# INSTRUCTION AND MAINTENANCE MANUAL VHF TELEMETRY RECEIVERS TYPE 1161-A

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# ADDENDUM
(IIGI-A)

1. Change, Page V-3, C-123 - GEL Part No. from " 12968" to "12778"

2. Page V-111 add "R-439 Same as R430"

3. Page V-2 change C-104 from "360 uuf ± 5%, CM15E361J, GEL Part No. 12503" to "330 uuf ± 5%, CM15E331J"

4. Page V-61, also V-68 Change C-516 Description to "Capacitor Fixed Silvered Mica, 82 uuf, CM15E820J, GEL Part No. 12508" Jan. 1963

5. Page V-62, also V-69 Change C-525 Description to "Same as C-515" Jan. 1963

6. Page V-62, also V-69 Change C-530 Description to "Same as C-516" Jan. 1963

7. Page V-13 Change R-144 , GEL Part No. from "11681" to "11683" Jan. 1963

8. Change R-1011 from "220K" to "470K", change GEL Part No. to " 10541" P. V-42 Mar. 1963

9. Page IV-15 Alignment Procedure, item 1, line 2, change "C-215" to "C-125". This is an error affecting all IIGI-A manuals.

10. IV-19 Under Alignment Check, item 1 add "C-227 should be adjusted for minimum capacitance". This should affect all IIGI-A manuals.

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# SECTION I

## GENERAL DESCRIPTION

### INTRODUCTION

The GEL Type 11G1A Telemetry Receiver (figure 1) has been designed specifically for use in FM/FM, PDM/FM, and PCM/FM systems. Noise figures of less than 7 db are obtained over the entire band from 215 to 290 megacycles through the use of two 5842/417A's in a cascode circuit. A tuned circuit at the input of the cascode amplifier reduces the intermodulation problems frequently encountered in receivers without input preselection. In addition, AGC is applied to the RF amplifier which greatly increases the linear operating range of the receiver. Reduced interference susceptibility has received considerable attention in the design of the 11G1A as evidenced by image rejection greater than 60 db and a capture ratio close to unity (approximately 1 db). At the same time, interference from the receiver such as oscillator radiation has been minimized.

The 11G1A Telemetry Receiver provides a degree of versatility heretofore unavailable. A front panel switch allows the operator to use the receiver in either crystal-controlled, continuously-tunable, or predetection playback modes of operation. In the crystal positions, either of two crystal-controlled frequencies may be selected. The two crystal units are contained in a temperature controlled oven. For crystal-controlled operation, it is only necessary to set the tuning dial to the frequency designated on the crystal oven cover and switch to the proper crystal position. For continuously tunable (VFO) operation, the receiver can be tuned using the main tuning dial. In either mode of operation, a vernier frequency adjustment is provided. This is necessary to compensate for transmitter-frequency inaccuracies or drift when the receiver is crystal-controlled.

TECHNICAL SUMMARY

| | | |
|---|---|---|
| 1. | Frequency Range ..... | 215-260 mc with tuning head readily replaceable with heads available from GSL for all of the commonly used telemetry bands. |
| 2. | Noise Figure ..... | Less than 7 db. |
| 3. | RF Bandwidth ..... | 3 mc ± 10% minimum at 3 db points. |
| 4. | Input Impedance ..... | Operates from 50 ohm source. |
| 5. | First Local Oscillator ..... | Selectable from front panel. Mode 1: XTAL 1 - XTAL 2. Crystal controlled (±0.002% stability) using standard CR33/U crystal with oven. Oven contains two crystals with choice of operating unit made by two positions of the LOCAL OSCILLATOR switch. Mode 2: PRE-DET. P. B. Local oscillator turned off to permit playback of prwviously recorded pre-detection signals. Mode 3: VFO. Continuously tunable oscillator, temperature compensated. Stability better than 0.001%°C. |
| 6. | Second Local Oscillator ..... | Vernier tunable over ± 150 kc range with front panel control. AFC operation derived from internal crystal discriminator. AFC may be defeated by front panel AFC ON/OFF switch. |
| 7. | Image Rejection ..... | Greater than 60 db. |
| 8. | IF Rejection ..... | Greater than 80 db. |
| 9. | IF Center Frequencies..... | First IF, 30 mc. Second IF, 10 mc. |
| 10. | IF Bandwidths ..... | Plug-in IF Amplifiers having bandwidth of 10 kc, 30 kc, 50 kc, 100 kc, 300 kc, 500 kc, and 1 mc ± 10%. Receiver is designed to contain any two of these strips with selection of operating choice by means of |

| | |
|---|---|
| | front panel switch. Front panel digital indicator denotes the IF BANDWIDTH in use. |
| 11. Oscillator Radiation ..... | Meets MIL-I-26600. |
| 12. IF Selectivity ..... | Response of IF amplifiers of 10 and 30 kc bandwidths have 60/6 db ratio of approximately 2.2/1, 50 kc and wider have 60/6 db ratio of approximately 2.5/1. |
| 13. Discriminator ..... | Receiver has three conventional discriminators chosen by front panel switch to allow choice of optimum discriminator slope for use as dictated by IF bandwidth and signal deviation. Linearity of all discriminators is such that the maximum distortion will be less than 1% for signal deviations of 70% of total IF bandwidth chosen. A fourth discriminator of the crystal type is included for AFC action on second local oscillator. The proper discriminator is automatically chosen by the DEVIATION RANGE switch. |
| 14. Phase Lock Demodulator ..... | Plug in module capable of linearity over ± 125 KC ± 1%, over ± 200 KC ± 2%, over ± 500 KC ± 5%. Choice of PHASE LOCK or conventional FM demodulator made by front panel switch. Phase lock loop bandwidth is selectable by means of front panel switch. Bandwidths of 50 kc, 100 kc, 200 kc, and "WIDE" are provided. |
| 15. FM Video Output ..... | Output voltage is limited to 5.0V peak. Selection of the discriminator in use is determined by DEVIATION RANGE switch to allow optimum use of video amplifier without over-loading. Fine adjustment of video level also provided as front panel control. Video |

amplifier sensitivity (v/kc) is determined by position of DEVIATION RANGE switch. Video amplifier designed to work into 470 ohm load with response within 3 db, 5 cps to 1.2 mc. Front panel control of video bandwidth in steps of 1.2 kc, 20 kc, 50 kc, 100 kc, 300 kc, 1.2 mc. Roll-off of 1.2 kc position 18 db/octave, other positions 6 db/octave.

16. AM Video Output ..... Frequency response to 30 cps to 150 kc within 3 db. AM video amplifier will work into 10k load shunted by 500 uuf.

17. Output for FDU ..... Provision for operation with 30 mc FDU, GEL Type 1401 or 1402.

18. Output for Predetection Recording ..... 10 mc output taken before limiter for external predetection recording equipment.

