

FCC Reconsidering Stereo Decision

Washington, DC ... Caught up short by the furor which greeted their approval of the Magnavox AM stereo system, the FCC has now made it known that they are reviewing their decision. News of this came out when the FCC denied the Harris Corporation request for release of the "matrix" used by the FCC's Office of Science & Technology in choosing the Magnavox system. Apparently, broadcaster's opposition to this choice as expressed at the NAB convention, and in letters sent to the Commission directly, has had the desired effect.

Behind the change

Staff members at the FCC now admit that the OS&T analysis may have been hasty, and that another examination of the voluminous data may yield a different result. But why was the analysis hurried in the first place? One explanation

Broadcaster's Voice Heard?

gaining credence is when it became known that the Broadcast Bureau was going to recommend that all 5 proponents be approved (via the so-called "marketplace" decision), the OS&T rushed in and within two weeks came up with the Magnavox choice. This provided those who were interested with the ammunition they needed to force the Commission into a "single system" choice instead of the "marketplace" choice. Among others, the NAB and the EIA wanted a single system chosen. Of course, now it looks like the OS&T's help was really no help at all.

What to expect

The key question now is what will the

staff recommend to the Commission at its 1 August meeting. Another single "best" system, or back to the "marketplace" method as originally proposed? As Leonard Kahn, of Kahn Communications, explained in an interview with *Radio World* (see 5/80 issue), "... as soon as the proponents get actual transmitter exciters and sample receivers into the hands of the broadcasters, the rhetoric stops and the engineering starts. I am sure there will be only one survivor in the marketplace ..." Since Kahn is still the only proponent who has openly come out in favor of the marketplace decision, one must assume that he is confident that his is the only system that will prevail.

Radio World has also discovered that a new organization, Stations Committed for AM Stereo, is in its formative stages under the direction of Scott Robb, from the New York broadcast law firm of Robb & Kuhns. This organization will be made up of AM stations only, and will try to influence the FCC to choose the methodology which achieves AM stereo quickly and yields the best stereo system. When asked whether this meant the organization was in favor of a marketplace decision, Robb stated that the marketplace decision might be the only workable alternative. In support of this he noted that if any proponent feels they are unfairly denied a chance to sell their system via the FCC's administrative procedures, then that proponent may very well decide to bring suit challenging the FCC decision. The net result being

(continued on page 10)

Bienvenida

Arlington, VA ... Comenzando con este número, el periódico *Radio World* ha aumentado su circulación para incluir a emisoras de toda América Latina. Esperamos que usted encuentre a *Radio World* útil e informativa en la operación de sus estaciones. Como puede observar al examinar este número, algunos artículos están en inglés y otros están en español. Trataremos de tocar temas que, a nuestro juicio, satisfacen sus necesidades.

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LED VU Meter . . . a Reader Report

Arlington, VA . . . In the March and May "Audio Process" column in BEE, Bill Sacks examined the VU meter and specifically mentioned a new IC as one way of constructing an electronic LED VU meter. One of those readers who quickly responded was Kenneth Rockwell of Old Bethpage, N.Y., who called BEE on its toll-free 800 number to say, "Hey, I just built a stereo V.U. meter with those chips!"

Ken decided to build a meter with a much wider display range than the standard 23 db. The IC's can be "cascaded" to provide indications over a range of 90 db, if one constructs a low noise precision rectified circuit. Since each VU display IC drives 10 LED's with a 3 db per LED scaling, the potential 90 db range would take a 3 VU display IC's.

What He Did

According to Ken, one can get a 60 db

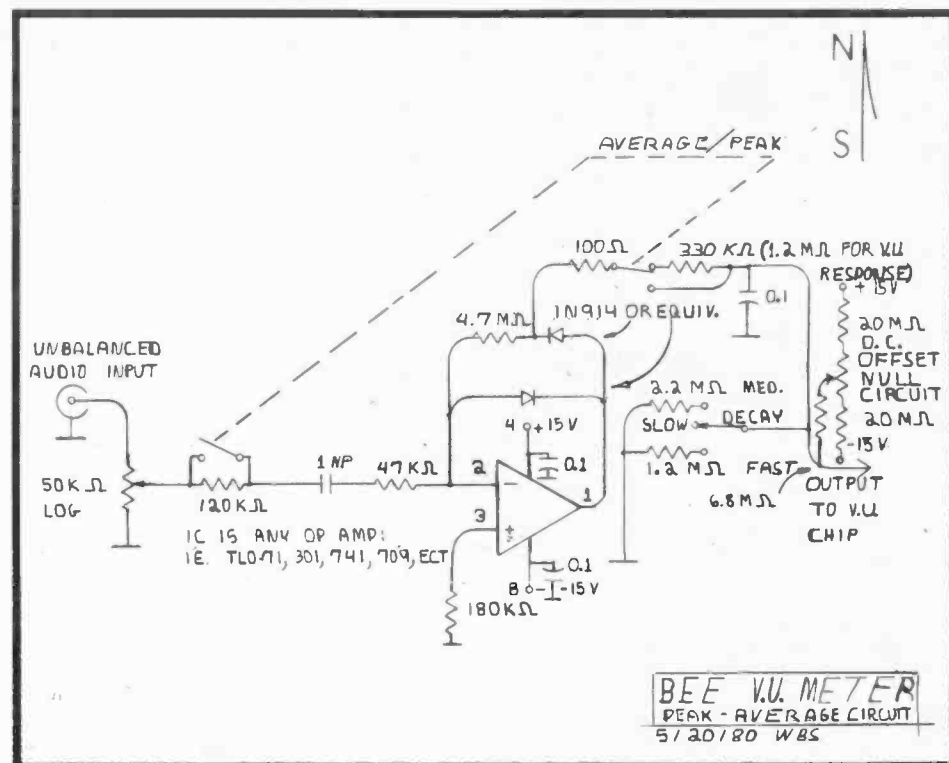
range with 2 LM3915's, but the resolution with be 3 db/step. Ken decided to build a VU meter with a more traditional scale, using 2 IC's for a 44 db dynamic range: 1 LM3915 for the bottom 30 db, and an LM3916 for the top 14 db. The 3916 has a quasi V.U. scale, so only the top 9 LED's are used on it. The 10 db step between LED's 9 and 10 did not fit well in the display so Ken dropped LED #10, and this resulted in a display which starts off with 3 db per step resolution at the bottom and gradually narrows to 1 db at the top.

Because of the approximately 600 millivolt diode threshold voltage it is important to build a precision rectifier or "detector." The detector circuit is also the place to introduce the appropriate peak or average display time constants. The detector that Ken uses in his meter is shown below. He used a half wave detector, since a full wave requires some more parts; and a half wave precision

rectifier works just fine for Ken's use. It has a considerable amount of gain; only a few hundred millivolts of audio will produce an output of 9VDC. This is done because of internal offsets in the 3915/3916 chips. National Semi advises that the display will be most accurate with full scale voltages in this range. By changing the values of the various resistors or capacitors, one can change the attack time (anywhere from the microseconds range to longer times for averaging indications). The decay times can also be changed; for example, in the

either no resistor, a 1.2 Meg, or a 2.2 Meg. One would want to change this time constant for different types of use; when used as a peak record level indicator, a long hold is useful, since one is interested in how high the peaks go, rather than the depths of the valleys.

The shorter times will cause the indications to decay more rapidly, so that when monitoring severely limited and compressed audio, the indication will be able to read other indications, rather than merely OdB all the time. This mode is also useful for determining noise



peak mode, the peak value is actually held for a length of time so that the eye can interpret it.

Delay Adjustable

In the peak mode, a short "tic" which may appear on a record during an otherwise silent time of audio (in between "cuts" on a disc) will produce a display that appears to shoot up instantaneously and gradually go back to zero. The length of this decay on Ken's version is settable to three different time constants via a switch which puts in

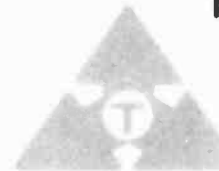
between announcers' words, etc. Ken adds that the values he used work very well; however, he urges the reader to experiment.

Ken also urges the reader to note the purpose of the 120 ohm resistor right after the gain control. This resistor, switched in and out, will change the gain of the detector; if the detector gain was not adjusted, the peak readings would be about 14 db above the average readings since that is the way that audio behaves.

The 330k resistor sets the attack time
(continued on page 6)

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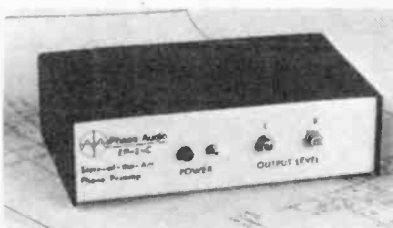
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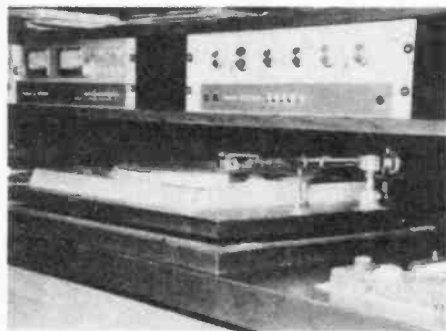


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A Better Acoustical Trap

by Dave Burns/Allied Bdct.

Richmond, IN ... Allied Broadcast Equipment has come up with a simple cure for a host of turntable isolation problems. Although many times the solutions to a problem are more confusing than the problem itself, Allied's de-



vice, a sandwich consisting of an upper and a lower plate which reduces physical contact to live rubber only, can be accommodated to all popular turntable/tone arm combinations. Installation is a breeze.

The sandwich's upper plate is composed of high-density particle board with an inlaid lead strip around the entire perimeter to reduce resonance and vibrations to an even greater degree. Coupling to the bottom plate is achieved through suspension with compounded natural rubber.

The bottom plate is supplied in sufficient size to completely cover any previous turntable hole. This permits easy retrofit with existing turntable pedestals. Certainly the problems associated with

two turntables having to share the same cabinet will thus be eliminated.

Test Results

tests in a real studio environment with the help of a real-time analyzer and calibrated attenuator reveal the following data:

- The head-room of the speaker-to-tonearm/turntable acoustic coupling (structure-borne and air-borne) was increased to 6db.

- In studio tests, acoustic coupling (feedback) was not only reduced, but the coupling took place in the spectrum area of 200 Hz instead of 80 Hz, as was the case without the sandwich. 80 Hz would tend to damage speakers more readily than 200 Hz.
- Tapping fingers and tapping pencils, as well as infuriated fists, were all reduced better than 20 db with the ease of the sandwich.
- Soft thuds, which were identified in

the spectrum as peak energy around 100 Hz, were reduced 18 db.

Different environments, woods, floors, etc., are going to exhibit different figures. However, this method provides solutions simply, easily and economically. This new isolation system, the AK10 MK II, is available in any color or combination of formica. As with the proverbial "better mouse trap," the idea is every-

The Best Kept Secret in Broadcasting!



The EXR Psychoacoustic Audio Processor

Leroy Dietrich — KMJQ, Houston, Texas:

"I wouldn't say that the EXR Exciter has made KMJQ the consistently number one station in Huston, but it sure hasn't hurt!"

Ed Bench — KMJM, St. Louis, Missouri:

"The EXR creates a delightful effect we would not want to be without."

Howard Quinton — WSBO, Ft. Lauderdale/Miami:

"One morning after maintenance, we forgot to put the EXR back on line — the phones lit up like crazy!"

Doug Holland — WHYI (Y100) Ft. Lauderdale/Miami:

"When the most listened-to station in Florida uses an EXR... what can I say?"

Theory behind the design:

The original concept behind the EXR Exciter (not to be confused with an RF Exciter) was to build an audio processing system which would make tape recorded material sound like a direct-to-disk recording.

A direct-to-disk recording was transferred to tape. The tape was re-recorded from tape machine to tape machine several times causing multiple generation loss. Using the human ear as the final judge, the following processes were used to restore the natural presence, clarity, transparency and individual signal separation lost due to the multiplier effect of generation loss.

Technical Description

Each of the four enhancement settings in the EX Model are a precise variation of the integral functions performed within the EXR Exciter:

- Pre-selective 180° phase notching
- Time manipulation
- Frequency manipulation
- Psychoacoustic juxtapositioning

The first three functions create an interference signal which, when added back into the original signal, reverses the primary or fundamental build-ups and losses caused by multiplier effects and distortion in the audio reproduction chain. 180° phase notching is used to cancel out specific frequencies where distortion tends to build up. Even though there is an apparent volume increase, the EXR Exciter does not affect the actual volume level when used correctly because it actually cancels as much as it adds.

Psychoacoustic juxtapositioning is the EXR process used to apparently fill the holes left by 180° phase notching. By using beat pulsing and other long known but little used processes, information is extracted from one part of the frequency spectrum, processed, then used to sonically replace another part of the spectrum which has been eliminated or lost.

Broadcasting/Disk Mastering Correlation

Because broadcasting and disk mastering have so many inherent problems and con-

cerns in common, the EXR Exciter has made the natural transition between the two fields. Phase integrity, stereo to mono capability and upper frequency overload characteristics are three mutual areas of concern that the EXR Exciter actually improves.

Performance Highlights:

- No distortion (harmonic or intermodulation)
- No compression
- No limiting
- No Multiplier effects (totally compatible with previously enhanced programmable material)
- No phase problems introduced
- S/N ratio better than 90 db
- Operational simplicity
- Adds to the apparent signal strength and reach of station without noticeably triggering compressors or limiters
- High improvement versus cost ratio

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Reader's Forum

Got something to say about *Radio World*? Any comments on articles? Get it off your chest! Call us at 800-336-3045 or send a letter to Reader's Forum (Radio World Box 1238, Arlington VA 22210) for a reply.

On the Name Change

Dear RW:

I enjoy reading BEE monthly and understand the name change. However, I question the name change as far as the equipment listings for those of us in television. As a tele-production facility, we find the technical articles on audio timely and of extreme interest (we don't neglect audio as television is sometime accused of).

Eric Address
EJ Stewart
Primos, PA 19018

RW Replies:

We appreciate your concern Eric, but rest assured that the Exchange part of our newspaper will continue to serve all of our readers, be it radio, TV, recording, video production, or whatever. Our editorial thrust, though, will be towards audio/radio.

Dear RW:

I find your "Radio World" very interesting and usually read it cover to cover. The key codes are a detraction from using the ads, however. Guess we can't get everything in life free.

Regarding your article on clear channel A.M. on page 23 ... it says Ray Livesay wants protection limited to 5 Mv/M. I agree that 5 Megavolts per meter is quite high and we should be protected from it! It might be even better to limit to 0.5 mV/M ... that is, half a millivolt per meter.

Donald Stenz
WAOW-TV
Wausau, WI 54401

RW Replies:

Those typos get us every time! Our readers always have a way of noticing them for us!

Another Action-gram

Dear RW:

Here's a suggestion from a new

subscriber:

Why not make your "ACTION-GRAM" a two sided affair?

That way we wouldn't have to forfeit the listings that appear on the back side.

You could arrange it so the contact, key code order, reader inquiry and subscription sections appear on the front of the sheet and the listing section would be on the back.

Our filed copies would then be complete even though we used the Action-Gram for that month.

EL Robertson
Joyful Sound
Sacramento, CA 95825

RW Replies:

This is a good idea, and actually reflects how we were set up 3 years ago. Right now, it's difficult to do since we switch this page into Spanish/Portuguese for our Latin American readers, but we will give it some thought. What would really be best is to have the entire Action-gram printed on a card which is inserted into the paper as a separate piece and thereby free the page entirely. Maybe next year!

Back Issues, Etc.

Dear RW:

Please place me on your mailing list. I want to receive your magazine regularly.

Your publication comes with very high recommendations from our sister stations, WSHH and WKTQ.

