models BRX-1, BRX-2, 20/20, 20/30, decks, electronics, separate or together, working or not working, for parts. Key Code 4-7.

**Teac 70-8** recorder any condition. Key Code 6-2.

Ampex full track 601 or 602, good cond. Key Code 6-23.

Gates ST-101-need not be in good cond. but repairable and intact. Key Code 6-28.

Ampex 350/351 portable transport case, good cond. minimum metal corrosion, tears & holes. Key Code 6-30.

Sony TC-850 10½" reel to reel ¼" tape decks. Key Code 6-46.

Real to reel tape recorder (½ track or ¼ track) 2 speed for production room. Key Code 6-28.

**7" reel to reel** decks that operate on 12 volts DC with or without record or play electronics. Key Code 6-46.

**Cassette tape loaders** used for winding ½" cassette tape into C-O cassettes with or without automatic splicers. Key Code 6-46.

8-channel record-playback erase head stacks (3m Min Com machine). Key Code 6-72.

Ampex 300 and 3200  $10\frac{1}{2}$  and 14" 3 motor transport with or without electronics. Key Code 6-46.

**Cassette Duplicator**, stereo at least two slaves (prefer four) any condition. Key Code 6-2.

**Bias amplifiers** (½ MHZ) for Ampex 3200 high speed duplicating system. Key Code 6-46. **Norelco** Carrycorder cassette recorders model #150. Key Code 6-46.

Ampex 350 or 351 series, FT, 7½/15 IPS w/tube electronics, AS-IS OK. Key Code 6-77.

Recorder 2-track, late model. Key code 5-81. Rack mounts for Ampex 601 recorders. Key Code 5-11.

Ampex 601, gd. or easy to repair cond., even if it doesn't work. Price negotiable, but be reasonable. Key Code 5-58.

Reel-to-Reel, 2 TR stereo, inexpensive. Key Code 5-43.

Cassette Duplicating machine. Key Code 5-45.

#### CATV-MATV EQUIP.

WANT TO SELL

Finco G-144, UHF broadband amplifier, new, never used. 45db gain, 75 ohms input and output. \$100. Key Code 6-80.

Finco G-532-FM, weatherproof FM trap, new, never used. 75 ohms input and output. \$12. Key Code 6-80.

### WANT TO SELL

Ampex MX-10 stereo mixers, works great (two) \$250 each. Key Code 7-32.

Tapco 6000R reverb mic mixer. gd. cond. \$225. Key Code 7-32.

Gates SA-50 dual channel mono console with custom formica cabinet, very good condition, just out of use 5/79, \$600 or best offer. Key Code 7-35.

Tascam model 10. 8x4 Demo unit. \$1650. Audio Techniques Inc., 652 Glenbrook Rd., Stamford CT 06906. 203-359-2312.

**Board with Technics SL210** (two) turntables, AKAI mono, stereo 6 channel mixer in mobile transport case looks good, \$1000. Key Code 7-10.

Tapco 6000 CFR, 6 channel, EQ, Reverb, XLR connectors, excellent condition, \$275. Key Code 7-5.

RCA BC3C good cond. \$350. Key Code 7-9. ORK Futura, 10 channel console, Used 3 years in high school communications course. Make offer, would trade for small stereo unit. Key Code 7-31.

See page 14 for International Contact Instructions

World Radio History

MXR mini-limiters (two) stereo pair with LED's, modified with strapping and in-out switches, rack mtd with rack mtd power supply (separate) STD 19", all for \$280. Key Code 7-32

Solid State recording console—24 in, 16 buss, 40 faders, 40 meters. Top quality. Used 7 years. Modified for 24 track, \$30,000. Key Code 7-41.

Ampex MX-10 mixer excellent at \$200. Key Code 7-47.

Custom designed 14-channel stereo console, Includes dual power supply, program equalizers, reverberation section, multiple *y* inputs, and mixing, and more. Made by Visual Electronics, for top FM station. Exc. cond. \$4000 or best offer. Key Code 7-52.

Langevein AM-4 with add ons. Transistorized Console (8 × 4). Key Code 7-62.

Konigsberg 16x16 Console.Orig. cost \$48K. Handyman special, requires rewiring and assy. \$7500. Audio Techniques Inc. 652 Glenbrook Rd, Stamford CT06906. 203-359-2312. Two MX10 tube type mixers (4-2) Mint cond. \$550/pair. Key Code 6-47.

RCA 8C-28 studio consolette and power supply. Used and modified, however lots of good parts. Still worked when removed. Make offer. Key Code 6-55.

Preamp cards (3) for Gatesway 80 console, should be ok. Make offer. Key Code 6-59. Gates studioette 4 channel mono fair condition as is \$275 or best offer. Key Code 6-62. Gates executive console, M6158A, Ten gain controls, with 40 inputs total stereo console 4 yrs old \$3500 or best offer. Key Code 6-79. Sony MX-16 mike & line mixer, 4 outputs,

excellent condition. \$450. Key Code 4-25.

RCA 8C-7A 10 Channel stereo console, \$2500 or will trade for 5 Channel Harris in good cond. BC-7A is in very good cond. Key Code 6-39.

SSI Console, 24 input, 16 bus, adapted to 24track monitoring; 40 faders; separate monitor mix; 2 cue busses; 4 echo sends; 550 audio accessories jack field; 40 vu meters, plus 27 d8m out, plug together installation. \$30,000. Key Code 6-41.

Sony MX-16; 8 in, 4 out; good cond. 4 yrs. old;

Electrodyne Console 20 in: 16 out, exc. cond.

stereo echo, Patch bay. Many extras. \$8000.

Gates "Yard" and Gatesway M-5133A tube

type audio consoles. Both operational. Key

8 Channel type BC-3C RCA Standard con-

solette M1-11641-A. \$300. Key Code 6-53.

Gatesway Console Heavily used and modi-

Sparta PS-6A power supply card for A-158

console and Sparta monitor amplifier card, .

#1025-A for A-158 console. Make offer. Key

Lamb PML 420 mixer with power supply, 4

channel stereo with sensitivity, three band EQ,

pan, reverb send on each channel. Limiters on

each output. Perfect except VU's don't work.

GE 8-mixer dual channel transistor console

model 4BC-21A1 with built in patch panel. Good cond., currently in use. \$1000. Key Code

Ramko DCBMS (2vrs old) stereo bd, with

monitor amp and LC-4 remote control relay

unit. 8d. still in service. Available July 1979.

\$2500 new, asking \$1100 for pkg. Key Code 6-

Budweiser console, Input Section: 20 inputs,

Monitor Section (solid state) 24 in and 2 out, The console uses discrete solid state compo-

nents throughout with the exception of the

details. \$1800. Key Code 6-70.

tube input modules. Call or write for complete

.

New \$675 priced \$295. Key Code 6-64.

fied. Good for parts. Make offer. Manual

RCA Console BC-68. Key Code 6-40.

\$300. Key Code 6-65.

included. Key Code 6-55.

Key Code 6-68.

Code 6-17.

Code 6-59.

6-51

58

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#### CONSOLES ... WTS ... CONTD.

Custom Heil 12 x 4 Mixing Console w/Duncan Faders, Used. Key Code 5-88.

Sony MX-20 8 x 4 Mixer, like new w/tape monitor switch added balanced in/out, \$500. Key Code 5-74.

CM-607 (CM Laboratories) Disco Mixer. New. K Code 5-88.

Tangent Mixing Console 12x2x1. New. Key Code 5-88.

Russco mixer, Studio Master 505, mono with Canon XLR connectors. \$500. Key Code 5-10. MM Electronics 16x2x1 Mixing Console. New. Key Code 5-88.

Sates producer board, Four pots, 12 inputs, vu merter, mono, good cond. Key Code 5-27. Tascam Model 10, used under 10 hours. Quad pan, input cue/solo, monitor mixdown plus more 8 in, 4 out. Key Code 5-52.

Fairchild 16 in, 4 out, plus Q-mixing console with equalizers, tone generator and all transformers, in and out, reconditioned. Key Code 5-73.

Spotmaster Consoles. New. Send for literture. Best package prices on trade-in of surplus equipment. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Gates 4 channel, solid state Producer Console, mono, rough but works, best offer. Key Code 5-9. Collins 212F-2, 6 mixer, 17 input mono console, Includes manuals, spare Pgm amp, built-in limiter. Price negotiable. Key Code 5-24. Biamp #1282 Mixer, new. Key Code 5-88.

Gates Dynamote Portable remote mic mixer amp, good cond, \$70. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

**7 mixer stere**o board \$1300. Key Code 5-51. **Bogen PA Mixer**, model LOM Series E-97, brand new. Key Code 4-40.

#### WANT TO BUY

MCI, Auditronics, Neve, Harrison, API. New, used. The Audio Group, 1780 B'way, New York, NY 10019, 212-765-7790.

Gates M-5235 phono pre-amps. tube type, mic input transformers for old G.E. BC-1A console and plug in condensers. Key Code 6-56. Microphone input transformers for G.E. type BC-1-A console, need two or three. Also need plug in condensers for same. Key Code 6-22.

Console 4 or 5 pot stereo, inexpensive. Key Code 5-43. Electrovoice Eliminator 2: Loudspeaker sys-

tem. Key Code 4-10. Tascam Model 10 Input Modules #101. Key

Code 4-5. Tascam 16 Monitor Mix Module. Key Code 4-

5.

### WANT TO SELL

Altec 9845-Six each. \$400. Key Code 7-41. JBL 4341 monitor speaker system, pair-\$1800. Key Code 7-2.

South West Tech Tigersauras (two) 200 watt amps all solid state both work, used in mobile disco, \$200 ea. Key Code 7-10.

Custom Micro-Trak turntable cabinet. Desk mount for Russco 720/740 turntable. Perfect to sit on shelf or table top. Best offer. Key Code 7-23.

Altec 16 in. coaxial speaker and Altec crossover network in enclosure. \$100. Key Code 6-78.

Pair of Altec A-7's 500 HZ X-over, 8 ohms, current model used once. Key Code 6-36.

Grampain Feedback Cutter and 150 watt amplifier. exc. cond. \$300. (Grampian Amplifier) Key Code 6-2.

Pair of small Voice of the Theatre speakers good cond. Key Code 6-36.