19. Internal Predetection Recording & Playback ..... Predetection down-converter from 10 mc intermediate frequency to 600 kc capable of approximately 1.0 volt rms to 91 ohm load for recording. Up-converter from 600 kc to 10 mc for predetection playback. Provision for up-conversion of 5 mc signal to 10 mc for playback through receiver of data centered at 5 mc. Front panel control of 10 mc-600 kc predetection playback is through LOC. OSC switch. Remote control of 10 mc-5 mc playback is through remote connector located on rear panel.

20. Signal Strength Recording ..... AGC bus drives cathode follower for remote signal strength recording with 3.3K ohm external load.

21. Aural Monitor ..... May be operated from AM or FM output. Built-in audio amplifier gain control for speaker and phone jack. Insertion of phone plug silences speaker.

TECHNICAL SUMMARY (cont.)

| | |
|---|---|
| 22. Metering Facilities ..... | a) Tuning Meter<br>b) Frequency Deviation Meter, 25, 75, 150 and 250 kc full scale.<br>c) Combination Video Output/ Signal Level meter switching function is selected by front panel switch. |
| 23. Power Input ..... | 117 VAC, 60 cps, approximately 400 watts. |
| 24. Cooling ..... | Unit includes fan with removable air filter. |
| 25. Weight ..... | Approximately 80 pounds. |
| 26. Size ..... | Standard relay rack construction, 8-3/4" high by approximately 20" deep exclusive of connectors. |
| 27. Slide Mounts ..... | Chassis-Trak CTN-130 |
| 28. Panel Finish ..... | Paint #26492 per Fed. Std. 595 with black fill for engraving. |
| 29. Connectors ..... | All mating connectors furnished, Antenna Input Type "C", all other RF and output connectors "BNC". Power connectors Hubbell 7486-C. |

| Location | Tubes Type | No. | Tube Pin No. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RF Head | 5842/417A | V201 | 125 | 6.8 | 6.3VAC | 6.8 | 6.8 | 7.5 | 6.8 | 6.8 | GRD |
| | 5842/417A | V202 | 110 | GRD | 6.3VAC | GRD | GRD | 1.0 | GRD | GRD | GRD |
| | 5654/6AK5W | V203 | -0.8 1 | GRD | 6.3VAC | GRD | 165 | 38 | GRD | | |
| | 6AU6WB | V204 | -4.5 1 | GRD | 6.3VAC | GRD | 160 | 120 | 0 | | |
| | 6AH6WA | V205 | -5.4 1 | GRD | 6.3VAC | GRD | 155 | 120 | 0 | | |
| | 5654/6AK5W | V206 | -16 1 | GRD | 6.3VAC | GRD | 155 | 110 | GRD | | |
| | 5654/6AK5W | V207 | -30 1 | GRD | 6.3VAC | GRD | 160 | 120 | GRD | | |
| | 5749/6BA6W | V208 | 2 | GRD | GRD | 6.3VAC | 165 | 90 | 1.3 | | |
| | 5725 | V209 | 0 | 2.2 | 6.3VAC | GRD | 38 | 140 | -6.5 4 | | |
| | 6AH6 | V210 | -2.9 | GRD | 6.3VAC | GRD | 146 | 128 | 0 | | |
| Meter Ckt | 6AH6WA | V1001 | 0 | GRD | GRD | 6.3VAC | 140 | 104 ** | 1.5 | | |
| | 5814A | V1002 | 124 | 3.6 | 0.5 | GRD | GRD | 280 | 124 | 130 | 6.3VAC |
| | 12AT7WA | V1003 | 132 ** | -0.3 | 2.1 | GRD | GRD | 132 ** | -5.2 | 0 | 6.3VAC |
| | 5814 | V1004 | 150 * | 132 ** | 132 | GRD | GRD | 150 * | 132 ** | 132 | 6.3VAC |
| Video Amp | 5654 | V801 | 0 | 2.5 | Fil A 4 | Fil B 4 | 114 ** | 120 ** | 2.5 | | |
| | 6688 | V802 | 1.2 | 0 | 1.2 | Fil A 4 | Fil B 4 | NC | 89 ** | 1.2 | 116 ** |
| | 5687 | V803 | 160 ** | 41 | 44 | Fil B 4 | Fil B 4 | 44 | 41 | Fil A 4 | 160 ** |
| Pre Det 5 | 5654 | V1101 | 6 4.4 vrms | 1.6 | 6.3VAC | GRD | 150 * | 95 ** | 1.5 | | |
| | 12AT7WA | V1102 | 135 ** | 0 | 0.8 | 6.3VAC | 6.3VAC | 135 ** | 0 | 1.0 | GRD |
| | 5670 | V1103 | 6.3VAC | 4.3 | 2.1 | 145 ** | NC | 150 * | 0 | 2.2 | GRD |
| Phase Lock 7 | 5702 | V901 | 170 ** | 120 * | 6.3VAC | GRD | 3.8 | 3.8 | 0 | | |
| | 5636 | V902 | -0.1 | GRD | 6.3VAC | -.17 | 65 | GRD | 120 * | GRD | |
| | 5702 | V903 | 118 ** | 75 ** | 6.3VAC | GRD | 0.7 | 0.7 | 0 | | |
| | 5639 | V904 | -.45 | 5.2 | 6.3VAC | 5.2 | 120 * | GRD | 120 * | 5.2 | |
| | 6021 | V905 | 120 * | -.42 | 6.3VAC | 1.8 | 1.8 | GRD | -.42 | 120 * | |
| | 6021 | V906 | 75 ** | 2.0 | 6.3VAC | 1.4 | 1.4 | GRD | 2.0 | 75 ** | |
| | 5639 | V907 | -.24 | 1.3 | 6.3VAC | 1.3 | 116 ** | GRD | 48 ** | 1.3 | |
| | 6111 | V908 | 78 | 20 | 6.3VAC | 30 | 26 | GRD | 20 | 150 | |