Please send me all the back issues. Even if there is a cost for back issues, I'd like to obtain them. Please send information.

Thank you.

Bruce Bierman
WKSJ-FM
Cleveland, OH 44115

RW Replies:

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(continued on page 10)

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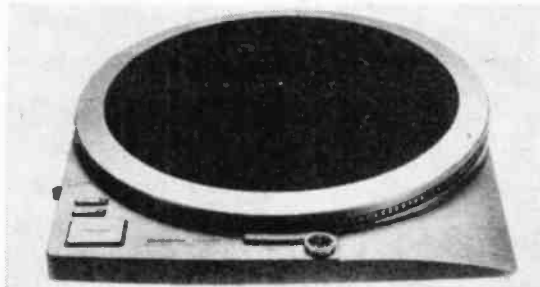
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Bill Sacks on the Audio Process

Get Rid of the Open Terminal Strip

Arlington, VA ... All of the new direct drive turntables have RCA phono jack outputs, which help keep things under control. Many older radio stations have a terminal strip directly under the tone arm because no such jacks were provided on the older broadcast arms. Some of these arms have no place in a modern facility but more on that in another issue. The best way to deal with a tone arm with a pig tail lead output is to mount an isolated steel mini box under the turntable with RCA phone jacks on it. This box is electrically isolated from the turntable and grounded independently. The RCA jacks are insulated from the box. The head shell ground is connected to the chassis of this box and the cartridge outputs are treated as balanced lines and are ground isolated from the box. The cables from the isolated box to the phono preamp are standard low capacitance Hi Fi phono cables with molded ends.

Compared to an open strip, the RCA jacks give you the shielding advantages of the box and make preamp or turntable maintenance much easier, and those frail miniature shielded pairs from the tone arm are permanently protected. In intense RF environments an outer braided shield helps to keep currents from developing on the phono cable shield which is acting as a return for the cartridge audio signal. This outer braid shield can be made with the outer conductor of some RG cable or can be obtained new as flat woven copper braid which can be pushed open like a Chinese handcuff. This outer shield should be insulated along its entire length with heat shrinkable tubing or electrical tape.

More on grounding

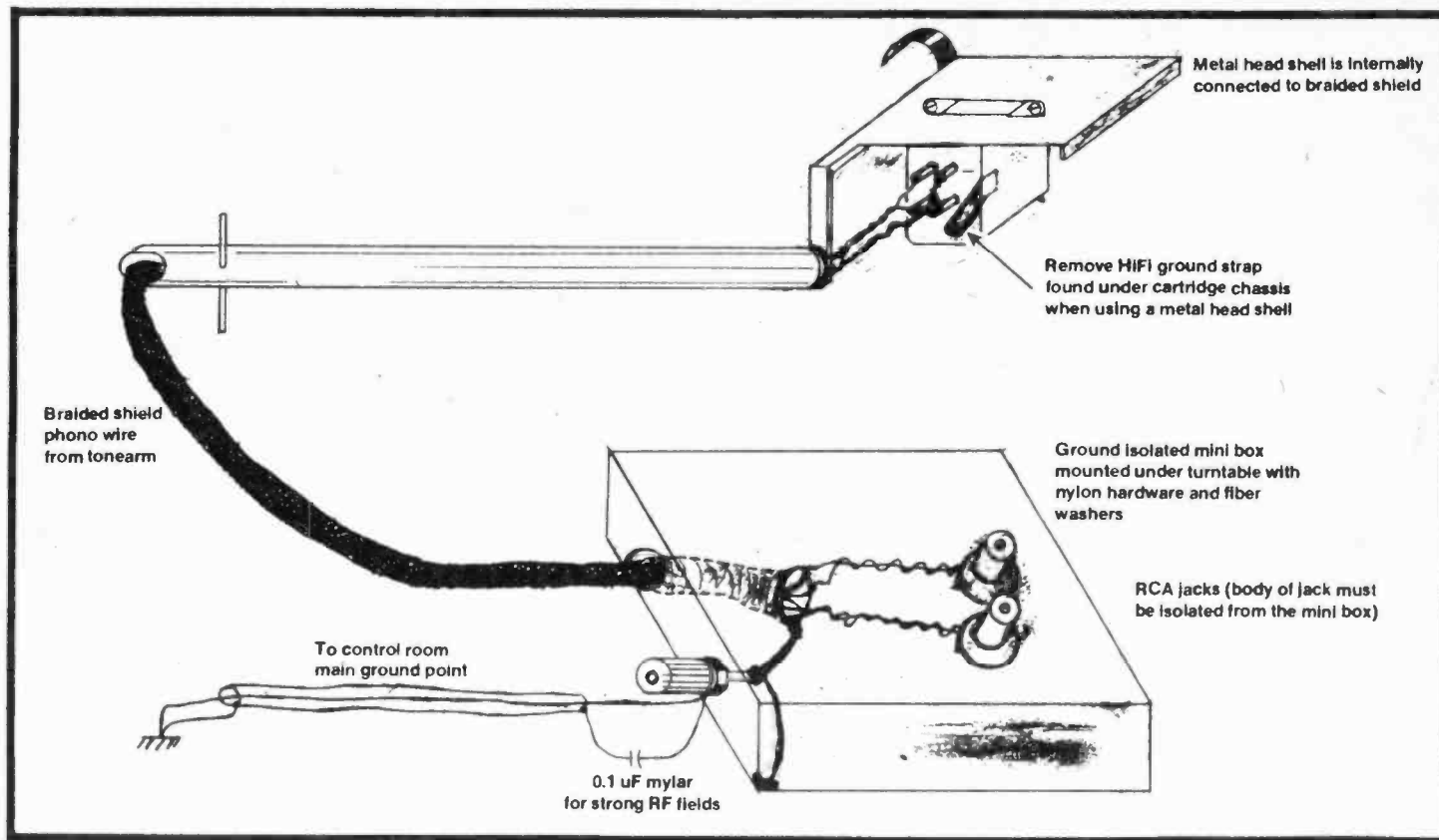
I would like to thank everyone for the response to "Audio Grounding Systems" in January's column. Selecting the proper ground point in each room is an integral part of your grounding system—Antonio Vaccaro, Chief Engineer of WHEB—had the following comment:

"I have just finished reading your very fine article in the January issue of the Exchange, entitled 'Audio Grounding Systems', and found it to be one of the

best articles on the subject that I have read in many years.

grounding the console end of the foil shielded ground wire is where the

room. The foil shield drain wire and the inner conductor(s) of the shielded



"Everything was fine until we went high power FM with a 20 KW xmitter and an ERP of 36 KW. The main FM transmitter on 100.3 MHz is just about fifteen feet from our main control room and all hell broke loose as far as hum is concerned. As you stated, every ground wire acts as an antenna and compounded the hum trouble. The part that I found very informative is the use of twisted pair, foil shielded cable. However, I am not completely sure I have it straight in my mind.

"I have enclosed a sketch of my interpretation of your explanation of the grounding process using the twisted pair, foil shielded cable with static wire. Is this correct as shown?

"Is the static wire grounded to the ground bus of the console, or to the 4 inch main ground strap?

"Your help in this matter will be greatly appreciated."

In keeping with the practice of establishing a SINGLE GROUND POINT IN EACH ROOM, the optimum point for

console ground buss connects to the two inch copper strap. This should be the central ground point for that control

ground cables should all terminate at the central ground point. The 0.1uf capaci-
(Continued on page 8)

STEREO

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Psychoacoustic Enhancement

by M.D. Heleniak
Flanner's Pro Audio

Milwaukee, WI . . . If ever there was a decade of electronic gadgetry, the 1970's was it. In the 1970's, suddenly single and double band limiting wasn't good enough; tri-band was the way to go. The new breed of AGC/compressors replaced dynamic range with absolute loudness, and if you didn't have a varia-

ble speed turntable, you probably weren't playing rock. There's one type of electronic add-on though that got its birth in the 1970's but won't make its presence felt until the 1980's, it's the "psychoacoustic audio processor." What this clinical-sounding phrase refers to is the new breed of signal processors which enhance mono and/or stereo program content via random single channel phase manipulations, harmonics manipulations, equalization, stereo L-R, L+R phase manipulations, etc.

As with any new product on the market, curiosity and controversy surround the psychoacoustic audio processors. Since our firm caters to the broadcast and recording industries, we looked into the psychoacoustic processors to see what they had to offer. The unit we found most favorable is made by a new company from Michigan called EXR. EXR's products are the SP1 and EX2 exciters which are both dual channel audio signal processors.

The EXR Company was born out of a recording studio in the 1970's. Jim Cassily, president of EXR, was looking for a way to make standard analogue tape recordings match the sonic qualities of the esoteric direct-to-disk recordings. In their R&D, Jim Cassily and partner, Jim Lagerkvist, designed a circuit which they felt vastly improved the clarity and intelligibility of an analogue audio signal. They dubbed their new invention the sub-phase psychoacoustic enhancer, which was later shortened to SP-1. The original SP-1, home-brewed in a Bud box, caught the attention of rock star Pete Seeger during a recording session at Cassily's studio. Seeger and his sax

player, Alto Reed, talked Cassily and Lagerkvist into making an SP-1 for them and with that, production of the EXR Exciter began.

The EXR Exciter is now used in almost any audio application imaginable. Although no one (except its makers) knows for certain how it works, its sonic presence is sought after. For instance, in PA applications, the giant McCormick Place in Chicago purchased an EXR for President Jimmy Carter's speech and now uses it regularly. Disk mastering labs and recording studios use the EXR and recording groups ranging from the Berlin Philharmonic to Linda Ronstadt to Earth, Wind and Fire won't record without it. Broadcaster's enthusiasm for the EXR is no exception. The latest Burger King and GM jingles were mixed through an EXR and although most of the 40 or more radio stations using the EXR won't allow their call letters to be used for

competitive reasons, the number one music stations in San Francisco, Los Angeles, Miami and Detroit all use the EXR in-line before their final limiters.

Tape Available

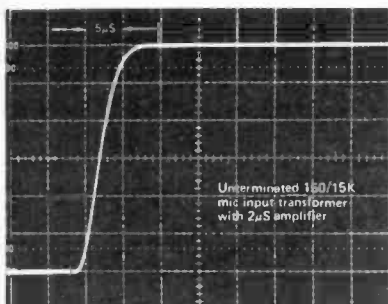
Since words could never describe a sound as unique as the EXR Exciter's, our firm has available a five minute tape showing the EXR in the production studio, A/B'd on the air at WEMP—AM Milwaukee and A/B'd on the air at WNUW-FM Milwaukee. The tape is available to anyone interested and clearly shows how the EXR can liven-up a dead sounding music bed, can rid your AM of the boxy sound attributed to receivers with cheap front ends, and can give your FM broadcasts the presence of a live disk in the home.

(Editor's Note: If you want a copy of this tape, don't call Radio World. Call the author directly at 414-259-9665.)

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Circle 108 on Action-gram.

VU Meter Project

(continued from page 2)

in the average mode. As it is, the time for the display to achieve 90% of its final reading is about 75ms. In the peak mode, this resistor is bypassed, so the only resistor the capacitor must charge through is 100 ohms, which results in an attack time of about 25 microseconds. For an indication which corresponds more closely to the standard VU attack time of 300 ms, replace the 330k with a 1.2M resistor or so. Again, Ken advises readers to experiment until they find what suits them best.

Ken mentions an application in which a VU meter can be converted to peak-holding with the addition of the circuitry just described. Since this detector is a high impedance device, it can only drive things such as the high Z input to the LM3915/16 chips successfully. However,

if one puts an op amp buffer between this detector and a VU meter, the VU meter will be used as a DC voltmeter, indicating the peak levels of the detector. This buffer is simply another op amp, so one could use a dual op amp to accomplish both detection and buffering functions in a single 8 pin package. The passive components centered around this package could be built on a circuit board small enough to attach directly to the back of VU meters. If, in a tape recorder, the audio to the meter was given pre-emphasis complementary to the saturation characteristics of the tape, one could wind up with wickedly accurate mechanical record level meters without changing the outside appearance of the tape machine.

(Continued on page 10)

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Circle 121 on Action-gram

Winn Schwartau on Recording

New York Video Seminar

Ossining, NY ... June 17, 1980 marked the opening of the B.S.F.&L. Seminar, "Audio Recording for Video" at the New York Hilton. This meeting initiated the process of interfacing the sophisticated video technologies with the increasingly complex audio process. The initials stand for the engineers of this \$395 per person seminar: Ham Brosious of Audiotechniques, Howard Schwartz of the studio with the same name; Don Frey, VP of A&R Recording; and Bob Liftin of Regent Sound.

According to its designers, the seminar had two discrete goals:

1. To familiarize the recording studio owners and operators with the expanding video marketplace and to demonstrate how they may join with the video studios in providing facilities to accomplish high quality audio/video post production work.

2. To attempt to bridge the technical gap between the audio and video fields

and to create an atmosphere where a mutual respect and recognition of the other's expertise can enhance an audio/video final product.

Opening Panel

The seminar opened Wednesday morning with a panel discussion on the marketing potential of video in many formats: video tape, HBO/Cable and the newcomer, Videodisc. Todd Rundgren moderated the panel with an overview on techniques of audio/video programming. As was the case with Quad in the 1970's, two competitive Videodisc manufacturers had it out in front of the audience. MCA, who represents Discovision, and the European counterpart Phillips, have decided on a reflective optical disc system, with laser pickups and a host of features to make their Videoplayers ideal for both consumer and industrial users. RCA, which designed and is marketing Selectavision

bases its video pickup on a capacitance sensor. Both systems are sound in their video premise, but here's where RCA lost the boat: the audio for the RCA Selectavision is only mono and will stay that way until RCA decides that the American public wants stereo. The audience went wild and took Seth Willenson (RCA VP, Programming for Selectavision), to task. A distinguished industry publisher said, "RCA spent one billion dollars on Selectavision in the last few years, did a market survey on the potential of Selectavision and decided that mono was enough? What you're telling this audience then is, that we, the studio owners and the producers and the record companies, have all been wasting our time and money by going stereo? Well, we won't buy it!" The audience, consisting largely of SPARS studio owners and technicians from all over the country, in fact, didn't accept the RCA premise and it was perhaps a good decision to demonstrate the MCA Discovision system the following day, instead of the mono RCA.

Technical Details

Bill Marino of Regent Sound studios and Bob Leiber of Matrix TV, went through some lengthy, yet valuable technical details on the hows and whys of Sync, BW vs. Color requirements, SMPTE code, locking etc.

Bob Fine, a freelance A/V consultant and Chris Stone of Record Plant West, agreed on the nature of the audio business and the swing it is taking towards video. Chris went into some detail into the economy of the recording studio today, "... more studios, less business ..." and outlined some ways in which studios could again be booked 24 hours a day.

By tooling up for audio/video post production, the daytime hours could be used for commercials, scoring, TV shows, movies, or what have you and leave open the "... classic rock'n'roll hours from 7PM to 3AM." Bob Fine, too, agreed on the amount of potential new business for recording studios. He maintains that of all the film or video shooting done for either TV, movies etc. that 60-90% of the dialogue and sound effects must be redubbed at a later date in the

(Continued on page 9)

Audio Process

(continued from page 5)

tor at the cart machine end will minimize the RF potential of the foil shield.

Debugging Phono Input Ground Loops

The most common mistake in debugging phono input ground loops in forgetting to remove the 'hi-fi' round when the cartridge is mounted in a metal professional shell. This extra ground connection is a tiny copper strap wedged inside the metal casing and attached to one of the coil's low terminals. This grounds the metal chassis of the cartridge in a plastic head shell. In a professional arm, the arm and the shell are metal and have the means for independent grounding which provides a ground connection for the phono cartridge chassis. Removing the 'strap,' which slips off, and using a separate ground wire for the arm/shell/cartridge case allows you to treat the two coils of the phono cartridge as floating, balanced lines. Usually they are grounded on only one end, at the phono pre-amp, but there is at least one phono preamp available with a fully balanced input.