Altec 9845 6 for \$375 each plus shipping. Key Code 6-41.

Biamp EQ 210-Stereo graphic 10 Band. New. Key Code 5-88.

In the U.S. call 800-336-3045

For any Key Code Names and Addresses.

Custom built 8-track cartridge loop mixer used to record a stereo mix onto an 8-track master loop (1" tape). \$500. Key Code 6-70.

Matrix PPI-16 Electronics. New. Key Code 5-88.

SP-108 (Concertaudio) Floor Monitor. New. (6). Key Code 5-88.

Klipsch Model B Corner Horns (pair), cost \$2500 new, excel. cond. \$1495 for pair. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Pace 1/3rd octave Pro SR-271 Graphic EQ's. New. (five). Key Code 5-88.

Snakes, 9 Pair x 100ft. New. (two). 15 pair x 100ft, 17 pair x 100ft, 19 pair x 100ft, and 27 pair x 100ft. Key Code 5-88.

Mic cables. New 25, 50, and 100 foot in quantity. Key Code 5-88.

Small Community horns w/Altec 808-8A & 80 Drivers (used) (th2ee). Key Code 5-88.

Ashly SC-66 Parametric Stereo EQ. Used. Key Code 5-88.

DBX units, Model 122, \$225. Model 124, \$325 (2 avail.) or all 3 for \$800. Key Code 5-49. De Coursey Stereo Electronic Crossover-800HZ. New. Key Code 5-88.

Bose Model 2201 Corner Horns (4 ea) with built-in 50W. amps. Walnut and hand carved Indian Sheeshamwood cabinets, hand loomed Tussah raw silk grille cloths. Cost \$3944 new. Like new, \$2750 for 4. Send for brochure. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

ElectroVoice Interface: B speaker system. In factory carton. \$675/pair reduced to \$550. Owner will ship anywhere in U.S. Key Code 4-85. ~

#### WANT TO BUY

Electro-Voice Speaker components 30W, 8HD, 1823, 1823M, T350, X8, X36, SM120A, EVM-18B, also EV mikes any model. Key Code 7-7.

Marshal Time Modulator, Eventide harmonizer, Kepex and Gain Brain, UREI 1176 LN, Neumann & AKG condenser mics. Key Code 6-66.

ALTEC Drivers: for 203B horns. Key Code 4-10.

# WANT TO SELL

Fresnel Spot Lights (three) 500 watts, with clamp mount and gell holders, \$80 ea. Key Code 7-10.

Lightmaster 681. Six channel, 1KW/CH with individual & master fader. Special effects modules. Audio Techniques Inc., 652 Glenbrook Rd, Stamford CT06906. 203-359-2312. Portable stage lighting for group, need used gear in good cond. Key Code 4-10.

#### LIMITERS

WANT TO SELL Spectra Sonics Complimiter 610, new. Key

Code 7-66. G.E. unilevel amplifier. Works sorta. \$35. Key Code 7-35.

CBS Volumax 400 in new condition. Key Code 7-66.

General Electric Model 4BA9 "Uni-Level" AGC amplifier. Fair condition. \$75 plus shipping. Key Code 7-24.

General Electric 2-chassis 1947 peak limiter, (Genuine) ideal for anchor for large rowboat or yacht. \$60. Key Code 7-35.

CBS Audimax 4440A new. Key Code 7-66. Fairchild 663 (two) compressors with variable release time and threshold set up for stereo, \$75 ea. Key Code 7-10.

GE BA-9B Unilevel Compressor Amplifier. Very good condition. \$75. Key Code 7-14.

**Raytheon** limiter amps (matched pair (?) of 1948-50). Work well, but! By the pound, or by the piece. \$50 ea. Key Code 7-35.

Teletronix leveling amplifier Model EL-2A. Good condition with instruction manual. \$150 or best offer. Key Code 7-56.

800-336-3045

World Radio History

Collins 26V-3 Auto-limiting amp. Exceeds manufacturor's specs. \$350. Key Code 7-61.

FM volumax 410 automatic peak controller \$250. Key Code 6-79. RCA BA-6A Limiter. 2 units. \$100 each. Key

Code 6-20.

CBS 4450A. Audimax (stereo AGC) great condition \$900 or best offer. Key Code 3-93. Spectra Sonics 610 complimiter. \$250. Key Code 6-27.

Spotmaster Sound brightener. Exc. cond. Key Code 6-40.

Roger Meyer, RM-58 stereo or dual mono limiter. \$400. Key Code 5-78.

Collins 26U-3 Auto-Limiting Amplifier, excel. cond, \$395. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Gates Dual Peak limiter, M6144, good condition, with manual. Key Code 5-4.

Gates Sta-Level, Model M-5167, exc. cond, \$100, FOB. Key Code 5-59.

Wilkinson TAMM-1A AM Modulation monitor with PPF-1A Positive Peak Flasher. Like new, \$695. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Ashley solid state peak limiter compressor, 1 yr. old, exc. cond, \$200, FOB. Key Code 5-59. Gates SA-38 and SA-39B Limiting Amps, not

checked out, look ok, \$65 ea. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868. Spectrasonics Model 610 limiters. (2), exc.

cond, sell or trade for two (2) Urei 1176LN limiters. Key Code 5-41.

Gates Level Devil, exc. Cond, \$100-FOB. Key Code 5-59.

Gates Solid Statesman AGC, good cond, \$395. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Gates 'Solid Statesman' FM limiters. Matched for stereo, excellent cond, pair for \$850. Key Code 5-23.

CBS Volumax 4110 four years old, exc. cond. Key Code 5-27.

Gates Limiter, fair cond., Model M-35298, \$50, FOB. Key Code 5-59.

CBS 710 Automatic Loudness Controller, excel. cond, \$535. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

CBS Audimax 4450A, four years old, exc. cond. Key Code 5-27.

Kahn Symmetrapeak Model SP-58-1A, exc. cond, \$100, FOB. Key Code 5-59.

UREI BL-40 modulimiter. Demo unit. \$591.50, warranty. Key Code 4-85.

#### WANT TO BUY

FM mono limiter for automation station. Must be in working condition. Key Code 7-26. Teletronix LA2A. Universal Audio 175, 176. Fairchild 660, 670. UREI 1176, 1176LN. Key Code 7-2.

Service/operating manual for RCA BA-6A limiter, origianal or good complete copy o.k., must be complete. Key Code 6-22.

CCA LA-1D limiter compressor amplifier, good cond., used. Key Code 4-28.

Urie 1176-LN limiters (2), trade for two (2) Spectrasonics Model 610 limiters. Both exc. cond. Key Code 5-41.

FM Limiter, Key Code 4-38.

DBX 162 Stereo compressor/limiters. Key Code 4-10.

#### MICROPHONES

#### WANT TO SELL

RCA 44A (quantity 2) excellent condition. \$55 each. Key Code 7-50.

**Sony ECM-33P** new with boxes, wrapping and warranty, never used! Two for \$315. Key Code 7-32.

**Superscope**, Super EC-9P electric condensor mics, battery or phantom powered, new with box, warrantys, never used. Both for \$165. Key Code 7-32.

Sony ECM-22P, like new, complete with holders, cables & cases. Two each at \$80, or both for \$150. Key Code 7-47. Neumann, AKG, Telefunken tube microphones, various others. Key Code 7-2.

AKG D202E2, Two Altec 633A, Sony ECM33P, Shure 315S, EV RE-55, AKG D-900E, Shure SM-33, New. Key Code 7-66. RCA BK11 Ribbon microphones (like 44BX)

Brand New. \$250 ea. Key Code 7-27. AKG 202E professional 2-way dynamic with

swivel adpt. \$95. Key Code 7-32. RCA-matchbox ribbon type, \$25. Key Code 6-

73. RCA 44BX with desk stand (mint), 3 early Altec condensors originally used by CBS, several WE/ALTEC 639 B, Key Code 6-17.

Western-Electric model 633A Saltshaker

Neumann U-67, Sony C37A, ADG D-900 sys-

tem, ADG D202 and many more used, demo,

and new microphones for sale, mostly trades

on our new equipment. Call or write for our

used equipment list. Full Compass Systems.

55 N. Dickinson, Madison WI 53703. Tel: 608-

Calrad 10-21 mics, 4 eac very good cond.

w/orig. boxes. Dual-Z; wired 200 ohmsdynamic. W/cables & clamps. \$25 each. or all

Electro-Voice model RE-20 professional mic-

rophone, new, in factory box. \$250. Key Code

Synchron AU-7A condenser mic's \$169

each. Autodyne; Box 13036, Orlando FL

Stands-basic Atlas, weighted base. (2) \$25.

Electro-Voice model CS-15 professional elec-

tret condenser microphones. Two available

new, never used, in factory cartons. \$170

Sony, Shure, Sennheiser, ElectroVoice,

AKG, AudioTechnica, JVC and Clear-Com

condensor, dynamic microphones and inter-

com headsets. Parabolic, Lavalier and wire-

less in stock now. New demo, rebuilt and used.

Also rentals, Full Compass Systems, 55 N.

Dickinson, Madison WI 53703. Tel: 608-257-

Marti microphones (2)-MCD-70. 'Push-to-

Talk' type. Require four prong jack, exc. cond.,

Sennheiser MD-421 Dynamic Studio Car-

doid, excel. cond., \$195 ea. (3 available.) Auto-

dyne, Box 13036, Orlando FL 32809. 305-

WANT TO BUY

RCA Model BK-1 and/or BK-11. Key Code 7-

Neumann U47, U87; Senn. 421, 441; AKG 414; Shure SM 57, 58; EV RE 20. The Audio

Group, 1780 B'way, New York, NY 10019.

Neumann M49, 249, U47, U48, U67, M50,

269, KM54, 256, KM64, KM66, SM-2, KM53, KM63; AKG C-12, C-12A. Telefunken M251 &

Western Electric 633 "Saltshaker". Key Code

RCA 44, 77DX BK-5, 10001-KU3A ribbon

Telefunken U47, U48, M251 tube micro-

Wireless microphone, any condition, prefer Hi

RCA BK-11 or Western Electric 639. Also

RCA 77 DX Microphones, non working, also

parts, yokes, shells, sure-mounts, magnet

assemblies, etc. must be reasonable. Key Code

Telefunken VF-14 tube, for Neumann U47

microphone. Also, Telefunken AC701 or AC701K tubes, Neumann Power supplies and

Neumann U-67s microphones. Key Code 5-

New Listings are in Italics.