VOLTAGE CHART

| Location | Tubes Type | No. | Tube Pin No. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Main Chassis | 5814A | V101 | 180 | 0 | 2.0 | 6.3VAC | 6.3VAC | 150 * | ② | 1.8 | GRD |
| | 5814A | V102 | 170 | 0 | 1.7 | 6.3VAC | 6.3VAC | 150 * | ② | 0.7 | GRD |
| | 12AT7WA | V103 | 280 | 90 | 93 | 6.3VAC | 6.3VAC | 280 | 0 | 2.5 | GRD |
| | 5687 | V104 | 150 | 0 | 6.0 | Fil A ⑨ | Fil B ⑨ | 6.8 | 0 | NC | 170 |
| Lim Disc | 6BN6 | V601 | 1.3 | 0 | 6.3VAC | GRD | 97 ** | 11 | 150 * | | |
| | 6BN6 | V602 | 1.3 | 0 | 6.3VAC | GRD | 99 ** | 11 | 118 | | |
| | 6BN6 | V603 | 1.4 | 0 | 6.3VAC | GRD | 95 ** | 11 | 119 | | |
| | 6BN6 | V604 | 1.3 | 0 | 6.3VAC | GRD | 99 ** | 11 | 118 | | |
| | 6AL5 | V605 | 2.9 | 2.2 | 6.3VAC | GRD | 5.3 | NC | 0 | | |
| | 5687 | V606 | 150 * | 2.4 | 10 | 6.3VAC | 6.3VAC | 16 | 10 | GRD | 150 * |
| | 6AQ5 | V607 | 22 | 33 | 6.3VAC | GRD | 170 | 170 | 22 | | |
| | 6U2 | V608 | 150 * | 82 ** | 6.3VAC | 87 ** | 1.3 | GRD | -0.4 | 82 ** | |
| | 6B4 | V609 | 0 | NC | 6.3VAC | NC | 4.6 | GRD | NC | 150 * | |
| 2nd IF Amp. | 5749/6BA6W | VX01 | ② | GRD | 6.3VAC | GRD | 160 | 90 | 1.0 | | |
| | 5749/6BA6W | VX02 | ② | GRD | 6.3VAC | GRD | 160 | 90 | 1.0 | | |
| | 5749/6BA6W | VX03 ⑩ ⑫ | ② | GRD | 6.3VAC | GRD | 160 ⑪ (175) | 90 ⑪ (125) | 1.0 ⑪ (2.3) | | |
| | 6AU6WA | VX04 | 0 | GRD | 6.3VAC | GRD | 165 | 150 | 2.7 | | |
| | 5726/6AL5W | VX05 | 2.5 | 0 | 2.5VAC ⑬ | GRD | 0 | GRD | ② | | |

VOLTAGE CHART (Cont)

NOTES FOR VOLTAGE CHART

A. All measurements made to chassis ground (GRD) with DC VTVM unless otherwise specified.

Unless otherwise specified, the following control settings should be used.

| CONTROL | SETTING |
|---|---|
| LOCAL OSC | VFO |
| PHASE LOCK - FM | FM |
| POWER | ON |
| FM VIDEO GAIN | FULLY CW |
| AM VIDEO GAIN | FULLY CW |
| AUDIO GAIN | FULLY CCW |
| IF BAND | 2 (with 500KC BW IF Amp. installed) |

B. All values are ±20% unless otherwise specified.

All filament voltages are ±10%.

* Values are ±5%

** Values are ±10%

C. NUMBER REFERENCE

1. These measurements should be made at the nearest test point with a DC VTVM.
2. The value of these measurements is a function of AGC and has a range of approximately 0 to -11 VDC. Pin 1 on V403 of the 1 Mc bandwidth 2nd IF Amp., if not connected to AGC should measure 0 VDC.
3. Measurements on this tube should be made with the LOCAL OSC switch in XTAL 1 or XTAL 2 position with a crystal installed in the approximate socket.

4) 6.3 VAC Filaments. Measurements are made between Fil A and Fil B.

5) Measurements on tubes in the 5-10 Mc pre-detection playback module should be made with 24 VDC applied to pins A & B on J103. (Positive to pin A).

6) Measurement must be made with an RF VTVM such as an HP 410B or equivalent. Noted measurement is for 10 Mc - 600 KC converter. Pin 1, V1101 on the 5 Mc - 10 Mc converter measures 13 vrms. To make this measurement the 5 Mc remote circuit must be energized.

7) Measurements made on tubes in Phase Lock module should be made with FM - Phase Lock switch in Phase Lock position.

8) Measurements made on tube V101 are made with the RF Head removed from the receiver.

9) 12.6 VAC Filaments. Measurement is made between Fil A and Fil B.

10) Tube VX03 is a 6AH6 in the 1 Mc bandwidth 2nd IF Amp.

11) Values in paranthese are values measured on 1 Mc bandwidth 2nd IF Amp.

12) Tube VX04 is a 6AH6 in the 300 KC and wider bandwidth 2nd IF Amp.

13) Pin 3, VX05 measure 6.3 VAC on the 10 KC & 30 KC bandwidth 2nd IF Amps.

SECTION II

# OPERATION

## CONTROLS

RF TUNING - The receiver functions as either a crystal-controlled receiver, a tunable receiver, or playback demodulator for a pre-detection recorded signal. The mode of operation is selected by the LOCAL OSC switch: XTAL 1, XTAL 2, PRE-DET P/B, and VFO. In PRE-DET P/B the first local oscillator plate supply is de-energized, and the input to the pre-detection playback receptacle is automatically connected through the Pre-detection Module to the input to the 2nd IF Amplifier. In addition, a remote 5 mc signal may be fed into the 11G1-A receiver for up-conversion to 10 mc and subsequent demodulation through the remainder of the receiver. Control of this signal processing is through the REMOTE 5 pin connector on the rear of the chassis. Operation of this line causes automatic disconnect of the RF tuning head and insertion of the 5 mc signal through the proper processing channels. 24-28V DC is required to operate the control circuits for the 5 mc playback.

The VERNIER tuning control adjusts the frequency of the second local oscillator to provide a tuning range of ± 150 kc and is used primarily for the precise tuning of the receiver in crystal-controlled operation. For VFO operation, the VERNIER tuning control would normally be set on zero but may be used as required.

XTAL-CONTROLLED OPERATION - The crystals to be used are type CR-33/U in the frequency range from 20.41667 to 24.58333 mc.

$F_c = (F_o + 30)/12$ where $F_c$ is the crystal frequency and

$F_o$ is the desired signal frequency.

To operate in crystal-controlled mode, select the proper crystal, set the LOCAL OSC switch to XTAL 1 or XTAL 2 and set the tuning dial to the operating frequency. The VERNIER tuning is used, as required, to accurately tune the incoming signal.

VFO OPERATION - With the LOCAL OSC switch in the VFO position, tuning can be accomplished using the dial or using the fine tuning knob, whichever is most convenient. VERNIER tuning may be used as required.

POWER ON/OFF - The POWER ON/OFF switch, main power pilot light and main power line fuse are grouped in the lower left corner of the receiver. A 5 amp SLO-BLO fuse should be used. The light is energized when the power is ON.

IF BAND 1-2 - The IF BAND selector switch and IF BAND indicator are located near the lower center of the front panel. A two position selector switch is provided to switch between either of the 2 second IF amplifiers plugged into the receiver. A special purpose digital indicator denotes the bandwidth chosen. Special circuitry is incorporated in each plug-in second IF amplifier to operate the digital indicator. Thus, at all times, the operator knows directly and without error the IF bandwidth in use.

FM VIDEO GAIN - This control is located near the left edge of the front panel and is a continuously variable adjustment for the output level of the FM video amplifier. Input level to the FM video amplifier is controlled by the DEVIATION RANGE Switch (described later). Clockwise rotation increases the video output.