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Circle 114 on Action-gram

June FCC Developments

by B. Jay Baraff

Baraff, Koerner & Olender, P.C.

Washington, DC ... In 1972, FCC released a pamphlet entitled "The Public and Broadcasting—A Procedural Manual". The pamphlet was revised in 1974. A copy of this pamphlet must be located in the public inspection file of every broadcast station. If you do not have a copy in your public file, please advise your Communications attorney at once. We have become aware that many licensees have failed to include this procedural manual in their public files.

Video Seminar

(continued from page 8)

studio. Now that's a lot of business, especially with cable TV expanding markets and available channels across the country!

Moogy Klingman, a veteran rock'n'roller, detailed his theories in the first break of the day. His syndicated cable TV show, "Manhattan Alley" is a New Wave rock show, with live concerts, interviews and some truly funny material. Moogy's point was that as a small studio owner (he is 8 track), he too can get into video, with very little money. Moogy produces Manhattan Alley with 2-3 cameras and a couple of VCR's. He doesn't reference to House Sync and edits all of his audio dubbings on the VCR itself. A unique, almost practical technique, but not without its sacrifices.

(Continued on page 13)

FCC To Shorten Renewals.

The FCC plans on taking a major step to eliminate government processing by reducing its renewal forms to a postcard size as opposed to the present form. The new form would only require a few brief replies and eliminate the lengthy responses generated by the present form. However, the FCC would spot check licensees at renewal time requiring some to file a regular renewal. Comments on this will be sought from the public.

Directional Antennas

The FCC has denied a request by the National Telecommunications and Information Administration which had proposed the use of directional antennas for FM stations. The Commission stated that it has only postponed consideration of the directional antenna issue and not dismissed or denied it.

Warning To Class C

As you are aware, the Commission is proposing to change its FM Rules in order to open up opportunities for an additional 300 to 400 stations. As part of its proposal, the FCC is requiring stations to operate with their maximum output. Since presently, only 20% of stations occupying Class C assignments operate at maximum output, we suggest that if you are one of these stations you begin preparations for upgrading your facility so that, in the event the Commission proposal becomes a rule, you will protect your classification as a Class C station. The Commission will provide up to three years to meet new minimum power and antenna height requirements and if you do not conform to these new

specifications, you will be reclassified to a lower grade facility.

EEO Procedures:

FCC has issued a Notice of Proposed Rulemaking looking toward the adoption of Rules which would make drastic changes in present EEO Rules and Policies. Some of the proposals are:

- blishing March 31 (rather than May 31) as the date for filing Form 395;
- iring that a complete EEO program be updated each year and placed in the Public File;
- iring the annual program to contain a complete list of all applicants for each job by race, sex and referral source;
- iring the annual report to contain the complete list of promotions by race and sex;
- sting of all job titles within each Form 395 category.

Comments on this proposal are due August 25, 1980 and reply comments September 25, 1980. If you would like a copy of the proposal, please advise your Communications counsel.

Nighttime Operation

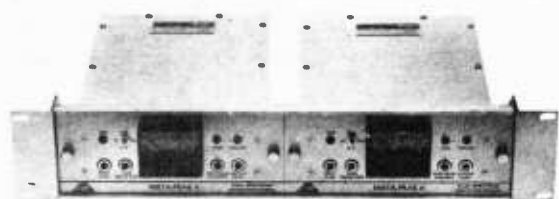
A petition for rulemaking has been filed by the National Radio Broadcasters Association to request amendment of the rules to permit daytime-only AM stations to obtain nighttime operating authority as long as such operations will not figure in any objectional interference or prohibitive overlap with other stations. We will keep you advised of the status of this petition.

Pre-Sunrise Authority

Daytime-only AM Station WHYT, Noblesville IN, has filed a proposal to permit Class II, daytime-only, AM stations situated between co-channel U.S. Class I-B Clear Channel stations, to commence pre-sunrise operation at 6 A.M. local time. The proposal recommends a power level which protects the 0.5 mv/m 50% contours of both co-channel and Class I-B stations.

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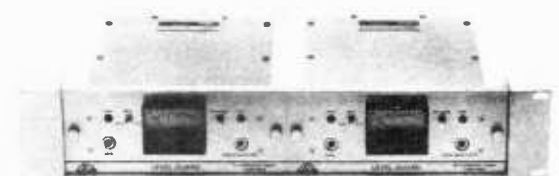
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Circle 104 on Action gram

Clint Free on VTR's:

More on Tape Scratches

Knoxville, TN ... I received another letter from Eric Address, at EJ Stewart in Pennsylvania. The letter is reprinted below ...

Dear Radio World:

I would like to comment on Clint Free's Column "Tape Scratches". I agree that tape scratches are a serious problem, although I have never heard of an incident where a technician was phys-

AM Stereo

(continued from page 1)

delay of AM stereo. His organization is not in favor of anything that means more delay.

Proponent Reactions

Needless to say, most of the proponents were pleased by the FCC's decision to re-evaluate their choice. Magnavox will wait and see what happens. It is still unclear whether the Commission will end out requesting more data from the proponents and/or broadcasters who tested the various systems. The hope is that the staff will have a final recommendation for the Commission's 1 August meeting, and that a final decision will be made then.

ically abused by a frustrated production staff.

There are two kinds of scratches to be considered, physical and electrical (magnetic). Physical scratches are to the tape and can be corrected in playback, at least to some extent, by a dropout compensator, depending upon the severity of the tape damage.

Electrical (magnetic) scratching is to the recording only and cannot be corrected in the recording (unless you can physically scratch the tape in identical places and force a DOC to correct it). However, re-recording over the same spot will not produce the same scratches.

The air guides on our older RCA machines never caused (to my knowledge) any scratches, however, as Mr. Free pointed out, the air pressure must be 5 pounds and all of the orifices clean. In addition, the guide must be oriented properly and the filters (in the rear by the record amp) must be kept clean. Replacement with the RCA roller guide does solve problems. However, a bad bearing in the guide or dirt in the guide bearings create static electricity and thus electrical scratches.

Mr. Free's description of the cause of magnetic scratches due to the front side head on RCA VTR's is not getting at the cause. In fact, I don't follow what he is saying. Scratches are caused by mag-

netic particles (dirt, oxide, etc.) building up in pits, grooves, scratches, gouges, etc. in the surface of the head.

Once the head begins to scratch, it must be replaced. A head may be relapped several times depending upon the severity of the defect(s) to the head. Our experience has been that an average RCA front side head (new or relapped) lasts about 1,000 hours in hard editing and dubbing usage in an extremely clean environment. Not all heads last this long, as we have lost a new head at 15 hours, too, due to a gouge.

Another source of electrical scratches is oxide buildup on the older style (pre-TR600) replacement version audio record/play, and audio erase heads and the backside guide at the audio stacks.

As Mr. Free suggests, we have converted our older RCA VTR's to backside erase heads. The cost far exceeds his \$300 estimate. The backside head (we use TR60 heads) cost over \$1,700 last year. About six hours labor is required to completely rebuild a section of the master erase (3A6), change the erase head transformer, mounting plate, and several small components at the transformer. In addition, we had a precision drilling template made (from RCA alignment drawings) for accurate alignment of the new backside erase head, and relocation of air (or roller) guide. The red "erase on" indicator does not require relocation if the metal work behind the head is omitted (as no RCA stock number is supplied). Our template does locate the mounting holes for this metal work. Finally, the old holes require filling in and refinishing.

As a final note, back side heads can cause electrical scratching, too. The average life of a backside head (on our

VTR's) is about 5,000 hours. Scratching can occur as the head nears the end of its life. We have two replaced backside heads in use and life is in excess of 2,500 hours so far.

Sincerely,
Eric R. Address
Dir. of Engineering
EJ Stewart/Primos, PA 19018

Some comments

As usual I like to hear from our readers, even if they are critical. Regarding the conversion cost. As noted by Eric, the cost far exceeds \$300, and in fact my article had \$3000 in it originally, but there was an error in typesetting (*Ed. Note: We're sorry, Clint.*) As for why the scratches happen in the first place, I was only offering one possible explanation. I've got no argument with Eric's suggestion either, I'm just not sure what the right answer is to this problem. Maybe the engineers at RCA would like to comment?

Reader's Forum

(continued from page 4)

complete set of back issue newspapers and a binder to store them. Let us know.

Dear RW:

Following my renewal of key code subscription service, please list the attached...

As I'm sure you've been told over and over, your paper is the best thing going when it comes to moving previously owned equipment. As fast as technology is advancing and equipment being replaced, I suspect the publication will be essential for years to come.

Bryce McBride
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Beatrice, NE 68310

RW Replies:

Thanks for the renewal, and we plan on being around for years to come!

More Radio Rangers?

Dear RW:

As one of the four bona fide Radio Rangers of Minneapolis, I would like to be put on your mailing list. Also, if possible, can I get a copy of the issue containing Mark's first Ranger column?

Thanks in advance.

Steve Brown
WCCO-FM
Minneapolis, MN 55403

RW Replies:

Are there only four?

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Se Habla Español

Circle 134 on Action-gram

VU Meter Project

(continued from page 6)

The LM3915's can be used either to give the familiar bar-graph indication, or a "moving dot" display in which only one LED at a time will light. Ken prefers the moving dot model such as the one he built to the bar mode for long displays. He feels that this mode also gives a closer approximation of a moving needle.

Since Ken got everything except the IC's, sockets, LED's and case from his own collection of parts, the whole unit cost only \$33.62, including tax. If the unit gives an erroneous reading when there is no signal present, settling on the lowest LED, this may be caused by the DC offset in the system. If so, this can be nulled with the circuit addition shown. The value of the pot can be anywhere from 100K to 500K.

A NUESTROS LECTORES DE LATINO AMERICA

Con esta edición *Radio World* e I.E.R. inician su sección en español.

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Al final de la página hemos incluido un cupon que les agradecere-
mos nos envíen con sus apreciables recomendaciones.

Atentamente

Radio World IER

Los articulos que me gustaría que incluyeran en su sección son:

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Desprenda este cupón y envíelo a:
Radio World, Box 1238, Arlington, VA 22210

Del Transporte en las Grabadoras

para Wayne B. Graham/Tentel

Campbell, CA ... Las grabaciones convencionales han evolucionado con un continuo desarrollo en los materiales de las cintas magnéticas, formulación de cubrimientos y tamaño de las partículas, sistemas de reducción de ruido, mejoría en amplificación electrónica, (desde la válvula de vacío al transistor hasta los

Bienvenida

(continúe de la página 1)

Una sección será especialmente valiosa en la compra y venta de equipo usado. El Broadcast Equipment Exchange. Esta consta de anuncios clasificados de estaciones de radio y televisión de todos los Estados Unidos. Si ve algo que le gustaría comprar, basta que nos lo haga saber y nosotros le conseguiremos el artículo y nos ocuparemos del embarque, etc. Puesto que el servicio de listado es gratuito, aprovéchelo incluyendo en la lista cualquier equipo que desee vender. Utilice el formulario del periódico. Se explican claramente los detalles.

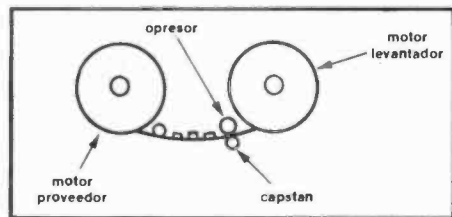
circuitos integrados), y la evolución en la configuración de las cabezas proviendo un aumento en su vida y capacidad para canales múltiples.

Una área de progreso es el método usado para mover la cinta a través de las cabezas (el transporte mecánico de la cinta).

Muchos ingenieros en audio no entienden en su totalidad la diferencia y los méritos relativos de las grabadoras con torque constante contra las novedosas y costosas máquinas con tensión constante.

¿Torque/Tension Constante?

El ejemplo que mejor nos ilustra la importante diferencia de torque constante y tensión constante es:



Si nosotros imagináramos que construímos una simple grabadora de cinta utilizando 3 motores, la configuraríamos de esta manera, un motor es usado en

combinación con el opresor para impulsar la cinta a determinada velocidad a través de las cabezas, a este se le llamaría motor Capstan, su velocidad y diámetro en contacto con la cinta, determina la velocidad de la cinta a esto cercanamente se podría determinar como sigue:

$$\text{TORQUE} = \text{TENSION} \times \frac{\text{DIAMETRO}}{2}$$

El segundo motor, usado en conjunción con el carrete proveedor trata de jalar la cinta en dirección opuesta al motor Capstan esto es lo que provee la tensión de restricción de la cinta. (Esto lo podríamos substituir por un sistema que frenara el carrete proveedor y que nos diera la tensión necesaria).

El tercer motor es utilizado en el carrete que levanta la cinta y jala la cinta en la misma dirección a la que viaja arrojándola fuera del motor Capstan. Este es el sistema básico y ha sido esencialmente el mismo desde antes de la segunda guerra mundial donde las máquinas Alemanas fueron desarrolladas pero recientemente improvisadas en

otras áreas; cinta cabezas, supresión electrónica de ruido; amplificación y reproducción, permitiendo a los diseñadores descuidar los errores que se tiene por variaciones resultado de los continuos cambios de tensión de nuestro simple transporte de cinta de 3 motores.

Nosotros claramente podemos determinar que el opresor del Capstan trabaja menos con un sistema completo de transporte, debido a que la cinta es jalada del carrete proveedor con una palanca mas grande.

En cuanto el carrete se va vaciando la palanca con que el Capstan está jalando es mas pequeña y de ahí que jale con mas fuerza o tensión opuesta (proveedor).

Este es el cambio de fuerza de jalado en una grabadora de torque constante la que causa dilatación de la cinta (como una liga) variando su valor magnético a lo largo de su longitud.

Si un tono constante es grabado al iniciar la cinta y al final y después se reproduce se notaría que habría variación.

Una máquina de tensión constante mantiene cambiando su torque para que una fuerza a tensión constante sea (continúa en página 13)

Le solucionamos sus problemas de adquisición de equipo usado.

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International Equipment Representatives

Video Seminar for Recordists

(continued from page 9)

We have to get a little technical now to understand what Bob Fine introduced Wednesday evening. He and Magna-Tech, of New York City, designed a system called Vidi-Mag, to alleviate the typical headaches associated with audio/video post production syncing and dubbing. When a video show is shot, either 3/4" VCR or 1" VHS, an audio scratch track is placed on the video tape too; if there are 2 or 3 cameras going to separate machines for later mixing; each has its own scratch track as well.

When the video mixing is done, the most important thing to the producer is the visual element; so they may mix and match and dub and overlay effects and pictures from a variety of sources, which have no relation to the sequence of the audio track itself. A beautiful video dissolve or edit generally means a horrendous audio edit. So, we end up with a

one hour show, or a 28 second commercial, with, for all practical purposes, no sound. The problem then, is to overlay and dub sound into the picture in absolute synchronization. This is done with a SMPTE time code synchronizer, which not only lets the two machines run at the same speed, but permits them to have an individual frame number and location. You can identify any single point in the entire program.

Bob Fine's technique, though, steps back 40 years to the techniques and

methods of audio/vidual synchronization used when film dubbers and projectors were the only medium available. He records the output video signal from any VCR/VTR onto the VIDI-MAG machine. This device uses a film based emulsion, not requiring development, and operates the sprocketed video/film as a conventional mag machine. The benefits are obvious: A simple lockup technique, well practiced for many years. This permits any film dubbing facility to enter into the audio post production

needed for TV or other video media, by the purchase of a single \$20,000 piece of gear. The video signal on this film, it is emphasized, is a work print only and not to be confused with a final video master.