RCA Model 91 desk stand. Key Code 6-31.

VF-14 tubes for U47-U48. Key Code 7-2.

microphones. Beyer M88. Key Code 7-2.

Band, transistorized. Key Code 6-2

RCA Model 50 with yoke. Key Code 7-54.

7722 or TWX 910-286-2745.

\$50 ea. Key Code 5-23.

855-6868

212.765.7790

phones. Key Code 7-2.

cables. Key Code 5-79.

54

7-54

6-22

81

Shure SM-7 mike \$200. Key Code 5-75.

RCA-44BX, \$50. Key Code 6-73.

mike, working \$80. Key Code 6-19.

257-7722 or TWX 910-286-2745.

Astatic-77A, \$10. Key Code 6-73

4 for \$87.50. Key Code 6-52.

32809. 305-855-6868.

each. Key Code 6-74.

Key Code 6-73.

6-74



MICROPHONES ... WTB ... CONTD

Neumann U-47, U54, U64 and KM 84, also tubes for 47. Key Code 5-29.

RCA desk stand Model 91-D (MI-4092G). Key Code 5-37.

Sony: ECM-377, ECM-280, ECM-33P, need several of each in good cond. Key Code 4-10.

#### 💼 MISCELLANEOUS 🚥

WANT TO SELL

Six foot, blue 19" equip. racks with plugs in side. Best offer. (Two) Key Code 7-64.

Rack Cabinet (14"), (19" w by 14" h) black finish, hinged lid, very good condition, \$30. Key Code 7-5.

3M background music machine, factory overhauled. Key Code 7-66.

**Custom built Micro-Track** turntable cabinet. Desk mount for Russco 720/740 turntable. Ideal to sit on shelf or table top. Best offer. Key Code 7-23.

Ampex ABR parts. Send for list. Key Code 6-69.

Factory manuals for the following: RCA RT-78 Cart/Playback machines, Gates M 4885 Console, Gates PC-150-190 and AC 150-190 Playback amplifier. Key Code 6-55.

SMC Spotter parts. Send for list. Key Code 6-69.

**Custom metal cabinetry w**ith console mounting board 2 single bay cabinets and cartridge storage racks \$1000 or best offer. Key Code 6-79.

8 Mic cables 50' long with Cannon XLR3 connectors \$10 each. Key Code 6-66.

Capitol switch assemblies, 21 switches, DPDT on 3½ panel. Key Code 6-69.

60 UTC PC-08 transformers (similar to Ouncer series) 600 ohm to 15 Kohm. \$3.50 each. Key Code 6-69.

Apeco copier, single sheet type. \$500. Key Code 5-87.

Warehouse Cleanout: Ashland A84HCEZU-8A 600/1200 rpm sync. & G.E. 5KCP12BG22 4 pole motors. All new, never used. Best offer. Key Code 5-5.

Dual rack cabinet. Two standard 19" racks side-by-side, blue armorhide, removable formica desk top at front. Two adj. sets of rack channels. Side and rear doors. Three sets chassis slides, a-c box mounted. Size less desk  $48\frac{1}{2} \times 26 \times 75$  inches high on heavy duty casters. New, some shopwear. \$200/each. You pay shipping. Key Code 5-44.

Uninterruptible power system. Charger-Inverter provides 115VAC at 300 VA up to 24 hrs, from 24 volt battery (not supplied) if power fails. Battery voltage and current meters, max. output 5 amps, new, with manual. \$100/each. You pay shipping. Key Code 5-44.

Multiple output power supply. Input 115 VAC, outputs (plus/minus) 50 VDC at 500 ma, -24 VDC at 1 amp, -18 VDC at 2 amps, -12 VDC reg at 3 amps, (plus/minus) 9 VDC at 300 ma, +6 VDC at 600 ma (adjustable to 5 volts). Outputs individually rectified, filtered, fused, common ground. With selectable output voltage meter, New. \$100/each. You pay shipping. Key Code 5-44.

**MICA Transmitting** and phasor capacitors. Many different ratings and values. Call with your requirements. Key Code 4-24.

Angle iron sample loops. Type 'N' output. With mounting hardware and insulators. Heavily galvanized, and in excellent condition. 4 available. \$50 each. Key Code 4-24.

Pyrex bowl feedthrough, 7 inch. Several available. With stud, \$8, without, \$5. Key Code 4-24.

**60 double patchpoint** jackfield wired to barrier strips. \$50. Key Code 4-24.

Pyrex bowl feedthrough, 6 inch. Several available, with stud \$5, without, \$3. Key Code 4-24. Phasor and LTU RF Coils by E.F. Johnson several types available. ribbon and ceramic core. Fixed and variable. Call for details. Priced \$10 to \$50. Key Code 4-24. WANT TO BUY

**Component parts** in your shed that are sporting Gates "SA" Series I.D. plates. Modular components only. Key Code 7-35.

Wanted for non-commericaleducational station; 2 mics, cartridges (any cond.), easy listening or gospel music; tape equip.; tax receipts for donations. Key Code 6-18.

Surplus Blank Records must be usable, 12 inch small hole and 7 inch large hole only. Seconds o.k. Key Code 6-22.

Patch Cords, double plug each end, two or three foot long, shielded type, can be shorts or opens, will repair, need 10 or 20. Key Code 6-22.

Equipment racks, price negotiable. Key Code 5-58.

Dummy load for 10KW AM, must be in gd. cond. and reasonable. Key Code 5-60.

Studio Warning ("On the Air") Lights/fixtures made prior to 1960. Key Code 4-6.

#### MONITORS

WANT TO SELL McMartin TBM3000 frequency monitor.

Excellent condition. Key Code 7-66. Belar SCA Monitor in new condition. Key

Code 7-45. McMartin TBM3005 frequency monitor.

Excellent condition. Key Code 7-66.

Collins 54Z-1 AM Freq. Mon. Excellent Condition, 78KHz, can be programmed to any freq., 540-1600 KHz, \$300. Key Code 7-61.

McMartin TBM-2500 FM RF Amplifier \$250. Key Code 6-51.

GE BM-1A mono FM frequency & modulation monitor with manual on 95.9 MHZ. \$100 or trade. Key Code 6-6.

GE 5A FM Monitors, 2 each, exc. cond. Key Code 6-16.

Belar SCA monitor, good cond. Key Code 5-27.

RCA 1181 frequency monitor. Key Code 5-36.

RCA 66A modulation monitor. Key Code 5-36.

Nems Clarke 108E, 3 tower phase monitor, good cond, \$95. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

HP 335 FM modulation monitor (3). Key Code 5-36.

Andrew 40-C Phase Monitor, \$95. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868

Andrews AM phase 40C monitor. Key Code 5-36.

General Radio Frequency Monitor Model 1181-A, 1430 KHZ. Good condition, best offer. Key Code 5-77.

TFT 713 AM Frequency and modulation monitor. Like new cond. Calibrated by TFT in summer of 1977. Will have TFT tune and test on your frequency as part of purchase price. \$1250. Key Code 4-24.

Johnson Air FM & SCA Tuner (tuned for 97.7 Mhz) Model 1C-1. Key Code 4-40.

Gates Radio Modulation Monitor Model M-2639. Key Code 4-40.

Miratel Air Alert model AA1. Key Code 4-40 Gates Radio Frquency Monitor model M4990 tuned to 1350 KHz. Key Code 4-40. Gates Radio Frequency Monitor Model MO-2890, tuned to 1420 Khz. Key Code 4-40.

WANT TO BUY

AM Mod. Monitor. Key Code 7-11. FM modulation monitor, RF amplifier, stereo monitor, SCA monitor. Key Code 6-77. Metron 506B-1 A.M. modulation monitor,

Metron 506B-1 A.M. modulation monitor, good cond., used. Key Code 5-28.

RCA BW-43 AM modulation monitor, good cond., used. Key Code 5-28.

See page 14 for International Contact Instructions

World Radio History

F.M. Modulation monitor. Kev Code 4-38.

FM-RF Amplifier to drive FCC approved modulation monitor. Key Code 4-67.

# WANT TO SELL

**B & W film camera**, GE 4PC17B1 and Multiplexer 4TV86C1. Make an offer. Key Code 7-43.

Minolta D-10 Super-8 Camera with Wilcam mag. sound conversion, mike, amplifier, magazine, chest pod. \$500. Key Code 7-33.

Arri 35MM Motion Picture Camera in mint cond, fact. overhauled, var. speed motor, matt box, 2 mags cable, \$500. Key Code 7-67.

Moviola 35 MM film editing machine, two heads, opt. & Mag, excellent cond, black model, \$550. Key Code 7-67.

Cineflex 35mm movie camera 200 and 400 ft magazines, 3 lens turrett, completely overhauled, 4 lens in fitted case, 12 volt D.C. operated, age unknown, but may be military, case was prior to re-finishing. Make offer. Key Code 6-22.

Boom Stands, Shot-Gun, Lavalier and wireless microphones, intercom headsets, Otari and Technics recorders, parametric equalizers, limiters, noise reduction, mixers, special effects equipment and custom equiment. Full Compass Systems, 55 N. Dickinson, Madison WI 53703. Tel: 608-257-7722 or TWX 910-286-2745.

General Precision/Graflex 16mm film sound projector. Needs sound P.C. board. Otherwise appears complete. \$100. Key Code 6-78.

Film Editing machine Moviola 35mm black model Mag and Opt sound \$700. Key Code 3-90.

Entire 16mm Film System. Equip. includes: Splicers; Timers; Jamieson film processor; B & H Cameras; Beauliou, Auricon, Mitchell & Cinema Cameras; and much more. Equip in excell cond, call or write for details. Key Code 6-5.

RCA 16mm film, sound projector model-400. \$200. Key Code 6-78.

Camera Movie Super 8 Bauer C5X1 zoom electric eye pistol grip cassette \$105. Key Code 3-90.

Kodak AF Carousel Slide Projectors (4); (1) Five Channel Encode/Decode controller; (1) Automatic dissolve control for two carousels. All in new condition. \$700. Key Code 6-25.