FM VIDEO BANDWIDTH - This selector switch controls the bandwidth of the FM video amplifier. The frequencies indicated on the selector knob are the approximate -3 db high frequency cut-off points in kc. Roll-off of -6 db per octave occurs on all bandwidths except the lowest which is -18 db per octave. The low frequency cut-off is not controlled and remains as indicated in the TECHNICAL SUMMARY.

AM VIDEO GAIN - This control is located near the left edge of the receiver and is a continuously variable adjustment on the AM video output level.

DEVIATION RANGE - This selector switch controls the full scale range of the DEVIATION METER and, in addition, controls the level of the input signal to the FM video amplifier. This latter function, in effect, selects the FM discriminator necessary to provide greatest sensitivity in volts per kc. In operation the DEVIATION RANGE switch should be set so that the highest scale reading is obtained on the DEVIATION METER. This, in turn, provides maximum output voltage of the FM video amplifier without overload. The DEVIATION RANGE switch should never be set so that the DEVIATION METER reads over full scale since this condition will overload the FM video amplifier with consequent distortion of the output video data signal.

AUDIO GAIN - This continuously variable control is located near the bottom edge of the front panel and controls the level of the signal going into the audio amplifier. This, in turn, controls the level into the SPEAKER or PHONES. Aural monitoring of either the FM VIDEO OUTPUT or the AM VIDEO OUTPUT is controlled by means of the AM-FM toggle switch located near the AUDIO GAIN control.

PHONES - Low impedance headphones may be plugged into this receptacle for aural monitoring. Insertion of the phones automatically disconnects the speaker.

PHASE LOCK/FM - This 2 position selector switch permits the receiver to operate with either a conventional FM discriminator system or a plug-in PHASE LOCK loop module. In PHASE LOCK, the FM data signals are fed to the PHASE LOCK module and thence to the FM video amplifiers. DEVIATION and TUNING meter circuitry, however, still uses the conventional FM.

AFC ON/OFF - This 2 position toggle switch, located on the RF TUNING HEAD permits activation of an AFC loop, if desired. AFC error voltage is provided by means of a crystal discriminator specially adapted for AFC operation. The total acquisition range of the AFC discriminator is about ± 25 kc from center frequency. In normal operation, and where AFC is desired, first set the AFC ON/OFF switch to OFF position. Adjust the VERNIER and Main Tuning so that the TUNING METER reads exactly zero. Then throw the AFC switch to ON and the control is then "locked in". It should be noticed that AFC is to be used only on the 10 and 30 kc IF strips. A false reading will be given if used with the other IF strips.

SIGNAL LEVEL/OUTPUT METER - This 2 position toggle switch is located on the RF TUNING HEAD and selects the function of the SIGNAL LEVEL/OUTPUT Meter.

METERS AND INDICATORS

TUNING METER - The tuning meter circuit is designed to operate on CW, FM/FM, PDM/FM, or PCM signals. When receiving PDM/FM or PCM signals, the tuning meter reading is essentially independent of pulse-width or pulse-coding and reads zero when the signal is centered in the IF passband.

SIGNAL LEVEL/OUTPUT - The SIGNAL LEVEL Scale operates from the AGC voltage applied to the second IF amplifier, the first IF amplifier, and the RF amplifier. The meter is calibrated in microvolts (approximately) at the antenna terminals. The OUTPUT LEVEL scale operates from rectified FM video output. The SIGNAL LEVEL/OUTPUT Meter switch controls the scale function. The zero level output is arbitrary and is generally used as reference only. The level is adjustable by means of the OUTPUT LEVEL screwdriver adjustment on the main chassis.

DEVIATION METER - The DEVIATION METER is a peak-to-peak voltmeter calibrated to read peak deviation. The meter will read the peak deviation (½ the peak-to-peak deviation) of PDM/FM or PCM signals. The meter will read the peak deviation of a single FM/FM sub-carrier but will not read accurately the peak deviation of a number of simultaneous sub-carriers.

IF BAND INDICATOR - This device indicates the bandwidth of the 2nd IF amplifier selected by means of the front panel switch IF BAND 1-2.

REMOTE ON - This light is energized when the receiver is in REMOTE operation and receiving the 5 mc input signal for data processing.

LOCK ON - This light is energized when the PHASE LOCK loop is in operation and is locked "on" to the incoming signal.

REMOTE LOCK ON - Facilities for a remote light circuit to indicate PHASE LOCK loop operation is provided through connector J-103 pin D and E. This light indicates when the PHASE LOCK loop has locked on to the incoming signal, however, when the PHASE LOCK/FM switch is thrown from the PHASE LOCK to the FM position, the remote light circuit may not indicate the change.

SIGNAL INPUTS AND OUTPUTS (unless noted all connectors are of BNC type)

PRE-DETECTION INPUT - This connects to the output of a tape recorder electronics or similar device for converting the pre-detected recording signals into demodulated output through the receiver. The input level required at this point is approximately 1 volts rms into 91 ohms. When operating in this mode, the RF TUNING HEAD of the receiver is de-energized and the receiver is used solely as a signal demodulator.

PRE-DETECTION OUTPUT - This connects the output from the Pre-detection module to the external pre-detection recording system electronics. For a 10 mc second IF signal, the output at this point is 600 kc. The output level at this point is approximately 1 volts rms. The IF signal for this output is taken prior to limiting. Recording may be made simultaneously with operation of the receiver on incoming RF signals.

AM VIDEO OUTPUT - This connector provides the output of the AM video amplifier.

FM VIDEO OUTPUT - This connector provides the output of the Video amplifier.

AGC OUTPUT - This output is normally provided for signal strength recording. The output is from a cathode follower and may vary up to -15 volts on high level signals. Short circuiting this output has essentially no effect on the operation of the receiver.

REMOTE CONTROL - A five pin AN Type connector is used (MS-3102A-14S-5P) to permit REMOTE CONTROL operation and indication for the 5 mc input signal. 24-28 volts dc is required across Pins A and B to operate in the remote mode. Remote indication is by means of a contact closure across Pins C and D.

MAIN POWER - The main power input is through a Hubbell 7566-C polarized receptacle.

ANTENNA INPUT - The ANTENNA INPUT connector is located on the rear panel and is a Type C connector. This feeds the input to the RF Tuning head and should be connected directly to the antenna or associated preamplifier.

FDU OUTPUT - This output is provided for connection to a GEI Type 14D1 or 14D2 Frequency Display Unit (FDU). It is taken from a voltage divider at the secondary of the first transformer in the first (30 mc) IF Amplifier in the receiver. The output impedance is approximately 50 ohms. Short circuiting this output has essentially no effect on the operation of the receiver.