The Magic Show

Thursday morning of the Audio/Video Seminar heralded an audience twice as large as the previous day. The reason was simple: the anticipation of Bob Liftin and his "Magic Show." His

(continued on page 23)

Del Transporte

(continua de la página 12)

aplicada a través de todo lo largo de la cinta.

Torque y tensión están relacionados por el brazo palanca del transporte o:

$$\left(\frac{\text{Velocidad de la cinta}}{\text{(pulgadas/segundo)}} \right) = \left(\frac{\text{RPM}}{60} \right) \times (\pi) \times \left(\frac{\text{Diámetro del Capstan}}{\text{Capstan}} \right)$$

Las máquinas de tensión constante han resuelto importantes problemas inherentes a las máquinas menos sofisticadas de torque constante.

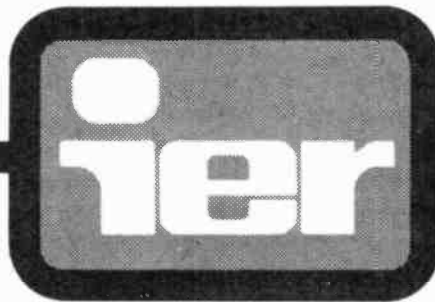
Los errores de intermodulación e inclinación de la cinta son corregidos debido a que la cinta pasa por las cabezas formando un patrón constante.

Las variaciones de señal son eliminadas debido a que la cinta no ha sido estirada ni al principio de la cinta ni al final; una tensión constante mantiene un fuerza constante.

El desgaste de la cinta, cabezas y guías es reducido debido a la tensión constante haciendo que el contacto (cabeza—cinta) sea optimamente mantenido, mientras que una máquina e torque constante requiere la misma tensión para obtener lo óptimo y si la tensión incrementa causa mayor presión de la cinta en la cabeza incrementando el desgaste de las partes en contacto.

Muchos sistemas de torque constante utilizan frenos con balatas de corcho que causan oscilaciones cuando se ensucian o se desgastan.

Muchas de las grabadoras profesionales como AMPEX ATR-100 estan empleando sistemas con motores de tensión constante que las hacen las mejores grabadoras y reproductoras de sonido.



I.E.R. tiene 26 maneras de incrementar sus utilidades.

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Broadcast Equipment Exchange

AMPLIFIERS

Want To Sell

Technics SU-8011 new cond. Key Code 7-46D.

Gates Blamotes M5167 (2), working. Key Code 7-34.

Gates pre amps, mikes, pkg deal. Key Code 7-83.

Collins tube type record amps (2). Key Code 7-65.

Fisher 50-C preamps (2), gd working order. Key Code 7-51E.

Nikko Alpha II 120 w/ch & Technics SU8080 integrated 90 w/ch, like new. Key Code 7-91.

Collins model 6X2 line amplifier, works; RCA model BA-6A limiting amplifier; RCA model MI1209A recording amplifier. Key Code 7-80.

Crown D-150, Bogen 100W amp. Key Code 7-62.

Technics SU-7300 new cond. Key Code 7-46C.

Fisher TX55, 25w per ch amp used, 2 tape monitors, solid state. Key Code 7-29A.

RCA BA-73 program amplifier, preferably D model. Key Code 6-74.

Ampex 80 watt, new mono solid state, bdct type power amps that are new and in factory cartons, 19" R.M. Key Code 6-22E.

Altec 1569B 100 watt solid state amp. Key Code 6-38.

Stax SRA-125 pre-amp with electrostatic headphone amp. Key Code 6-82.

McIntosh amps 65 watts (4). Key code 6-96C.

Ramko stereo distribution amp, model DA-2080 with 4 modules (2 in, 8 out), excel cond, meets all specs. Key Code 6-40A.

Ramko SP-8E stereo TT preamp. Key Code 6-32.

Phase Linear 400, in wooden box. Key Code 6-41C.

Knight stereo pre-amp, tube model. Key Code 6-89.

Bogen TU100 (2 ea) 100 watt solid state amps, one needs work the other is O.K. Key Code 6-38.

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

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

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

Want to Buy

Crown DC-300 amp frame, or frame and circuits, any cond. Key Code 7-71.

McIntosh & Marantz tube type amps & preamps in any cond at reasonable prices. Key Code 6-38.

Bogen, Altec, etc, mono or stereo solid state amp, no mix control, 80 watts R.M.S. or higher power, will trade for all of our items listed in test equip. Key Code 6-9.

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

ANTENNAS & TOWERS

Want To Sell

FM antenna 4 Bay polarized H & Vert on 92.7. Key Code 7-65A.

Transmission line hangers (30) for round members w/insulators and 1 1/2" clamps. Key Code 7-34.

Gates FMA-3, no phasing lines or de-icers, tuned to 103.9. Key Code 7-21.

Icocooupler, and 310' tower. Key Code 7-65.

Gates FMC-3A circularly polarized 3 bay antenna, 93.5 MHz, for class A, gd cond. Key Code 7-36.

Gates lighting choke. Key Code 7-34.

Tower, 255' heavy duty, excel cond. Key Code 7-22.

Tower, 460' of Utility #480. Key Code 7-23A.

Andrew FHJ5-50 7/8" foam transmission line, 75', never used, but a few years old. Key Code 7-54J.

Jampro 10kw highband FM harmonic filter, 1 1/2" EIA flange fittings, approx length 15'. Key Code 7-30C.

Rohn model 25G, 120' tower, 5 yrs old, gd cond; Shivley model 6602-4 FM antenna tuned to 90.9, four bay, 5 yrs old; 150' Andrew Heliax 7/8" transmission line model HJ-5 w/"N" connectors. Key Code 7-80.

Air Hellax Line, 500' of 1 1/2", FM transmission line, type HJ7-50A in 2 pieces. Key Code 7-65.

6 Bay FM horizontal ant, 5KW tuned to 101.3 MHz, w/brackets. Key Code 7-34.

Jampro JA8B 8 bay FM transmitting antenna, 3 1/2" EIA flange feed, 8.39 power gain/28KW input maximum @ 106.5 MHz. Key Code 7-30D.

RCA TFU30J, Ch 48, 62 KW UHF antenna, gain of 27, beam tilt .5 degree with deicer and sleetmelter. Key Code 6-67.

Hellax transmission line 7/8" foam, 185' in original shipping carton (FCC 78-50J). Key Code 6-8.

Hellax, 150', used 3 1/2" pressurized & semi-flex, removed from service 3 yrs, gd cond. Key Code 6-26.

Phelps Dodge CFM-LP3, 92.7 MHz with radomes. Key Code 6-7.

Collins LTU (3 coils) used at 1450 kHz, went to new equip, w/1 spare shunt cap. Key Code 6-8.

Triex Mfg, new, never been used, 30' sectional tower. Key Code 6-45A.

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

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

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

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

Want To Buy

FM antenna 4 Bay that can be tuned to 88.9 MHz, harmonic filter, 2 TT, reel to reel recorder, solid state FM exciter, EBS equipment for educational station. Key Code 7-79.

Guyed tower, 400', in gd cond. Key Code 7-25.

Towers, one to four guyed towers, 80 to 120 ft. Key Code 6-83.

Tower lighting, red obstruction lighting, top mounted 300 mm flashing beacon and set of steady burning lights for 275' tower. Key Code 6-27.

Rhon 45 G sections, need 300 feet total, will remove yours if we can haul it away, other size, mfg OK too, no phone calls please. Key Code 6-97.

Coax, 350' 1 1/2" or larger, prefer heliax or equiv 50 ohm, must be cheap and in one piece, no phone calls please. Key Code 6-97.

Tower capable of supporting 12 bay FM, either on ground or standing, 700 to 1000'. Key Code 6-10.

Antenna, 4 bay FM, H or CP, prefer CP, tunable to 92.7 complete with pole mount or face mount, must be cheap, no phone calls please. Key Code 6-97.

Self supporting tower, 80 to 120 ft. Key Code 6-83.

AUDIO PRODUCTION (OTHER)

Want To Sell

Tapco 2200 dual ch graphic equalizer, 600 ohm in/out. Key Code 7-30P.

Eleven pair multi-channel snake, one end XLR male "pigtailed," other end XLR M/F splitter box, 50' long. Key Code 7-62.

CBS dynamic presence equalizer model 5400. Key Code 7-42A.



Edcor, Inovonics, Orban, Urei, Delta Labs, Technics, dbx, Lexicon, Eventide, Strand Sound, and Tapco. All available from Full Compass Systems, 6729 Seybold Rd, Madison WI 53719.

800-356-5811
(In Wis: 608-271-1100)

1/3 Octave graphic equalizers (2), one year old. Key Code 7-38.

Inovonics 241 noise suppressor, mint cond (2). Key Code 7-13A.

Inovonics 230, overhauled from factory 6/80, in use. Key Code 7-83.

Sansui QSE-5B 4-ch quad encoder, 600 ohm balanced isolation unit, and Sansui QSD-1 4-ch synthesizer and decoder, all rack mount, factory cartons, new cond. Key Code 7-30N.

Klark-technik DN-34 analog delay; Orban stereo reverb, (2); Urei LA-4 compressors; (2) Teac/Tascam Patch Bays; (2) JBL 4311 monitors. Key Code 7-91.

Eventide 1745A digital delay, Quad-8 RV-10 reverb. Key Code 7-62.

Altec Lansing rotary attenuators, 600 ohm in and out, new and in factory cartons; RP series, 8-gang and 6-gang; RA series, 3-gang and single-gang. Key Code 6-22ABCD.

Jackfield, three rows, 10 single jacks in row, mounted in panel for rack. Key Code 6-89.

MXR stereo graphic equalizer, 10-band, like new, excel for non-critical applications. Key Code 6-92A.

Teac AN-180 high fi noise processor and TC-160 cassette deck, stereo w/limiter. Key Code 6-29.

Altec equalizer, 9062-A. Key Code 6-29.

Ramko ACL-25-E automatic 1/4" or cassette tape winder, best offer. Key Code 6-12.

Teac Dolby AN-180 noise reduction. Key Code 6-32.

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

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

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

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

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

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

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

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

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

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

Urei 1/3 Octave graphic equalizer 527-A, has 30 eq controls for all possible ranges, excel cond. Key Code 5-31.

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

Want To Buy

Van with complete radio remote studio, STL, etc within 500 miles of GA. Key Code 7-83.

CBS Labs audio filter or Fairchild or Collins 116F. Key Code 7-83.

Burwen DNF1000 noise reduction unit, gd working cond w/schematic. Key Code 6-86.

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

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

AUTOMATION EQUIP.

Want To Sell

SMC 252RS carousels (2), stereo, w/IGM interface boards, will consider trade for open reel decks of comparable value. Key Code 7-89.

SMC TS-25, 25 Hz sensor, gd cond. Key Code 7-33.

Gates OPC-3 overlap program control, was working when removed, make offer. Key Code 7-18.

SMC time announcer, 722 w/Tac-1 time announce control, like new. Key Code 7-43A.

Gates SP-10 complete automation switching and control system "brain" rack, including, TA-1, MP-S, SP-10-2's, RES, TS-3's, MDF-S, OPC-10, TB-1, AMS-10's, TC, EAA and more. Key Code 7-30BB.

Gates 55-S, 55-cart multiple player, stereo, 3-cue, in 7' Gates rack w/new spare drive belts. Key Code 7-30S.

Gates MDF-S motor fader, works fine, clean, make offer. Key Code 7-18.

Automation, audio racks, 19" (2); Sono Mag-20 cart wheels, two random select (3), sequential start and remote control (1). Key Code 7-65.

Tapeathon "Librarian" dual transport with auto programmer and line amp. Key Code 7-44B.

Gates ACC-2 audio control center & ACC-2 power supply, one or both, works, best offer. Key Code 7-18.

International Contact Section

For more information on any product listed in the Broadcast Equipment Exchange section of *Radio World*, contact the following companies. Importante para los radiodifusores de México, su suscripción a este periodico esta pagada por I.E.R.

In Canada: United Video Ltd
1485 Triolet Street
Ottawa, Ontario K1B 3S4
Canada
613-741-5554

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

In Other Countries:

Radio World/Exchange
PO Box 1238
Arlington, VA 22210 USA

Tel: 703-525-0400
TELEX: IMASINC 64593
Cable: IMASINC ARLINGTON VA

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

800-336-3045

New Listings are in italics.

BROADCAST EQUIPMENT EXCHANGE

ACTION-GRAM

JULY 1980
USE BEFORE
OCTOBER 1980

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(Verifiable number must be provided)

Signature _____

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TOLL FREE KEY CODE HOTLINE

800-336-3045

In Virginia call 703-588-0400 collect.

...our Hot Line telephone number. When you call, we will give you any Key Code names and addresses and send you the full list with an invoice for \$5.

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See International Contact Section
on page 14**

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There are three ways of receiving *Radio World*, so choose the way that suits you best.

1. FIRST CLASS MAIL WITH KEY CODE LIST. Avoid delay . . . get in on the action faster! For \$25 per year, you get *Radio World* 1st Class WITH the matching Key Code number list. (Enclose your check with your order and get 3 BONUS issues!).

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LISTING SECTION:

Radio World's "Broadcast Equipment Exchange" provides FREE listings for all broadcast or pro-sound end users. Send in your "Want to Sell" or "Want to Buy" requirements, and we will list them for three full months. Hundreds of stations and companies have used us successfully. Why don't you? The system

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We make no attempt to evaluate equipment, but rather publish exactly what is sent to us by the listees.

Classified listings with contact information are available to manufacturers, dealers, brokers, distributors, etc. on a \$12 per listing basis. Call or write for complete details.

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Broadcast Equipment Exchange

AUTOMATION ... WTS ... CONTD.

Gates random select cartridge system including, (2) 252RS, (2) carousel service & switching units, (1) pulse diverter, (1) Gates 7' rack and (1) RA-5. Key Code 7-30T.

Schafer 902 demonstrator for programming srvc, Ampex stereo decks (3), recently rebuilt & like new, Carousels (3) w/random access controllers, in 3 racks. Key Code 7-4A.

Automation Systems, older tube type system up graded with 4 Revox decks, 2 carousels, carts, time ann, and programmer. Key Code 6-4B.

Gates automation system, mono, 6 carousels random access, silence sensor, SP-10 programmer, motor driven fader, overlap, monitor amplifiers, odd-even time announce, carts, I.D. & fill cart units (Criterion), Metrotech logger, all manuals, 10 sources can be upgraded for stereo, will take best offer. Key Code 6-71.

SMC 20A carousel (mono), gd cond, SMC 22A carousel (stereo), needs capstan motor, otherwise O.K., both with IGM plates. Key Code 6-39.

Schafer 800-T system, including 4 Scully 270 stereo bps, 3 mono carousels, 800-T brain, sub brain, rand access, 4 racks. Key Code 6-44.

IGM Mono system controller 500, easy convert to stereo, voice channels, music modules, clock, and monitoring, avail about June 15. Key Code 6-23.

IGM Random Select Carousel Controller 50-3, modified to run four carousel events in fifty steps, avail June 15. Key Code 6-23.

IGM MOS direct access random select memory, model 100-11. Key Code 6-36.

ITC 25 Hz tone detectors (4); Gates 25 Hz stereo filter. Key Code 6-93.

SMC 252RS carousels (2), stereo w/mono heads, gd working cond, random select for Schafer 800 system. Key Code 5-67A.

Stereo Automation System, complete, including Schafer Brain, Ampex reel-to-reel, carousel, network join, racks, remote controls, time announce, logger, manuals, 25Hz tone recorder, CBS Volumax, CCA compressor and Moseley generator. Key Code 5-47A.

