

NAB '80: NEW SIGHTS AND SOUNDS

by Kathleen Imbema

Washington, D.C. ... The National Association of Broadcasters is, once more, about to preview the "Sights and Sounds" of an industry whose members will soon convene for the 58th year. The 1980 Las Vegas Convention, April 13-16, will present more than sixty workshops directed toward radio, television and engineering interests. The NAB ad men promise "... experts in the fields of sales, programming, research, technology, management, government affairs, legal problems—absolutely *everything* you'll need to know about running your station in the '80s ..."

Despite its truly impressive promotional campaign, this Las Vegas Convention is generating enough anticipation to make those PR claims

more than just cliches: Mac Davis, Bob Newhart, Senator Barry Goldwater, Jack Anderson, and FCC Chairman Charles Ferris represent some of the "stars" that the NAB is relying on to make this event shine.

Engineering Sessions

"Broadcast Engineering will be different in the '80s ..." Those sessions that will focus on the needs and interests of the broadcast engineer cover topics such as "Audio Processing for the '80s," "Radio Facilities: Acoustical Treatment and Design," "AM Stereo Implementation," "AM Directional Antenna Systems: The Skeleton Proof," "Earth Station Technology," "Purchasing and Maintaining Digital Equipment and Software," and, for radio and television engineers, "Frequency coordination." The Las

Vegas Convention Center will be packed with electronic equipment: transmitters, video and audio recording equipment, satellite gear, engineering and studio gadgets, and syndicated shows for radio and television.

Some New Products

Cetec Vega will be among the exhibitors in the Convention Center; they claim that their hand-held wireless microphones represent a substantial improvement over all previous hand-held wireless mics, and they cite not only top audio performance, but also a revolutionary case/antenna system. The Model 80 is equipped with an Electro-Voice EV-671 mic capsule, and the Model 81 utilizes a Shure SM-58 capsule. Both models use a standard 9V alkaline battery, offering from 7 to 9

hours continuous use, and a range of up to 1000 feet.

Ramko Research may well be displaying a new unit called the PhaseMaster Cart/Cassette Recording Center which, reportedly, solves the stereo phase shift problem by capitalizing on a simple premise: phase shift doesn't matter much in mono. In the PhaseMaster, the stereo signal is mixed on the upper track (with decoding information of the low) before it ever sees the head or tape, and then it's decoded and phase locked after it leaves these two major sources of phase shift error. The result is phase error-free recording/reproduction/duplication, (no "holes" in mono reception and no stereo side-to-side shift), that meet or exceed all other systems on the market.

Electro-Voice is debuting the (Buchanan) Encore, a new three-speaker line consisting of Encore 33, an 8", 2-way system; the Encore 55, a 10" 2-way; and the Encore 77, a 12" 3-way system. According to the manufacturer, this new line was specifically developed to provide E-V dealers with high-margin products which are quite compatible with a variety of merchandising approaches. Designed as bookshelf models, the Encore can be easily positioned either vertically or horizontally. They are handsomely styled in a simulated walnut-grain vinyl.

More Products

IGM will also be commanding a booth in the Hall; their Go-Cart II has
(Continued on page 23)

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CKLW TESTS HARRIS AM STEREO SYSTEM

Windsor, Ontario ... As the FCC continues its investigation into the feasibility of AM Stereo, the fierce debate among proponents of the different AM Stereo systems persists. E.R. Buterbaugh, a member of the Canadian Federal Department of Communications Technical Advisory Sub-Committee on AM Stereo and Director of Engineering at CKLW Radio, prefaces his own opinion by admitting that "None of the AM Stereo Systems are perfect; each has advantages and disadvantages over the other."

Although Buterbaugh has had contact with all five of the AM Stereo Systems in the current competition, his station, CKLW Radio, served as one of the primary test sources for the Harris V-CPM System. Tests were conducted with receivers in

Buffalo, New York, and Maplewood, New Jersey.

The Harris Report

According to *The Reply Comments of Harris Corporation on Notice of Proposed Rulemaking*, submitted to the FCC on August 3, 1979, "The Harris System best satisfies the public interest criteria (determined by the FCC), far surpassing the systems of the other proponents. The Harris System is the only linear (AM/FM) system proposed—its signal is the sum of two amplitude modulated (AM) signals transmitted at the same frequency, varying in phase between 30 and 90 degrees. Because it is linear, the signal transmitted by the Harris System has exactly the same bandwidth and sideband structure as existing monophonic signals. The

Harris System, therefore, would cause no additional adjacent or second adjacent channel interference under the existing allocation framework and would fit within any future allocation framework, such as 9 kHz, equally as well as existing monophonic systems."

The Harris report goes on to assert that the Harris System's ability to occupy "... the same bandwidth as monophonic transmissions, coupled with the fact that the phase angle between the left and right signal carrier waves is varied optimally on the basis of the content of the audio program, makes the Harris System the only proposed system compatible with synchronous detector receivers which provide low-noise and distortionless reproduction of AM broadcasts. With frequency response as high as 15 kHz, the Harris System can broadcast the AM signal of a quality comparable to that of FM."

The Harris report further claims that "... the Harris System provides excellent stereo channel separation and covers over 90% of a station's monophonic service area with stereo service. These benefits of the Harris System can be made available to the public and broadcasters at a cost equal to or lower than that for any of the other proposed systems ..."

Harris on Bandwidth

In reference to the four other AM Stereo Systems under consideration, the Harris Report states categorically that they are "... incapable of satisfying the public interest criteria (outlined by the FCC). All the other systems are nonlinear—their signals are the product of an AM signal and phase modulated (PM) or frequency modulated (FM) signal. Even under normal broadcast conditions, the nonlinear systems occupy excessive bandwidth."

This question of bandwidth requirements has been a real point of

contention among the proponents of the various systems; however, the Harris Report not only asserts that the nonlinear systems do require greater bandwidth, but also claims that "... whereas linear systems only require twice the highest audio frequency broadcast, nonlinear systems require a bandwidth approximately six times the highest audio frequency broadcast."

The Harris report concludes its allegations concerning bandwidth requirements thus: "Besides producing unacceptable levels of adjacent channel and second adjacent channel interference, the excessive bandwidth of the nonlinear systems as a practical matter forecloses the option to reduce channel spacing and occupied bandwidth to allow more stations on the AM band."

Distortion Problem

Harris' *Reply Comments* accuses the nonlinear systems of producing unacceptably high levels of distortion in existing monophonic receivers: "All existing monophonic receivers have bandpass filters; thus, audible distortion results when a nonlinear signal passes through a bandpass filter." And, "Despite claims to the contrary, none of the nonlinear systems is compatible with synchronous detector receivers. The synchronous detector receiver is a linear device and requires a linear signal in order to provide a low noise, high-fidelity sound. Forcing a nonlinear signal into a synchronous detector results in extremely high distortion and nullifies the advantages that synchronous detection has over envelope detection."

System Modifications

The Harris report also concludes that since, as it stated previously, unmodified nonlinear systems occupy an excessive bandwidth and create unacceptable distortion in

(Continued on page 9)



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Ninn Schwartz on Recording:

THE PRODUCTION CONSOLE

Ossining, NY... For every person who is questioned, there will be a different opinion concerning the ideal recording or production console. Each engineer has developed his own method of operation, and expects the console to reflect his taste. For this reason, there are more custom production consoles found in studios, than stock manufactured consoles. Even the stock production consoles are very heavily modified to meet a specific studio's or engineer's requirements. So what is the ideal production console and where does one find it? The answers are simple: there isn't and one doesn't! The prospective production studio operator or owner is going to have to decide what present and future systems capabilities he or she wishes to accommodate, how much money he/she wants to spend and, on that basis, arrive at a compromise. One may find that an off-the-shelf mixer, of one variety or another, suits one's needs sufficiently and a few mods will make it, "MY Console". Or, one may say, "Nothing is right, so I'll build it myself" and begin the process of constructing one's own board from scratch. Either way, the same set of questions must be addressed and suitable answers found, in order to feel comfortable about doing the work. And finally, the product must be acceptable to one's clients.

Consider the Room

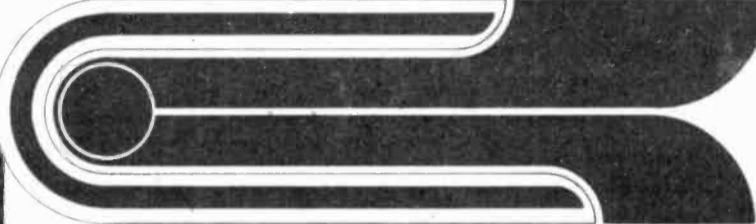
Let's consider last month's studio set up. A simple stereo production room with three 2 tracks, a master mono machine, a studio complement for recording voice overs and perhaps a cassette machine or outboard processing equipment.

The console required for such a studio should include the following features: 10 inputs for tape return, some or all of which can be switchable to a microphone source; a stereo output buss which can be "daisy-chained" to all machine inputs; a monitor select for "A-B"ing tape copies or recording.

These basics are all that is absolutely required to perform most production work; voice overs, tape copies, multi-machine mixes and so on. For example, a couple of Altec 1567A's or similar mixers (see figure #1) could be hooked up in such a way to perform these tasks.

(Continued on page 12)

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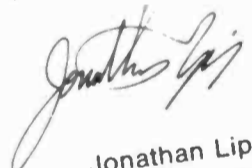
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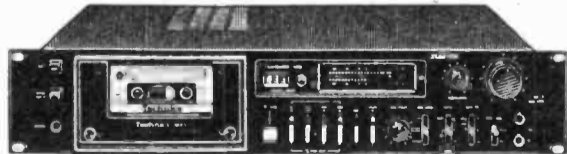
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Circle 123 on Action-gram.

Reader's Forum

Got something to say about BEE? Any comments on articles? Get it off your chest! Call us at 800-336-3045 or send a letter to Reader's Forum (BEE, Box 1238, Arlington VA 22219) for a reply.

More on AM Stereo

Editor:

I want to congratulate you on an excellent article on AM stereo in the January issue of BEE. It was refreshing to read an engineer's overview of the proposed AM stereo systems currently before the FCC.

I have read a number of articles in the trade magazines, both technical and non-technical, and I believe that your expose on the AM stereo issue dealt more with the "real world" that engineers and management are faced with than any other.

Keep up the good work. You have a fine engineering periodical.

James H. Dickson
Director of Radio Engineering
Meredith Broadcasting
Atlanta, GA 30305

Editor:

I look forward to receiving Broadcast Equipment Exchange each month. Your technical articles deal with topics that are of much interest to today's broadcaster. I have also been following your extensive coverage of AM stereo.

KTSA was one of the stations testing the Kahn-Hazeltine ISB system. We operated with this system for 3 months continuously last spring. We are quite pleased with the results obtained. Fidelity and stereo separation was quite good. I believe the biggest plus with the ISB system is that stereo reception is possible with a pair of existing mono radios. This is especially important in the South Texas area with a large minority indigent population of which

many cannot afford the luxury of FM radios to receive stereo. We are ready to resume stereo transmission as soon as the FCC gives the go-ahead.

Keep up the good work on BEE!

Gary Wach
Technical Director
KTSA/KTF
San Antonio, TX 78211

BEE Replies:

Thanks for the comments, and like everyone else, we hope the FCC will make its decision soon.

Regarding the NRB Show

Editor:

Your article on the NRB show was excellent. You covered the facts and caught the nuances in a way few "outside" reporters have managed to do.

In sum, FAIR, EXACTING, and readable. Many thanks.

J. Thomas Biss
General Manager
Radio Station WRFB
Baltimore, MD 21222

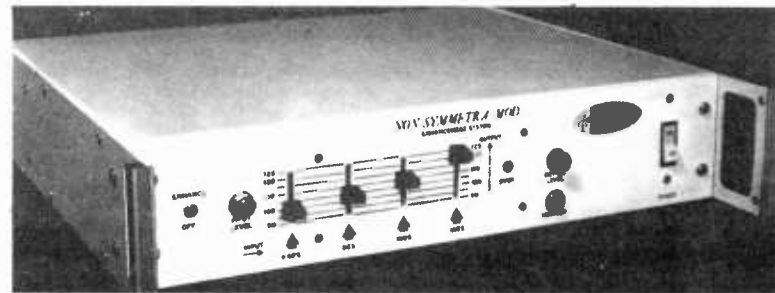
Gentlemen:

We just want to say "THANKS" for the outstanding article "DC HOSTS NRB SHOW" by Kathleen Imbema, in your Feb. edition of BEE. Our church, First Baptist of Starke, Florida presents broadcasts "live" via the local AM-FM radio station, WPXE, our 11:00 a.m. Sunday Morning Worship Service, which we have a good size listening audience. We felt as though religious broadcasting needed to be expanded.

(Continued on page 1)

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Circle 105 on Action-gram.

February FCC Developments

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

Washington, D.C. ... I will be attending the NAB Convention in Las Vegas April 13-16 and will be staying at the Las Vegas Hilton. Please be sure to look us up and join us for some good advice and some good "spirits"!

EEO Guidelines

The FCC has revised its Equal Opportunity guidelines to require that stations with five to ten fulltime employees should employ minorities and women on their fulltime staffs, for all job categories at a ratio of 50% their work force ability and in the top four job categories 25%. Stations with 11 or more fulltime employees will be bound to a ratio of 70/50. If you have less than that percentage, the Commission will review your EEO program and might possibly place conditions on your renewal.

Distress Sale Effects

FCC denied a request by Stations WJLB and WMZK-FM, Detroit, asking the FCC to clarify its distress sale policy by declaring what consequences an election of distress sale alone proceeding would have on a multiple owner's qualifications to remain a licensee of its other broadcast properties. The FCC, in a typical bureaucratic response, stated that it may become pertinent to any assessment of the licensee's qualifications, but it only could be made in light of the particular facts and circumstances found at the time. It did not foreclose the possibility that certain issues might warrant designation of any and all of the remaining licenses for hearing.

Political Advertising

All stations should be aware that the Communications Act requires a licensee to afford reasonable access to candidates for federal office. In the past, many stations have had a policy of not selling political time, but of giving a certain amount of time to each candidate. The Broadcast Bureau, in deciding on a complaint filed by the Kennedy for President Committee against WCVB-TV, Boston, has indicated that federal candidates have a right to purchase time if they so desire. In that decision, the Broadcast Bureau said it expects broadcasters to attempt to accommodate the requests of candidates as much as possible. This indicates that the Commission will take a much harder look at what is "reasonable". In short, whatever a candidate wants is deemed to be reasonable unless the

broadcaster refusing the request can demonstrate that his refusal was reasonable.

UHF TV Reception

The FCC has released two reports concerning the technical opportunities for UHF television transmitters and indoor television antenna

performance which are part of Congress request to determine ways of improving UHF reception. The reports disclose a new technique called multi-element depressed collector, which may be able to cut UHF power costs in half. If you desire a copy of these reports, please let us know and we will try to obtain them.