IF OUTPUT - This output is taken at the second IF amplifier (10 mc) and is obtained from a suitable divider at the secondary of the last IF amplifier stage. It is automatically connected to the IF amplifier selected by means of the front panel switch (IF BAND) and prior to limiting. The output impedance is approximately 50 ohms and short circuiting this output has essentially no effect on the operation of the receiver. This output is provided primarily for connection to antenna tracking equipment or for pre-detection combining.

5 MC INPUT - This connector is provided for inserting the remote 5 mc signal for subsequent signal processing. When the 5 mc signal is not in use by the receiver it is terminated in a 75 ohm resistive load. Approximately 0.5 volts to 1.2 volts rms is required at this point. When operating in this mode the RF TUNING HEAD is automatically de-energized and the receiver is used solely as a signal demodulator.

IF INPUT - This input is controlled by a coaxial relay, K-102, which is itself controlled by the IF BAND selector on the front panel. The second IF amplifier located on the left-hand side is number 1 and the right-hand side is number 2. Each is connected to their respected color coded part of K-102; left-hand IF strip to the brown dot, right-hand IF strip to the red dot. This is in addition to the red-black-green color code of the connectors.

# SECTION III

# THEORY OF OPERATION

## GENERAL

Refer to block diagram Figure 3 for a general description of the receiver operation and internal switching. Only the basic switching is indicated in order to simplify the discussion.

The antenna input is fed into the RF tuning head, which in turn contains the RF amplifier, first mixer, first local oscillator multiplier chain with its crystal oscillator or VFO; the first IF amplifier centered at 30 mc, the second mixer, and second local oscillator, the latter of which may be vernier controlled. K-101 (a coaxial relay) switches between the RF tuning head output and the output from the pre-detection record/playback modules.

Two IF amplifiers centered at 10 mc and each containing their own AM and AGC detectors are provided. Coaxial relays K-102 and K-103 switch between either of the two units.

One section of S-103 controls the digital bandwidth indication. Other sections of S-102 are used to switch the AM output cathode followers and the AGC cathode followers to their proper terminations.

K-100 controls the 10 mc IF output which in turn is used for pre-detection on recording techniques and/or antenna tracking circuitry.

The output of the switched AM cathode followers is fed to the AM video amplifiers through the AM video gain control. The output of the AM video amplifier goes to a rear panel jack and also to the AM/FM front panel switch for audio monitoring. The audio amplifier may be connected either to the AM or FM output and has associated with it an audio gain control, a loud speaker, and a phone jack.

The switched output of either of the two IF amplifiers is fed through S-102 to the signal level meter. This meter is also used to read the FM output level by means of the SIGNAL LEVEL/uv front panel switch. The switched output of either second IF amplifier is also fed to the limiter-discriminator and the phase lock loop.

The discriminator section of the limiter-discriminator module is switched coincidently with switching the deviation range switch, and this in turn varies the slope of the discriminator in order to provide optimum FM demodulated signal levels. The output of the switched discriminators

feed two cathode followers. One is a direct coupled unit for feeding the relatively high input impedance tuning meter circuitry. The other, an AC cathode follower, feeds the deviation meter circuitry and the FM video amplifier. Both of these have relatively low impedance inputs, hence, the need for two types of cathode followers.

The bandwidth of the video amplifier may be switched from the front panel, and the input control to the video amplifier varies its gain.

The output of the phase lock loop or FM conventional is switched to the input FM video amplifier by means of S-104, the FM/phase lock switch. However, deviation meter and tuning meter circuitry are always fed from the conventional discriminator. In addition, a relatively narrow band crystal discriminator (± 25kc) is provided for AFC operation; the output of which is fed to the AFC ON-OFF switch located on the RF tuning head. It should be noticed that AFC is to be used only on the 10 and 30 kc IF strips. A false reading will be given if used with the other IF strips.

Playback of a 5 mc signal is controlled through the remote control connector located on the receiver rear apron and is fed into the receiver through coaxial relays K-106, K-103, and K-101. Remote indication is provided through a contact closure controlled by the remote control voltage.

Internal pre-detection record/playback up or down converting between 10 mc and 600 kc is controlled by the crystal-predetection playback-VFO switch on the front panel of the RF tuning head. In pre-detection recording, the 600 kc output may be obtained simultaneously with normal receiver operation through coaxial relays K-109 and K-107, and the record output jack on the receiver rear apron. Playback of the 600 kc signal is accomplished through the playback input jack and coaxial relays K-106, K-103 and K-101. In addition, during this latter operation, K-107 is also energized to short out the usual predetection IF output. In this mode, the receiver is merely used as a demodulator for the previously recorded 600 kc signal.

RF TUNING HEAD (200 Series Module)

RF AMPLIFIER - Mallory UHF inductuners are used as tuning elements for the RF amplifier and the local oscillator multiplier chain. A four-section inductuner tunes the RF amplifier and the final stage of the multiplier. A three-section unit tunes the local oscillator and two multiplier stages.

The RF amplifier is a cascode using a pair of JAN 5842/417A low-noise, triode tubes. The cascode amplifier is ideally suited for this purpose because of its inherent low noise characteristics and because the input-tuned circuit provides selectivity ahead of the first tube. An additional advantage of the cascode is that it can be easily gain-controlled. Selectivity ahead of the first tube

is particularly important because of the attenuation it provides to undesired signals outside the band. Gain control of the first stage is important because it provides a considerable increase in the signal handling capability of the receiver.

The input network is a single-tuned circuit with the antenna connection tapped down to provide optimum source resistance at the grid of the first tube. The output-tuned circuit of the cascode is a double-tuned circuit. The combination of the single-tuned input circuit and the double-tuned output circuit produce a response that is greater than 80 db down at the image frequency. The gain of the cascode is great enough that the mixer does not contribute to the noise figure of the receiver and the gain control characteristics are such that the RF amplifier gain is not decreased until the signal level is large enough that noise figure is no longer important.

FIRST MIXER - The first mixer is a pentode mixer using a JAN 5654/6AK5W tube. Both the local oscillator and the signal voltages are applied to grid number one. A test point is provided at the mixer grid to monitor oscillator injection and to facilitate alignment of the RF amplifier. A transitionally coupled, double-tuned circuit in the plate of the mixer is tuned to the first IF frequency of 30 mc. The FDU output is taken from a capacity voltage divider in the secondary side of this double-tuned circuit.

LOCAL OSCILLATOR MULTIPLIER CHAIN - The first local oscillator is a high-beat oscillator. In VFO operation, the basic oscillator operates at one-fourth the first-local oscillator frequency and is tuned by one inductuner section. The VFO (V-204) is an electron coupled Colpitts type, with its output at the fundamental frequency.

In crystal-controlled operation, the basic oscillator operates at one-twelfth the first local oscillator frequency. The crystal oscillator is an electroncoupled, Colpitts type with its output taken at the third harmonic of the crystal frequency. The crystals used are standard MIL type CR-34/U parallel-mode crystals. C-227 is adjusted to provide the 32 mf load capacity specified for this type of crystal. The LOCAL OSC switch in positions XTAL 1 and XTAL 2 place either of two crystal units in the oscillator circuit.