Auricon Pro-600, exc, complete in case, 2 mags, no amp or mag heads. Angineux 12-120 zoom, tripod & dolly. Package \$1600. Key Code 5-54.

#### WANT TO BUY

Zeiss Moviscop 16mm picture viewer complete in good cond. Reasonable price paid. Key Code 6-52.

Neumade Dynamic film rewinder, 2000 ft., 16mm, two geared ends. Prefer well-used units in good cond. Reasonable price paid. Key Code 6-52.

Optical-magnetic sound reader; single unit portable-type in good cond. and complete, for use mainly on 16mm. Reasonable price paid. Key Code 6-52.

use mainly on 16mm. Reasonable price paid. Key Code 6-52. **16mm ''soundies''**. These are short productions by singers, etc. on film. Reverse image, or normal ok. Answered immediately, reasona-

# ble. Key Code 6-32.

WANT TO SELL

McMartin TR55 SCA receivers, 10 each, excellent contiion. Key Code 7-66. Johnson Z42-540 remote transceiver, four

years old, good cond. Key Code 5-27. Motorola HT-220, 4-channel VHF Handle-

Talkie, 5 watt, with charger, remote mike and touch-tone signalling, \$400. Key Code 5-53. WANT TO BUY

Primary power cable connector, with cable or alone, for a COMCO 940 UHF-FM transistorized mobile radiotelephone. Manufactured by MOLEX. COMCO part number A501. Quantity—2. Key Code 7-46

AM tuner for minotoring AM Broadcast Band. Key Code 6-61.

NOAA weather receiver with alert circuit; 162.475 MHz. Key Code 5-49.

#### REMOTE & MICROWAVE EQUIP.

WANT TO SELL

Rust 1000 Remote Control Unit. Good condition. Key Code 7-51.

Moseley PCL-505-C 950 MHZ, composite S.T.L., SGC-9 stereo generator. 2 yrs. old, now in service. Price for all: \$3990. Key Code 6-11. Gates RDC-10 AC remote control units, two

both in good cond. \$500 each. Key Code 6-29. Studio end PBR-30 AR with Data Receiver. Key Code 6-69.

Moseley RRC-10 remote control units for use w/26 KHZ STL system, needs tubes. \$450 or trade. Key Code 6-6.

Rust Remote Transmitter Control system. Key Code 6-16.

Two 7GHZ tunnel diode preamps 15DB gain 5DB N.F. Sell or trade. Key Code 6-48.

CCA RPT 150-40W remote transmitter, four years old, good cond. Key Code 5-27. RCA Model BN-6 transistorized remote

CCA RPR-540 remote receiver, four years

Marti 960 MHZ STL without antennas. Best

Microwave Assoc. 2 GHz, STL, MA-2B with

built in 7.5 & 8.5 MHz sub-carriers, A-1 condi-

Gates Radio Remote Control Unit, studio

unit model M5864, transmitter unit model M5663. Key Code 4-40.

WANT TO BUY

Transmitter remote control system. Key Code

Dual channel STL. 950 MHZ solid state/with

Marti Transmitter & Receiver tuned for

Gates M-5870, RDC-200-A remote control

STL. stereo, with or w/out remote control.

Moseley PCL-303C or PCL-505C composite

STEREO GENERATORS

WANT TO SELL

RCA BTS-1A stereo generator with manual.

CCA Stereo Generator, SG-1E, modular

model, good condition, with manual. Key Code

Stereo generator, exc. cond. Key Code 5-51.

CCA SG1E, only 2 years old, replaced by

Gates stereo generator (for use with Gates

TE-3 exciter). Exc. cond, \$300. Key Code 5-23.

WANT TO BUY

Moseley SCG-9 stereo generator. Key Code

RCA BTS 1-A in operating condition. Key

SWITCHERS (VIDEO)

WANT TO SELL

American Data 558-1 less than a year old.

RGB Chroma Keyer, soft wipe, edger and 99

VIS-75 Sarkes-Tarzian prod. video switcher, 7

noncomp and 3 comp. w/preview bus. Best

Ampex monochrome switcher-disolver, 2

input, rack mounted, solid-state, \$50 or best

Sony SEG-2 monochrome switcher, with

manual, perfect cond, \$650 or best offer or

Hitachi EA-103 color switcher and effects generator. Key Code 4-73.

effects. \$17,500. Key Code 7-43.

offer or trade. Key Code 5-68.

offer. Key Code 7-64.

trade. Key Code 5-68.

Optimod, offers considered. Key Code 5-35.

remote control. Key Code 7-40.

metering system. Key Code 6-3.

STL, 947 MHz. Key Code 5-71.

161.73MHZ. Key Code 7-51.

Key Code 5-49.

\$300. Key Code 6-6.

5-4.

6-81.

Code 6-25

amplifier, \$95. Key Code 5-26.

old, good cond. Key Code 5-27.

offer. Key Code 5-89.

tion, Key Code 5-66.



## WANT TO SELL

**Sonly or 3M 3/4" video cassettes, 128 (60** min), 12 (5 min), 12 (15 min). Best offer. Key Code 7-64.

Sony 3/4 inch videocassette empty hard plastic cases. Key Code 7-55.

Used Fidelipac Carts. Variety of lengths. Contact Ed Lipson, KVOE Radio, 316-342-1400.

14" reels (3)  $\frac{1}{4}$ " recording tape on metal reels with NAB hub, used but should be okay. Make offer. Key Code 6-59.

Classical music series. Details available. Key Code 6-75.

Basic beautiful music masters on ten reels with 25 Hz tones. Instrumental and vocals on separate reels. \$5.00 for a demo 10" reel. No announcements. Key Code 6-75.

Red Audio cassettes, C-8 high quality Audio magnetics tape, never recorded. Lots of 1000, 35¢ each, lots of 10,000 25¢ each. No lables, no boxes, you pay shipping. Key Code 6-37.

Music library hits from fifties and sixties, w/announcer. \$1.00 per reel. Send bucks for any amount you want. None repeated. 7" reels of vocals and instrumentals intermixed. Key Code 6-75.

1" tape for IVC, Scotch 361, 10 new 60 min, 11 used 60 min, 3 used 30 min, 1 used 10 min. All for \$350. Key Code 5-48.

Huge inventory of used Scotch, Fuji and Sony 34" videocassette stock. 10:00 length only \$4.00/reel negotiable. Key Code 5-2.

3M and Fuji used 2" videotape stock. All reels cleaned and evaluated. \$25.00/reel negotiable. Key Code 5-2.

Easy listening music-½ trk stereo approx 95 reels, 25 Hz cue tones, \$1000 for all, metal and plastic reels. Key Code 5-49.

Sulk erased 2" tape precision reels, 1200' splice free, \$20. Key Code 5-61.

#### WANT TO BUY

Video cassettes, ½" for Phillips/Norelco VCRs. Used, any length. Key Code 5-40.

#### TEST EQUIPMENT

WANT TO SELL

RCA Field Intensity Meter, type WX-2D. Covers bdct band 540 to 1600. Key Code 7-59 Tektronix 547/1A1 dual trace, dual time base, alternate sweep 50 MHZ scope. \$990. Key Code 7-63.

Hewlett-Packard 141AR storage mainframe. \$295. Key Code 7-63.

Eico tube tester model 667. Make offer. Excellent condition. Key Code 7-3.

HP 524 Freq. Counter w/100MHz Plug-in, \$125. Key Code 7-5.

Hewlett Packard 616B Microwave Signal Generator meets or exceeds new factory specs. Complete with manual. \$1000. Key Code 6-4.

H-P test set: rack, 204C oscillator, and 353A patch panel. \$500. Key Code 6-70.

B&W Mod. 400 distortion meter. \$100. Key Code 6-70.

Tektronix 545 oscilloscope with dual trace plug-in, \$300. Key Code 6-78.

Hewlett Packard 61BC Microwave Signal Generator meets or exceeds new factory specs. Complete with manual. \$1200 or will trade for FIM-21, or WX2c Field Int. Meter or Nems-Clarke 120-E. Key Code 6-4.

Sencore: PS 148 scope. \$70, and PS 120 scope \$30. Key Code 6-70.

Sorenesen model OSB-6-15 rackmounting 3½" high, lab type regulated power supply variable 5 to 9 volts at 15 amps, 30 pounds. New, \$75 plus shipping charge. Key Code 6-74.

**Oscilloscope**, B&K 1471BP. Dual trace. Both probes included. less than 1 yr. old. Cost \$600 new. Make offer. Key Code 3-61.

Eico Capacitor tester, old but good. Make offer. Key Code 6-59.

H-P 331A distortion a nalyzer. \$700. Key Code 6-70.

In the U.S. call 800-336-3045

For any Key Code Names and Addresses.

H-P test set #3550B-like new, including rack, H20-204C oscillator, 353A patch panel, 403B VTVM. \$1200. Key Code 6-70.

Heathkit: Lab generator (RF); \$30. Hickok Tube Tester, \$20; RCA Senior Voltohmyst; \$40; RF Generator, \$20; Simpson VTVM, \$20; Transistor Checker, \$20. Key Code 6-70.

Leeds-Northrup Resistance Decade Box, 1 ohm to 10k in one ohm steps. Make offer. Key Code 6-59.

Sencore MU-150 mutual conductance tube tester, just factory calibrated, exc. cond. Best offer. Key Code 6-59.

Room tuning package: including, GR #1382 random noise generator; B&K precision sound level meter #2203; B&K octave filter set #1613; B&K precision calibrated condenser mike. \$1800 for all. Key Code 6-70.

Tektronix #154-0562-00 replacement CRT for model 602 display scope. New, in factory box, \$165. Key Code 6-74.

Rutherford Electronics Co. model B16 Pulse Generator. Like new. \$85. Key Code 5-91.

H-P 202B Low Freq. Osc. 5HZ to 600 KHZ, 5 bands, as-is. \$50. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

HP 400D AC voltmeter. Calibrated, clean. \$75. Key Code 5-8.

BC-221AA freq. meter, 125 KHz to 20 MHz, gd. cond.; with manual and calib. charts, \$25. You pay shipping. Key Code 5-44.

B & K Dual Trace 15 MHZ scope model 1472B. Lkie New. \$450. Key Code 5-91.

Polyskop I model SWOB, 400 MHZ. \$400. Key Code 5-91.