Waiver Extension

The FCC denied stations KNIX (Tempe) and KNIX-FM (Phoenix, AZ) and extension of their waiver of the Commission's non-duplication rules requiring the FM station to devote no more than 25% of its

(Continued on page 13)

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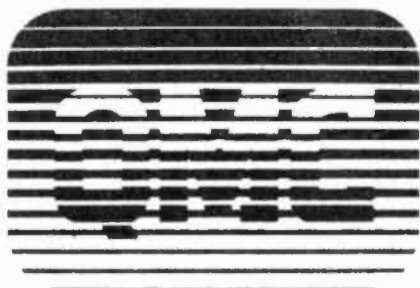
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dbx and the Broadcast Market

Newton, MA ... "Broadcasters are becoming more aware of the way they sound ... quite frankly, they didn't used to care." dbx's Larry Jaffe went on to emphasize his company's interest in this changing attitude by citing their attempt to "... help stations create their own sound, establish an identity ...". His remarks set the tone of the interview that BEE was conducting. To what extent were recording equipment manufacturers getting into the broadcast market?

Jaffe considered the question for quite some time before he finally committed himself: "Twenty percent of our sales are now coming from the broadcast market ... twenty percent."

Noise Reduction Entry

BEE continued; how did dbx get involved with the broadcast market? Jaffe quickly pointed out that the move was deliberate, and based on a fairly simple perception. Wherever one uses tape, there is a need for noise

reduction; both recording and broadcasting studios use tape.

What is dbx's relationship with Dolby? Jaffe admitted that dbx has had several advantages over the other firm: "We're more affordable, especially in a broadcast situation where purchasing is done more carefully than it is in a recording situation. Our price is very important."

BEE was very interested in finding out which dbx products were selling fastest, and Jaffe was quite open in his response. "Quite frankly, there are two different things going on. First, production work is becoming a hot, hot market ... major stations are putting together broadcast production studios and recording studios are getting more involved in production work. Second, noise reduction products are, of course, selling well."

Other Products

Jaffe added that the 142 and the 148 noise reduction systems had been

specifically designed for broadcast use. When BEE inquired about the motivation behind the development of the boom box and the sibilance machines, Jaffe pointed out that these signal processors were also big business, but that they had been designed primarily for the recording industry; broadcasters have just picked up on their advantages.

Jaffe also mentioned the importance of dbx's satellite communications products. dbx is interested in expanding that product line; they believe that their compander is unique, and they cite the NPR

utilization as a positive indication.

Jaffe interrupted the interview suddenly and volunteered to go on a limb: "Audio is, potentially, an incredible market, and the reason everyone is looking at broadcast is because they (broadcasters) have the bucks ... the recording studio market is absolutely glutted; the recording companies are fouled up, especially now ... going for broadcasting is an excellent way to expand." It will be apparent at the upcoming NAB show that other recording equipment manufacturers are seeing the same opportunity.

Clint Free on VTR's:

Motor Drive Power Amps for the TR-22

Knoxville TN ... One of the giant mysteries of video tape recording is the TR-22 motor drive power amplifier. I have worked with machines that never had had drive amp problems, however, upon inspection, most drive amp modules show signs of being repaired at some time. To say the amps are fragile is not an understatement.

high gain stage is negative and this will cause the inverter to forward bias the common emitter stage. The voltage and current power factor necessary to destroy the transistor is less than 150 watts; 50 volts at 4 amps produces 200 watts! A leaky output stage will destroy both transistors before the 4 amp fuse will open.

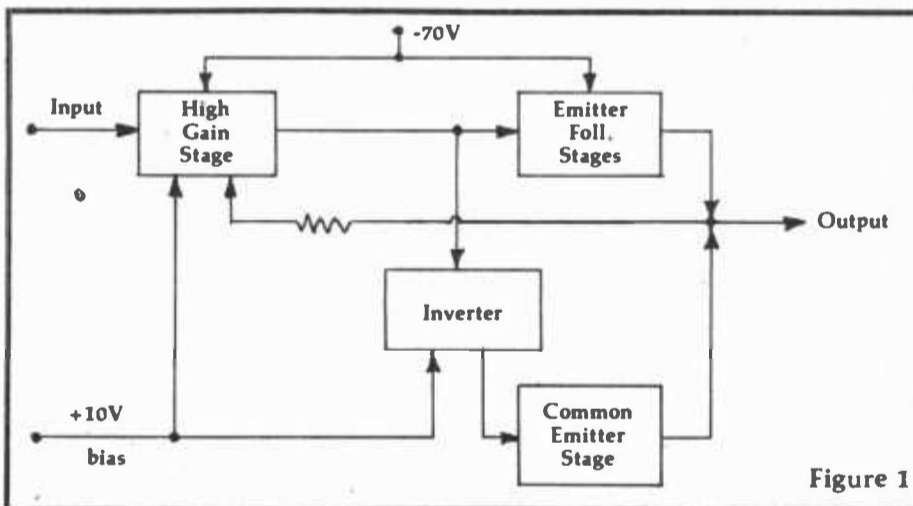


Figure 1

In Figure 1, note the +10V bias voltage. Loss of this voltage allows the common emitter output stage to conduct heavily, destroying either it or the emitter follower output stage, or both. This will happen in most machines if a heavy current is applied to the +70V regulated power supply. A fuse in the -70V current source will not open until both the output stages are shorted. This is because the output transistors are destroyed by less current than is necessary to blow the fuse. There is no magic! Suppose the emitter follower stage becomes leaky with heat and the collector voltage on the common emitter stage increases (becomes more negative). The feedback from the output stage to the

Transistor Leakage

Output stage transistor leakage causes most failures with momentary failure of the +10V bias supply contributing to the fragile nature of the amplifier. Correcting the leakage can be accomplished by installing silicon output stages (2N1556 germanium), however, the amp will have low gain and the reverse bias excessive on the common emitter stage and it will eventually short. The excessive bias is simple to correct however, the low gain is not. And you still have the +10V bias to contend with. At the request of a TV static in Kingsport TN, I worked out a modification converting the

(Continued on page 1)

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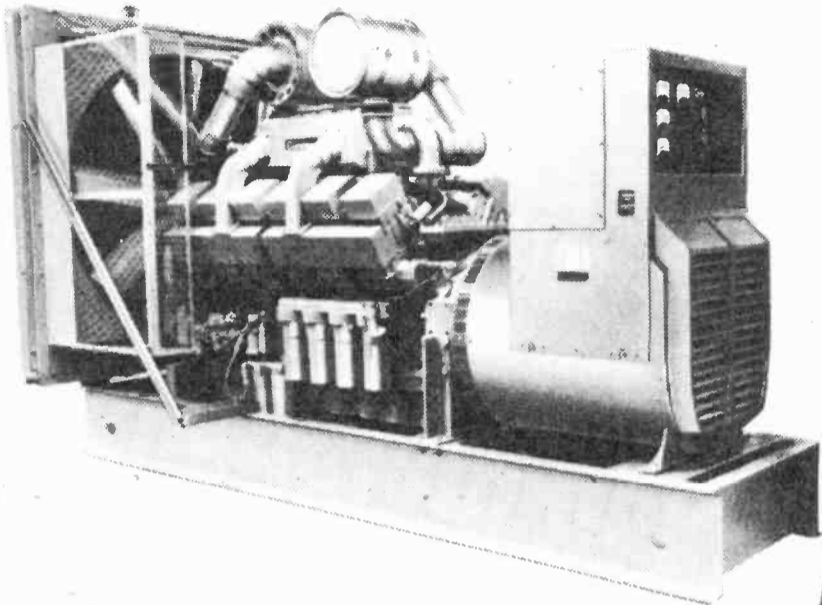
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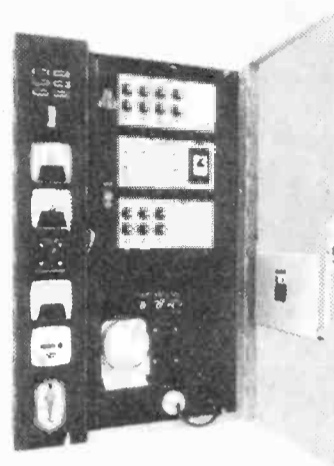
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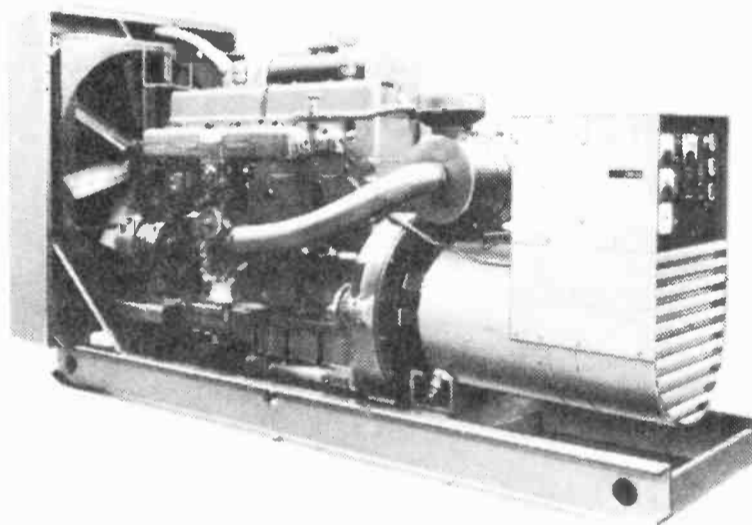
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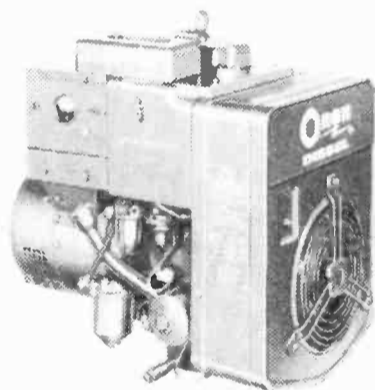
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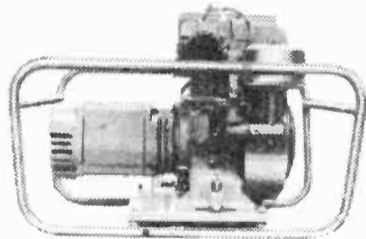
RADIATOR-COOLED GASOLINE SETS



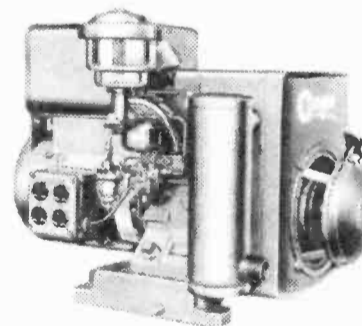
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ANOTHER VIEW OF V.U.

Arlington, VA ... V.U. stands for *Volume Units*, a standard of measurement which has been with us since 1939. Before the advent of the standard V.U. meter, there was a confusing array of measurement systems; the most prevalent being 6 milliwatts across 500 ohms. Today "0dbm" always means 1 milliwatt across 600 ohms. The V.U. meter is usually calibrated so that +4dbm is 0 V.U. People follow this system because the 4db of loss across the 3600 ohm buildout resistor. This value is required for proper ballistic damping. The ballistics of the V.U. were chosen to give more artistically understandable displays of program material. In comparison to an instantly responding AC voltmeter, a V.U. meter is easier for the eye to follow.

Ballistic Response

V.U. ballistics were also designed to approximate the RMS response of the human ear; however, the design does leave much to be desired as far as peak indication. Take a situation where the clip point is 20 db above 0 V.U. Peaks with durations as long as 45 milliseconds can be clipped without the V.U. indication ever exceeding +2 V.U. The standard V.U. reading would have to be reduced by 16 db to insure that clipping would not exceed 5 milliseconds at any one time. Even the newer peak program meters allow a 5 millisecond peak to be clipped in this situation. Remember that clipping periods in excess of 10 milliseconds are above the threshold of objectionable distortion in tape recording.

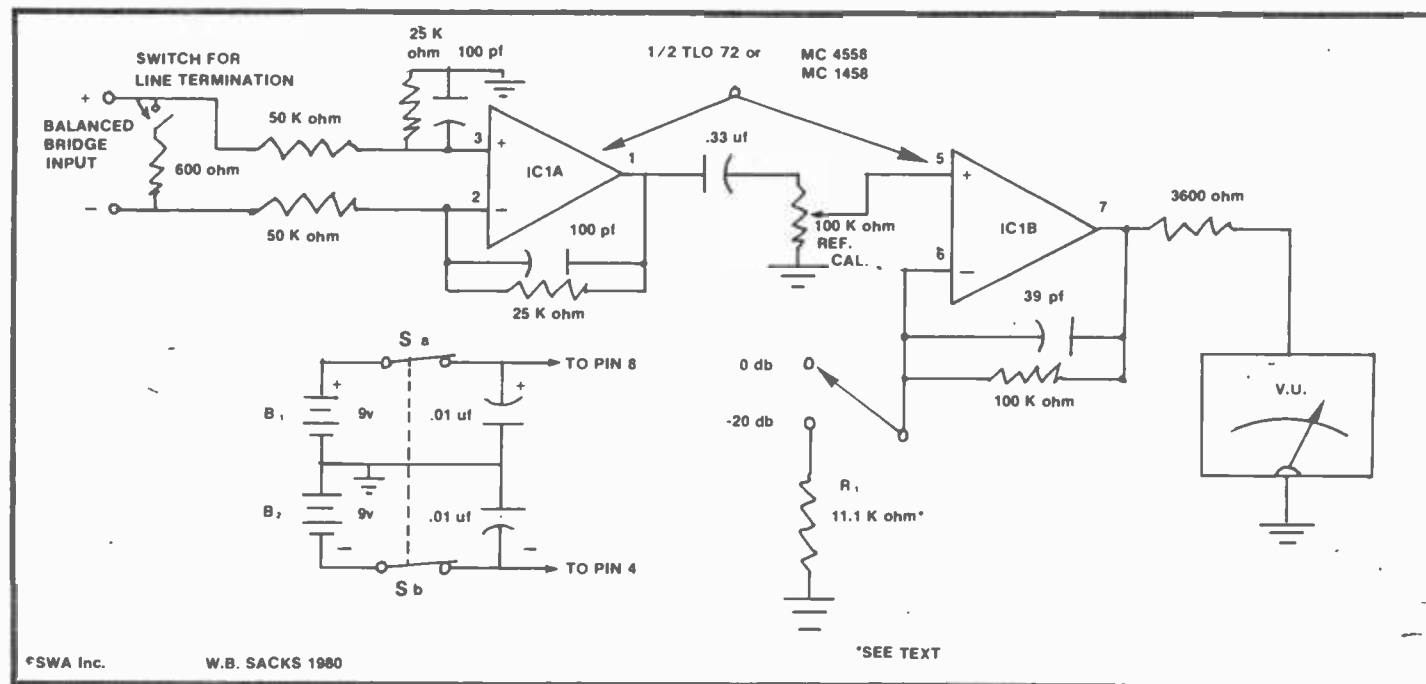
The ballistics of V.U. meters was the topic of a recent A.E.S. paper, "Bridging the Gap Between the V.U.