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

Want To Buy

Gates logging decoder, type LD-10G. Key Code 7-8.

Gates logging encoder & control model LE-C, Key Code 7-8.

IGML 400 automation brain. Key Code 7-40.

800-T Brain, will consider buying Brain with/other equipment. Key Code 6-1.

Network join and fader in gd cond. Key Code 6-76.

Random select carousels, old, any cond if repairable, must be cheap, need four total, blown capstan motor OK. Key Code 6-97.

Time announce tapes in gd cond. Key Code 6-76.

Victor printer for logging Gates automation system, in working order. Key Code 6-76.

CAMERAS (VIDEO)

Want To Sell

IVC color cameras (3), 10:1 zoom lens, tubes, encoder, image enhancer, cables w/200' extension, gd cond. Key Code 7-82A.

Hitachi GP-7 color camera w/AC adapter, batteries, zoom lens, custom case, etc, less than 6 mos old, still under warranty, perfect cond. Key Code 7-72.

RCA TK-40A image orthicon color cameras, fair cond. Key Code 7-41C.

IVC-300A Camera, w/Rank 10:1 zoom lens, 100' mini cable, GVG enhancer, Cohu encoder, w/Houston Fearless tripod and cradle hd. Key Code 7-31.

JVC AGS-4600U B/W portable, sim to Sony AVC-3400, electronic viewfinder, mic, 6:1 zoom lens. Key Code 7-29.

JVC 1800 color TV camera, used approx 1 1/2 hrs per wk for 1 yr, excel cond. Key Code 7-1A.

Hitachi 3 tube Plumbicon Studio Cameras (2), FPC-1000P & FPC-1007P w/Angenieux 10:1 & Fujinon 5:1 lenses, Hercules CAMlink, tripod and dollies. Also, editing system. LOW-LOW prices, call 201-575-1168.

IVC 100 lens lens, color camera chain, needs work, buyer must pick up. Key Code 7-85C.

Sony DXC-1610, mint cond, over-haul 2 mos ago, includes Sony VO-3800 deck, 6 tapes, 4 batteries, carrying cases. Key Code 7-20A.

Shibaden FPC-1000H color camera w/Fujinon cable drive lens, camera control unit, and 50' cable. Key Code 7-10.

Ikegami ITC 240, 3 tube Saticon, less than 250 hrs on tubes, includes battery, power & headsets. Key Code 7-74A.

Dumont TA124, 3" I.O. camera chain, working order, w/manual. Key Code 7-51C.

Marconi MK-4 video cameras, power supplies and control units, some stripped, some work (7). Key Code 6-4.

Grass Valley 771 vertical aperture equalizer (2), correct vertical aperture loss by one line delay. Key Code 6-72.

Marconi MK VII's (3) w/3 lenses, 3rd camera may be used for spare parts. Key Code 6-88C.

Sony Trinitron DXL1000 color camera, 4 yrs old. Key Code 6-45B.

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

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

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

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

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

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.

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

Want To Buy

RCA TK-31/41 lenses, 8.5", 13", 17", 25" zoom. Key Code 7-85.

TV-33 camera cable f/u/w PC-70. Call Clint Free at 615-693-4043.

Varitol 5 zoom lenses and other Rank and Angenieux lenses. Key Code 6-65.

CART MACHINES

Want To Sell

Spotmaster 500 record/playback; one Tapecaster; and three Collins tube type cart machines. Key Code 7-65.

Harris Compact II stereo record-play cartridge machine, triple-cue, tabletop cabinet, 18 mos old. Key Code 7-30U.

Spotmaster 500's mono-record playback in fair cond, and mono-playback only for parts. Key Code 7-64A.

RCA RT-7A tape playback unit, needs work. Key Code 7-80.

Tapecasters R.P. brand new in carton. Key Code 7-16A.

Magnacarta cart & record w/TER & secondary tone. Key Code 7-65.

QRK R-P mono units (2), two yrs old. Key Code 7-38.

Spotmaster bdct cartridge rewriter w/timer, gd cond. Key Code 7-73.

Spotmaster cartridge tape rewriter w/tape timer, gd cond. Key Code 7-7.

Tapecaster R-P & playback units (several), 5-8 yrs old, all are in service. Key Code 6-26.

Collins 642-A cart machines (2) gd cond, 2 for parts, plus one record amp. Key Code 6-42B.

Audi-Cord model 100 stereo recorder playback cart machine, built in time clock & all cue tones, adaptable to automation & encoding system. Key Code 6-46.

Criterion 80, mono R/P single-tone; Criterion 80, stereo, R/P, single-tone; Criterion 80, stereo, playback, single-tone. Key Code 6-93.

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

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

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



Employment Service

For Help Wanted

Any company or Station can run "Help Wanted" ads at the flat rate of \$12 per listing per month (50 words max). Payment must accompany insert; there will be no invoicing. Blind box numbers will be provided at an extra charge of \$2. Responses will be forwarded to listee, unopened, upon receipt.

Help Wanted

Chief Engineer in Duluth MN. Take charge type person with quality in mind, and technical background looking to move to a radio Chief Operator. EOE. Send resume and salary requirements to S. Terhaar, Box 2983, Fargo ND 58108, or call 218-236-8129.

Top 15 market 50KW AM/100KW FM in warm climate seeking applications for aggressive/self starter engineer. Advancement opportunities rapid for right person. This is a career opportunity with a growing chain. Send resume and salary requirements to Box 1001. EOE.

For Positions Wanted

Any individual can run a "Position Wanted" ad, FREE of charge, at any time. Simply send in your listing, 50 words maximum, and it will appear in the following 3 issues of *Radio World*. Contact information will be provided, but if a box number is required, there is a \$2 fee which must be paid with the listing (there will be NO invoicing). Responses will be forwarded to the listee, unopened.

Positions Wanted

"Combo" engineer seeks fulltime engineering with station, consultant or manufacturer. 1st, SBE member, CIE graduate, C.E., past three years at AM-FM with SMC automation, STL, weather radar. Married, 27, available now. Call Mike at 414-324-5877 or write 14 Smerling Ct, Waupun WI 53963

NOTE: Send listings and/or responses to box numbers to

Radio World Employment Service,
PO Box 1238, Arlington, VA 22210.

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

RCA playback. Key Code 5-15B.

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

Want To Buy

Cart delay mono or stereo, gd cond. Key Code 7-75.

Gates Criterion record amplifier. Key Code 7-69.

WANTED: We get daily requests for your clean working mono & stereo cart machines. BROADCAST INTERNATIONAL, INC. 1229 NE 37th St. Ft. Lauderdale, Fla. 33334 (305) 564-4422

Manuals, diagrams, any info for MaCarta Carousel model MS-2408 w/auto sequence S3, by Moulic Specialties Co, Bloomington IL. Key Code 6-87.

Solid state stereo cart record/play and single or multi deck play only machines, also any working Audio or Fidelapac carts up to 300. Key Code 6-97.

CASSETTE & REEL-TO-REEL RECORDERS

Want To Sell

3M 56 modified for servo, 15/30 ips, loads of spares, 16 and 8 tr, \$14,500. Call for other listings. Empirical Audio 914-762-3089.

Magnacord 1028/1048, 4 ch audio tape recorders w/solid state elec, very good cond (low mileage), several avail at \$350 ea. L Healy, 710 E State, Delmar DE 19940. 301-896-2000.

PASS FCC EXAMS TESTS-ANSWERS FOR FCC FIRST AND SECOND CLASS COMMERCIAL LICENSE
The Original FCC Tests-Answers exam manual that prepares you at home for FCC First and Second class Radiotelephone licenses. Newly revised multiple-choice exams cover all areas tested on the actual FCC exam. Plus "Self-Study Ability Test" Proves! \$9.95 Moneyback Guarantee.

COMMAND PRODUCTIONS
RADIO ENGINEERING DIVISION
P.O. BOX 26348-H SAN FRANCISCO, CA 94126
Please rush me Tests-Answers for FCC First and Second Class Commercial License. My \$9.95 is enclosed.

Name _____
Address _____
City _____ State _____ Zip _____

Teac/Tascam 80-8 w/dbx; 25-2 w/dbx; A-303 cassette w/Dolby, like new. Key Code 7-91.

Ampex PR-10 gd cond. Key Code 7-88A.

Ampex 600 and Ampex AG 500 stereo reel recorders. Key Code 7-83.

Ampex 350 plus 300 motors, \$150 each. Empirical Audio 914-762-3089.

Recordex C5-2500 cassette duplicator (five slaves) with a G2A reel to cassette transport, excel. Key Code 7-81F.

Otari QXHD-5050, 4 trk, 4 ch, tape deck, like new. Key Code 7-67.

Ampex 601 record/playback (2). Key Code 7-65.

Ampex 351 style head stack, 2 trk stereo record and play full track erase, used but excel cond. Key Code 7-54F.

Scully 270-2. Call BCA at 404-487-9559.

Scully 280, 7 1/2-3 1/4, Saki heads. Key Code 7-33.

American Concertone 505 2-trk recorder & 4 trk playback, 4 heads, in handsome luggage-style case. Key Code 7-30K.

3M reel to cass duplicator, model 6030, gd cond w/spare parts and manual. Key Code 7-5A.

Ampex AG-440, rebuilt. Call BCA at 404-487-9559.

Scully 280-B, 2 tr, \$2450 ea. Empirical Audio 914-762-3089.

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

800-336-3045

New Listings are in italics.



Broadcast Equipment Exchange

CASSETTES ... WTS ... CONTD.

Recordex super pro cassette duplicator, mono, 1 master, 2 slaves, excel cond. Key Code 7-90A.

Dukane duplicating & pulsing system, 3 slaves model 28A18. Key Code 7-81G.

Stellavox SP-7 mint cond, w/mono/sync heads. Key Code 7-61A.

Ampex and other 1/2" and 1" data type decks, would make great multitrack deck if you have the time and ingenuity. Key Code 7-54G.

Ampex 601, gd cond, fairly new heads, Ampex 602, fairly new heads, Ampex AG-500. Key Code 7-34.

Ampex MM-1100-1200, 16 tr head stacks, ERP, like new, \$5500. Empirical Audio 914-762-3089.

Wollensack R to R record/playback. Key Code 7-65.

Scully R to R machine w/record amp stereo. Key Code 7-65.

Pentagon Pro Series Reel to reel duplicator system, master and one slave, new heads, system under warranty. Key Code 7-44A.

Ampex 601, w/rack mount or in case. Key Code 7-38.

Ampex 351, stereo, 7 1/2-3 3/4. Key Code 7-33.

Scully tape decks (2), type 270, 1/2 trk stereo, in gd shape. Key Code 7-23B.

Scully 270 1/4" playback (2), auto-reverse, 4 trk, like new cond, make offer. Key Code 7-3.

Ampex AG-300-1 or 300-2, spare parts included, \$950. Empirical Audio 914-762-3089.

3M 24 tr w/Selectake II, several avail around \$30,000 each. Empirical Audio 914-762-3089.

Scully 280, 4 tr, \$2800 and up. Empirical Audio 914-762-3089.

Magnecord reel to reel, hi speed duplicator, 3 slaves, model DMT, recently overhauled. Key Code 7-81E.

Ampex 602 full trk 7 1/2 ips, excel cond. Key Code 7-52A.

Sony TC-650 recorder, SOS & Echo, 1/4 trk, 3 head, solenoid operated, full remote capability, 7 1/2 & 3 3/4, xInt cond, meets all specs. Key Code 7-37A.

Ampex 612 2-trk stereo playback, 7" reel, 7 1/2 ips, rack mount panel. Key Code 7-30J.

Ampex 351 F.T. w/tube electronics, edit pedal and service manual, excel cond. Key Code 6-24A.

Magnacord M-80, 1 track push button recorder. 7 1/2-15 ips. Key Code 6-29.

Ampex 601. Key Code 6-33E.

ITC model 750, 7 1/2 & 15 ips. 1/2 trk stereo, in roll around console. Key Code 6-46A.

Akai GX 270-D-SS, 4 trk, 1 yr old. Key Code 6-91C.

Ampex model 350 (2), model 300 (1). Key Code 6-96B.

Maggie PT-6, several units, 2 in use, 4 are not but gd for spare parts. Key Code 6-26.

Ampex AG500, stereo. Key Code 6-33F.

Ampex PR-10 electronics (2), one unit needs minor work. Key Code 6-73B.

Magnecord mono 1/4" tape recorder, full trk, PT6-AH tape deck, PT6-1M-4 mixer w/4 inputs, PT63-J amplifier, PT6-M 2400' tape deck, in cases, Pilotone and Rangertone sync heads and outputs, excel. Key Code 6-89.

Concertone 505, 3 3/4-7 1/2, new 1/4 trk heads, gd 3-motor transport, as is, gd for parts. Key Code 6-92B.

Stellavox SP-7 recorder, mint conc w/mono & sync head. Key Code 6-18A.

Ampex or Ashland capstan drive motors hyst/sync for Ampex 300 or duplicators model 3200, new #4030137-07. Key Code 6-22F.

PR-10 transports (2), one high and one low speed, both need erase head, otherwise good. Key Code 6-73C.

Nagra III portable reel-to-reel recorder currently in service in studio, best offer. Key Code 6-83.

Roberts 770, old audiophile deck, 2 & 4 trk stereo, internal amp/speakers, gd shape. Key Code 6-92C.

Full trk E/R/P head assembly (unused/rebuilt) for Ampex 350/351 and cream puff Urei 527-A, 1/3 octave graphic equalizer, sold together or individually, best offer basis. Key Code 6-11.

Scully 284-8, 1" 8 trk, motion sense, ATL, sync-master remote, very low hrs, STL test tape and 25 reels 1" tape thrown in. Key Code 6-17.

Magnecord 1021 2 trk stereo recorder, 10 1/2" reels, switchable 1/2 trk, 1/4 trk, PB heads, fair cond. Key Code 6-26.

Revox A-700, 1/2 trk, excel, 3 speeds. Key Code 6-35B.

Ampex ATR-102 system, excellent condition, low hours, \$5650. Call or write L. Clifton, Clifton Recording, 180 Bellmead, Shreveport LA 71105.

318-865-5489

Wollensak 1580 compact stereo reel-to-reel recorder, needs minor adjustment, otherwise excel. Key Code 6-73D.

Nagra 3 full trk reel to reel recorder, ATN unit, leather carrying case, excel cond, used by movie studio, battery charger. Key Code 6-89.

Ampex FR100 FM logging recorder w/spd control amp, plug in boards & rack. Key Code 6-38.

Revox A700 (3), Magnecord 1028 (1). Key Code 6-93.

Scully 280-1 deck, pre-amps SP-14; 7 1/2 and 3 3/4; 14 and 10 1/2 reel size; mounted in 3' rack. Key Code 6-15A.

Tascam 80-8 w/DBX, remote control, all wiring, and 8 reels of used 1/2" Ampex 456, only 100 hrs, must sell. Key Code 6-17.

Ampex recorder rack mount, 351-2, needs new erase head. Key Code 6-29.

Nortronics playback heads, one 4 trk (1/4" tape), and two 2 trk, all with little wear. Key Code 6-73E.

Tascam series 70 1/2" trk with "B" type Dolby and motor drive amp for sync with film and/or VTR (in travel case). Key Code 6-84.

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

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

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

Revox A-700 w/1/4 trk and 1/2 trk head assemblies. Key Code 5-37B.

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

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

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

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

Revox A77, half trk stereo, recent factory recond. Key Code 5-67B.

FULL COMPASS SYSTEMS



MX-5050-B 1/4" Recorder

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

800-356-5811
(In Wis: 608-271-1100)

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

Want To Buy

Ampex MM1100 16 trk head stack, remote control & spares, also 16 trk console, MCIL, Audiotronics etc. Key Code 7-53.