H-P 211A Square Wave Gen. 1HZ to 1MHZ, Excel. Cond. \$195. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Hewlett Packard Model 200AB audio osc, (2 avail.), very gd cond, with manuals, \$75/each. You pay shipping. Key Code 5-44.

Tektronix 525 waveform monitor, perfect cond, \$500 or best offer or trade. Key Code 5-68.

Tektronix 316A 10MHZ scope. Good cond. and calib. \$200. Key Code 5-91.

H-P 330B Distortion Analyzer, 20HZ to 20KHZ, .03-300V, as-is. \$150. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Stoddart PRM-1 field intensity meter, \$300. Key Code 5-26.

Hewlett Packard Model 310A wave analyzer, exc. cond., with manual, \$1200. You pay shipping. Key Code 5-44.

Eico capacitor checker, Knight signal generator, old scope, all as is, all for \$50 plus freight. Key Code 5-74.

Leeds & Northrup 5430A, Wheatstone Bridge/cable fault finder, good cond. \$95. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

**Electronic** test equipment and parts for sale. Write for list. Key Code 5-7.

**Tektronix Model 514-D** oscilloscope, good cond., with manual, \$150. You pay shipping. Key Code 5-44.

Tektronix RM31A, with dual trace plug in and calib. Rack mount. \$275. Key Code 5-91.

Bendix/Military BC221/MC Frequency Meter/Osc., 125KHZ to 20MHZ, with Cal. book, not checked out, as-is. \$50. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

General Radio Distortion Analyzer, clean. 50-15K, \$175, Key Code 5-8.

Telonic Model HD-7 sweep generator, 100 KHz to 100 MHz, very gd cond., with manual, \$375. You pay shipping. Key Code 4-44.

Hewlett-Packard Model 130C oscilloscope, good cond. with manual. Key Code 4-66.

Heathkit SB-610 Oscilloscope. Key Code 4-40.

Barker & Williamson Model 200 low distortion audio oscillator. Good cond., with manual. Key Code 4-66.

WANT TO BUY

Leader LAS5500 audio systems analyzer or equivalent. Key Code 7-37.

800-336-3045

World Radio History

Audio Oscillator, prefer HP-200CD. Key Code 6-61.

Oscilloscope, prefer solid state scope. Key Code 6-61.

### WANT TO SELL

Gates 250-GY, 250 watt transmitter. Excell.

cond. \$1500. Key Code 7-6.

**Collins 786W-1** SCA generator card used in 310-Z series FM exciters. Excellent condition. \$500. Key Code 7-24.

**RCA TTU-2A** tuned to ch. 14 taken out of service May 1979 exciter, harmonic filters, diplexer included. Key Code 7-29.

QEI Automatic Transmission service very good cond, currently in service. \$2250. Key Code 6-18.

Gates BFE-10C, mono. 91.5 mhz; 10-watt. Now operating. Make offer. Key Code 6-65. RCA BTX-1A, 67KHZ sub-carrier generator with manual. \$300. Key Code 6-6.

Two high power FM isolation filters can be retuned. Key Code 6-43.

RCA UHF Filterplexers; CH. 31, 12.5 KW rated, 3-1/8" line; CH. 35, 12.5 KW rated, 3-1/8" line; CH. 40, 25-30 KW rated, 6-1/8" line. Key Code 6-16.

RCA BTA-5H 5000 watts AM on 1300kHz with extra cystal at 1240kHz. Beefed up solid state power supply. Very good cond. Key Code 6-51.

Moseley Model ADP-220 Transmitter Auto Logger with IBM Typewriter Model 3604. Key Code 6-13.

Gates TE-1 exciter with stereo generator. Rebuilt by Gates in 1974. \$1500. Key Code 6-29.

Gates M-6095 exciter, \$350. Key Code 5-75. McMartin TBM 25000-C RF amplifier. Key Code 5-17.

Gates 3KW FM transmitter (2). Key Code 5-36.

Raytheon RA-1000. Excellent condition. \$1100. Key Code 5-18.

FM 1000 broadcast transmitter \$5800. Key Code 5-17.

RCA BTA-50H1S 50 kilowatt AM ampliphase. BTE-20A solid state exciter with 5KW cutback. Exc. cond. \$35,000. Key Cond 5-20. FM Transmitters(used), 20 KW, 15 KW, 10 KW, 5 KW, 1 KW, 250 W. AM Transmitters (used), 50 KW, 10 KW, 1 KW, 500 W, 250 W. Contact Communications Systems Inc, Drawer C, Cape Gifardeau MO 63701. 314-334-6097.

FM-10 solid state exciter. Key Code 5-17. Westinghouse FM 10KW final and power supply. Key Code 5-36.

ITA-Wilkinson, 10-watt exciter less power supply, new tubes, \$400. Key Code 5-49. AM 1 KW Vanguard II, used on air until Sept. 78, spare parts and final tubes, 10 years old.

Key Code 4-17. Western Electric 1937, 50 KW AM transmitter, \$11,000. Call (800) 336-3045.

#### WANT TO BUY

**Properly working** low voltage 350 Volt Power Transformer (T-6) used in Gates BC1-F transmitter. Key Code 7-44.

1KW AM transmitter. Key Code 7-11.

Gates Vanguard I or Vanguard II transmitter 1KW/250 or 1KW/500 (damaged but reconstructible). Looking for one that may have been fire damaged or cabinetry damaged. Key Code 7-35.

FM transmitter 250 watt. Key Code 6-16. Gates BC1G, BC1H or BC1T transmitter 1000 w/250w, good cond. Key Code 6-23.

TT 1UB in operating condition. Key Code 6-33. High School wishing to increase power, needs 250 watt transmitter. Key Code 6-50. RCA BTA 10-F used transmitter. Key Code 6-44.

Harkins & Hershfield manual needed for model FME-50 FM exciter. Key Code 6-19.

Collins 300 AM transmitter or parts. Key Code 5-36.

Gates FM-1H or Gates FM-2.5H FM xtr. Key Code 5-51.

FM transmitter, 250 watt, mono or stereo. Key Code 5-67.

FM stereo exciter, Collins 310Z-1 or similiar. Key Code 5-69.

CCA FM10DS direct FM broadcast exciter. Key Code 5-38. R.C.A. BTR-1R 1 KW AM transmitter. Key

RCA Harmonic filter MI-27967 tuned to 99.1

Collins 20V, 1KW transmitter or parts. Key

Old Model Collins 5KW transmitter, parts

TV translator 1 KW or transmitter with 1 KW

Wanting 250, 500, 1,000 and 5,000 watt

AM FM transmitters. Guarantee Radio Supply

Corp., 1314 Iturbide Street, Laredo, TX 78040.

BTA-5R, BTA-5T, AM Transmitter. Key Code

F.M. Broadcast Transmitter-500 watts 1kw

I TUBËS I

WANT TO SELL

3CX10000A3 and two 4CX3000A General

Electric, save 25% on current price. Key Code

Six 3X2500A3 Tubes. Removed from trans-

mitter & spares. Condition unknown. Key Code

Receiving tubes (190) in large tube caddy, all

tubes good, used in communications equipment. 110 are in boxes, 80 are loose but all are

4-400A transmitting tubes (4), used but ok

JAN-CBXT 8161 Eimac tubes (4-new). Key

872A mercury vapor rectifier tubes, (three),

Tubes: Two each 845 and 872-A probably

used, condition unknown. Make offer. Key

WANT TO BUY

Telefunken VF-14 for U47; U48 microphones.

GTE color slide studio tube for Model CSS-1

TURNTABLES & LATHES

WANT TO SELL

Gates Model CB-77, 12 inch turntables. One

with Gates tonearm, \$100, one without arm \$25. Key Code 7-57.

Gates Model CB-77, 12" turntables (two)

with Microtrak 303 tonearms. Fair condition,

Fairchild variable pitch disc cutting lathe,

mono, 2 speed, complete with microscope,

Grampian head, Gotham amplifier and not sty-

Gray 33H single speed t.t. w/Ortophone arm

and stereo cartridge on walnut base. \$100.

Pioneer PLA-35 turntable w/base, dustcover

& cartridge. Like-new cond. \$85. Key Code 6-

Micro-Track Rosewood 12 inch tonearms

with Stanton D5107 cartridges and stylus, 2 sets available. \$75 set. Key Code 6-79.

G.E. mode 47A12B2 transcription equalizer

New Listings are in Italics.

\$150 eac. plus shipping. Key Code 7-24.

lus. Make offer. Key Code 7-28.

Key Code 7-27.

Key Code 6-42

19.

new, never used, half price. Key Code 5-65

good. Make offer. Key Code 6-59.

4-1000A (new). Key Code 5-36.

891 (3-used). Key Code 5-36.

Telefunken AC-70I. Key Code 7-2.

Tube 813 (four). Key Code 7-43.

125A tubes (4). Key Code 5-36.

250A tubes (4). Key Code 5-36.

400A tubes (4). Key Code 5-36.

for spares. Make offer. Key Code 6-59.

stage retunable for UHF. Key Code 5-50.

MHz (5000 watts). Key Code 5-38

also transformers, Key Code 5-36.

Richard Reyes, 512-723-3331

or even 250 watt. Key Code 4-38.

Code 5-7

Code 5-36.

4-9

7-12.

6-16

Code 5-36.

Code 4-24.

Key Code 5-14.

# Exchange The Exchange The Excl

#### TURNTABLES ... WTS ... CONTD.

Gray Research Tone Arms (older) 16 in. modified but good for parts. Less cartridges. Make offer. Key Code 6-55.

Sparta TEP-3M Monaural Turntable Preamplifier, excel. cond. Make offer. Key Code 6-59. Rek-O-Kut B-12H 12 in TT w/320 arm will accept a trade of something. Key Code 6-35. Gray model 208 16" viscuos-damped tone arm. Key Code 6-42.

QRK (older) tone ams 12 in. One in good condition, one poor. All metal. Make offer. Key Code 6-55.

Russco studio pro model B with Shure tone arm and cartridge. Key Code 6-66.