Meter and the PPM," by Jack Gordon and James Wood (of Inovonics). In this paper a compromise between artistic values of movement and accurate peak measurements is discussed in detail. The authors favor development of a "head-room meter" with a rise time twice the speed of a normal V.U. meter while maintaining the same scale. I believe that this concept will gain wider acceptance in the coming decade.

DYNAMIC OVERSHOOT: The meter must not overshoot more than 1.5% or less than 1% (.15 db) when being sourced by 600 ohms, with the pointer reaching 99% in 0.3 seconds. The 3.6k series resistor is important in maintaining the proper meter ballistics.

RESPONSE: The response curve must be flat within plus or minus 0.1 db 35Hz to 10kHz or plus or minus .25 db 25Hz to 16kHz.

supply is a pair of 9 volt transistor batteries. It can also be powered any standard plus or minus 5 to plus or minus 15 volt supply. The power supply bypass caps should be right next to the IC. The capacitors across the feedback resistors and across the non-inverting shunt resistor are for protection in high RF fields. The array has an optional 20 db increase in gain for looking at levels below the 23 standard V.U. range. The recorder



The Details

Getting back to the standard V.U. meter, here are some more of its characteristics:

THE SCALE: There are two types of scales. The 'A' scale (recording) has the db scale on top and the 100% modulation scale on bottom. The 'B' scale (broadcast) is just the opposite with the 100% scale on top. In either case the 100% or 0 db mark is 71% of full scale.

ALLOWABLE INDUCED DISTORTION: I find this to be the most interesting specification of the V.U. meter. All V.U. meters are actually DC Galvanometers with an integral full wave bridge rectifier. Consequently, bridging a standard V.U. meter across a 600 ohm line adds some THD. Up to .3% THD is permissible according to the specifications, but .1% is typical.

U-BUILD IT: The V.U. meter introduces more distortion than an entire op. amp program amplifier. This problem can be avoided by the isolation circuit which I have included in this article. It is easy to build, using a minimum of components. This circuit was conceived as a portable bridging test unit. Hence the power

mended calibration method is to apply 1.228 volts across the 600 ohm resistor (+4 dbm) and adjust the reference calibration pot for 0 V.U. Have fun! If there is enough demand I'll provide a circuit board to mount on the rear of a V.U. meter.

ONE CHIP L.E.D. BAR GRAPH DISPLAY: For those interested in experimenting there is a new IC based L.E.D. display driver. (National LM 3915). This would be a nice supplement to the circuit I have drawn. One would have to add an independent reference calibration pot in parallel with the present 100 ohm pot. The resulting response within specification with the .33 uf capacitor. Till next time...

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CKLW Tests

...from page 2

Existing monophonic receivers, these systems must be modified by making sacrifices in other important areas of performance: "To reduce occupied bandwidth and distortion in existing monophonic receivers, the nonlinear systems must reduce (1) modulation, (2) frequency response, and (3) channel separation."

CKLW Reports on Harris System

CKLW's test results, submitted to the Canadian Department of Communications Technical Advisory Subcommittee on AM Stereo, are relevant to the following areas: directional antenna null protection, channel separation as affected by directional antenna systems, adjacent channel interference, distortion in monophonic receivers, sky wave effects, compatibility, frequency response and distortion, and, finally, signal to noise ratio.

Testing Methods

CKLW reports that the tests were conducted with the CKLW transmitter operating in the monaural mode and modulated at a level of 80% with separate sine waves of 4 kHz

and 8 kHz. Although the *Comments of the Harris Corporation* to the FCC, *Appendices, Vol. II*, states that "The equipment is capable of satisfactory operation at the authorized operating power or the proposed operating power with amplitude modulation of at least 85 to 95 percent with no more distortion than 7.5 percent harmonics...", CKLW limited itself to an 80% to 85% modulation level throughout their test procedures. The received carrier level and then the upper and lower sideband were measured at the points described on a Stoddard MN-25 Field Intensity Meter and simultaneously at the transmitter output on a Tektronix 7L5 Spectrum Analyzer. The transmitter was later switched to the stereo mode and the same measurements were made, first with an L+R and then with an L-R modulating sine wave equal to 80% total modulation at the same frequencies transmitted in the monaural tests. Tests of left channel only and right channel only were conducted in the same manner.

CKLW also conducted tests using a composite tone consisting of the following frequencies: 400 Hz at 35%

modulation, 2700 Hz at 25% modulation, 5500 Hz at 15% modulation, and 8500 Hz at 10% modulation. According to CKLW's report, these tones were first transmitted in the monaural mode and then in the stereo mode. Further spectrum analyzer observations and field measurements were made with these tones modulating the carrier in the L+R configuration, then L-R, and finally the right channel audio was phase shifted 90° with the left channel to produce a quadrature audio signal. Because the Stoddard Field Intensity Meter is not sufficiently selective at the lower modulating frequencies, CKLW states that accurate field measurements utilizing the composite tone could not be made, except at 8.5 kHz in the monaural and L+R modes. CKLW concludes, however, that "... it is apparent from the measurements obtained that no increased interference resulted," and, further that "... the Harris System does not alter or distort the protection afforded by directional antenna systems."

Channel Separation Tests

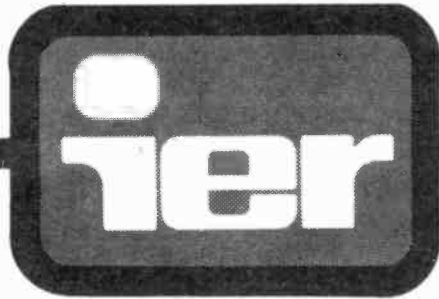
CKLW conducted channel separation tests using a new 50 ohm directional antenna feeder system, and an old system, an open wire, high

"Q" 230 ohm system which had been maintained specifically for purposes of conducting these comparative tests. Separation tests were conducted comparing the new antenna feeder system to the old feeder system.

Sine wave tones were introduced into the stereo generator audio input terminals at a level sufficient to cause 45% modulation of the carrier, first left channel, then right channel. Additional tests were conducted at 80% single channel modulation into the 50 ohm antenna system, to determine if separation was effected at different modulation levels. Identical tests were conducted at the 45% modulation levels on both directional antenna systems and additionally with the antenna system operating in the non-directional mode at reduced power.

CKLW reports that its test results indicate that separation resulting from the Harris AM Stereo System does not seem to be critically affected by directional antenna characteristics. Although CKLW admits that some slight variations are evident between antenna systems, the evaluation deems it doubtful "... that the stereo signal generated by the Harris System would be degraded

(Continued on page 10)



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International Equipment Representatives

CKLW Tests.....

..... from page 9

substantially beyond the resultant high frequency attenuation and distortion characteristics experienced in monaural transmissions where a sharply band limited antenna system is used."

Adjacent Channel Interference Test

CKLW conducted this test using the monaural transmissions of WPIC, 790 kHz, Sharron, Pennsylvania, in conjunction with CKLW, 800 kHz, transmitting in both the monaural and stereo modes. CKLW explains that a point was located near Cleveland, Ohio, where the CKLW ground wave signal interferes significantly with the WPIC ground wave signal. At this point, according to CKLW, the measured field intensity of that same station was 2.2 mv/m and the WPIC measured field strength was 300 uv/m. The test report states that subjective listening tests were made at this location on a standard AM automobile radio and additionally on a RCA Model WX-2D Field Intensity Meter. Both receivers, states CKLW, were tuned

to 790 kHz and the CKLW transmitter, modulated with normal stereo and monaural programming material was alternately switched between the monaural mode and the stereo mode every thirty seconds, for a period of one-half hour.

CKLW concludes that the subjective listening tests substantiated with tape recordings, indicates "... that the Harris AM Stereo System does not create any audible increased interference to first adjacent channel stations."

Distortion in Monophonic Receivers

CKLW's tests to determine the effect of AM Stereo transmissions on harmonic distortion characteristics of band limited monophonic receivers were conducted using three standard middle grade AM receivers. The CKLW transmitter was modulated to a level of 80% in the monaural mode with a 3 kHz sine wave. Each of the three receivers located at the CKLW studios were then, as the report states, carefully tuned for minimum harmonic distortion at the 3 kHz audio signal by adjusting the

receivers front panel tuning controls. No further adjustments were made to the receivers during these tests. The transmitter was then modulated to a level of 80% in the monaural mode, with a series of sine wave tones between 50 Hz and 7.5 kHz. Reference levels, noise levels and harmonic distortion measurements were then recorded from the audio output terminals of each receiver using the transmitted tones as an audio signal.

The transmitter was then switched to the stereo mode and modulated to 80% with the same series of sine wave tones between 50 Hz and 7.5 kHz. Reference levels, noise levels and harmonic distortion measurements were then recorded from the audio output terminals of each receiver using the transmitted tones as an audio signal.

The transmitter was then switched to the stereo mode and modulated to 80% with the same series of sine wave tones used in the monaural test. The left channel audio was phase shifted 90° with reference to the right channel, in order to provide a phase modulated signal at the detector of the standard AM receivers. Measurements were then taken by CKLW in the same manner as in the monaural mode. All received measurements were read from a

Hewlett Packard Model 334 Distortion Analyzer.

On the basis of its test results CKLW asserts that the Harris AM Stereo System does not generate substantial increase in harmonic distortion when detected by a conventional monaural band limited AM receiver. The station also points out that in some cases, the harmonic distortion is actually lower when receiving stereo transmissions compared to the monaural signal. CKLW suggests that this phenomenon may be due to partial phase cancellation of certain distortion component created by non-linearities in the receiver's envelope detector.

Skywave Effects Test

These tests were conducted by CKLW using a Delco AM/FM automobile receiver, converted by the proponent to decode AM Stereo transmissions. CKLW notes that because of the sharp cutoff ceramic filters employed in the manufacturer's original design of this receiver, measurements of audio frequencies above 3 kHz could not be obtained.

CKLW explains that the tests were conducted by technical personnel in Buffalo, New York, where a combination of ground wave and skywave signals were detected. The

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RF signal as read on a standard RF field intensity meter showed fluctuations between 150 uv/m and 1 mv/m. Sine wave tones were introduced into the stereo generator audio input terminals at a level sufficient to cause 45% modulation of the carrier, first left channel, then right channel. Audio levels were then measured, according to the CKLW report, first on the modulated channel and then on the unmodulated channel at the receiver location. Additional tests were conducted at 80% single channel modulation into the 50 ohm antenna system, and again at 45% single channel modulation into the 230 ohm antenna system. The receiver used to conduct these tests was then shipped to Maplewood, New Jersey, where further tests were conducted by technical personnel under conditions of absolute skywave signal.

CKLW completed this series of tests believing "... that the Harris AM Stereo System does provide a reasonable stereo signal in areas where skywave and groundwave are evident, as well as areas served by skywave alone." CKLW adds in its report that "It should be noted that accurate separation measurements were difficult to achieve in both test locations, due to signal fading and noise conditions; however, during normal programming in stereo, both locations reported an excellent stereo signal during those periods when the signal strength was sufficient to override the interference levels."

Compatibility, Frequency Response and Distortion Testing

CKLW transmitted normal programming in the stereo mode for a period of seven days, using all stereo music sources, while the remainder of the transmitted audio sources originated in monaural. Listeners and employees of CKLW were asked to submit their comments regarding the quality of reception on their standard monaural transmissions. During normal stereo programming, spectral photographs of several musical selections were taken from the transmitter output sample on a Tektronix 7L5 Spectrum Analyzer. For comparative purposes, these same musical selections were then photographed under identical conditions, except that the transmitter was switched to the monaural mode. The spectrum analyzer was adjusted to record and store peak information of the transmitted audio in the maximum hold mode. CKLW tests results indicate no substantial increase in the occupied bandwidth of the signal under normal programming in the stereo mode.

Frequency response and distortion test results led CKLW to note "... that there is approximately a 3 to 4 db attenuation at the lower single channel modulating frequencies ... high pass filters are used to remove

the L-R signal components below 200 Hz. This is required to protect the stereo pilot from interference from low frequency audio information. For this reason, a low frequency correction has been included in the Harris AM Stereo System. This circuit permits the L-R audio information below the filter cutoff point to be rotated by 90° and added to the L+R signal ... the overall frequency response and distortion characteristics of the Harris AM Stereo System are well within the technical standards regarded as acceptable for good quality AM broadcasting."

Signal to Noise Ratio

The final test performed by CKLW focused on effective stereo vs. monaural coverage as a function of the signal to noise ratio. The receiving tests were conducted at the CKLW studios on a Sansui Model TUX1 receiver, modified for AM Stereo by the proponent, and employing an envelope detector and a synchronous detector switchable on the rear panel of the receiver. A General Radio Gaussian Noise Generator, a W-J MIA Balanced Mixer, and a Potomac Instruments Synthesized RF Generator were used to generate a radio frequency signal consisting of white Gaussian noise. The output of the noise generating system was connected in parallel with the receiver's external antenna at the RF input of the receiver. A Ward-Beck Extended Range VU Meter was then connected to the receiver output and all measurements were observed and recorded directly from the meter scale. The envelope detector was selected on the receiver panel, and both the receiver and transmitter were placed in the monaural mode. A 400 Hz tone was transmitted at 50% modulation from the CKLW transmitter, and a received reference level was obtained on the extended VU meter. The output level of the Gaussian noise generator was obtained by alternately removing the modulation source from the transmitter and adjusting the output of the noise generator. Once the 20 db signal to noise ratio was achieved at the receiver output, no further adjustments were made to the transmitted modulation levels or noise levels.

After evaluating their test results, CKLW concluded that the Harris AM Stereo System does not diminish the coverage area or signal to noise ratio on existing monophonic receivers. The station adds that "... because the stereophonic signal to noise ratio was measured to be 1.5 db worse than mono, the stereo coverage area is determined to be almost as great as the mono coverage area ... adding stereo to AM does not in any way reduce the mono coverage area; it simply adds a new stereo coverage area over most of the existing mono

(Continued on page 23)

Reader's Forum

..... from page 4

Starke so last November we filed with the FCC for a construction permit for an FM station. A lot of people have donated good usable equipment toward our goal of someday having this FM religious station in our community, thanks to you BEE and "The Exchange".