In VFO operation, the crystal oscillator is disabled by removing the screen voltage of V-205 and in crystal operation the VFO is disabled by removing the screen voltage of V-204. Since the plate circuit of the VFO and the plate circuit of the crystal oscillator operate at the same frequency, (for a given signal frequency) they are tied in parallel and are tuned by one inductuner section.

In PRE-DETECTION P/B operation the local oscillator is turned off so that no input signals are received.

V-206 operates as a frequency doubler with its output circuit tuned by one inductuner section and V-207 operates as a doubler with its plate circuit tuned by one inductuner section. The local oscillator signal is taken from the plate circuit of V-207.

The frequency determining circuit of the VFO and all the tuned circuits associated with the multiplier chain have both low end and high end adjustments. Tests points are provided to facilitate alignment.

FIRST IF AMPLIFIER - The first IF amplifier has the response shape of two slightly over-coupled double-tuned circuits (peak to valley ratio approximately 1.03) and is centered at 30 mc. The transformers are capacitively coupled using "top" or high impedance coupling. With this configuration, the primary is in one can and the secondary is in another can with coupling in the form of a capacitive "tee" using the capacity-to-ground one of the transformer terminals as the shunt element.

The amplifier is nominally 2 mc wide to the -3 db point, in order that the first IF amplifier does not affect the selectivity of the receiver (as determined by the second IF amplifier) with any combination of second local oscillator tuning and second IF amplifier bandwidth.

AGC is applied to V-208. A suitable value of unbypassed cathode resistor compensates for input capacity variations that occur with changes in tube transconductance minimizing IF response shape change with gain control. Screen-grid neutralization is also used to improve shape stability.

SECOND MIXER - The second mixer (V-209) is of the pentode type with the oscillator and signal voltages applied to separate grids. This type of mixer was chosen because its use minimizes the spurious responses associated with double superheterodyne receivers.

The signal voltage is applied to grid number one which is biased for Class A operation. The oscillator voltage is applied to grid number three and develops self bias.

A double-tuned circuit in the plate of the mixer is tuned to the second IF frequency of 10 mc.

SECOND LOCAL OSCILLATOR - The second local oscillator is an electron-coupled, Colpitts type with output taken at the fundamental frequency. The VERNIER tuning control of the receiver (R-252) tunes this oscillator plus or minus 150 kc around its normal operating frequency at 40 mc. A varicap (voltage variable capacitor) C-298 is used as the VERNIER tuning element and for AFC.

The oscillator coil, L-237, is a metallized glass inductance chosen for its low-temperature coefficient.

The plate circuit has a high C to L ratio to minimize harmonic output and the circuit design is such that plate-circuit tuning has a minimum effect on oscillator frequency. The plate circuit is tuned by L-234 for an indication of maximum injection at the mixer test point C-275.

SECOND IF AMPLIFIER (300, 400 or 500 Series Modules)

SECOND IF AMPLIFIER (L-C Type) - The second IF amplifiers of the L-C type (50 kc bandwidth and above) are plug-in units all operating at a center frequency of 10 mc. In general, all have similar circuitry consisting of 5 slightly over-coupled double tuned circuits centered at 10 mc. These amplifiers may have 300, 400 or 500 series component numbers.

In order to properly operate the automatic digital readout of bandwidth each IF amplifier has one internal special connection, unique to that frequency amplifier. The connection is indicated on the schematic diagram of the particular amplifier.

AGC voltage is applied to the first three stages of the IF amplifiers with bandwidth 500 kc and narrower and to the first 2 stages with bandwidths of 750 kc and greater. The output stage drives an AM detector, an AGC detector, and the first limiter.

A suitable value of unbypassed cathode resistor is provided for each gain-controlled stage to compensate for input capacity variations that occur with changes in tube transconductance, minimizing IF response shape change with gain control. Screen grid neutralization is also employed for all stages to improve shape stability.

All of the IF transformers are capacitively coupled using "top" or high impedance coupling. With this configuration the primary is in one can and the secondary is in another can, with coupling in the form of a capacitive "tee" using the capacity-to-ground of one transformer terminal as the shunt element.

B plus, limiter, and AGC decoupling is provided as required to prevent regeneration. This decoupling, in combination with input capacity compensation and neutralization, produces a response that is extremely stable from the condition of maximum gain to minimum gain.

The antenna-tracking output is taken from a suitable voltage divider in the secondary of the last IF transformer. The AGC output (for signal strength recording) is taken as a separate feed from the AGC detector.

R-432 and R-437 or R-532 and R-537 as noted are adjusted to set up the signal level meter for the 300 kc bandwidth amplifier.

SECOND IF AMPLIFIER (Crystal Type) - The second IF amplifiers of the crystal type are plug-in units operating at 10 mc center frequency and having a bandwidth less than 50 kc. The second IF amplifier has a response shape of a transitionally coupled interstage transformer centered at 10 mc. This shape is controlled by the 10 kc or 30 kc crystal filter; the other interstage circuits are conventional single tuned inductances with capacitor coupling. The four stage amplifier exhibits a bandwidth of approximately 50 kc without the filter. The output of these amplifiers are fed to both the AM detector and the AGC detector.

AGC voltage from the AGC detector is fed to two grids of the first three IF amplifiers through suitable decoupling networks.

B+ and heater decoupling is also provided as required to prevent regeneration. This decoupling in combination with input capacity compensation and neutralization produces a response that is extremely stable from the condition of maximum gain to minimum gain.

LIMITER-DISCRIMINATOR (800 Series Module)

The limiter-discriminator system is constructed on a single chassis. This system consists in part, of a 2 section limiter and three conventional discriminators automatically chosen by the front panel DEVIATION RANGE switch. This permits choice of optimum discriminator slope for use as dictated by the IF bandwidth and the signal deviation. A fourth discriminator, driven by the limiter, is of the crystal type and is included for AFC action on the second local oscillator.

Basically, the conventional discriminator consists of 2 limiters drving a pair of side tuned circuits to provide the discriminator action. This is, in effect, a Crantund type discriminator.

Type 6BN8 are selected for both limiters because the characteristics of this tube type approach the ideal limiter.

The characteristics of 6BN8 are such that a relatively small change in limiter-grid voltage (grid number 1) changes the plate current from a condition of saturation to cut-off while the cathode current remains essentially constant. This allows the operating point of the tube to be set by cathode bias such that plate-current saturation and cut-off occur symmetrically about the zero-crossings of the input signal. Furthermore, the limiter grid draws essentially no

current when it is driven positive so the loading on the tuned circuits connected to the limiters is essentially constant.

Since the grid time constants associated with grid-leak type of limiters are not required for the gated-beam limiter, the AM rejection characteristics of the limiter are not deteriorated for high AM frequencies.