Scully 280B, 2 trk, 10" reels. Key Code 6-80.

Superscope CD-330. Key Code 6-70.

WANTED: We get daily requests for your clean working AMPEX 600 & AG-600 SERIES tape machines. BROADCAST INTERNATIONAL, INC. 1229 NE 37th St. Ft. Lauderdale, Fla. 33334
(305) 564-4422

Magnecord PT6-M, P-75, M-80 and M-90 deck large hole reel holders. Key Code 6-4.

Magnecord recording amps for M-80 and P-75 decks, also need head covers for M-80 (2 sets). Key Code 6-4.

Magnecord PT6-55A, complete cases (1 pair), also want head covers for same (upper and lower). Key Code 6-4.

4 trk or 8 trk machines, damaged or in need of repair. Key Code 6-28.

CATV-MATV EQUIP.

Want To Sell

Conrac AC12A receiver, works. Key Code 6-67B.

Want To Buy

Jerrold SSE-200A and SRD or SD recovery, used OK. Key Code 5-2.

CONSOLES

Want To Sell

Tascam M-10, 12 x 4 w/8 x 2 monitor mix module plus 240 pt RTS patch bay. Key Code 7-60A.

RCA 76-B4 console, six mixer, operating, w/manual. Key Code 7-51J.

Penny & Giles faders type 1520. Key Code 7-35.

Stevenson Interface 16 x 4 mixer, original owner, excel cond. Key Code 7-19A.

Trident 10 x 2 Fleximix, mint cond w/warranty, 1 yr old. New price \$6200, used \$4500. Empirical Audio 914-762-3089.

Teac/Tascam model 5, model 2, model 1, used little. Key Code 7-91.

McMartin B-802S1 dual channel stereo bdct console, 3 yr old, excel cond, Daven Pots. Key Code 7-80.

Gates "Producer" four mixer, transistorized console, 12 inputs, mono, w/manual, very gd cond. Key Code 7-73.

Sparta AS-30 and AS-100-B. Key Code 7-33.

Gates stereo Statesman, 5 chan stereo. Call BCA at 404-487-9559.

Console, 20 x 8 x 16, XLR in/out w/spares, installation included w/warranty, \$10,250. Empirical Audio 914-762-3089.

RCA BC-2B, 8x1 gd cond, buyer must pick up. Key Code 7-85D.

Ampro dual channel mono, 10 input channels, one yr old. Key Code 7-38.

Audiotronics 501 26/24 console w/producer desk. Key Code 7-6A.

Gates Executive. Call BCA at 404-487-9559.

Neve 24 ch console, \$50,000. Empirical Audio 914-762-3089.

Sparta AS40B, very good cond, w/manual. Key Code 7-21.

Quantum QM128, 12x8 board, in producer's console, make offer. Key Code 7-66.

Tascam model 5A w/talkback, 6 hrs used. Key Code 7-46B.

Collins 212S-1 stereo w/6 pots, out of service 30 days, need more inputs. Key Code 7-25.

FULL COMPASS SYSTEMS



RS-1500US, \$1170

Technics RS-1500, RS-1520, RS-M85, and others. Available from Full Compass Systems, 6729 Seybold Rd, Madison WI 53719.

800-356-5811
(In Wis: 608-271-1100)

In Canada call United Video
613-741-3691

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

In Mexico call ICR
741-459-5554



Broadcast Equipment Exchange

MIKES ... WTS ... CONTD.

Shure 55SW dynamic. Key Code 7-30G.

Sennheiser 441 (2), Sennheiser 421 (2), Sony 6FP, Shure SM-57 (2), Audio-Technica Electret. Key Code 7-91.

Western Electric 639A mike, gd cond. Key Code 7-51G.

1-47 tube, Tele 251, VF-14 tube, make offer. Key Code 7-35.

Shure 556S Unidyne dynamic. Key Code 7-0H.

Shure Lavaller 560 dynamic mike. Key Code 81K.

Sennheiser wireless mikes, 2 pair, as is, cheap. Key Code 6-32.

EV 668. Key Code 6-32.

Sony C-500 (1 pair) for sale or swap for 4 Sennheiser MD421 mikes or swap for 2 current model Kepex's and cash. Key Code 6-1.

AKG C-60 tube condenser microphones (1 pair) w/power supplies, cables & spare, unused Telefunken AC-701 tube. Key Code 7-73A.

Shure SM 33 (2). Key Code 6-93.

EV630, EV665, RCA (sm brush type ribbon). Key Code 6-33B.

RCA BK-5 mint cond. Key Code 6-74B.

RCA lavaller w/attached cable, model BK6. Key Code 6-89.

RCA model 77 (2), 2 EV model 666, one AKG & one EV. Key Code 6-96.

Neumann KML 325 with batt. supply. Key Code 6-41.

AKG 451 CK-9 shotgun assembly. Key Code 6-32.

EV. Shotgun with mount model 642. Key Code 6-41.

Sennheiser 405 condensers (2), with power supply, cables, new capsules. Key Code 6-12A.

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

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

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

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

Want To Buy

RCA "Loudmouth" microphone consisting of RCA mike with transistorized amplifier self contained, unit was built by Kellogg Co, does not have to be in operating condition, will purchase or swap classic mike. Key Code 7-12.



FULL COMPASS SYSTEMS

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

800-356-5811
(In Wis: 608-271-1100)

Microphone limiter and adjustable filter preamp, level locks not wanted. Key Code 7-83.

Neumann M49, 249, U47, U48, U67, M50, M269, SM-2, SM-69, SM-23, KM56, KM53, KM54, 256, KM-66, KM63, KM64, KM84, KM86, KM88, U87. AKG C-12, C-12A, C-24. Telefunken M-251, M-250 & VF-14 tubes for U47-48. RCA 44, 77DX, 10001-KU3A, BK-5. J Mandel, Triton Prod, 38 Brooks St, Brighton MA 02135. 617-787-2220.

MISCELLANEOUS

Want To Sell

Video patch panel, Nems Clarke, rack mount, BNC connectors on rear. Key Code 7-85B.

Patch bays, 19" and 21" DBL row and five row units, wire wrap and standard, gd to excel cond. Key Code 7-49.

Service disconnect switch, three phase, three pole w/ground and fuses, 400 amperes, 208 volts, gd cond. Key Code 7-76.

ADC audio patch bay assemblies, 3 rows of 22 T-R-S Jacks, 2 rows normalled and prewired to trees, third row bridging for monitoring. Key Code 7-54A.

Yorktown Electrostatic copier in gd cond. Key Code 7-64B.

WP-16B power supply, MI-26084B. Key Code 7-87.

Teletype, receive only set for National Weather Service, model 28E. Key Code 7-80.

"Key Telephone" cable, 25 pr 24 AWG, approx 150' per roll (no connectors). Key Code 7-54B.

Telco 25 pr crunch blocks, "B" type. Key Code 7-54C.

Lighting Choke, single phase, 2400' #10 soft drawn wire, new. Key Code 7-34.

Audio transformers, send SASE for list. Key Code 7-32.

RCA MI-19313-3, 45° Elbows (8). Key Code 7-87.

"Key Telephone" cable, 60 pr 24 AWG, 1000' rolls, will cut, 100' min. Key Code 7-54E.

Rack, 4-bay, 6'. Key Code 7-33.

Anvil rack mount case on casters, 19x19x24", removable doors front & back, includes shelf & draw unit, excel cond. Key Code 6-77B.

Rack, black metal, on 4-wheel dolly, 6'1" high, 1'8" deep, 1'10" wide, with back door. Key Code 6-89.

Systemcoms briefcase telephone, 25w, 7 channel RCC for car or carry. Key Code 6-20.

5/10 KW oil filled plate transformer, primary 32000 VA, 230 volts, 3 phase, Secondary 3600 WYE, 3.1 Amps (RMS), taps 3100/2600 Y. Key Code 6-34A.

5/10 KW modulation transformer, primary 14000 ohm, DB level 57, ratio 1.16/1, response 1.0 db, 30-10000 Hz. Key Code 6-34B.

Audio reactor, 120 henrys, DC amps 0-9, insulation test volts 35,000. Key Code 6-34C.

Filter choke, 4 henrys, 20,000 test volts, 3.7 amps. Key Code 6-34D.

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

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

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

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

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

Want To Buy

RCA MLI-11706 "on-air" and "stand-by" signs, need several. Key Code 7-85.

Audio and video RCA catalogs and instruction books, also RCA Bdct News. Key Code 7-85.

MONITORS

Want To Sell

McMartin TBM-8500 AM mod monitor. Call BCA at 404-487-9559.

McMartin TG-2 EBS two tone generator. Key Code 7-80.

Metron 506-B-1 AM modulation meter, working cond, best offer. Key Code 7-18.

McMartin TBM-2000B SCA monitor. Call BCA at 404-487-9559.

General Radio frequency deviation monitor type 1181-A, used, working when removed. Key Code 7-79.

Gates MO2639 for parts; Gates MO2890 freq mon looks complete; McMartin TBM3000 mono, working. Key Code 7-34.

McMartin TBM-2500A FM RF amplifier. Key Code 7-30V.

Gates GTA-88F pilot SCA freq comparator. Key Code 7-69A.

General Radio 1931A AM modulation monitor, excel w/manual. Key Code 7-40A.

Gates freq mon extn meter. Key Code 7-34.

McMartin TBM-4500A FM stereo monitor, factory recal, tuned to 106.5. Key Code 7-30W.

McMartin TBM 3700, FM frequency/modulation monitor, set for 90.9, excel cond, 5 yrs old, 12000 hrs of operation; TFT model 760-04 EBS monitor; Multi-Elmac EBS receiver. Key Code 7-80.

RCA BW-100B FM RF amplifier. Key Code 7-30X.

Belar AM RF amp RFA-2, recently moved back to xtmr site, 1450 kHz, w/manuals. Key Code 6-8.

General Radio modulation monitor, 1080 kHz, model 1931-A. Key Code 6-36.

Gates frequency monitor, excel cond, AM monitor, M-4990. Key Code 6-76.

Hewlett Packard 335B tuned to 99.3 MHz FM monitor, in excel cond. Key Code 6-76.

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

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

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

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

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

Want To Buy

RCA BW-85 Belar stereo monitor in working cond. Key Code 7-36.

Modulation monitor, SCA modulation and frequency monitor in gd cond. Key Code 6-31.

MOVIE PRODUCTION EQUIP.

Want To Sell

Revere S-16 16mm sound projector, low hrs, in gd cond. Key Code 7-51F.

Super 8 film equipment, excel cond, including 2 video players, 2 Beaulieu sound cameras with lens, batteries, charger and case, 1 Bolex editor, 1 Auricon sound film camera with lens, amp, carrying trunk, charger power pack, 1 Canon Scoopic, with lens, amplifier and battery charger and carrying cases for above (2). Key Code 7-87.

Beaulieu R16E-S60 camera, 12-120 zoom lens, battery charger, battery. Key Code 6-89.

Bauer Selecton II, 16mm motion picture projector, mint cond, used 360 hrs. Key Code 6-25.

Moviola 35mm. Key Code 6-32.

Bolex 8mm with zoom, 100' capacity. Key Code 6-41A.

Magnasync 602 16mm film recorder/reproducer in original cases, B&H 202 projector, optical/magnetic w/sync motor. Key Code 6-89.

Arriflex 35mm, 2 motors, 3 lenses, (3) 400' mags. Key Code 6-32.

Mitchell 16mm, 1200' magazine. Key Code 6-41B.

De Vry 35mm projector. Key Code 6-32.

Arriflex-M 16mm cameras (2) w/5-400' magazines, extra constant speed motors, 12-120mm zoom lens (1), 17-85mm zoom lens (1), various tripods, meters, other access, precision sound reader, optical/magnetic, B&H 816 hot splicer, other production equip. sell as package or break up. Key Code 6-89.

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

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

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

Want to Buy

Microfilm camera, prefer portable. Key Code 7-68.

RECEIVERS & TRANSCEIVERS

Want to Sell

Sansul 210 stereo receiver, like new cond w/books. Key Code 7-51H.

Moseley RPL-1 remote pickup system, fixed & mobile power supply, rack mount, receive unit, RPL-1R, transmitter RPL-1T. Key Code 6-71A.

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

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

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

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

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

Want To Buy

Multi 2000 or other multi mode transceiver wanted. Key Code 6-75.

REMOTE & MICROWAVE EQUIP.

Want To Sell

RC-9 remote control. Call BCA at 404-487-9559.

Collins 551, 7.2-8.4 GHz microwave TX-RX, Klystron type, tube and solid state, I.F., tube type modulators, several avail, Int'l use only, gd cond, recently removed from service. Key Code 7-54H.

Lenkurt "76" series microwave receivers (2) tuned 12.7-12.9 GHz. Can be tuned down to 10 GHz. Includes Gunn local oscillator, power supplies, IB, waveguide, plus 8.5 and 7.5 MHz subcarrier demods. Solid state throughout, \$750 each or \$1300 for both. D Castellano, Capitol Broadcast Exchange, 3469 W Benjamin Holt Dr Ste 525, Stockton CA 95207. 209-957-1761.

CCA remote control system, studio and xtmr units and latching relay panel, recently moved back to xtmr. Key Code 6-8.

Raytheon KTR100, television STL, repairable or very gd part supply. Key Code 6-67.

In Canada call United Video
613-741-3691

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

In Mexico call IER
741-459-5554



Broadcast Equipment Exchange

REMOTE ... WTS ... CONTD.

General Electric TT-29-A, 2 Hop, 2 GHz, 1.5 watts output now xtal'd for ch 3 & 7 in the 2 GHz band, mint cond. Key Code 7-76.

Schafer remote control system, 19 position for AM transmitter. Key Code 6-67.

Marti RMC-2AXS remote, 10 channel, working when removed from service, w/book. Key Code 6-78.

Want To Buy

Moseley PCL-505 /C for 927-928 MHz STL. Key Code 6-83.

STL system for 217 MHz. Key Code 6-83.

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

STEREO GENERATORS

Want To Sell

Moseley SCG-8, 67 kHz subcarrier generator. Call BCA at 404-487-9559.

Sparta 682. Key Code 7-30A.

Harris MS-15 stereo modules (3) perfect. Key Code 7-69B.

Collins 786M-1. Key Code 7-30B.

Harris MS-15 stereo gen modules (3), incl 994-7989, 994-7990 and 994-7991. Key Code 6-91.

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

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

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

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

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

Want To Buy

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

SWITCHERS (VIDEO)

Want To Sell

Dynalr 15X10C Video Routing Switchers (2). 0% dif gain, 1° DP. Fully tested includes manual, \$800 each. D Castellano, Capitol Broadcast Exchange, 3469 W Benjamin Holt Dr Ste 525, Stockton CA 95207. 209-957-1761.

Shibaden SE-101 video switcher-special effects generator, brand new, still in box. Key Code 7-17.

Hitachi, PAL System, excel cond, model EA103U (EK), six camera inputs, six audio intercom inputs. Key Code 6-6.

Viscount Video 7V3FE, 5 inputs, plus 2 non-sync, int & ext keying, fair. Key Code 5-36.

Want To Buy

RCA TS-2 9x1 switcher, also remote control panels for TC-4. Key Code 7-85.

Panasonic WJ-545P black and white S.E.G. and 10 pin cables for same. Key Code 7-84.

TAPES, CARTS & REELS

Want To Sell

Fidelipac 380 Master Carts: 40 each 40 sec, 100 each 70 sec, 50 each 100 sec. Some slightly used, others never used, overstocked, \$1.50 each. S Fisher, KLDL, 303-832-1090.

Alignment tapes: 2" NAB, 30 ips, 15 ips; 1/4" NAB, 15 ips, 7 1/2 ips. Key Code 7-62.