Emmett M. Norton, Jr.
Chief Engineer
First Baptist Church
Starke, Florida 32091

Editor:

As the manger of a Christian radio station, I just wanted to drop you a brief note concerning your article in the February issue of your publication entitled "D.C. Hosts NRB Show". I thought the article was well-written and zeroed in on the true nature of the convention, as opposed to reports the likes of which were carried in Time Magazine (February 4, 1980) and a few other publications.

I especially appreciated your line about following the Lord and making a living, not making a living following the Lord. It is refreshing to come across a journalist in a secular publication who, when writing on religious topics, demonstrates a perception and knowledge of what's really going on.

Please keep up the good work!

Jim Schweickart
General Manager
WBCL
Ft. Wayne, IN 46807

BEE Replies:

Thanks, and we are planning a follow-up article concerning how one of the major manufacturers has approached this particular market segment successfully.

On "The Audio Process"

Editor:

I was in complete agreement with Mr. Bill Sacks' article about the loudness wars and excessive audio processing. Sometimes while reading ads for various pieces of processing equipment, I wonder if people have gone completely mad. After the signal has been Boom-Boxed, AGC'd, limited, reverbed and nonsymmetrized, it's amazing to me that the result would be recognizable. It's like looking at a Renoir in a carnival mirror with floodlights and color enhancement.

I saw a device advertised recently which transforms a symmetrical signal into an asymmetrical signal. The FCC allows AM broadcasters 125% modulation on positive peaks in recognition of the fact that some program material is not symmetrical, thus allowing us a couple more db on properly phased material. I don't think they had a full time modulation at 125% in mind when they made that ruling.

The way I see it, music is art, and we

really have no right to distort it any more than absolutely necessary. I feel that just enough slow AGC to compensate for sloppy operators, and limiting to prevent accidental transmitter over-modulation is all that is really justifiable. How about a Hi-Fi war for a change?

Karl Uppiano
Station Engineer
KCID
Caldwell, ID 83605

BEE Replies:

It's simple, we agree.

(Continued on page 13)

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Production Console

... from page 3

However, with the sophistication of producers, engineers and the final product being what it is today, there are many more in-line console features which would greatly enhance the product and the ease to achieve it.

- In line EQ; more than a tone control, but not necessarily a 4 band parametric. (i.e.; API-550 or 550A; Melcor AE-20)
- Channel "on-off" or mute switches on each input. Keying program material in and out is often a lot more accurate than even the fastest fade.
- A monitor solo, which allows pre-cueing of program material not yet put into the mix.
- Auxiliary send and return circuits which can be used for effects, echo, cue mix, etc.
- Multiple buss assigns, to provide for possible future expansion into 4 or 8 track productions.
- Slating and talkback facilities.
- A full patchbay.

We could go on, designing "our" ideal production console, but would it be ideal for everyone? A fairly comprehensive input channel with "the bells and whistles" is shown in figure #2. This block diagram can be easily modified to suit any particular needs.

What's Available

Most of us don't want to build our own consoles; we don't have the time, and/or inclination. Generally, a custom board is substantially more expensive than a stock one from a manufacturer. An overview of a few of the production style consoles available, ranging from inexpensive and with limited features, to expensive with all the tricks may be helpful. Many of these boards were originally intended for music work,

but they can be easily adapted to make a fine production facility:

The previously mentioned Altec and Shure mixers are all monophonic, but they are, in simple copying applications, adequate. There are many other small mixers in this range, mono and stereo, which can be adapted for remote use as well. One can find these listed most often in the trade publications.

The Tapco 6000 series boards offer either a balanced or unbalanced console, expandable up from 6X2 with additional plug-in units. They offer mic/line facilities, simple tone

ing options are available as are expanding frames for additional inputs.

Sound Workshop, Quantum and Allen & Heath, offer small boards, although they are more expensive than the previous ones. They offer optional patchbays, increased switching flexibility, more EQ and other features closer to meet your needs. These boards also are expandable in input and output capability.

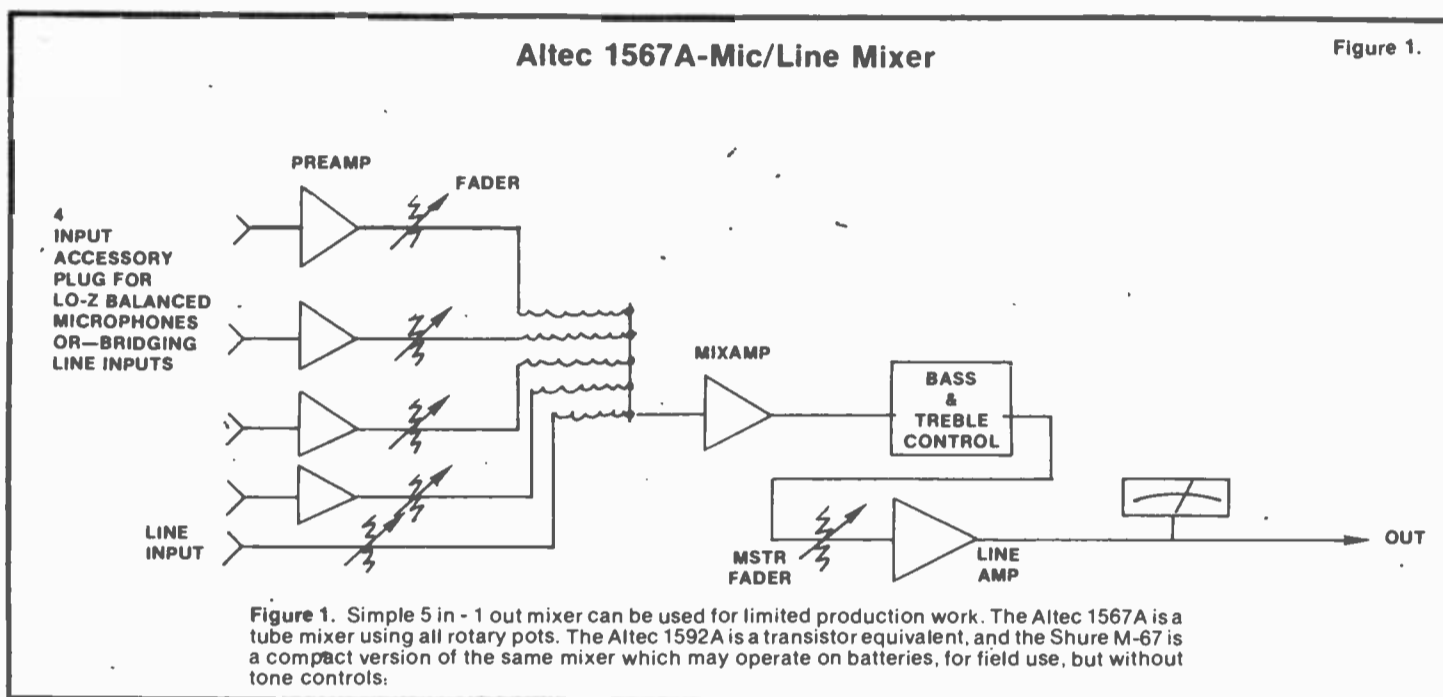
Need Flexibility

It is becoming increasingly popular for production studios to have consoles which can also double as small music rooms; a piano-vocal demo, a voice over on a prerecorded music track and even a trio or

provide a "mini-console" line to fit the bill. Auditronics makes an excellent well-rounded, full featured console, as does Automated Processes (API), Syncon and Trident. These boards have many of the features of the "super-consoles" and are all expandable, if that production room suddenly becomes another music room.

There are many other consoles which may suit your needs, and a little research through the trades will give you a handle on what's available. Unless one builds one's own console, two main restrictions on choosing a production console are going to be:

- What features does one have to have?



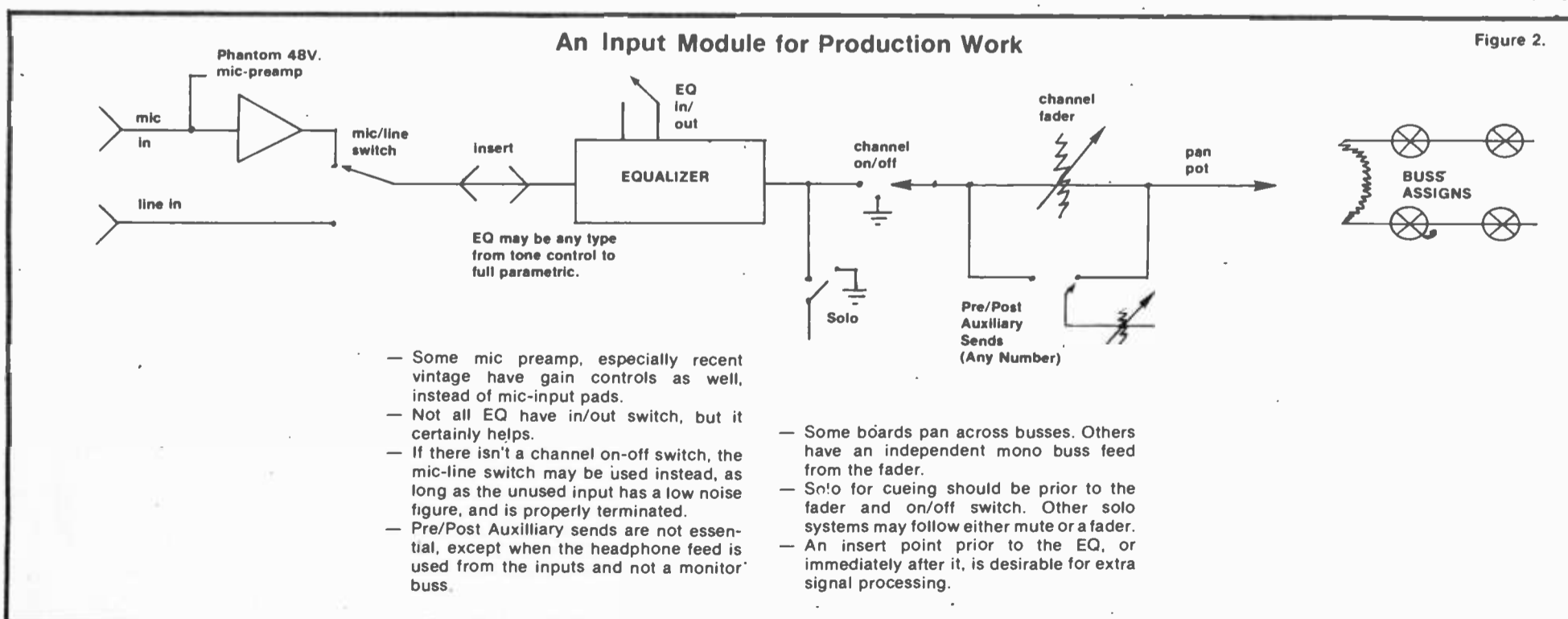
controls per channel, an effects send and return channel and stereo panning.

Teac offers several boards, the most common of which is seen in production studios being the Model 5. It has 8 in 4 out, with mic/line switching, buss select, some switchable frequency tone controls and a 4

channel monitoring system. TB-slat-quartet. These requirements lend themselves to the more expensive consoles which have 'bunches and bunches' of extras; phantom powering, integral patchbays, insert points for external equipment, extensive EQ, echo and cue facilities, built-in limiters, compressors, etc.

The larger console manufacturers have realized this need and often — How much can one spend?

Next month, we will look at how production techniques and multi track recording techniques are beginning to resemble each other, and how the engineer can make that work for him and his studio income.



Developments.....

..... from page 5

average program week to duplicated programming. The FCC had previously granted a waiver in order to allow the AM station to go on full-time authority and thus, once this CP was granted, the FCC required compliance.

Specialized Programming

The FCC has stated that applicants in comparative broadcast hearings may include a specialized programming issue to be filed with the presiding judge 30 days after designation for hearing. The showing would demonstrate that the proposed specialized format was not available in the market in a substantial amount so as to give comparative credit to the applicant proposing it.

Religious Network Subpoena

The FCC, in its investigation of Station, KWAN/TV, Canton, OH, has subpoenaed the records of PTL Television Network, which is closely affiliated with the station, to investigate allegations concerning misrepresentation by the station soliciting funds. Since the Commission does

not have direct jurisdiction over PTL, it has refused to comply with the subpoena, requiring FCC to obtain a court order.

Transfer of Control

The FCC designated WBRY, Woodbury, TN, for hearing on the issue of whether an unauthorized transfer of control took place to the proposed assignee corporation, which assumed some authority over the finances, personnel and programming of the station prior to Commission authorization.

Free on VTR's.....

..... from page 6

germanium transistors to silicon, eliminated the bias supply, increased the drive and built an amp that can be removed and inserted not only with the machine power on, but with the motor running.

I want to add at this time that when trouble shooting, you can replace the fuse with a 50 ohm, 100 watt resistor and save a few transistors. Replacement transistors should be selected for low leakage at high temperature. Properly repaired, the power amp works fine!

Reader's Forum.....

..... from page 11

The Key Code System

Editor:

Regarding your not listing prices; why don't you publish prices but keep the addresses, etc., in your Key Code list, or eliminate items for sale and just publish your articles and ads. It seems to me that the seller should always bear the cost of the transaction. I just don't think its logical to charge \$12 to a potential buyer to allow him the privilege of knowing the price! At least it seems odd. Maybe a basic discussion of your publication and how and why it exists is in order! I like your articles!

Tom Ewing
Operations Manager
WSMM

Sault Ste. Marie, MI 49783

BEE Replies:

Ever since we started using the Key Code system, this question has come up. The most important thing to remember is that we are a profit making business running this newspaper, not a trade association. The Exchange itself is a useful service (as the following letters demonstrate), but advertising alone cannot support BEE. We need

your help. If we charged for the listings (as most newspapers do), we wouldn't have 1000 listings each month, we would have 100 if we were lucky! Our main interest is really in subscriptions, and many of our readers are supporting us this way. In fact, if everyone took a paid subscription, we would eliminate the Key Code system! Since the free listing aspect is critical to the successful functioning of The Exchange itself, this really is the only workable option ... but we're glad you like our articles.

Editor:

Thank you for your help. I truly look forward to your publication each month. I have found and bought many pieces of good used equipment thanks to BEE!

K. Kinnon Thomas
Station Manager
KTQQ
Sulfur, LA 70663

Editor:

I received immediate, successful response to my ad for ... Thank you!

Art Shifrin
Little Neck, NY 11363



Le solucionamos sus problemas de adquisición de equipo usado.



I.E.R. tiene la representación exclusiva de Broadcast Equipment Exchange para proporcionar acceso inmediato al mercado de equipo usado.

Si necesita equipo usado a precios razonables para su estación, nuestro personal bilingüe le proporcionará directamente toda la información del equipo que se anuncia en esta publicación.