Mastering Room Package, includes: Scully lathe #50l, Scully 280-mastering tape recorder plus many other top brand items. Call or write for complete list. \$25000. Key Code 6-70

G.E. Model 48A10A Pre-amplifier. Key Code 6-42

Technics direct drive. Dependable, quiet, low maintenance, well engineered. Also cartridges and preamps. Full Compass Systems, 55 N. Dickinson, Madison WI 53703. Tel. 608-257-7722 or TWX 910-286-2745.

Disc mastering mono Neumann lathe. \$5000. Key Code 6-70.

Rek-O-Kut Disc Recording ;Lathe & I6in. turntable, w/spiral crank and 120 LPI and 210 LPI feed screws. exc. cond. \$250. Key Code 6-2. QRK 12 (2 ea.) turntables w/QRK arms & Shure M-44-7 carts; 5 yrs old rebuilt 6 mos. ago. \$150 each. Key Code 6-65.

Sparta 6T-12 turntables, 2 available at \$100 each. Key Code 6-79.

Rek-O-Kut 16 in. turntable, 33-1/3 & 78 RPM idlers needs felt pad. \$50. Key Code 6-2. Rekocut Rondine turntable, fair cond. Key Code 5-27

Microtrak 306 tonearms, two available, good cond. Key Code 5-27.

RCA BQ2B in cabinet with Shure M-236 arm. \$50. Key Code 5-22.

Collins twelve inch turntable, fair cond. Key Code 5-27

Gates CB-500 16" turntable with mounted Grey tonearm, \$75. Key Code 5-23.

Rekocut A-60 tonearm, fair cond. Key Code 5-27

Gray 208S tonearm, fair cond. Key Code 5-27. CCA 12-72 turntables with Shure arms, 3 year old, 2 each, new motors. Best offer. Key Code 5-9

Gates CB-500 turntables, four available, good cond. Key code 5-27.

Rekocut S-260 tonearm, two available, good cand. Key Code 5-27

Russco turntable. Like new. Its a repo. \$150. Key Code 4-85

#### WANT TO BUY

Gray old style 16" tone arms, viscous damped or Gates GR-16 arms. Need two. Service manual for RCA BA-6A limiter. Key Code 6-56.

Gates GR-16 ftone arms or Gray equivelent, 2 each. Also need two or three Gates M-5235 pre-amps, tube type, reasonable. Key Code 6-22

#### WANT TO BUY

Sony 3/4" Recorders/Players, Film Chain Equipment and Color Monitors

Ronald Phillips, P.O. Box 19149 Kansas City, Mo. 64141 816-221-2720 RCA Model BQ-1A turntable manual needed, or copy of same. Key Code 6-19 Turntables, Russco & QRK 12", \$150 for (2) tops. Key Code 5-43.

#### TV FILM EQUIPMENT WANT TO SELL

Cine Special w/case. Two sets special effects mats, three lenses, two magazines motor, assortment of filters. \$350. Key Code 7-25.

16MM Edit Bench Kit: Moviola SZA synchronizer and winders, Muray viewer, Bolex

splicer, Neumade applicator, and Spedrol cleaner. Excellent condition. \$195. Autodyne, Box 13036. Orlando FL 32809. 305-855-

RCA TK-27 color film chain. Numerous Updates. Key Code 7-13.

RCA film chain F(completed) with 16mm projectors and teleprojector (slide) w/remote control and mirrors. Working cond. Best offer. Key Code 7-64

TP-16 Film Projector. Key Code 6-13.

6868.

Canon DS-8 Super 8mm camera with F1.4, 7.5-60mm, 1-8 zoom, automatic aperature, carrying case, 21 synchronized cassette reecorders, 3 filters, and extra NiCad power unit and charger. Cost over \$1700 new excel. cond. \$795. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

Telecine island with Laird 5300,FP 1200 camera, Bell Howell I6mm projector, Spindler-Saupe 35mm, Key Code 5-42.

Bolex SM-8 Super 8mm projector-with sound, excellent cond. \$225. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868

KTV Film, Shot-Gun Microphones, Lavaliers and wireless. Sony, Shure, Sennheiser, ElectroVoice, AKG, AudioTechnica and Clear-Com. Sales, rentals, new, used and demo, Also mixers and recorders for sale and rent. Full Compass Systems, 55 N Dickinson, Madison WI 53703. Tel: 608-257-7722 or TWX 910-286-2745 Kodak TV M-100-A Super 8 projector for film

chain or normal use. Like new, sealed bid to open June 20. Mark outside envelope "Super 8 Bid", minimum bid \$750. Key Code 5-48.

#### WANT TO BUY

35mm Film projector with television three to two pulldown. Key Code 6-67.

Slide projector for film chain. Key Code 6-16.

#### VIDEO PRODUCTION EQUIP. WANT TO SELL

Kanarc monitors (17" b&w), New HI-E transformer. Best offer. Key Code 7-64. Telemation TSG-2000 SYNC generators. Two, both color, one with GEN-lock. Key Code

7-18 Vital Proc Amp V1-750 in good condition. \$1200. Key Code 7-43.

Ball Bros. special effects Mark IV generator.

Best offer. Key Code 7-64. H-P 335E TV frequency and modulation monitors for channel 73. Like new. 2 available at \$300 each. Key Code 7-33.

Dynascience Model 468 Vertical Aperature Equalizer. Solid State. Working when removed from service. Key Code 7-18.

I.M.I. MK III large screen color projector, demo. \$12,950. Key Code 7-18.

Gibralter, Quick-set cradle Heads (2) original price \$520. Good condition. Make offer. Key Code 7-49

Full tripod with elevator (2), Quick set 2 sec. legs ht. 42"-85". Very good condition original price \$520. Make offer. Key Code 7-49.

Vital Processing Amps, V-500 (2 units); V-100 (2 units). Key Code 6-16.

RCA TA-9 Stab Amps, 2 units available. Key Code 6-16

RCA TG-25 special effects generator complete with 6' rack. Sell of trade. Key Code 6-48.

Telemet RGB Color Keyer Model. Key Code 6-

RCA TG-2 sync generator. Key Code 5-83.

Advent video beam 1000 A with screen. Best cash offer Key Code 6-57.

1.O. camera chains, 3 inch. RCA TK-14 with zoom lenses. Key Code 5-83.

Sony VTR system: 21" B/W monitor with tuner, 7" x 1/2" reel recorder, camera (B/W), tripod, microphone, cases, cables, \$650 for package. Key Code 5-74.

Houston Fearless pedestal, PD-3, perfect condition, \$500 or best offer or trade. Key Code 5-68.

Concord MR750 Receiver-monitor, 9 inch solid state. \$150. Key Code 5-91.

Davis & Sanford floating action tripod "B" & head, excel. cond. \$175. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

RCA TR-22 monochrome, worked fine when removed from service, \$1000 or best offer over. Key Code 5-64.

Conrac KNB9 monochrome 9" monitor with manual, \$125 or best offer or trade. Key Code 5-68.

RCA Waveform TO-2. Very clean. Like New. \$300. Key Code 5-9I.

Kodak AF-2 Ektagraphic Slide projector with auto-focus and timer, excel. cond. \$195. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868

International Nuclear Corp. Model TVM-2 video modulator to feed TV receiver IF strip bypassing tuner, \$50. Key Code 5-15.

Conrac CQF-14 monochrome monitors, 2 units, high resolution, with manual, 2 for \$150 or best offer or trade. Key Code 5-68.

Ampex AC-116, SEG. \$150. Key Code 5-85. Reynolds/Leteron Mod LE-200 Titler machine with 3 alphabets. In carrying case,

excel. cond. \$225. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868. Chyron IIIB stand alone font create system. 1

yr. old in excellent condition. Call for list of components. Key Code 5-12. Advent 7' projection TV/monitor, Videobeam

1000A. Retails approx. \$4400, sell for \$2600. Key Code 5-53.

WANT TO BUY

Local Control panel for a Bell & Howell model 614EVMS 16mm projector. Key Code 7-58. RCA monoscope camera. Any condition. Key Code 5-91.

### VIDEO TAPE RECORDERS

WANT TO SELL

JVC/Ampex CR-4400-LU, 3/4" miniportable, Just reconditioned by Ampex, AC supply with charger and spare battery. \$2500. Key Code 7-43.

IVC 960 video tape recorders, 2 each, with IVC4102 TBCs, 2 each. \$5000 for the lot. Key Code 7-33.

VPR-1 with AST. (machine is in tabletop case). Good condition. \$23000. Key Code 7-17 Sony 2860 3/4" VTR, with new warranty. A good deal. Key Code 7-25

JVC 6300 3/4", excellent condition. \$1500 and freight. Key Code 7-67.

JVC. CR6000U 3/4", needs some work. \$400. Key Code 7-48.

Panasonic NV 3110, 1/2" video tape player with RF adapter. \$100. Key Code 7-33.

Panasonic 3/4" editing system. two 9500's, one 9200, NUA950 controller. Key Code 6-9. JVC-U-matic ¾" full editing system, one

RM-83U, 2 pc CR300U, mint cond. in original cartons. \$9000 firm. Key Code 6-21. IVC-870 Video Tape machines, 2 each, one

working and one needs repair. Key Code 6-13. Ampex VR-7500 VTRs. 1", 3 units available. Key Code 6-16.

GE (Sony CV2000) 4TD1B2 1/2" B&W VTR. re-EIAJ.compatible w/Videorover 1 etc Used less than 10 hours. Good cond. \$150 plus shipping. Key Code 6-60.

Sony 2860 VCR ¾" U-matic modified for Convergence editing system, 3 each. Like new cond. Will sell individually or all three. Key Code 6-71

See page 14 for International Contact Instructions

World Radio History

Sony 1" 320F VTR. Key Code 6-9.

Panasonic Model NV-3085. Battery operated, AC adapter. B/W with camera, Zoom lens, tripod, extra tape reels, 12" B/W TV set (with off-the-air recording capability), 16ft. camera extender cable, extra batteries. Plays through any TV set. Perfect cond. Original cost over \$2000. Sacrifice at \$1175. Key Code 6-15.

Panasonic Tape-A-Vision Portable Video Tape Recorder-Model NV-8100. Just removed from service. Exc. cond. Complete w/B&W camera, monitor, mic and all wire and cables. Complete instruction books, factory repair manuals and extra reels of video recording tape. Key Code 6-55.

Ampex VR-5100, \$245; VR-7550, \$295; IVC 800 AS/M, \$495. Autodyne, Box 13036, Orlando FL 32809. 305-855-6868.