In the discriminator proper, the time constants normally associated with the more conventional type of discriminator have been minimized or eliminated entirely. Linearity is achieved by adjustment of the LC ratio of each side tuned circuit and/or the potentiometer used as a bias source.

Six separate tuned circuits (3 pair of side tuned circuits) are relay switched to provide optimum slope. Relays are controlled by the DEVIATION RANGE switch.

The AFC detector consists of two limiters which in turn drive a cathode follower. The cathode follower is of the proper impedance to drive the crystal discriminator. The crystal discriminator is used to drive the AFC loop.

Two cathode followers are provided at the discriminator output; one is direct coupled, to drive the tuning meter amplifier, and the second AC coupled, to drive the video amplifier and associated low pass filter and the deviation meter circuitry.

PHASE LOCK LOOP (900 Series Module)

A basic block diagram for the phase lock loop operation is shown in Figure 3. A brief description of some of the theory behind the operation of the phase lock circuitry is as follows:

In general, the performance of any signal detection system can be optimized only when all available prior information is obtained and used to the best advantage. Correlation detection (phase lock) is one means of using prior information about the signal characteristics in order to optimize the signal detection system. The basic operation of correlation detection is the multiplication of incoming signal plus noise (S+N) by a locally generated estimate of signal S', which embodies to the greatest possible extent the known signal characteristic. This process -

$$(S + N) S' = SS' + S'N$$

when averaged by a low pass filter yields the signal plus a small amount of noise. This process is said to be linear in that the signal to noise ratio of the output is the same as that of the input. This linear detection process may be compared with square law detection in which the input signal plus noise is passed through a square law detector. In this process, the desired signal appears as $S^2$ contaminated by noise $(N^2 + 2SN)$. It can be seen that the output signal to noise ratio is not equal to that at the input. Thus, the signal to noise ratio for square law detector becomes important when the signal to noise ratio approaches unity.

One method of obtaining correlation detection is the phase lock loop. In this circuit, the local estimate of the transmitted signal is generated by a voltage controlled oscillator (VCO), and the mathematical operation of multiplication is performed by the phase detector. This phase detector provides an output voltage which is proportional to the phase difference between the incoming signal and the local estimate generated by the VCO. This output voltage is passed through a low pass filter to provide a controlled voltage to the VCO.

The circuit diagram of the phase lock loop module is provided at the back of the manual. The voltage controlled oscillator V-906 is a free running plate coupled multivibrator. The frequency of the multivibrator is controlled by the voltage from the cathode follower, V-905. The output of the multivibrator is at 5 mc and is doubled in V-907 into a 10 mc carrier. This carrier from V-907 feeds one input to the phase detector which consists of CR-903 and 904 and associated elements. Received carrier is obtained from the last IF stage and is fed through V-903 which is an amplifier in the isolating stage. This, in turn, feeds transformer T-904, the other input to the phase detector. The output for the phase detector is fed through suitably switched low pass filters FL-1 through 4 into the cathode follower V-905.

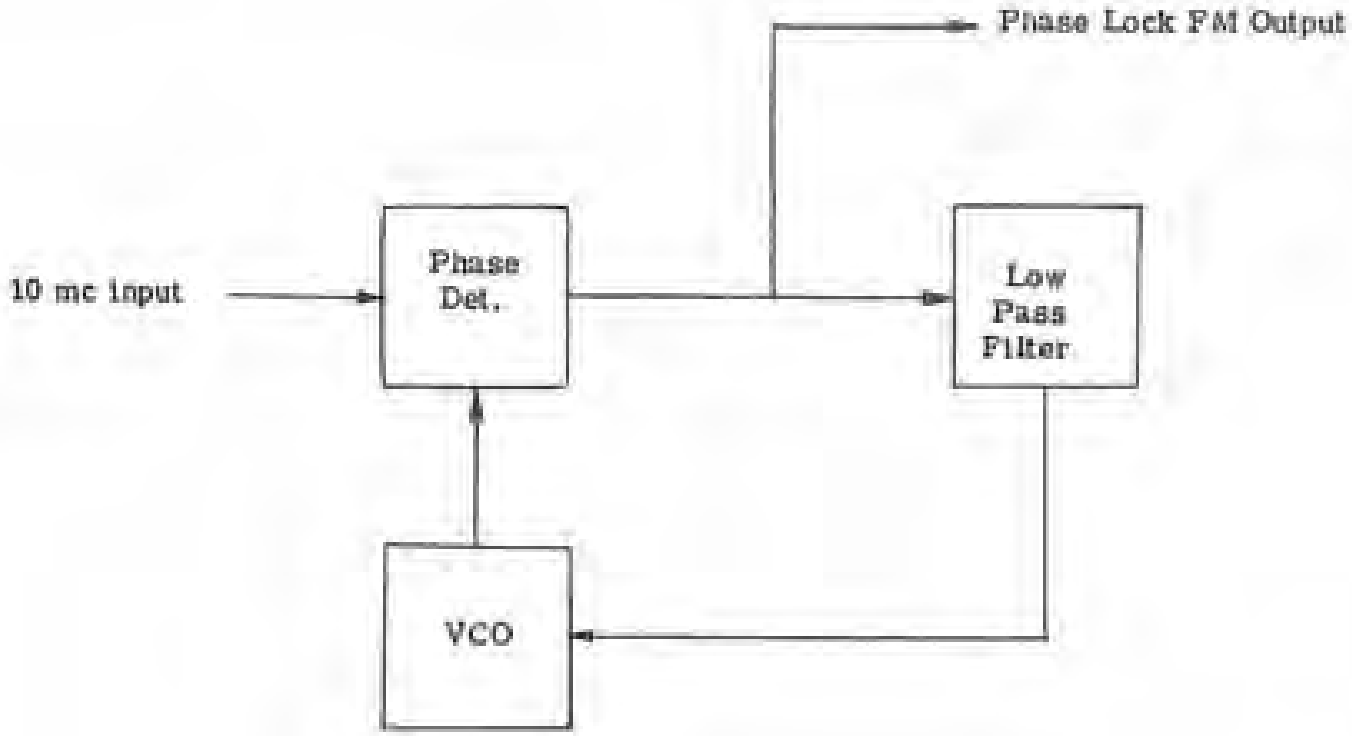



FIGURE 3. PHASE LOCK LOOP OPERATIONS, BLOCK DIAGRAM

FM VIDEO AMPLIFIER (800 Series Module)

The FM Video amplifier contains 3 tubes. It is a negative feedback type of amplifier with feedback from the output cathode, V-803 to the input cathode, V-801.

Variation of overall closed loop video amplifier gain is made by changing the feedback resistor. High frequency response and roll-off characteristics may be modified by changing the R-C time constant of the feedback combination.