Ahorre tiempo y dinero, póngase en contacto con nosotros por que tenemos la solución a sus problemas.

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O ESCRIBANOS A:
I.E.R.
1205 Prospect, Suite 510
La Jolla, Ca. 92037

International Equipment Representatives

Circle 140 on Action-gram.

The Exchange The Exchange The Exchange

AMPLIFIERS

Want To Sell

Dynaco Stereo 120, needs work, great buy. Key Code 3-22.

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

Gates utility amp. Key Code 3-72.

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

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

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

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

Gates M5576 program amplifier. Key Code 3-53.

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

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

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

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

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

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

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

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

McIntosh MC40 amplifiers, clean pair. Key Code 2-70E.

PA amplifier, 45W, w/mic & line inputs, solid-state, overload protection. Key Code 2-14.

Marantz 3300 stereo pre amp, mint cond. Key Code 2-18.

Technics SU-8011 25-watt per ch. stereo amplifier, new, in original unopened carton, within warranty. Key Code 2-56.

Marantz Model 7T preamp (pre Japan), excel. cond. Key Code 1-14E.

Peavey CS-800 stereo amp, 400 watts per ch., 800 watts mono, like new with book. Key Code 1-55.

McIntosh MC40 (2), excel. Key Code 1-9A.

Marantz Model 5. Key Code 1-9.

McMartin LT10B amplifiers like new, MSA-1 pre-amps like new. Key Code 1-11.

Want To Buy

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

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

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

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

Marantz model 5, need one, any condition. Key Code 2-70.

Automatic tape control cartridge, playback and record amplifier. Key Code 2-4.

ANTENNAS & TOWERS

Want To Sell

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

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

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

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

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

Coax transmission line, 175', 7/8", new. Key Code 2-41J.

RCA TFU-21BLS, medium power Ch 23 pylon, on ground, must sell. Key Code 2-23.

RCA rigid xmission line, 51.5 ohm, 20' sections, 440' available. Key Code 2-44.

Hy-Gain 402BS, 2 element 40 meter beam, assembled, tuned, never up. Key Code 2-9B.

RCA BFA-8B, 8-bay horizontal FM antenna, tuned to 94.9 w/transformer, no deicers ready to ship. Key Code 2-23.

Helix 3-1/8", new, oh reels, up to 500'. Key Code 2-26C.

RCA BFA 5 bay FM ant, 99.7 MHz w/matching transformer. Key Code 2-44.

Cable clamps and misc. Tower hardware. Key Code 1-76.

Andrew 1-5/8" gas barrier (1261B), 90 degree miter elbow (1061) and 58" rigid transmission line (2761-1). Key Code 1-74.

Horizontal Jampro antennas (6) w/heaters tuned to 93.1 MHz. Key Code 1-76.

Iso-Coupler, Electronics Research type 402, adjusted for 94.5 MHz. Key Code 1-74.

Ten 20' sections, 6-1/8 flanged both ends, one 7' section with 45 degree elbow 50 ohms, gd. cond. Key Code 1-70.

Want To Buy

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

FM antenna, 2-3 Bay circularly polarized, tuned to 89.3MHz. Key Code 2-32.

Phelps-Dodge 3 bay CFM-LP3 with or without radomes. Key Code 2-38.

Air Helix Cablewave HCC-15/8-50 approximately 600'. Key Code 2-38.

Guyed type, 150' tower. Key Code 2-50.

45' pole for top of FM tower to hold FM antenna, 3 bay, new preferred. Key Code 1-70.

AUDIO PRODUCTION (OTHER)

Want To Sell

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

Eventide Instant Phaser. Key Code 3-77F.

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

Mellotron. Key Code 3-15E.

White 4301 1/16 octave 41 Band Active EQ, new, \$1175. Audiotechniques, 652 Glenbrook Rd, Stamford CT 06906. 800-243-2598.

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

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

Audio & Design Recording E950-RS Paraphoric EQ, new, \$1740, sell \$1250. Audiotechniques, 652 Glenbrook Rd, Stamford CT 06906. 800-243-2598.

Eventide Omnipressor nearly new. Key Code 3-77D.

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

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

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

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

Sound Workshop 262 reverb unit, new. Key Code 2-18.

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



FULL COMPASS SYSTEMS

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

Loft 440 delay line/flanger, new. Key Code 2-18.

DBX 216-28 channels of noise reduction, with custom 5 strip patch bay and cables. Key Code 2-19A.

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

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

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

Eventide 1745A DDL and 1745M DDL, excel. cond. Key Code 2-25.

DBX decilinear noise reduction units, 8 ch total automatic switching, rack mounted, almost new. Key Code 2-36.

MXR, mini-limiters custom in & out switches & stereo strapping switches, 4 pair avail. w/separate rack mount power supply. Key Code 2-52F.

Dolby A301, Dolby 360. Key Code 2-54.

Urei Digital Metronome, Model 963. Key Code 1-32.

Jackfield, Switchcraft 1400 w/26 MT-334B jacks, 22 individual MT-334B jacks (loose), 2 ea. Cannon XLR-3-35 wall microphone receptacle, all new. Key Code 1-54.

Advent Model 100 noise reduction units (2), excel cond. Key Code 1-36.

Cinema 4031-B equalizers (3), Hycor 4201 equalizer (1). Key Code 1-28A.

JBL Mark XII Studio monitors (pair), excel. cond. Key Code 1-35.

ARP Odyssey II Electronic music synthesizer model 2813. Key Code 1-34.

B&K precision level meter, type 2203, w/Octave filter set, type 1613, also many attachments and extras. Key Code 1-32.

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

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

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

Orban dynamic sybillance controller. Key Code 2-33.

AUTOMATION EQUIP.

Want To Sell

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

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

SMC stereo automation, DP-1 programmer, two loggers w/tape reader, 3-stereo Revox A-77's 5-SMC random select carousels, time announcer, single play cart with inputs for additional units, provision for Marti Remote Call in using 40 Hz tone, in top cond, in four racks. Key Code 2-67.

Sono-Mag model 252 stereo, factory recon, still in case. Key Code 2-68E.

Control Design Model CD 28M programmer, Model CD 28A monitor, Model CD 12C elec. clock w/outboard battery backup supply, Model CD 28P power supply. Key Code 2-68A.

Sono-Mag model 252 stereo. Key Code 2-68F.

Gates automation system, mono, 6 carousels random access, silence sensor, SP-10 programmer, motor driven fader, overlap, monitor amplifier, odd-even time announce cart units, I.D. & fill cart units (Criterion) Metrotech logger, all manuals, 10 sources, can be upgraded for stereo. Key Code 2-48.

Mono 250 carousel. Key Code 2-51A.

Scully 270, reel to reel, playback only, tape decks (2). Key Code 2-68B.

Aitken Carousel Control unit older model w/interface to control 2 model 350 carousel. Key Code 2-68G.

Sono-Mag Model 350 monaural. Key Code 2-68C.

Automated Broadcast Controls, time announcer control. Key Code 2-68H.

Carousels, 20A's (2), 22A (1), IGM "slot machine", gd cond. Key Code 2-10A.

Schafer 800 stereo brain, SMC carousel, Random Select, network join, slow speed logger, 5 racks. Key Code 2-66.

Sono-Mag model 250 monaural, factory recon. Key Code 2-68D.

Schafer 903 w/latest factory updates, including 2800 & 2900 function codes, 4 Ampex reel-to-reel decks, 2 AudioFiles, 1 Carousel, and more. Key Code 2-69.

Schafer 800 automation brain, tube type working when removed. Key Code 1-74.

Schafer 800T stereo brain, slow speed logger, networkjoiner, SMC 250 rndom select carousel, plus 5 racks. Key Code 1-33.

ITC 750 series reel play back only, gd. cond. Key Code 1-23.

Schafer system, complete, 3 Ampex reel-to-reel decks, 3 carousels, and time announce, lots of spare parts. Key Code 1-48A.

Gates DCU-3 25Hz sensor, gd. cond. Key Code 1-23.

Tone Sensors, 25 Hz for automation, in gd. cond. Key Code 1-74.

Gates DC-10 clock with model TA time announce unit, gd. cond. Key Code 1-23.

International Contact Section

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

In Canada: United Video Ltd
1485 Triole 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:

Broadcast Equipment 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*.

ACTION-GRAM

MARCH 1980
USE BEFORE
JUNE 1980

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

<p>CONTACT SECTION:</p> <p>Name _____</p> <p>Title _____</p> <p>Company/Station _____</p> <p>Address _____</p> <p>City _____</p> <p>State _____ Zip _____</p> <p>Telephone _____ <i>(Verifiable number must be provided)</i></p> <p>Signature _____</p>	<p>KEY CODE ORDER SECTION:</p> <p>TOLL FREE KEY CODE HOTLINE</p> <p>800-336-3045</p> <p><small>In Virginia call 703-626-0400 collect.</small></p> <p>...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.</p> <p>International Readers See International Contact Section on page 14</p>	<p>READER INQUIRY SECTION: 3/80</p> <p>If you are interested in receiving literature from any of the advertisers, in this issue of the <i>Broadcast Equipment Exchange</i>, then circle the numbers as shown at the bottom of the ads, and we will be happy to forward your request to the appropriate company.</p> <table style="width:100%; border: none;"> <tr><td>101</td><td>107</td><td>113</td><td>119</td><td>125</td><td>131</td><td>137</td><td>143</td><td>149</td></tr> <tr><td>102</td><td>108</td><td>114</td><td>120</td><td>126</td><td>132</td><td>138</td><td>144</td><td>150</td></tr> <tr><td>103</td><td>109</td><td>115</td><td>121</td><td>127</td><td>133</td><td>139</td><td>145</td><td>151</td></tr> <tr><td>104</td><td>110</td><td>116</td><td>122</td><td>128</td><td>134</td><td>140</td><td>146</td><td>152</td></tr> <tr><td>105</td><td>111</td><td>117</td><td>123</td><td>129</td><td>135</td><td>141</td><td>147</td><td>153</td></tr> <tr><td>106</td><td>112</td><td>118</td><td>124</td><td>130</td><td>136</td><td>142</td><td>148</td><td>154</td></tr> </table>	101	107	113	119	125	131	137	143	149	102	108	114	120	126	132	138	144	150	103	109	115	121	127	133	139	145	151	104	110	116	122	128	134	140	146	152	105	111	117	123	129	135	141	147	153	106	112	118	124	130	136	142	148	154
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SUBSCRIPTION SECTION:

There are three ways of receiving BEE, so choose the way that suits you best:

<p>1. FIRST CLASS MAIL WITH KEY CODE LIST. Avoid delay ... get in on the action faster! For \$25 per year, you get BEE 1st class WITH the matching Key Code number list. (Enclose your check with your order and get 3 BONUS issues!)</p> <p><input type="checkbox"/> Bill me \$25 for a 1 year, 1st class mail subscription to BEE including the Key Code list.</p> <p><input type="checkbox"/> Check enclosed for 3 BONUS issues!</p>	<p>2. THIRD CLASS MAIL WITH KEY CODE LIST. Save better than 50% by reducing our handling costs! For \$12 per year receive BEE via 3rd class mail WITH the KEY CODE list included. (Enclose your check with your order and get 3 BONUS issues!)</p> <p><input type="checkbox"/> Bill me \$12 for 1 year, 3rd class mail subscription to BEE including the Key Code List.</p> <p><input type="checkbox"/> Check enclosed for 3 BONUS issues!</p>	<p>3. You receive BEE monthly WITHOUT THE KEY CODE LIST free via 3rd class mail if you send in this form at least once a year. You buy the Key Code lists for \$5 by using the Key Code order section above; only when you need it.</p> <p><input type="checkbox"/> Free without the Key Code list (I'll buy the list for \$5 only when I need it).</p>
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LISTING SECTION:

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 in BEE for three full months. Hundreds of stations and companies have used us successfully. Why don't you? The system is simple, just fill in your listing below, and send this form in by the 15th of the month preceding issue. Don't forget to fill in the contact section above before you mail the form. On each listing please circle either "Want to Sell" (WTS) or "Want to Buy" (WTB), and if possible please note in which category you would like the listing to be run.

<p>1. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>2. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>3. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>4. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/>	<p>5. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>6. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>7. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/> <p>8. WTS or WTB, Category: _____</p> <p>Text: _____</p> <hr/>
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IMAS BROADCAST EQUIPMENT EXCHANGE accepts no responsibility for the condition of the equipment listed. 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. We make no attempt to evaluate equipment, but rather publish exactly what is sent to us by the listers.

FILL IN, REMOVE, AND MAIL THIS FORM TO...



BROADCAST EQUIPMENT EXCHANGE
P.O. BOX 1238
ARLINGTON, VA. 22210 U.S.A.

The Exchange The Exchange The Exchange

AUTOMATION . . . CONT.

Want To Buy

Schafer 800 brain. Key Code 3-20.
25Hz tone detectors. Key Code 3-20.
25Hz tone generator. Key Code 3-20.
IGM Time Announcer 382 or SMC Time announcer 581 in working cond. Key Code 2-4.
ITC 750 or Otari ARS-1000. Key Code 2-42.
Tone generator or Automation system, must be in excel cond. Key Code 1-59.
Go-Cart or carousels for Automation system in excel cond. Key Code 1-59.
Time carts for Automation system plus logger in working order. Key Code 1-59.
Playback machines w/large reel capacity, operating or repairable, also sensors. Buy outright or swap old mikes. Key Code 1-19.
Autogram, Sparta or similar stereo sequential cartridge type automation. Key Code 1-60.
IGM MOS-200 or MOS-400 set up for carousel control. Key Code 1-53.
Stereo sequential automation with logging, small. Key Code 1-60.
IGM Model 500 music modules. Key Code 1-53.

CAMERAS (VIDEO)

Want To Sell

Sony CVC-2100A-R1, 1" vidicon B&W w/3" electronic viewfinder, pan & tilt head, 4:1 zoom & 10' mini cable, very gd cond. Key Code 3-33B.
TV25TN B&W camera cable, 2 large reels. Key Code 3-52.
GE 4PC4A1-Rev 2, 3" L.O. B&W camera head (only) fair cond. Key Code 3-33C.
Marconi Mark 7 color camera cable, large reel, several 100'. Key Code 3-52.
Akai VC 150 color/sound cameras (11) w/control unit, zoom lens, auto white balance, AC, new w/cables and filters, all or part. Key Code 3-56A.