JVC videotape CR-6300U, new, w/warranty, remote control unit, Bretford rollingbase production cabinet, \$1500. Key Code 5-53.

AKAI, 1/4" VTR, B/W R-R Portable with camera tuner & monitor like new. \$500. Key Code 5-80

Ampex 5100, one inch VTR-needs head. Best offer. Key Code 5-85.

Sony 1000 VCR 3/4 "U-matic player. Key Code 5-32.

AKAI 700 Deck complete electronics, 1/4 VTR like new. \$375. Key Code 5-80.

Sony 1200 VCR 3/4 "U-Matic player. Key Code 5-32 Ampex Video Tape Spooler for ACR-25 carts.

Type 1370650-01. Make an offer. Broadcast

WANT TO BUY

Sony 2800 in good condition. Will consider

Service/Operational manual for the IVC 760

Panasonic NV8000 or equiv, (have old tapes

that need dubbing to cassette). Key Code 6-24.

Norelco Video Head for model EL3401/54 1

inch recorder, also need original type T.V. con-

nector cable for same. Head Part No. EL 1953.

VHS format video recorder/player. SP and LP

mode, any brand in good cond. Key Code 5-40. Ampex VP4900 VTP, need rotary trans-

former and head assembly. Key Code 5-40.

RCA TR-3 or TR-4 quad machines, low band

or high band, will pay cash or trade. Key Code

Westel one inch color VTR, Model WRR350.

Westel one inch color record only portable-

Sony two inch helical production VTR

w/editor and D.O.C.-Model MV 10,000. Key

**PAL Standard** 

Video Equipment

Foreign TV station updating complete

operation disposing of large variety

PAL-standard video equipment. Items

RCA TR-600, 3 each Ampex AVR-2, 4 each RCA TR-60, 2 each

RCA TR-70, 2 each

RCA TR-61, 1 each

RCA TK-28 system, 1 each

Plus a variety of cameras, lenses

and other equipment.

Call or write for complete list & details.

**BEE, Box 1238,** 

Arlington, VA 22210

703-525-0400

VTR Model WR 201. Key Code 4-89

or photocopy of same. Key Code 6-60.

Export Association. 800-336-3045.

good 2850A. Key Code 7-43.

Key Code 6-22

Key Code 4-89

Code 4-89.

include:

5-68

# **MOD. CONTROL**

- continued from page 2

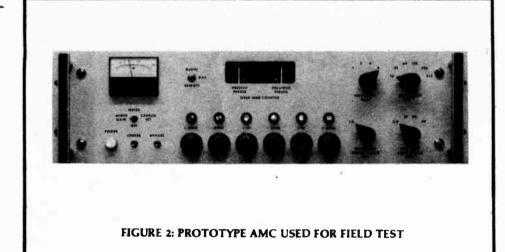
low modulation level criteria have been satisfied. Likewise, if the modulation exceeds minus 95% or plus 112% at any time, a decrement clock will be gated, causing the counter to count downwards reducing the audio level to the transmitter until the high modulation condition has been cleared.

The other two thresholds shown on the figure measure the overmodulation conditions and are connected to two counters whose counts are displayed on the front panel. These counters operate for one minute so that the operator can see how many modulation bursts, both negative and positive, have occurred in the preceding one minute period. They display both the accumulating count in the current minute and the total count in the preceding minute. These counters are necessary and convenient tools for adjusting the variables for the desired degree of control. They also provide the necessary overmodulation count signals for ATS operation.

The actual program control is done by an eight bit multiplying D to A converter. Without resorting to

counter periods adjustable for field evaluation. The production models have all of these adjustments with the exception of the overmodulation counter periods adjustable behind a front panel door. The range of adjustments have been restricted to practical values as determined in our field tests. By setting these adjustments in the desired manner, the unit can be made to operate very slowly as might be desired in a classical music station so that long term variation in transmitter characteristics can be corrected without any change in program material characteristics. It also may be adjusted for fast action so that very high average modulations can be obtained. This would be suitable for stations operating with more contemporary formats.

In the past several months we have made extensive field tests at three different broadcast stations. Generally, we asked the station engineer to adjust his program equipment to obtain modulation characteristics according to his normal operating procedure and to include all of the audio processing equipment normally in the circuit. We then inserted



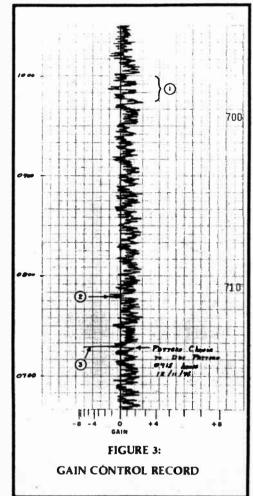
unnecessary detail, this device can be described as a linear attenuator, adjustable in approximately 0.1 dB steps by an eight bit binary word coming from the up-down counter. The total range of adjustment is plus or minus 8 dB. The adjustment steps are so small that gain changes are not discernible in the program material.

This then is a complete description of the operation of the Amplitude Modulation Controller although it is greatly simplified.

#### **Field Test**

Figure 2 is a photograph of a protofype model of this device. As you can see from the numerous knobs and dials on the front panel, we have made all of the parameters, threshold levels, the increment and decrement clock rates, the low modulation period counter time and the display

the Amplitude Modulation Controller into the system and observed the adjustments that were made by the device. The operating gain is displayed on a front panel meter. This is accomplished by running a small fixed dc voltage into the multiplying D to A converter and measuring the voltage delivered at its output. Thus, as the circuit adjusted itself for different gains, the through gain of the audio circuit is displayed on the front panel meter. Figure 3 is a recording chart showing the voltage at the meter terminals over several hours of operating time. These records were made with the chart speed of 6 cm per hour and the real time is shown along the border of the chart. A scale calibrated in system gain is shown at the bottom of the chart. The particular record shown in Figure 3 was made at radio station WMAL here in Washington. The record shows that the Amplitude Modulation Controller increased the average signal to the transmitter by about 1 to 2 dB during most periods.



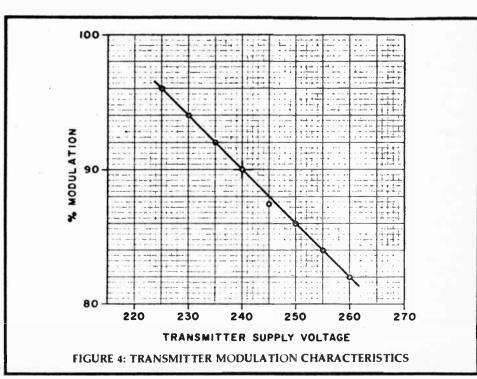
Several interesting features can be seen on this record. In the area of program source. That is, on a change of live to network, announcer to recorded music, etc. Occasionally the gain is reduced to below zero to prevent overmodulation. A typical example of this is shown in area (2). The large downward spike at (3) shows a malfunction of the equipment on pattern change. When the carrier momentarily went to zero, the logic system appeared to detect a very high modulation and drastically reduced the audio level. Subsequent to this experiment we installed a special circuit to idle the control logic when the carrier dropped below a predetermined level. This malfunction was not detected in further tests.

It is of interest to point out that these corrections were made even though WMAL was operating with what it considered the best complement of audio processing equipment. The tests at two other stations showed results very similar to these. At one station the gain adjustment was larger because the audio and symmetry level varied considerably between program sources.

An interesting transmitter characteristic was measured at WGH, Hampton Roads, Virginia during these field tests. WGH is equipped with two complete transmitter sites and with diesel backup power. They were kind enough to permit us to operate one of the sites on a dummy load and vary the primary supply voltage to the transmitter using the diesel generator. With an audio oscillator source we adjusted the transmitter for 90% modulation with a 1000 Hz tone. The audio level was maintained constant and the AC supply voltage was varied from 225 to 260 volts. Figure 4 shows the measured percentage of modulation for different supply voltages. It is striking to see how the transmitter characteristics change under these conditions. Mr. Looper, Chief Engineer for WGH, has long recognized this problem and in fact presented a paper at last year's convention on the subject. He has successfully corrected the problem by regulating the modulator bias and the dc supply to the audio amplifiers in the transmitter. It is obvious though, that standard audio processing equipment will not cope with this situation. In fact, Mr. Looper's paper on this subject provided the impetus for our development of the Amplitude Modulation Controller.

I would like to thank Mr. Looper of WGH, Mr. McPherson of WMAL, and Mr. Miller of WFAX for their great interest in this project, for the use of their facilities for field testing and for the suggestions and guidance they have given us in this program.

(Note: From a paper presented at the 1977 NAB convention.)



#### TIN EAR\_

#### continued from page 8

head resonance, and it's right in the middle of the "boom" range that muddies music and lowers speech intelligibility. You may want to operate with a permanent 2-4db dip at 100Hz. Here, your main gain will be better sounding spots...not a bad goal to aim for.

Again, this is a job for a perfectionist with the proper equipment. Better to leave it alone than entrust it to anyone whose ears are less then 24-karat.

Stereo balance: Fortunately this is an easily-measured ailment. Once set correctly, it tends to drift very little.

#### What about mono

Of equal importance is the gremlin caused when mono material is fed at full level in both channels, then mixed or heard as mono. The technical term is "center-channel buildup," and it causes announcers and mono spots to leap at you from your radio. Even in stereo, the centered source will bombard compared to stereo material.

So why do we persist in centering "mono" material? Tradition: maybe laziness. Try placing your deejays 5db to one side of center, your newsmen 5db to the other side. A stereo listener will detect a slight directionality, a mono listener will not miss the Bigmouth Syndrome.

Just make sure that when one channel peaks 0VU, the other is peaking -5VU. You'll be surprised how many stereo shops put you on display because of this natural use of the medium.

Separation: With records as source material, it's none too good to start with. Don't help it get worse. Check the crosstalk of your entire chain while activating all possible patching, switching and routing combinations that are used on the air or in the studio. Just one leak across the channels can destroy all that you have to make you sound spacious.

And keep the ganging cables between sections of your stereo processing equipment in place.