Aristocarts, 78 in gd shape but some need new tape, will sell cheap. Key Code 7-9.

Aluminum reels, 10 1/2, 1/2" tape and 1" tape. Key Code 7-88D/E.

AUDIO TAPE: Several thousand reels, 3600 x 1/4", 10" plastic reels, slightly used but in very good cond, erased. \$1.50 ea or \$18 for 18 reels. L Healy, 710 E State, Delmar DE 19940. 301-896-2000.

Scotch 1" video tape, 361-1-2150, used 2-6 passes only, 8" alum reels, 3" 3-slot hub, polished backing, in orig boxes, over 600 avail, sell or trade, all or part, reasonable. Key Code 6-87.

Ampex 456, 1" and 1/2", all in gd cond, also boxes, reels and flanges available. Key Code 6-17.

Ampex 1" video tape on 1 hr reels, 60 reels available. Key Code 6-79B.

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

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

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

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

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

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

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

Want to Buy

Music tape library in working order for automation. Key Code 6-76.

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

TEST EQUIPMENT

Want To Sell

Hewlett Packard 335-E freq modulation monitor. Key Code 7-87.

Tektronix 551 dual beam oscilloscope w/2 direct access plug-ins, gd cond. Key Code 7-54L.

Hewlett Packard audio generator and distortion analyzer. Key Code 7-38.

Wavetek 180, audio sweep/function generator, sine/square/triangle wave, excel cond. Key Code 7-26.

Tektronix oscilloscope 515A, 15 MHz. Key Code 7-88B.

B&W distortion meter, model 400. Key Code 7-65.

Tektronix RM15 rack mount oscilloscope, gd cond. Key Code 7-54M.

H.P. 400-GL, A.C. voltmeter, 20 Hz - 4 MHz, scale calibrated in dB, built in 100 kHz low-pass filter, excel cond. Key Code 7-26.

Hewlett-Packard audio oscillator model 201B. Key Code 7-65.

Tektronix 434 opt 01, 25 MHz portable storage oscilloscope, new CRT & calibrated, w/accessory case & manuals. Key Code 7-63.

FM deviation meter/scope, low band/high band/UHF, gd cond. Key Code 7-54P.

General Radio audio oscillator type 1301A and noise and distortion meter 1932A. Key Code 7-87.

Tektronix Vectorscope model 526, mint cond. Key Code 7-76.

Tektronix 535 oscilloscope w/type 1A2 dual trace plug-in, gd cond. Key Code 7-54K.

HP 650A gen, 1 Hz-10 MHz, HP400C AC voltmeters (2), Varo (D&R) FL4 flutter meter, Audio Instruments 168D SMPTE I.M. analyzer, best offer. Key Code 7-32.

Freq counter FR-38D/U w/MX-1637/U freq mixer. Key Code 6-9B.

Sierra Electronics high freq wave analyzer, 158A. Key Code 6-9G.

Tektronix 513 scope. Key Code 6-20.

Tektronix 466 portable storage scope w/DM43 & temperature probe. Key Code 6-72.

HP-332A distortion analyzer; HP portable telecomm set model 3550B consists of HP204C oscillator, HP403B voltmeter, HP353A patch panel, all equip calibrated by H.P. recently. Key Code 6-2.

Hewlett Packard computing digital indicator, #2500 (freq counter), Dymec Electronics. Key Code 6-9C.

Digital Voltmeters (2) Non-Linear Systems, series 4200, rack mounted. Key Code 6-20.

Cushman CE-5 service monitor, w/modulation meter and VHF pre-selector modules. Key Code 6-43A.

Cushman CE15 spectrum monitor, very clean, almost unused, Key Code 6-67D.

Tektronix 214 dual trace storage miniscope, excel cond. Key Code 6-72.

Leader oscillator, LAG 125, recently calibrated, sine wave & burst square wave, -60 to +20db scale. Key Code 6-2.

American Electronics Labs, square wave generator, #5226, 400 or 1,000 Hz. Key Code 6-9D.

Fluke 8000A-01 DVM, AC/NICAD rechargeable batteries, in mint cond, never used, original box, manual, warranty, must sell. Key Code 6-37A.

Ballantine Labs model 320, true-root-mean-square voltmeter. Key Code 6-20.

Ballantine 305A, 1K volt peak volt meter. Key Code 6-38.

RCA BWU-4B television demodulator, BW-5 TV sideband response analyzer (UHF transmitter sweep package), tuned to Ch 29. Key Code 6-67.

Tektronix 434 Opt 1 portable 25 MHz bistable storage oscilloscope, new CRT, just calibrated, excel cond. Key Code 6-68A.

Tektronix 545 scope w/dual trace plug in, gd cond. Key Code 6-72.

HP330B distortion analyzer, HP650A generator, D&R (Varo) FL-4 flutter meter, Audio Instruments 168D SMPTE I.M. analyzer, Ballantine 320 true R.M.S. voltmeter. Key Code 6-90ABCDE.

Tektronix 545 oscilloscope with CA plug in. Key Code 6-95.

Hickox 191X, A.M. signal generator, crystal controlled. Key Code 6-9E.

M-B automatic vibration exciter control model N685/N686. Key Code 6-20.

Sencore TF 151 transistor tester. Key Code 6-38.

RCA TO-2 waveform monitor, had strong trace when last quit, repairable with instruction manuals. Key Code 6-67C.

Tektronix 455 scope dual trace, delayed sweep, like new. Key Code 6-72.

B & W 210 oscillator; B & W 410 distortion meter. Key Code 6-93.

Tektronix "M" 4 trace plug in and "CA" dual trace plug in. Key Code 6-95.

Tester, tube & battery, Precision Apparatus Co. Key Code 6-9A.

Hetrodyne freq meter, TS-323/UR. Key Code 6-9F.

Elco 460, works, but needs work. Key Code 6-33D.

Tektronix digital unit model 230. Key Code 6-65.

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

Want To Buy

Service monitor VHF Hi band. Remote pickup equipment. Key Code 7-78.

Tektronix type 82 or type 81A oscilloscope plug-ins for Tektronix 585 scope. Key Code 6-83.

Leitch or **Tektronix** test signal generators, waveforms, vectorscopes, both NTSC's and PAL. Key Code 6-65.

Tektronix 922, Phillips PM 3226, Hewlett Packard 1220A portable oscilloscope or similar. Key Code 6-83.

TRANSMITTERS

Want To Sell

TTU-1B RCA UHF TV transmitter used parts, transformers, relays, switches, meters, etc, manuals for above transmitter. Key Code 7-79.

S.C.A. equipment, factory cut FM antennas 95MHz, some S.C.A. tuner modules. Key Code 7-44.

Gates BC-500-D AM transmitter, tuned to 1410 kHz, gd cond, has spare crystal tubes, transformers. Key Code 7-24.

Power supply including plate transformer for RCA 5G and 5H transmitters, all in excellent cond and complete. Key Code 7-57.

GE 50-3 Model 4BT General Electric 50KW AM transmitter & spare tubes

Currently in full time
operation
In excellent condition
Available September 1st.

C. B. King — WGY
518-385-1234
1400 Balltown Rd.
Schenectady, N.Y. 12309

Circle 120 on Action-gram

5KW AM transmitter in excellent cond to trade for a 5 to 10 KW FM transmitter. Key Code 7-45.

Gates FM-250-B FM transmitter, now on air, complete w/exciter, sub-carrier generator and injector. Key Code 7-24.

Collins 10/5 KW, excell. Call BCA at 404-487-9559.

Gates 250 FM C. Has stereo generator and exciter on 99.3, sacrifice. Key Code 7-86.

RCA BTA 5/10H tuned to 1010 kHz. Key Code 7-34.

Collins A830-Z direct FM exciter, baseband or mono input, w/numerous spares. Key Code 7-30R.

Gates 250C-1 w/driver unit, operated at 1240 Hz, was back-up until 1979. Key Code 7-18.

RCA 250L. Call BCA at 404-487-9559.

FM radio station equip for sale, xmtr, tower, cable, monitors, stereo generator, 3 bay antenna, Marti remote, and much more. Key Code 7-14A.

RCA 1 KW, Mdl 1M. Call BCA at 404-487-9559.

RCA UHF FM exciter M1-19363 w/xtals tuned to ch 25, working when removed. Key Code 7-79.

Subcarrier generator, Marti SCG-BH used for only 3 mos. Key Code 7-59.

Blower, 1HP, new, unused for Collins 21E transmitter. Key Code 7-48.

Westinghouse FM3, 3 KW FM transmitter, less exciter. Key Code 6-36.

General Electric inductrol regulators, 2 O.K. and 1 for parts, used for 30 KW UHF transmitter with instructions. Key Code 6-67.

RCA BTA-50G, 50 KW AM xmtr, excel cond spare tubes, parts. Key Code 6-94A.

Westinghouse 5 kw HV-5 AM transmitter component parts, 1949 vintage, some new, some used, transmitter could be placed in service with some work, price negotiable. xmtr used 892-R modulator and final tubes. Have supply of 802's, 805's, 807's. Key Code 6-5.

Gates tube-type exciter, pulled from 1965 Gates FM-5 transmitter, works at 95.5 MHz. Key Code 6-26.

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

800-336-3045

New Listings are in italics.



Broadcast Equipment Exchange

TRANSMITTERS ... WTS ... CONTD.

A-1-B, 5 KW linear amp, 1 KW in, 5 KW out, 6eds tube. Key Code 6-36.

ates 1 KW AM transmitter in excel cond, will ade for a 5 to 10 KW FM transmitter. Key ode 6-14.

CA TTU-30 UHF harmonic filters, Ch 48, re set, aural and visual. Key Code 6-67.

ates 250GY, 250 watt, served well as aux, /manuals, some spare tubes 1450 kHz. Key ode 6-8.

CA-BTA-5H, 5KW transmitter, 1080 kHz mplete w/spare tubes, after Sept 1. Key ode 6-36.

aytheon RA-1000 AM transmitter, 1 KW to 30 watts, in excel cond. Key Code 6-76A.

ates 250-C modulation transformer, and her spares & assorted parts for the 250-C, lake offer. Key Code 5-58.

CA BTF3B w/spare exciter & stereo enerator, 96.5 MHz. Key Code 5-39.

parts SS1000A Solid State AM transmitter erating on 970KHz, currently in operation, 300/500W adaptable to 1000/250W. Key ode 5-14.

CA TV model TTU-1B w/filterplexer, ch 24, P freq monitor, dummy load. Key Code 5-1.

CA-5-D transmitter modulation transformer reactor. Key Code 5-21.

ates FM-5B transmitter, w/exciter, no filter instruction book. Key Code 5-30.

HF TV translators, Adler 100 watts, UST-1M20 with RA-7 amplifier, EMCEE 100 atts, HTU-100 with remote receiver. Key ode 5-6.

ollins 20-V-3, 1KW, AM, excel cond, on the r. Key Code 5-19.

CA BTA-IL, 1KW transmitter w/spare parts id tubes, gd working cond. Key Code 5-11.

ollins 732-A 1kw re-built FM transmitters), \$1600 each less exciter, 25kw dummy ad with the purchase of both. Dave tellano, Capitol Bdct Exchange, 3469 W hjamin Holt Dr, Ste 525, Stockton, CA 5207. 209-957-1761.

Want To Buy

TC modulation transformer, type LS-691, 'so might be interested in a UTC LS-692 odulation transformer. Key Code 7-77.

ates M-6095 FM exciter or similar with SCA enerator. Key Code 7-69.

M transmitter, 250 watts plus for construc- on of new religious non-com station in MD, eed specs and prices on all types. Key Code -56.

KW AM transmitter, clean. Key Code 7-57.

M transmitter, 1 KW to 3 KW, prefer erating on 95.9 MHz, must be ready for air ork. Key Code 7-24.

3-30 KW FM, best price or tax deductible gift ir non-profit Christian Corp. Key Code 6-16.

ates M6095 tube type exciter. Key Code 6-1.

ates M-6095 mono tube type FM exciter or quiv, plus 67 SCA gen. Key Code 6-91.

Harris or McMartin 1 KW transmitter w/exciter and stereo generator complete. Key Code 6-19.

WANTED: We get daily requests for AM & FM transmitters in any condition. BROADCAST INTERNATIONAL, INC. 1229 NE 37th St. Ft. Lauderdale, Fla. 33334. (305) 564-4422

1-3 KW FM, operating, cheap, anything in one cabinet tunable to 92.1, no phone calls please, also need hard wire remote control (phone line), also mono STL or RPL. Key Code 6-97.

FM mono and stereo 10 to 100 watts exciter, transmitter, tube or transistorized. Key Code 5-26.

20KW FM transmitter for non commercial public radio operation. Key Code 5-56.

UHF transmitter ch. 23. Key Code 5-44.

Background music unit, sub-carrier on bdct FM. Key Code 5-42.

TV VHF and UHF 10 to 100 watts exciter, transmitter, tube or transistorized. Key Code 5-26.

Gates or later model other brand 10KW FM transmitter, plus AM 5KW w/cutback. Key Code 5-27.

TUBES

Want To Sell

ELMAC 3CX2500F3, rebuildable, low emis- sion. Key Code 7-30Z.

ELMAC 2X3000F3, brand new. Key Code 7-30AA.

Receiving tubes. Key Code 7-88F.

Econco-rebuilt 7D21, factory tested good, low hrs, may be delivered via Econco plant. Key Code 7-30Y.

GE-673, new (6), 4-125A new (6), sell or swap for cart machine. Key Code 4-24.

Elmac tubes, 4CX1000k (2). Key Code 4-75.

25, 30 mil, and 2/3" plumbicon tubes, used in good condition, fair price. Call United Video at 613-741-5554.

Want To Buy

6J7 metal tubes (working) wanted, also cap shields for same. Key Code 7-51.

GL-6942 in gd cond. Key Code 5-16.

TURNTABLES & LATHES

Want To Sell

Russco Studio Pro model B (2) w/Micro-Trak 303 tonearms, xlnl cond, recently on air. Key Code 7-37B.

RCA BQ-2B 16" T.T. for parts, as is. Key Code 7-51.

Accutrac 4000 single play random access turntable, selects cuts, new stylus, used. Key Code 7-29B.

Presto 6N overhead w/leadscrew & RCA cutter head, gd cond. Key Code 7-51K.

Spotmaster Studio Pro turntable complete w/Shure tone arm, cartridge, Shure pre-amp (stereo) and bridging transformer. Key Code 7-73.

Gates CB-100 (2) for parts, no motors; Gates CB-100 presently in use; Gates CB-500 M5739, working. Key Code 7-34.

Russco turntables (2) in excel cond w/tonerms and Stanton 600EE, used only 10 hrs each. Key Code 7-28.

Gates 16" turntable w/Grey tone arm, Stanton cartridge model M5202; Gates CB500 16" turntable without arm; Presto model T-68 turntables with arms (2). Key Code 7-80.

Technics SL-1500 MK2 turntables (2), like new. Key Code 7-67.

QRK 12C (2), gd cond. w/Micro-Trak arms. Key Code 7-38.

Gates M6442 (2) stereo solidstate T-T preamps. Key Code 6-91D.

Rek-o-Kut Rondine turntable w/Gray 216 arm, Shure cartridge. Key Code 6-89.

Shure arms/heads (4), Collins TT, Gates M6244 (2), T.T. preamps. Key Code 6-33C.

Technics SP-15 turntable, best reasonable offer, excel cond. Key Code 6-86A.

Collins 16" TT with arms (2), also Gates CB-77 with arms, all in excel cond, includes spare arms, new motor mounts. Key Code 6-97A.

QRK turntables (2), 12" w/Gray tone arms, very gd cond, sell or trade for R/P cartridge machine. Key Code 6-42A.