Harris TE-201 Color Cameras—lens, cables, CCU's ea. \$10,000
IVC 500 Color Camera—lens, cables, encoder, CCU \$4,000
RCA TK-43 Color Cameras—lens, cables, pedestals, gd. cond, ea. \$2,000
Norelco PC-70 Color Camera—16 x 1200M lens, 2 available, ea. \$18,000
Norelco PCP-70 Color Camera—Portable or studio use \$8,000
Norelco PC-60 Color Camera—Updated to PC-70, new tubes \$8,000

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

GPL PD-250A, 1" vidicon B&W camera heads (2), w/50' cable only, gd cond. Key Code 3-33D.
RCA TK-42 color cameras incl. cam. heads & TD9 pedestals (2). Key Code 3-52.
Ikegami HL-77 Fujinon lens, 150 hrs, complete w/case & acces. Key Code 3-32.
Hitachi FP-40 saticon camera, new, complete w/factory warranty (\$23,500 list), \$17,750. SoundDesign, PO Box 921, Beverly Hills CA 90213. 213-276-2726.
Singer video camera, blk & white, Model T-1. Key Code 3-45.
RCA TK-31A, 3", L.O. B&W chains (2), gd cond. Key Code 3-33A.

Norelco LDH-1 camera, modified trimmer, matrix, I and Q encoder, and genlock. Comparable to LDH-20. Schneider 5x1 zoom w/diopters. ITE tripod and dolly, \$5500. J. MacAllister, Tufts Educ. Media Ctr. TV Prod. Dept, 136 Harrison Ave., Boston MA 02111. 617-956-6675.
Sony DXC-5000 cameras (2), w/CCU, \$1000. J. MacAllister, Tufts Educ. Media Ctr. TV Prod. Dept, 136 Harrison Ave, Boston MA 02111. 617-956-6675.
Hitachi FP-1212 and 1000P, FP-1212 w/1:10 zoom, 1000P w/1:5 zoom, both excel. cond., also a Phillips LDH 20-3 w/1:10 zoom lens also in excel. cond. S. Lefkowitz, Video Prod. Svcs., 1212 Tenth St, Berkeley CA 94710. 415-526-6741.
Hitachi FP20 Saticon, new, factory warranty, latest model, \$8400, complete but w/o lens, incl. 3 Saticons, carrycase. SoundDesign, Box 921, Beverly Hills CA 90213. 213-276-2726.
Sony 1610 Color video camera and 3800 VCR. Key Code 1-10.
Sony 1610, (2) Sony 3450, Sony 2850A's w/TRI Edit controller, V03800, V01600, Panasonic 19" monitor, plus misc. Key Code 1-6A.
RCA PK-330 B&W studio cameras, 3 heads w/15-150 Angenieux lenses (motor-driven iris & zoom), 2-CCUs, 600 ft of cabling, manuals. Key Code 1-26A.
IVC/B & H 90 self contained vidicon color cameras, 3 pcs some with lens. Key Code 1-44.
RCA TK 60 studio B/W cameras (2), w/zoom lenses, fixed lenses, manuals, power supplies contol units etc., perfect condition, never used. Call BEE, 800-336-3045.
Norelco PC-70 cameras in good condition. Complete except for lenses. Available from R&B Industries, 629 Grove St., Jersey City NJ 07302. 212-924-7910.

Want To Buy
IVC-500 camera cable. Key Code 3-24.
RCA/Walker, Electra-Zooms, Studio zoomers, Universal zoomers, GPL-PYE/Watson zoom 75 series, need several of these, any cond. Key Code 3-67.
RCA/HF TD-1A studio camera pedestals, need 4, any cond. Key Code 3-67.
RCA/HF TD-30BT, TV studio camera crane, need one, any condition. Key Code 3-67.
RCA TK-40A, TK-41A, TK-14, GE PC-15, PC-25, PC-11, DuMont TA-124B MK 1, GPL PA-600A, EMI 2001B, Marconi Mark II, need one of each. Key Code 3-67.
Vidicon camera w/electronic viewfinder. Key Code 1-5A.
RCA WP-16B power supply, TK-60-B remote control, TK-60 zoom lenses, spare 4 1/2" I.O.'s, field tripods, pedestals, cradle heads and wedge plates, crab dolly or mini-crane. Key Code 1-7.

CART MACHINES

Want To Sell
ATC-4 playback, 1 record playback, all complete and in working cond. Key Code 3-79A.
Tapemaster R.P. gd cond. Key Code 3-70A.
ITC R.P. good cond. (2). Key Code 3-70B.
Spotmaster 5 spot, gd cond. record by Tapemaster. Key Code 3-70C.
Rapid-Q, 3 in a row cart machine. Key Code 3-72.
Tapemaster playback. Key Code 3-70D.
RCA RT-7 audio cart P.B. deck. Key Code 3-52.
Spotmaster, triple deck mono playback machine, new motor and all 3 recue, gd shape, recently removed. Key Code 3-37.
Sparta 4625 broadcast cart stereo record & play, gd cond, new r/p heads, new motor. Key Code 2-27.

Gates Cartritape II w/record package, record amp is tube-type, fair but working. Key Code 2-14.
ITC RP-004 stereo record/play machine, all 3 tones, good cond. Key Code 2-41L.
ITC RP series delay cartridge recorder, excel cond. Key Code 1-75E.
Spotmaster 3100 playback, w/full cuing, in service till 11/79, gd cond. Key Code 1-43A.
Collins 642A-2 cart machine w/216C-2 record amp. Key Code 1-74.
Spotmaster 3300 record-playback, w/full cuing in service til 11/79, gd cond. Key Code 1-43B.
Gates Criterion compact cart machines (3), gd cond. Key Code 1-68A.
Tapemaster Cart recorder w/150 Hz cue, gd. cond. Key Code 1-35.
Spotmaster cart machines, new and used. Send for literature. Best package prices on trade-in of surplus equipment. Autodyne. Box 13036, Orlando FL 32859. 305-855-6868.

Want To Buy
Cart machines, 1 record/play and 2 play only, in gd cond. Key Code 3-64.
Ramko ACL-120 tape winder. S Stepp, National Audio, Box 3657 Glenstone Sta, Springfield MO 65804. 417-883-5377.
Collins, made by A.T.C., cart output switcher model AMS3 for parts. Key Code 2-46.
Record/playback cart machine (3). Key Code 2-7.
Any make in gd cond., mono, record/playback, w/tones, w/cues and fast forward. Key Code 2-11.
ITC 3-D and ITC RP delay, other models considered. Key Code 2-42.
Record/Play cart machine, any model. Key Code 1-17.

CASSETTE & REEL-TO-REEL RECORDERS

Want To Sell
Scully 280B in console, low hours, nice cond, 2 trk. Key Code 3-41D.
Conceptone 3 motor recorder, parting out. Key Code 3-22.
Teac A500 stereo cassette deck w/memory and Dolby. Key Code 3-27A.
Magnacord reel to reel (1), old. Key Code 3-11.
MCI 16 trk master recorder w/auto locator. Key Code 3-17.
Magnacord PT 63 transport and amplifier (2). Key Code 3-72.

FULL COMPASS SYSTEMS

Technics RS-1500, RS-M85, Mk II, JVC portable decks, and others. All available from Full Compass Systems. 6729 Seybold Rd, Madison WI 53719.

800-356-5811

Ampex AG440, 1/2", 4 trk w/console, \$3750; **Ampex AG440 2"** 16 trk, w/console, \$12000; **Ampex AG300SS** 1" 8 trk w/console, w/full remote, \$3500; **Otari MX 5050-HS8**, 8 trk 1/2", \$3450; **DBX 158** Noise Reduction, 8 ch, \$2450. Dan Uzzell, Alpha Studios, 1700 E 12th St, Austin TX 78702. 512-472-6151.
Ampex 300C motor Hysteresis Synchronous #4590068 (motor #), Mfg Electric Indicator Co., less than 1 yr service, with capacitor checked out o.k. Key Code 3-58.
Ampex 354 stereo electronics, 2 ch, tube type electronics, fair cond, w/manual. Key Code 3-69B.
Wollensak 1520AV full trk portable reel to reel tape recorder, excel. cond. Key Code 3-50.

Scully 280B, 2 trk, mounted in console w/casters, 7 1/2/15 ips, 14" reel capacity. Key Code 3-34A.
Otari 5050, stereo 1/2 trk recorder, 1 yr old, 7 1/2 ips and 15 ips, 1/4 trk and 1/2 trk heads. Key Code 3-36.
Scully 280, 8 trk in console, low hours, remote control. Key Code 3-41E.
RCA RT-21 B, reel to reel tape decks, rec/pb, super cond. (2). Key Code 3-45.
Teac A4010 reel-to-reel stereo deck w/automatic reverse, 3 3/4 to 7 1/2 ips. Key Code 3-27.
Telex high speed cassette rewriter, 3 cassettes at a time, like new cond., \$80. Call Gary Hovanec, (313) 233-3002, after 2 pm EST.
Ampex AG-300, 1 tk. Key Code 3-57H.

Technics Cassette and Reel-to-Reel machines at the lowest prices anywhere. Call Ramko Research collect (916) 635-3600.

Teac Tascam 40-4, 1/4" trk, great cond, full specs, includes 1 roll of Scotch 250, biased for 250. Key Code 3-62A.
Ampex 352-2 electronics. Key Code 3-53.
Pentagon 1100 duplicating system, new, cassette to cassette, (Master-11 slaves) 30 ips, 1/2 trk 2 ch, accutrack metering, bias check, motion sense, audio select level control, lighted push button switches, model selector switch, track select, dust covers and alignment tape included. List: \$7000, your cost: \$4500, save \$2500, call or write, Gary Hovanec, 1258 Pickwick Pl, Flint MI 48057, (313) 233-3002 aft. 2 pm EST.
Ampex AG-350, 2 tk. Key Code 3-57G.
Scully 280, 2 Ampex AG600, all excel. cond. Key Code 3-59.
Metrotech 552A, 4 trk, 96 hrs per 3600 ft of tape, excel cond, shipping included. Key Code 3-68A.
Ampex 300/350 head stacks & housings, gd cond (2), orig, part of 3200 duplicator w/FT erase, 1/2 tr V & L heads. Key Code 3-22.
Ampex PR-10 circuit board & faceplate. Key Code 3-22.
Otari MX 5050 FLT, prof. model tape-recording unit, full trk mono, reel-to-reel, excel. sound reproduction, own set-up for editing, wood finish. Key Code 3-10A.
Scully 280-2 with console, ATL gd cond, \$1800. Audiotechniques, 652 Glenbrook Rd, Stamford CT 06906. 800-243-2598.
Ampex 601-2 recorder/reproducer, 1/2 trk stereo, low hrs, no bdct use, needs belts, otherwise mint cond, in portable case. Key Code 3-65A.
Sankyo STD 1700 front loading cassette deck, new head, needs alignment. Key Code 3-69C.

Akai X-355, 1/4 trk reel to reel. Key Code 3-53.
Ampex 351-2 (needs) electronic work. Key Code 3-54A.
Otari 5050-8, 1" 8 trk full size recorder, very little use, sel-sync, remote capability. Key Code 3-36.
Ampex AG-440-B in console, 2 trk & full trk, gd cond. Key Code 3-41F.
Crown reel to reel rec/pb, 700 SS, w/20 watt amp & carrying case, super cond. Key Code 3-45.
Ampex slant console for 350 transport, adaptable to any 19" equip. Key Code 3-22.
Ampex AG350 recorders, solid state electronics, recently rebuilt. Key Code 3-28.
Telex Model 235/300 Mod reel to reel master (stereo) to stereo cassette slave three position copy. Master play speed of up to 30 ips on reel master. Key Code 3-7A.
Magnacord, rack mounted model 1022, 1/2 trk, stereo, gd cond. Key Code 3-43B.
Ampex 400 series transport. Key Code 3-22.

The Exchange The Exchange The Exchange

CONSOLES ... WTS ... CONT.

Western Electric 25B mixing console, tube type w/power supply, 7in, 2 out. Key Code 1-28B.

Altec 9 in, Quad (4), stereo (2), mono (1), out. 4 echo sends, 2 cue, tone, etc. All Altec, RCA preamps, line amps, power supplies, API meters (7), Altec mic transformers (20), etc. Tube type. Will trade for any 1" VTR Editor, Camera, TBC, etc. (color). Key Code 1-3.

Stevenson Interface Series 100 Board, 16 input frame, 9 in, 4 out w/compression mod. A. Papa, 213-768-4604 or 213-399-9069 or J. D'Anastasio, 609-424-2352 or 215-546-1808.

Bogen mixer-preamplifier, 2 each with 5 mic-inputs, high & low impedance output, both in fair cond. Key Code 1-66.

API 1604 console, 12x4, expandable to 16x4, 10/550A, Eq, 2 comp/limiters, 8 trk monitoring. Key Code 1-41D.

Sparta A-15 audio console. Key Code 1-34.

Sony MX-16 mixer, excel. cond. Key Code 1-30C.

Gates Producer four pot solid state audio console, like new cond. Key Code 1-55.

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

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

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

Want To Buy

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

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

Altec 230B. Key Code 3-21.

Collins 212B. Key Code 3-21.

Audio console, 6 input or more, stereo, any make, tube or not. Key Code 2-5.

Audio console, 8 ch or more, mono/stereo. Key Code 2-38.

Stereo console, 5-8 channel. Key Code 2-32.

Console mono, at least 8 inputs in gd working order. Key Code 2-7.

Broadcast Electronics 10S350 vertical fader, 10 mixer dual ch. Key Code 2-63.

DISCO & SOUND EQUIP.

Want To Sell

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

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

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

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

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

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

JBL D120F-2, 12" speaker, excel cond, 4 ohm. Key Code 3-22.

Delta Lab DL-1 Stereo Digital Delay Line, new, \$1000. Audiotechniques, 652 Glenbrook Rd, Stamford CT 06906. 800-243-2598.

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

JBL 2440 drivers. Key Code 3-77.

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

Yamaha P-2200 power amplifier, new, 230 watts into 8 ohms, XLR input connectors, new, \$700, Gary Hovanec, (313) 233-3002, after 2 pm EST.

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

The Audio Group, Inc.

1780 Broadway, Suite 800
New York, N.Y. 10019
(212) 765-7790

Full Service Audio Brokers of New & Used Equip.

Dealers:

3M, DBX, Dolby, etc.

USED

Consoles, tape machines, outboard gear, etc

Great Prices!

Call—

Margaret, Barbara,
Bernadette, Suzie

Circle 114 on Action-gram.



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

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

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

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

DBX model 187, noise reduction system, like new cond., 4 ch, switchable record or play, \$900, Gary Hovanec, (313) 233-3002, after 2 pm EST.

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

Fairchild 664 equalizers. Key Code 3-63C.

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

Peavey CS 800, 400 watt per ch. or 800 watts in mono, great for stereo disco. Like new. Key Code 2-12.

Cassette tape portable disco mixer, w/2 cassette units, mixer, EQ, and output metering, 2 mix inputs, not fancy, just works. Key Code 2-14.

Urei digital metronome 963, like new. Key Code 2-33.