Stereo-mono compatibility: Most of the lack of it comes from carts, and there have been more solutions to this problem than there are people. Mounting the soap-box again, I must express the opinion that a lack of tools, rather than design deficiency or lack of knowledge, is responsible. The broadcast engineer has not had the means to prevent the problem.

In our next installment, we'll outline a simple set of test cartridges. One or two must be purchased; the rest may be made at any station that has an audio generator and a full track recorder.

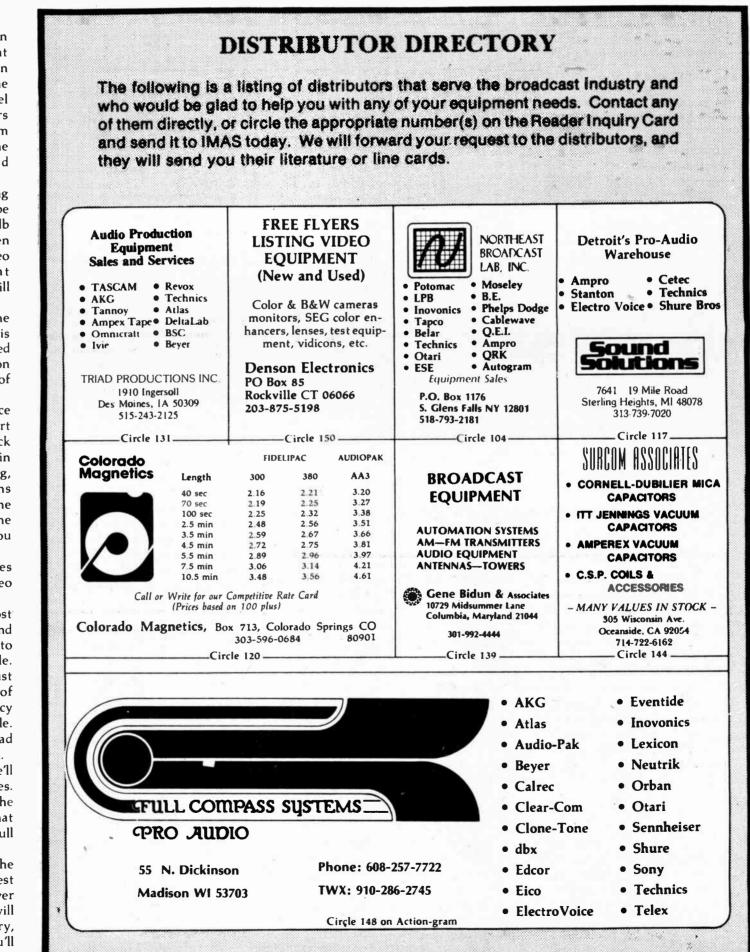
Using them according to the instructions will result in the best darn cartridge audio you have ever heard. As a bonus, no cartridge will ever miss a cue tone—primary, secondary or tertiary. And you'll know precisely how much headroom your cue tones have, for a bad cartridge will miscue on your production studio recorder before it will ever goof on the air. No more carts coasting through Paul Harvey.

Tape saturation: I would welcome ideas. Lowering the overall gain when carting is not really acceptable...most cart tape has enough hiss that you don't want to voluntarily increase it by the 3-5db necessary. I suppose an FM-type limiter that attacks highs separately could be the answer, if judiciously used. That the problem exists can be quickly seen if your cart recorder has a "peak record" position for the meter. Dub at normal levels with the meter in this position, and you will see it the red much of the time.

Armed with the list of faults from your listening session, you may feel a sense of depression. Don't feel like the Lone Ranger. Start with the problems heard most often. A wowing before the hum on the phone line for the hog markets, used for three minutes twice daily.

I once ran a proof from a test record through the transmitter of a majormarket AMer, and found that it could boast "flat" (plus or minus 3db) response from 100-4,000Hz, with nine per cent distortion and a signalto-noise of 32db. In short, the sound was approximately equal to that from a tinfoil cylinder. The looks on the faces of staff members as they arrived for work the next morning, having heard the new sound of music from their station, made the long night almost worth it.

So pick, pare, tweak and troubleshoot. Then, return to those thrilling days at the listening room. Bring your reel of samples from the previous session. Hopefully, you'll find your station blossoming before your very dial. You may also find a competitor slipping down the slimy slope-...maybe they didn't read this piece. Keep working on your weak points, and make your own kind of music the best-sounding in your market. Like chicken soup, it can't hurt. At worst, you'll own a pair of gold-plated ears, and gold gets dearer every day.



# DINC OB 0 0

#### We buy — sell — trade all types and makes of used broadcast and cable TV equipment. For Sale For Sale

#### For Sale

6

American Data switcher Ampex KHH-25 colour monitor Ampex CC-500 2/3" colour vidicon camera, 3 tube w/ CCU, & 50' cable.

2 Danscoll TSP-101 proc. amps. Dennard pedestal Edcor wire less microphone and receiver, new.

Electrohome ETV-7 monitor/receiver

Eumig Super 8 projector (telecine use).

Generator pulse black distribution amplifier.

Shibaden FP-100 camera ISI 902 video switcher

ITE D-7 dolly, H-2 head and T-10 tripod.

IVC-100 camera

**IVC-825 VTR** McCurdy AT-132 phone preamp

lifier. McCurdy SA-134P power supply & rack.

McCurdy AT-135 phone preamp lifier.

Novatech pulse distribution amp. Panasonic NV-3010 1/2" VTR, Play only.

3 Panasonic NV-3020 1/2" VTR, rec/play.

Philips 250A B&W camera w/ CCU, 6 zoom lens & 50' cable 2 Philips pan & tilt. Control for one

2 Powertronic 664 voltage regulators.

Quick Set Tripd, Gibralter 6312 cradle head and Hercules 5602 dolly

Quick Set 5230 head w/ 5450 pedestal. Qty. 2 Setchell Carlson 23" monitor.

Shintron 315 sync generator w/ power supply and burst generator. Shintron 361 switcher.

Shure M-64 phone stereo preamplifier

Sony EV-210 Sony AV-320. 2 Sony VP-1000 playback VTR's. Sony VO-1600 3/4" rec/play videocassette machine.

Sony CVM-192 monitors.

Sony KV-1710 television. Sony VPP-2000 video projector

w/ screen Sony AV-3200 camera w/ viewfinder

Sony AV-3600 1/2" VCR. Sony AV-3650 VTR.

Sony AVC-4600 camera w/ CCU. 50' camera cable & 5:1 push rod

zoom lens. Telemation TSG-2000 sync generator.

Telemation TPA-551 pulse dist. amp

Topaz frequency changer

2 TRI Step 1 image enhancer. TRI Sun II time code encoder. TRI Sun III time code encoder.

Viscount SG-2 sync generator. 2 Viscount 7V3FER switchers.

Viscount 5V2FE video mixer. RCA TR-3 black and white VTR

RCA TR-4 B & W VTR rec/play. Tektronix 525 waveform monitor,

needs some work McMartin TBM-3000 FM fre-

quency monitor 92.7. RCA BW-73 FM multiplex monitor

Hewlett-Packard 335B frequency monitor.

Misc. IVC equipment and accessories

Ampex VR-7900 VTR-s, 2 good cond., 1 fair.

Fluke 910A true R.M.S. voltmeter 10hz to 7mhz Ballantine 340 R.F. millivoltmeter

300uv to 3v to 1000 mhz. J. Fluke 821AR differential DC

voltmeter 0 to 500V accuracy .01%

H.P. 5214L counter H.P. 310A wave analyzer

Sierra selective voltmeter NEKS range 40khz to 600khz. H.P. 562A digital recorder used with 5245L frequency counter. H.P. 150A oscilloscope. H.P. 650A oscillator frequency range 10Hz to 10mhz metered output. Polarad FIM-2 field intensity meter. Marconi OA-1094 spectrum analyzer Ampex VR-1100 VTR. Ampex 5800 VTR. Ampex 5200 VTR. Ampex 7500, 7100, 5100 and

7000 VTR's. Ikegami ITC-7001 3 tube self con-

tained high resolution, 6 X 1 zoom lens rear control color camera, good cond. Ikegami VR-624 camera w/ sil-

icon or vidicon tube option, good cond Panasonic mobile w/ 3 cameras,

2 WV-350, 1 WV-220, 1 switcher WV-600 audio mixer/monitor, etc., good cond.

Sanyo 2000C VTR rec./play. good cond.

Sanyo 2000 VTR rec./play., good cond

ITC VF-2020 B&W camera w/ 5' viewfinder, remote panel, 50 cable and 2 1 sync generator, good cond.

ITE VF-301 camera w/ 5" view finder, 2-1° remote panel, 50° cable, option of self-contained., Good cond.

Audiotronics camera w/ 4" viewfinder, 12V DC/110V AC int. Ext

Hitachi TIE 15R camera.

Philips EL-8000 camera, int./ext w/ 7" viewfinder

Hitachi VMF-104 switcher, good cond

For Sale

Conrac 23" B&W monitor, tube type, gty. 23 Shibaden SP-2000 cameras Topaz 1000 frequency changer Hitachi FP-100 camera. Koler generator 115/230V on stand w/radiator, output 10KW,

good cond. Panasonic JV-1520 VTR. Sony AV-3400 portapak. Strand Century lighting CPD-1 six

pak w/ 6-3.6 KW modules, 12 TLE 20A rec 1 control console SC-6/2

Electrohome EVM-23 23" B&W monitor

Sony AVC-3400 camera kit. 2 Sony AV-3650 VTR, needs heads

CDL 30 X 40 video routing switcher w/ audio follow. Sony PVM-9100 monitor

Ampex 350 VTR. Tektronix 527 waveform monitor. Orban Sound stereo synthesizer, unused cond.

Sony DXC-5000B colour camera w/ Plumbicons, good cond. Sony 340 1" VTR, exc. cond.

Shure SR-101 8 channel mixer w/ 3 Shure 565SD microphones.

Koss HV-1LC headphones. exc. cond CBS Dynamic presence equalizer

RCA RT-27 New coils for ATV's

WANT TO BUY

CVS-504B time base corrector Gates M6244 turntable pre-amp Tektronix 520A vectorscope Video enhancer to TK-27 4 tube telecine camera CBS-527 video enhancer or equiv

for a 4 tube camera. Jerrold SRR-3 microwave receiver freq: 2500 to 2686 mhz.

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