FULL COMPASS SYSTEMS

SP-10MK11, \$675

Technics Direct Drive SP-10, SP-15, SP-25 and SI-1200 Mk II. In stock and available from Full Compass Systems, 6729 Seybold Rd., Madison WI 53719.

800-356-5811
(In Wis: 608-271-1100)

QRK older 12-S TT (2) w/Microtrack 303 arms. Key Code 6-91B.

Rek-o-kut R-16H, 16" recd turntable in fl cab, Rek-o-kut Master Pro M-5S 16" overhead lathe w/2 leadscrews 120-10, two cutting heads for lathe, Rek-o-kut R-8B cutting head amplifier/equalizer, all as a package only, with complete manuals. Key Code 5-64S.

RCA BQ2B, 16" T.T. with Shure M236 arm and cabinet/manual. Key Code 5-51A.

QRK 12" w/Rek-o-Kut tone arms (2), and Stanton 500AL cart & Styli (extra parts). Key Code 5-9.

Sparta turntables (3), Gates Harris in console. Key Code 5-45.

Gates CB-100, 16", & Gates CB-500, 16" w/Gray arms, turntables rebuilt, very gd. Key Code 5-25.

Grey 602 turntable eq (2), gd cond, make offer. Key Code 5-58.

Wilkinson stereo turntable preamps (2), model TTP-1-A. Key Code 4-19A.

Wilkinson stereo, solid state preamps (2). Key Code 4-55.

Scully lathe auto pitch, 6 speed Westrex mono F.B., head to amp, excel cond. Key Code 4-22A.

Wilkinson TT-P1-A stereo (2), solid state, preamps. Key Code 4-75.

FULL COMPASS SYSTEMS

Shure Broadcast Cartridges
—very rugged —no back cue burn

SC-39EJ List \$70, Sale \$45
SC-39ED List \$100, Sale \$64

Full Compass Systems
6729 Seybold Rd
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Fairchild 523 variable pitch disc cutting lathes (2), one three speed, one two speed. Complete with microscopes, Grampian mono heads, Gotham amps, suction, extra heated styli, and many blank discs, located in N.Y.C. make offer. Key Code 4-79.

Gates CB-500, 16" turntables (2) w/arms and preamps. Key Code 4-33.

QRK turntables (2) w/Gray arms, Shure cartridges. Key Code 4-32B.

Want To Buy

Gray 12" arms (2), viscous damped, single pivot type, with arm rests. Key Code 6-4.

Turntables, bdct quality (2), best price or donation basis for non-profit Christian Corp. Key Code 6-16.

WANTED: We get daily requests for your clean working Russco & QRK 12" turntables. BROADCAST INTERNATIONAL, INC. 1229 NE 37th St. Ft. Lauderdale, Fla. 33334 (305) 564-4422

Russco or QRK turntables (2) with pre-amps in gd cond. Key Code 5-15.

Turntables (2), any model/age, must be complete and operational. Key Code 5-63.

Gates CB-500, 16", 2 speed TT, very gd to excel cond, late mfg preferred, need one only w/o arm, reasonably priced. Key Code 5-7.

TV FILM EQUIPMENT

Want To Sell

Telematlon TMM-203 optical multiplexer w/Buhl dissolve unit, will consider trade. Key Code 7-55.

Wollensak flipper dissolve AV22 for 2, 35mm projectors. Key Code 7-81J.

RCA TP-11 Multiplexer. Key Code 7-87.

General Electric professional light valve TV projection system PJ500. Key Code 6-94B.

Kodak VPX Super 8 w/sound flying spot scanner, gd cond. Key Code 6-67A.

RCA TP-11C color optical multiplexer, bench, camera mount, make offer, must go now, cheap, trades OK. Key Code 6-97.

RCA TP-3 (Grey) slide proj (2), with 8 slide holders, for spare parts & RCA (Grey) 7" lens and optical spares for proj, new. Key Code 5-6.

I.T.V. Lens, 75mm, Cosmocar, F1:1.9. Key Code 4-10.

Kodak Projection Lens Ektanon F12, 3". Key Code 4-10.

I.T.V. Lens, 150mm, Soligor, F 1:3.5. Key Code 4-10.

Want To Buy

Film chain (color), slide proj, multiplexer, RCA TP-12 or 15, 16mm film proj (2), RCA TP-6 or B&H 614. Key Code 5-6.

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Fine Used AM & FM Transmitters and Also New Equipment

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Broadcast Equipment Exchange

VIDEO PRODUCTION EQUIP.

Want To Sell

TV Studio on Wheels including Sony VO 2850A 3/4" VCR, DXC 1200 camera, 3M character generator, Shure M67 mixer, custom digital editor & much more. All in a 75, 3/4 ton Chevy 10 van. Key Code 7-92A.

B/W 12" TV monitors, DAGE model 602C w/schematics, working when removed from service (4), also B/W 12" TV monitor RCA TM4 DC. Key Code 7-79.

Belden 8280 TV camera cables with plugs. Key Code 7-79.

Microtime Delta 44 time base corrector, needs some work, Grass Valley Group Proc Amps. Key Code 6-65.

Ampex 793 (PAL version) TBC, also spares to make up 790 and extra parts. Key Code 6-88B.

Telemet 3200 series video distribution amplifiers, 4 outputs to a module, 8 modules to a rack. Key Code 6-65.

O.K., who put the used prices on the new equipment?

It's no mistake. Here's your chance to buy brand-new 3M video gear at prices you may never see again. And each of these surplus pieces comes with full manufacturer's warranty.

Production Switcher Model 812	\$1,800.00
3 buses, 8 video layouts, 12 popular effects	
Subcarrier Distribution Amplifier Model 730	\$400.00
RGB Image Enhancer Model 6210	\$1,500.00
Time and Temp. Generator Model TT-1	\$750.00

For more information call toll-free 1-800-328-1656.



Circle 106 on Action-gram

Ball Brothers Mark 10 video processing & AGC amplifier, gd cond. Key Code 6-72.

Conrac WVA-21 B&W 21" monitors (2). Key Code 6-20.

Telemet TSG2000 EIA synchronizing generator, gd cond. Key Code 6-72.

RCA TA-9 video stab amps (2). gd cond. Key Code 5-6.

Vital processing amps, V-500 and V-1000. Key Code 5-6C1&2.

RCA UHF TV demodulator, MI-3402/MI-34004. Key Code 5-6.

RCA TG-31 in field case. Key Code 4-53.

Want To Buy

Tuner/Timer, preferably all electronic tuning, clock circuit, used. Key Code 7-29.

Sony color monitor/receiver, 8"-12", used, solid state. Key Code 7-29.

Time Code Generators and readers, window makers, video monitors, Conrac, CYB, RHA. Key Code 6-65.

CVS 504B or similar time base corrector. Key Code 6-75.

Tek 650 monitor with access to use with 602 scope. Key Code 6-88.

Chyron III graphics system or similar. Key Code 6-75.

Sync generator, Telemet TGS 2000 or 3000 or equivalent. Key Code 6-88.

Non-bdct quality equip for ITV, B&W or color, new or used. Key Code 5-70.

Color Video monitors, Black Burst generator, Ball Bros Mark VII color special effects generator card no. 3 & 4, color synthesizer card, Manual for CBS 526 NTSC Program Line Image enhancer (Photocopy OK), extender board for CBS 526 Image enhancer. Key Code 5-6.

RCA portable master monitor, contains 8" mono pix mon & 3" w/f monitor in portable case combo, gd cond, reasonable. Key Code 5-7.

VIDEO TAPE RECORDERS

Want To Sell

TR-4 (rebuilt) parts, including new motor, air compressor and vacuum pump. Key Code 7-87.

IVC/Quantel 2200 digital time base corrector w/manuals. Key Code 7-31.

3M video recorder 3/4" umatic, gd cond. Key Code 7-81H.

Ampex VR660B VTR, very gd cond w/manuals, electronic editing. Key Code 7-51A.

Editing system, 3/4" VTR (2), interfaced w/TRI-5 edit controller (built in monitor) excel cond. Key Code 7-47.

IVC-960 video tape recorder w/IVC-4102 time base corrector. Key Code 7-31.

Shibaden SV-700 1/2" VTR w/DB-101 distribution unit, like new, less than 15 hrs use. Key Code 7-17.

Panasonic NV-9500A w/NV-9200 and Jatex VSEC 42TD time code controller. Key Code 7-55A.

Sony 3/4" video cassette recorder player, color, stereo U-matic model 1809, excel cond. Key Code 7-39A.

CVS 5044 heterodyne phase corrector. Key Code 7-31.

Concord 1" VTR's model VTR-600-1 (2), one gd cond and one fair cond. Key Code 7-41AB.

Sony AV3600 B&W VTR w/18" mon/rec, RF unit, cables, tape. Key Code 6-12A.

Sony AV-3650 B&W. Key Code 6-20.

Sony VP-2000 player, 3/4" solenoid controlled, can be remoted, also other 3/4" VTRs. Key Code 6-65.

Anvil case for portable Betamax, AC adap, camera, tripod, like new. Key Code 6-77A.

Ampex VR 5700 with color board & new belts. Key Code 6-79A.

Ampex VPR 1, A format, excel cond w/A.S.T. & spare heads, make offer. Key Code 6-81.

RCA TR22 HB record & playback, RCA field installed, no accessories or head. Key Code 6-88A.

VR100 HB record w/editor latest Allen Signar system, best reasonable offer. Key Code 6-88.

VR1100 HB record and playback hybrid system looks better than VR1200, best reasonable offer. Key Code 6-88.

VR1100 HB record with editor hybrid system, best reasonable offer. Key Code 6-88.

Ampex VR-7500 VTRs (3), color, 1". Key Code 5-6A.

Sony 2600 3/4" U-matic recorder players. Key Code 5-66B.

Sony SLO 340, portable 1/2" recording deck, used 10 times, mint cond. Key Code 5-61A.

JVC-VCR CR6100U, 3/4" cassette. Key Code 5-1.

Sony 2000 VCR 3/4" U-matic player. Key Code 5-66J.

Sony 1000 VCR 3/4" U-matic player. Key Code 5-66D.

Sony EV-310 (5), 1" VTR's, rack-mount, gd to fair cond. Key Code 5-36.

Sony 2860 VCR 3/4" U-matic modified for Convergence editing system, like new cond. Key Code 5-66E.

Panasonic 3020C, best offer or swap for Betamax, call BEE at 800-336-3045.

Ampex 3000, spare head excel cond. Key Code 4-80.

RCA TR-5 VTR, low hrs, two head wheels. Key Code 4-53.

Ampex 1100 highband, 1200 electronics, DOC. Key Code 4-80.

RCA TR-50 VTR, Cavac, DOC, Editor, 5000 hrs, two head wheels. Key Code 4-53.

Norelco EL3401-A 1" B&W VTR, with accessories and reels of tape, very low hrs. Key Code 4-6C.

Ampex VR-3000 portable backpack quad LB/HB Color Record, mono playback, no batteries, battery charger(s) are available, currently in use by major prod house, 3 avail. Key Code 4-12.

RCA TR-22 factory high band electronic splicer, excel cond. Key Code 4-50.

IVC VCR 200XN, monochrome, plug-in colc conversion avail, gd cond, (2). Key Code 4-38.

Ampex 1200 B, editor, sidcar monitor, spar head. Key Code 4-80.

Want To Buy

Ampex 1021 Intersync in good cond along with its accompanying VR-1100 control panel. To be used on a now standard VR-110 which is soon to be equipped with an editor. *Castellano, Capitol Broadcast Exchange 3469 W Benjamin Holt Dr Ste 525, Stockton CA 95207. 209-957-1761.*

Panasonic NV-9500A, 3/4" cassette deck in gd cond, must be able to edit well. Key Code 7-58.

BUV-200 Sony VTR. Key Code 6-75.

Portable 3/4" player or player/recorder needed. Key Code 6-75.

Sony video cassette machines, 2850, 2850A, 2860, 2860A. Key Code 6-65.

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New Listings are in italics.

Video Seminar

(Continued from page 13)

synchronization workshop was a demonstration of the various hardware needed to accomplish an audio/video post production project. Perhaps the most interesting portion of his talk was the description of the SMPTE and V-drive requirements for useable editing and interlocking. The audience immediately launched into a vigorous Q&A period concerning the various tricks of the trade; Liftin shared his years of experience in clear and concise answers.

The actual demonstrations of interlocking were plagued with problems. This came as little surprise to the members of the audience who had tried interlocking in the past. But throughout the BTX, EECO and other synchronizer demonstrations, Liftin attempted to impress one thought on the attendees. "If you leave here with only one piece of knowledge," he said, "let it be that the 80 bit SMPTE code that we are using here is only an *electronic sprocket hole!*"

Much interesting trivia regarding the audio/video marriage were brought up, such as, when a color V-drive is used as the master SMPTE clock, one's audio tape machine runs at 14.98 IPS. The technical details of the talk are the subject of another paper, but all in all, Liftin provided the most technically entertaining and informative lecture of the Conference.

More Videodiscs

The MCA VideoDisc, marketed at DiscoVision, provided a truly remarkable demonstration of the hows and whys of placing video on a piece of plastic and retrieving the data with a helium laser. The control and accuracy of the device brought several rounds of applause from the impressed audio and video audience.

There are two versions of the MCA VideoDisc: one for industrial uses, as in hospital training, educational institutions, etc.; the second, a conventional consumer version built to compete with the video tape industry and used to watch feature length movies at home. The discs play 1/2 hour per side now, but are being refined to play a full hour per side. The disc travels at 600-1800 RPM, depending upon application, with the laser scanning 54,000 individual tracks, (or frames in this case) each of which is individually addressable from the infrared, cordless remote programmer. The bandwidth of each track (frame) is roughly 10 megahertz, not bad considering the track spacing is 65 millionths of an inch. The units may be used in the straight mode, as in watching a movie, or TV show, but also may be slowed down, speeded up (while retaining sync), still framed for detailed analysis, or recall any single addressable frame by frame number.

The helium laser is rated at 5000 hours, but MCA maintains that their testing has shown an MTBF ratio of

9000 hours per player. The audio section of the disc was fairly respectable as well. The inner groove signal to noise ratio (diameters here also plague the signal quality, as in conventional disc mastering) is "around" -55 dbv. The outer grooves approach -70 dbv. The present audio recording technique is FM analogue modulation and detection, but by 1982, they plan to use digital audio techniques to record and retrieve the data. How about the price? The consumer price for the player with the remote control assembly is \$799 and the industrial version with all the goodies, including a programmable memory for

laying out one's own presentations, is \$3000 in single lot quantities.

Was the Conference as fruitful as the planners had hoped? There are mixed reactions: Some of those who selected the equipment to be demonstrated seemed to be biased; in another case, an absolutely horrendous sound system was at work; and, of course, the perennial "what did I learn?" was heard at the conclusion of the event. In my case, I think I gained an appreciation for an industrial marriage which is apparently inevitable. I experienced the excitement of creating new equipment and techniques to meet the changing markets.

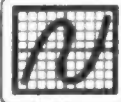



To quote two appropo statements:

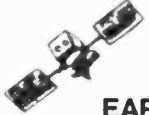
Bob Fine: "The only way to approach the audio/video marriage problem is by creating and implementing a hybrid of technologies. Mix the old with the new, use what we now know, with what we think we will need to know, and we'll have a good chance."

Todd Rundgren: "None of the equipment you will see here today, or any of the presently available technology will be a standard in 10 years. A new synthesis of technologies will become the standard for digitized and synchronized audio/video recordings."

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The following is a listing of distributors that serve the broadcast industry and who would be glad to help you with any of your equipment needs. Contact any of them directly, or circle the appropriate number(s) on the Reader Inquiry Card and send it to IMAS today. We will forward your request to the distributors, and they will send you their literature or line cards.

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