EXR type aural exciter, brand new, still in box, can be used in FM bdct. Key Code 2-33.

Harmon-Kardon Citation 12, 120W, power amplifier, solid state, excel. Key Code 2-14.

Fairchild Reverb II 659 very smooth spring echo. Key Code 2-33.

Big Brute mike cables, eleven 25', Switchcraft XLR's. Key Code 1-22E.

Hammond B-3, chopped for road use. Key Code 1-2A.

Cerwin-Vega GE-2 graphic equalizers (2). Key Code 1-22F.

Rack locker, 6'. Key Code 1-22A.

A/DA Flanger, new w/power supply. Key Code 1-14A.

Voice of the Theater copies with Altec drivers, horn and crossover (800 Hz). Sonically fine, cabinets rough. Key Code 1-62A.

Rack locker 6 1/2'. Key Code 1-22B.

Maestro Phase Shifter w/3 position foot pedal. Key Code 1-14B.

Acousti-Log Digital Reverberation Timer. Key Code 1-62B.

Anvil flight cases, 20 hole mike case. Key Code 1-22C.

Echo Plex w/foot switch. Key Code 1-14C.

Shure mixers, RTS patch panels, Auratone speakers, Dynaco preamp, Dynaco amplifier, Lafayette headphone, Lafayette generator, (2) Fisher reverb chambers, (3) metal 19" racks, Altec studio monitor loudspeaker in cabinets, (2) direct boxes, (4) headset boxes, microphone snake plus cables, Harmon cassette, Garrard turntable, (2) Magnecord PT-6 w/cases. A. Papa, 213-768-4604 or 213-399-9069 or J. D'Anastasio, 609-424-2352 or 215-546-1808.

Technics by Panasonic speaker stereo systems, woofer mid-range, tweeter, gd. cond. Key Code 1-66.

Yamaha PM-400B. Key Code 1-30.

Anvil utility case. Key Code 1-22D.

Mutron Octave Divider. Key Code 1-14D.

Sansui QSE-5B 4 ch. encoder. Key Code 1-1.

Want To Buy

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

Reverb, reasonable. Key Code 2-5.

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

Eventide harmonizer, Eventide flanger. Key Code 2-39.

Micro-Trak arms, 12" (2 or 3), gd cond., buy or swap old mikes. Key Code 1-19.

Dolby A, 8 trk of 22 & 44 to fill M16 rack. Key Code 1-41.

LIGHTING EQUIP.

Want To Sell

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

Mole-Richardson, Bardwell-McAllister, 2000 watt fresnel spotlights (4), 5000 watt fresnel spotlights (2), 4.0 copper cables, 300' ir sections w/pin plugs, 2 large stage plug transformers, converts 220V to 110V, used w/above cable. Key Code 12-40.

FEL and FAD lamps (4 new), and others, for sale less than 50% of retail. Key Code 11-20

LIMITERS

Want To Sell

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

Spectra Sonics complimiter model 61 factory checked and calibrated to specs. Key Code 3-54.

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

Urei LA-2A limiters, new. Audiotechnique: 652 Glenbrook Rd, Stamford CT 06906. 800-243-2598.

Urei 1176B. Key Code 3-57C.

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

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

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

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

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

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

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

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

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

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

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

Kahn Symmetrapeak, like new, w/manual. Key Code 2-26A.

Urei LA-4 limiter/compressors, new. Key Code 2-58.

Urei LA-3A (2), leveling amps, new, never used. Key Code 2-41K.

Trident Parametric Eq, slightly used. Key Code 2-54.

Gates dual limiter stereo. Key Code 2-61.

SpectraSonic 610 Complimiters (2), excel cond. Key Code 2-33.

Gates Stay level, model 994-6629-001 (2) Key Code 2-61.

CBS 4110 Volumax, 4 yrs old, excel cond stereo, recently inspected. Key Code 1-65A.

Gates 6631 limiters, stereo pair. Key Code 1-24.

Collins 26U-2 FM Limiter. Key Code 1-74.

CBS 4450A Audimax, 4 yrs old, excel cond stereo, recently inspected. Key Code 1-65B.

Gates SA-39B limiter amplifier. Key Code 1-1.

BEE Announces ... The British Connection March '80 Listings From London

Consoles—

- Neve 24-16-16, 6 echos with eq, 6 lim/comp, digital clock, etc.
- Neve 30-16-24
- Amek 2000 console 20-16
- Cadac 28-24-24 L console
- Sound Techniques 28-8-24

Recorders—

- MCI JH428 w/20 modules fitted
- MCI JH428 w/28 modules fitted
- MCI JH100 24 tr w/autolocate
- MCI JH114 16 tr w/autolocate
- Studer A80 MK 1, 16 tr, 7000 hrs
- Studer A80 MK 2, 16 tr, 2000 hrs

Broadcast Equipment Exchange

PO BOX 1238, ARLINGTON, VA 22210
800-336-3045 (in Virginia, 703-525-0400)

Circle 151 on Action-gram

- 3M M56, 3 avail, 1 w/selectake
- Scully 280, 1" 8 track
- Scully 280, 1" 4 track

Other—

- Dolby A360 noise reduction units
- Dolby A361 noise reduction units
- Jackfields, 20 holes/row, 19"
- Neumann KM86 microphones
- Yamaha CP70B, electric grand piano
- Studer C37 stereo trans. elec.
- Studer J37, 8 tr, 1", tube elec.
- Philips Pro 51 stereos
- Studer A62 stereo

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

800-336-3045

New Listings are in *Italics*.

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TRANSMITTERS

Want To Sell

lines 20T, 1KW transmitter w/3 phase inverter, gd cond. Key Code 3-72.

A BTA 10F transmitter for gd 1KW standby kHz, want to trade. Key Code 3-44.

theon RA-250 AM transmitter, 250 watts complete with manual. Key Code 3-29.

lines 21E, 1HP blower for AM transmitter, r used. Key Code 3-40.

al DFM-15K-B FM transmitter, factory built w/extras, type accepted to 20KW. Key Code 3-18.

es TE-3 Solid Statesman FM exciter, excel d. Key Code 3-59.

es exciter, tube type, working, mention, spare tubes. Key Code 2-9.

es exciter, model M6095 stereo. Key Code 1.

onal NCL-2000 8-10 meter 1 KW output, excel. cond, w/book. Key Code 2-9A.

A BTF-3B, 3KW FM, gd cond, books and es. Key Code 2-23.

ins 820D-1 1KW/250W AM, now on air alternate main, tuned 1490, available now, gd cond. Key Code 2-29.

-10G with 5kw cutback and most H ifications, spare parts and manuals. Key Code 2-49.

as MM-5394 10 watt FM exciter, spare tal ovens, tuned to your frequency, \$550. Castellano, Capitol Broadcast Exchange, 3 W Benjamin Holt Dr, Stockton CA 95207. 209-957-1761.

e transformer for Gates BC-1H needs nding. Key Code 1-55.

TT42A3 TV transmitter, tubes, spares, t exchangers, water pumps, power lies, excel cond, Ch. 5, Key Code 1-38.

naire Solid State contactless Xtal oven for TTU UHF tube type B and B1 exciters. Plug replacement, eliminates on-air flash. Key Code 1-13A.

ins Model 20V 1000 watt AM transmitter tuned to 1460 KHz. Key Code 1-1.

C. UST-105 100W UHF translator, Ch. 13 t, Ch. 69 output. 1973 w/tube type plier, driver & final. Key Code 1-61.

theon RA-1000 Am 1 kw transmitter in l cond. Key Code 1-59.

o 15A transfer switch. Key Code 1-9.

A TV Model TTU-10 w/filterplexer, Ch 14, Freq. Monitor, BW-4 demod, dummy load, to poor cond. Key Code 1-57.

A BTX-1A, 67KHz sub-carrier generator manual, \$300. C. Coleman, KGAB, Box 3, Ventura CA 93003, 805-647-0634.

ins 732-A 1kw FM (2), re-built, perfect for dby. D. Castellano, Capitol Broadcast ange, 3469 W Benjamin Holt Dr, Stockton 95207. 209-957-1761.

ins 300G AM Transmitter. Presently d to 1450 KHz, good condition, ready to go ir. Key Code 12-2.

ar 707, 1KW, on air, 1600KHz. Key Code 7.

Power Transformer, high voltage, for Gates BC-1G has taps for 1000 or 250 watts. Key Code 12-46.

Raytheon RA-1000 AM transmitter 1KW w/complete manual, in excellent condition. Key Code 12-5.

RCA type BTA 1kw with 500 w cutback,, can be put in working cond w/minimal effort, complete w/parts, up haul, make offer. Key Code 12-20.

Western Electric 1937, 50 KW AM transmitter, \$11,000. Call (800) 336-3045.

Want To Buy

AM transmitter, 1KW, must be in gd cond. Key Code 3-38.

Gates, RCA or McMartin, late model 10KW, FM transmitter. Key Code 3-47.

FM transmitter, 2.5kw in working cond, no immediate need, up to 6 mos. Key Code 3-2.

UHF TV station transmitter to tower equipment. Key Code 3-19.

FM transmitter, 250 watt. Key Code 3-20.

FM transmitter, 2 to 3 KW, 92.7 MHz. Also, 1 KW AM transmitter, 1600 kHz. Key Code 2-50.

AM transmitter, 5000 watt, prefer Gates BC-5P or any brand. Key Code 2-7.

FM transmitter, 1 KW-3KW used 7 yrs or less. Key Code 2-38.

Transmitter, 40-100 watt, tuned to 89.3MHz. Key Code 2-32.

AM transmitter, 1kw in gd cond. Key Code 2-49.

FM exciter, with or without stereo generator. Key Code 2-5.

250W FM transmitter (1965 or later), mono or stereo, for remote control, prefer tube tupe PA, solid state exciter. Key Code 1-60.

Type approved power Amp for 10 watt exciter, 250, 500 watts. Key Code 1-58.

McMartin B103 SCA generator. Key Code 1-11.

Need 3KW in "on air" condition. Key Code 1-25.

5KW AM Transmitter, less than 10 yrs old. Key Code 1-51.

TUBES

Want To Sell

RCA 4CX250B, never taken out of original boxes (4). Key Code 3-42.

3CX1500A7 (2) tubes, one brand new, one about 1/2 used. Key Code 3-48.

5672's (3) and 4-125's (3), cash or will trade for cart machines, turntables, speakers, studio mic stands, 25 Hz gen, Urei stereo graphic EQ, phono pre-amps, 7/8 or bigger coax, Rohn 45G tower sections, other items. Key Code 3-6.

4-400 transmitting tubes (4), used but serviceable. Key Code 2-8.

Tektronix 564 CRT, new, unused. Key Code 2-35.

Eimac 4-400C, new (4). Key Code 1-78.

Tektronix #154-0562-00 replacement CRT for model 602 display scope. New, in factory carton. Key Code 1-73B.

Eimac 4CX3000A, new (2). Key Code 12-7.

Sony trinitron color picture tube 470DLB22. Never used \$90. Dan Mulally, KUMV-TV, Box 1287. Williston, ND 58801, 701-875-4311.

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

Want To Buy

Tubes OG3 for old RCA 10 watt exciter. Key Code 2-43.

892R vacuum tube in gd cond. Key Code 1-76. G.E. or Sylvania 6P7. Key Code 1-35.

TURNTABLES & LATHES

Want To Sell

Gates CB-500, 16" turntables w/2 mono preamps, used 5/6 times, new. Key Code 3-45.

Gates CB-500 turntable, with tonearm, base & pre amp. Key Code 3-30.

Gates 16" turntables (2) w/Gray viscous damped tone arms and cartridges. Key Code 3-11.

Sparta turntable with tonearm and base. Key Code 3-30.

Russco Studio-Pro model B turntable, arm and cartridge. Key Code 3-32.

Rek-O-Cut TR-43H 12" lathe turntable in floor cabinet, no lathe, 3-speed, excel cond. Key Code 2-23B.

Harris CB-1200 (2) w/Gray Microtrak 303 tone arms, gd cond. Key Code 2-41F.

RCA BQ-2B turntables w/Micro-Trak 306 arms (2), in custom built cabinet, many extras, excel. cond. Key Code 2-60.



FULL COMPASS SYSTEMS

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

Gates turntables (2) w/Micro-Trak tone arms, model CB 500. Key Code 2-61.

Russco & QRK accessories, reconditioned, call or write for current listings. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Presto 16" lathe turntable for model 6N lathe, no lathe, 2-speed, gd cond. Key Code 2-23C.

Technics SL-1500 MK II, new, includes tone arm, base & dust cover. Key Code 2-41G.

Fairchild 523 variable pitch lathes, one is three speed, one is two speed, both complete w/microscopes, Grampion mono heads, Gotham amplifiers, suction, extra styli and many blank discs. Key Code 2-16.

Micro-Trak Model 303 12" tone arms (8), will sell at cost, in original shipping containers, brand new. Key Code 2-56.

Gates CB 1200 turntable (12") w/Gray tone arm, Shure M44-7 cart & equalized preamp. Key Code 2-31C.

Presto 16" direct drive turntables (2), 2-speed. Key Code 2-23A.

Russco tables (2) with new idlers and felts plus (2) rebuilt Empire 980 arms. Key Code 1-71A.

Sparta 12" turntables (2) in gd. cond. Key Code 1-58A.

Shure SM-64 phono preamps (2). Key Code 12-58.

QRK Studio Pro turntable w/o arm. Key Code 12-58.

QRK solid state pre-amp's (2). Key Code 12-66.

Russco Studio Pro turntable w/o arm. Key Code 12-58.

Gates 12" T.T. with tone arm and built-in pre-amp's. Key Code 12-66.

EMT-930ST turntables and arms (2 ea), with new Stanton 500AL carts, less preamps, excel. cond. \$790 pair. Cabinets & preamps avail. Autodyne, Box 13036, Orlando FL 32859. 305-855-6868.

Technics Turntables at the lowest prices anywhere. Call Ramko Research collect (916) 635-3600.

Gates 12" TT/Gray Micro-Trak arm (1), Gates 16" TT/Gray Micro-Trak arm (1). Key Code 12-44.

Gates/Harris Transcription turntables, CB-77 (2), completely rebuilt, painted, new rollerwheels, excel cond. Key Code 12-36.

Rek-O-Kut Rondine turntable w/Gray 216 arm. Key Code 12-40.

Want To Buy

QRK 12" turntable in good shape. Key Code 3-64.

EMT turntables, preamps, arms, any cond. Key Code 2-26.

Turntables (2), arms & pickups, must be in good working order. Key Code 2-7.

Gates CB77 turntable motor assembly. Key Code 2-46.

Turntables (2) with or without preamps, for production, with arms. Key Code 2-5.

RCA or WE universal mono pickups, equalizers, arms 16", any cond. Key Code 2-26.

Turntables, 12", 2 or more w/o arms, Russco, QRK, Technics preferred. Key Code 2-38.

RCA MI-11883, 45RPM conversion kit for 70C/D turntable, complete, gd. cond. Key Code 1-31.

RCA MI-11874 pickup for MI-11885 light weight tone arm. Key Code 1-31.

Turntables, prefer two units, any model. Key Code 1-17.

TV FILM EQUIPMENT

Want To Sell

RCA TP15B multiplexer, RCA TP15 extension for TP-7. Key Code 3-52.

Buhl multiplexer, stand and Graflex 16mm sound TV projector. Key Code 3-32.

RCA TK26C color film camera. Key Code 3-52.

RCA TP-11C color film chain multiplexer. Key Code 2-9.

WANTED: 16 & 35 mm telecine projectors; Eastman, RCA, Brenkert, GPL, Norelco. FOR SALE: RCA TK-42 color cameras, two RCA TR-3, one RCA TR-4, one RCA switcher, two RCA effects generators, one Eldaphor TV projector. Priced to sell. International Cinema Equipment Co., 6750 N.E. 4th Court, Miami, FL 33138 - 305-756-0699

Kodak VP-X Super 8 film videoplayer. Transfers Super 8 to broadcast quality 3/4" tape. For use with external sync, \$1200 or offer. Jim Ellsbery, 3519 W: 229th St, Torrance CA 90505, 213-326-1769 or 213-466-6464.

Athena 400 16mm telecine projector w/lens, factory refurbished, \$3500. SounDesign, Box 921, Beverly Hills CA 90213. 213-276-2726.

Kodak TVM100A Super-8mm projector w/lens, like new, 10 hrs used, remote controllable, \$1750. SounDesign, Box 921, Beverly Hills CA 90213. 213-276-2726.

Film Chains including B&H 614, Telemation TMM 203, 203B and RCM 22 and others. Shibaden FPC-1000, Gates TE-201 cameras. Viscount 1140 switcher plus Sparta A-20b & EP-20B. Call or write for more info. G. Busby, Oceanic Cablevision Inc, 2669 Kilihau St, Honolulu HI 96813, 808-836-2888.

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TV FILM ... WTS ... CONT.

TP-11 Multiplexer, no cameras or projectors. Key Code 1-49A.

Selectroslide Mod 322 TV slide projector, excel. Key Code 12-53.

Want To Buy

35mm projector w/three to two pull-down to transfer film to video carts. Key Code 3-71.

RCA TP-66 telecine projectors. Need 2 for foreign subscriber. Call BEE at 800-336-3045.

VIDEO PRODUCTION EQUIP.

Want To Sell

RCA BW-4 demodulator. Key Code 3-52.

Vidicon pan & tilt head, gd cond. Key Code 3-33G

3M video distribution amplifier. Key Code 3-32.

Ranix zoom & focus control w/o cables, gd cond. Key Code 3-33H.

3M color bar and sync generator. Key Code 3-32.

Gray Eng. Labs time code generator and reader. Key Code 3-32.

RCA XL-100, new, unlimited supply, complete RF circuits and board, video. Key Code 3-56B.

Video Data Systems T-100 character generator. Key Code 3-32.

Custom editing station, console set up for 2 monitors, scope, 3/4" recorders and all accessories. Key Code 3-32.

Microtime 2020+ w/Image Plus, velcor, DOC. IVC-7000P w/Canon 10:1 lens. Key Code 3-24.

Setchell Carlson triple 5 black & white monitor. Key Code 3-32.

RCA 21" master monitor, fair cond. Key Code 3-33F.

CVS-504B time base corrector, digital 3 line bdct quality, full amp-gen lock, advanced vertical, etc. Key Code 2-34A.

Panasonic complete color package, cameras w/zooms, cassette recorder and reel recorder, spec effects gen, phaseshifter, triple monitors, master monitor, cable and more. Also lighting and audio. Key Code 2-20.

CBS Laboratories Mark III Model 8000 Image enhancer, \$3600. J. MacAllister, Tufts Educ. Media Ctr, TV Prod. Dept, 136 Harrison Ave, Boston MA 02111. 617-956-6675.

Central Dynamics, video proc amp, model VA2083, very gd cond. Key Code 2-57.

Telemation Black Burst Generator TVM-400, \$200. J. MacAllister, Tufts Educ. Media Ctr, TV Prod. Dept, 136 Harrison Ave, Boston MA 02111. 617-956-6675.

Vital #PA-1 Pulse Distribution Amplifier w/power supply & rack, \$220. R Smith, Ohio Univ, 1425 Newark Rd, Zanesville OH 43701. 614-453-0762.

RCA TA-9 stabilizing amplifier, tube type, color proc amp with 280V supply. Key Code 1-44.

GE TT-57 30 KW UHF Transmitter—spare klystrons, available fall \$45,000

GE PE-240 Film Camera—Automatic gain & blanking \$8,000

RCA TK-27A Film Camera—good condition, TP 15 available \$12,000

RCA 1600 Film Projectors—New, factory cartons, TV shutter ea. \$1,200

Eastman CT-500 Projector—optical and mag sound \$9,000

Eastman 285 Projectors—Reverse, good condition ea. \$6,000

RCA TVM-1 Microwave—7GHZ, audio channel \$1,000

RCA TR-4 VTR—RCA hi-band, vel-comp, editor, \$15,000

Ampex 1200A VTR's—Amtec, colortec ea. \$24,000

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Two Versatile fully tested EFP Vans. One contains VR2000. Other 3/4" cassette equipped. D. Catellano, Capitol Broadcast Exchange, 3469 W Benjamin Holt Dr, Stockton CA 95207. 209-957-1761.

TV Production Trucks (2), 40' truck, 3 Ampex BCC-1 Plumbicon cameras, RCA TR600 quad, American Data 558-3 switcher (quad split, rotary, soft wipes), 20 ch audio board, 24' truck, 2 Ikegami cameras, RCA TR61 quad, 12 ch audio, 3/4" 3800 Sony w/Microtime TBC, built-in generator. Key Code 12-52.

Telemation video test generators, group of 3 w/rack mount, TMT-101, 102, 103, Stairstep/Sin Squared/Window/Multiburst, gd cond. Key Code 12-23.

Telemation TSG-3000-GL color sync generator w/manual, built-in bar dot & blackburst generators & digital genlock. Key Code 12-23.

Want To Buy

T.B.C., low end to middle price. Key Code 3-14.

VIDEO TAPE RECORDERS

Want To Sell

IVC 600, VTR, colour 1", (2). Key Code 3-45.

IVC video head, new. Key Code 3-39B.

GE VTR, b&w, 1/2", Model 4 TD1B2, needs work. Key Code 3-45.

Sony 2850 convergence ECS-1 editor, read-out and interface (2). Key Code 3-32.

CVS 520 digital time base corrector. Like new. Key Code 3-32.

Ampex VPR 7900A like new. Key Code 3-39A.

VO-2860 color video cassette recorder with full electronic editing. Key Code 3-41B.

Sony Betamax 7200 1/2" videocassette recorder, excel. Key Code 2-8.

JVC editing system, 3/4", incl.: (2) CR8300, (1) RM83. Key Code 2-17A.

Sony EV-320F VTR's (2), w/remote control and CLP-1A, \$250. J. MacAllister, Tufts Educ. Media Ctr, TV Prod. Dept, 136 Harrison Ave, Boston MA 02111. 617-956-6675.

Sony 3400 Portapak, \$300. J. MacAllister, Tufts Educ. Media Ctr, TV Prod. Dept, 136 Harrison Ave, Boston MA 02111. 617-956-6675.

RCA TR-5, lowband, working when removed. Key Code 2-30.

IVC 870 1" video tape machines (2), factory reconditioned, and TRI EA-5 editing controller for these machines. Key Code 2-40.

Sony 2600, mint cond. Key Code 1-67A.

Ampex VR-5000 1" Helical, new heads, low hrs, all Ampex mods incorporated, gd. cod. Key Code 1-64.

Sony 2860 VCR 3/4" U-matic (3) modified for Convergence editing system, like new cond, will sell individually or all three. Key Code 1-10F.

IVC series 800 one inch color video tape recorder w/slow-motion and stop-frame, pack mounting configuration. Key Code 1-73F.

JVC PV-4800U, 1/2" R to R color recorder, slo-mo, audio dub, 5" reel w/case battery, charger, PWR supply like new. Key Code 1-44.

Allen Mod/Demod chassis, hi band model 1124 SW like new. Key Code 1-44.

Allen 1240/1241 channel switcher/equalizer like new. Key Code 1-44.

IVC 800 (2) not working but repairable and in gd cond. Key Code 1-15.

Sony 1000 VCR 3/4" U-matic player. Key Code 1-10D.

Ampex 5100's (2), 1-6,000, 2-7,000's VTR's. Will trade for 3/4" or 1" color Editor, TBC, etc. Key Code 1-3.

JVC CR-6300U 3/4" recorder, low hrs. Code 1-16A.

Sony 1200 VCR 3/4" U-matic player. Code 1-10E.

Sony 2600 3/4" U-matic recorder play Key Code 1-10A.

RM300 random access for Sony SLP—also Sony SLO-340 portable Beta deck. Code 1-4.

IVC-800 color VTR's (2) not working, but repairable, one like new, w/manual. Key Code 12-48.

Sony portable video cassette recorder w/camera, monitor/TV, cords, rechargeable Ni-Cad Battery, w/AC power supply/charger. High resolution electronic viewfinder on camera, play back on viewfinder, has built in mic with instructions, swap for good color TV camera or Ampex stereo 2 trk audio recorder. Key Code 12-21

Panasonic NV3120 reel to reel video (color) in like new cond. Key Code 12-21

NEC 8700, (2) 3/4" direct drive players, full warranty. Key Code 12-34.

Sony 1" EU320 (3), CLP-1B (2), CLP-1A need alignment, \$1000 for the lot. Mulally, KUMV-TV, Box 1287, Williston 58801, 701-875-4311.

Panasonic (3) NV-9100 player only, new warranty. Key Code 12-34.

Ampex VR1000 transport, ideal for par for multi-trk audio recorder. Key Code 12-28.

JVC 6300U demo, w/remote control, gd cond, w/warranty card. Key Code 12-28.

Panasonic (4) NV-9200A direct drive recorder, new, full warranty. Key Code 12-28.

Want To Buy

Panasonic editing unit, complete, w/consider other brand. Key Code 3-14.

Sony 1000, 1200, 1600, 1800, 2600, 2800 for use in Christian bdct application. Key Code 2-34.

TR4 hi band color (1), ATC color. Key Code 3-7.

Systematics VJB-12/VJB-3/VM automated cassette players with or without tape decks, Christian bdct application. Code 2-34.

Sony V02800, V01600 with RF out. Key Code 2-37.

RM300 random access for Sony SLP—also Sony SLO-340 portable Beta deck. Code 1-4.

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New Listings are in *Italics*.

NAB Show

... from page 1

redesigned to remain at the edge of current technology. The second generation version of the widely used multiple cartridge playback, part has many new features; automatic cue sensing; high speed cue; a MIL code wheel, improving the cue sensing; improved power...

... always on hand to explain new products, has now opened a new "Scotch" video tape head especially for IVC 9000 heads. The new 2" helical video (Scotch 371) offers more tape and less dropouts over earlier versions, and, in addition, has color noise stages. A distinctive feature of the tape is a stabilized polyester coating with control wind treatment. In turn, helps to save time by cutting down time due to interchangeability problems; tape creases and edge damage is also reduced.

T.V. Sessions

Television is going to be different in the '80s... Approximately seven workshop sessions are scheduled to the newest issues in television broadcasting: "What's Going On in Washington?" "Small Town vs. Big Town Clout," "Climbing the Executive Ladder," "Cable TV: Profit and Royalties," "Television's Uncertain Future," and "The New Deal on the Block" are a few of the...

CKLW Tests

... from page 11

... conclusions of the CKLW Report summary, CKLW emphasized that the Harris V-CPM AM Stereo system is fully compatible with the 9 MHz bandwidth, an important point that the CKLW report stresses, that the regulations were to restrict the spacing of AM allocations. However, CKLW feels that the Harris system possesses strong fidelity capabilities, and that the choice of an AM system requiring audio band pass filtering to reduce interference would only "... preclude the growth of radio..." The decision, of course, is in the FCC's hands.

topics to be discussed. Special sessions for Convention delegates are also on the agenda; while some events are pure entertainment, others, such as that led by Chairman of the FCC, Charles Ferris, promise to be vigorous and informative.

Radio Workshops

According to the promotional literature distributed by the NAB, radio will not only be "different," but "stunningly different," a distinction that BEE is sure radio broadcasters are happy to note. The workshop sessions directed toward radio

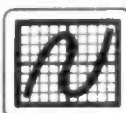


interests cover a variety of topics, including "Should You Have an Electric Bookkeeper," "Is Skywriting Really Better Than Matchbook Covers?" "If It's Not Against the Law, Maybe It Should Be," "The Regulators: Meet the Folks Who Make the Rules," "Selling the New, Wonderful World of AM in the '80s," and of special interest, "Your Competition Is Ready for AM Stereo—Are You?"

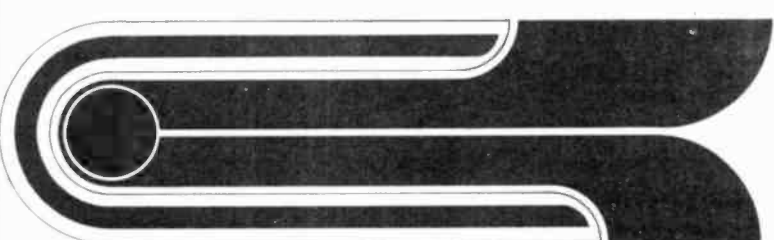
Chairman Charles Ferris will, again, be available for "give-and-take" conversation concerning the new directions that radio broad-

casting hopes to follow, and Jack Anderson will host a special luncheon designed specifically for radio delegates. Of course, April 13 through 16 will also contain a great many intervals designed to provide only relaxation and sport—tennis, dancing, dining, and, of course GAMBLING. Delegates will not only have every opportunity to win or lose, but also to learn how: a short course is offered "... on the biggest game in town, including the history of the game, the rules, the people, what to expect and what to avoid." The NAB Convention has it all.

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2 TRI PPC-1 portable production console c/w 3 colour monitors, 6 input video switcher, audio board and power supply to power portable camera. Excellent condition, asking \$7,000 ea.

G.E. TTC-95 Channel 5 XMitter 1961 Vintage retrofitted in 1967 and colorized.

Ampex 352-1's, 1/4" playback tape decks w/solid state electronics. Good condition.

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LDH-1 cameras (3), complete w/10:1 zoom lens, viewfinder & 100' cable.

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