Receiver band switching for 6 db/octave roll-off is accomplished by switching in various R-C combinations in the feedback loop with FM VIDEO BW switch. The 18 db/octave roll-off uses a specially designed low pass filter switched in between the FM Discriminator output and the input to the FM VIDEO amplifier.

The FM VIDEO GAIN control varies the input to the Video amplifier.

PRE-DETECTION RECORD/PLAYBACK (1100 Series Module)

The Pre-Detection Record/Playback Module in the Record Mode consists of a crystal controlled local oscillator at 10.6 mc, a balanced mixer for heterodyning the incoming 10 mc to 600 kc and suitable amplifiers and isolating stages to obtain the 600 kc output for record.

In Playback, the incoming 600 kc is fed into a phase splitter and connected in the balanced mixer into a 10 mc signal.

In Record, the 10 mc signal is obtained from the last second IF amplifier stage prior to limiting. In Playback, the 10 mc signal is fed to the second IF amplifier input for subsequent amplification and limiting prior to demodulation of the FM data.

Playback of the 5 mc signal is identical to that described above except that the local oscillator is at 15 mc rather than 10.6 mc.

V-1101 is the crystal controlled local oscillator which operates in both the Record and Playback Modes. V-1102 and V-1103A are amplifier and output cathode follower designed to drive the Record circuitry. V-1103B is used in Playback to provide drive to the balanced mixer.

METERING CIRCUITRY (1000 series module)

DEVIATION METER - This module contains Deviation Meter and Tuning Meter circuitry. The deviation meter is a peak-to-peak voltmeter calibrated to read peak deviation. The meter will indicate the peak deviation (one-half the peak-to-peak deviation) of PDM/FM or PCM signals. The meter will indicate the peak deviation of a single FM/FM sub-carrier but will not read accurately the peak deviation of a number of simultaneous sub-carriers.

Deviation Range Switch, S-102, selects the full-scale range of the deviation meter. Pentode amplifier, V-1001, is DC coupled to triode amplifier V-1002A, which in turn, is direct coupled to a cathode follower V-1002B. Flat frequency response is maintained in this amplifier by partially by-passing the cathode resistors. The bypass capacity for V-1002A is adjusted by C-1005 to give the desired frequency response characteristics.

CR-1001 and CR-1002 operate as a voltage double charging C-1006 to a dc voltage very nearly equal to the peak-to-peak voltage appearing at the cathode of V-1002B. R-1012 is adjusted as required to calibrate the deviation meter.

TUNING METER - The tuning meter circuit is designed to operate on CW, FM/FM, PDM/FM or PCM signals and reads zero when the signal is centered in the IF pass band. The tuning meter reading is essentially independent of pulse width for PDM/FM signals or of pulse coding for PCM signals.

The discriminator output through its associated cathode follower is direct coupled to triode amplifier, V-1003A, which is in turn, directly coupled to cathode follower, V-1004A. V-1003B and V-1004B are not part of the signal circuit but function to stabilize the amplifier by reducing the effects of B+ supply and heater voltage variations on tuning-meter indication.

The tuning meter is connected between the signal cathode and the non-signal cathode of V-1004, A dc voltage is taken from the DEVIATION RANGE switch so that adjustment for the particular discriminator is applied to the non-signal grid of V-102. This voltage is set by R-1026 through 1029 for zero current through the tuning meter when a CW signal at center frequency is fed to the discriminator.

When a video signal is present at the signal cathode, C-1010 is charged through CR-1004 to the maximum voltage at the cathode and C-1009 is charged through CR-1003 to the minimum voltage at the cathode.

As a result, there is a current flow from the non-signal cathode through the tuning meter and R-1034 toward C-1009, and there is a current flow from C-1010 through R-1025 and the tuning meter (in the opposite direction) toward the non-signal cathode. If the received signal is centered in the IF passband the deviation is symmetrical about the center frequency of the discriminator and the voltage differences between C-1009 and C-1010 (with respect to the voltage at the non-signal cathode) are equal and opposite. The net current through the tuning meter therefore is zero, the indication for proper tuning.

SIGNAL LEVEL/OUTPUT LEVEL - This meter is located on the RF TUNING HEAD.

OUTPUT LEVEL METER - The Output Level Meter is calibrated in Volume Units (VU). The VU reference (0 db) is taken at full scale video output.

The detected FM signal output from the FM VIDEO Amplifier rectifier is fed through a circuit to the meter. The reference may be adjusted by the OUTPUT METER ADJ. located on the main receiver chassis.

S-203 on the RF TUNING Head permit the use of this meter as either a Signal Level or Output Level Meter.

SIGNAL LEVEL METER - The Signal Level Meter is calibrated in microvolts and indicates the approximate input signal level. The AGC voltage of the IF Amplifier is fed through R-430 and R-432 or R-530 and R-532 to the meter. A very small positive voltage is bled down from the B+ supply through the divider of R-108, R-109 and R-110. This and the AGC voltage are essentially balanced by adjustment of R-432 or R-532.

AM VIDEO AMPLIFIER (on main chassis)

The signal from the AM detector incorporated in each second IF strip is capacitively coupled to the grids of the AM cathode followers and thence through the front panel IF BAND selector switch.

The arm of the selector switch S-103 is fed to the AM VIDEO Amplifier GAIN and thence to the output cathode follower V-103. The output is, in turn, fed to the AM OUT, J-112 on the rear apron.

AUDIO AMPLIFIER (on main chassis)

The output either AM or FM Video Amplifier is coupled to the grid of the audio amplifier (half of V-103) through the AUDIO GAIN control. The output of this amplifier drives a speaker mounted behind the panel of the receiver through a high-quality audio transformer. In addition the output may be connected to phones, as required.

POWER SUPPLY (on main chassis)

The power supply furnishes operating voltages of +300 VDC, +170 VDC, both unregulated and +150 VDC regulated by a Zener regulator. The two unregulated voltages are obtained from a center tapped transformer driving four 1N547 diodes in a full wave bridge. The grounded pair of diodes are used in conjunction with the center tap as a split phase, full wave circuit. Resistors are used to control the peak current in the diodes.

Several separate filaments are provided. A full wave bridge rectifier supplies 24V for operation of the relays. Another full wave bridge rectifier supplies negative voltage to permit proper operation of the AGC cathode followers. The AC input is shielded and bypassed for the RF frequencies involved.

A cooling fan with a cleanable filter is provided. This fan is thermostatically controlled, the thermostat having a turn-on temperature of approximately 80°F at the chassis and a turn-off temperature of approximately 55°F.

# SECTION IV

# ADJUSTMENT & MAINTENANCE

## ALIGNMENT PROCEDURE FOR WIDE BAND (LC) SECOND IF AMPLIFIER

### RECOMMENDED EQUIPMENT

RCA WR-59C Sweep Generator or Jerrold Model 602 Sweep Frequency Generator

Dumont 401-A Oscilloscope

Hewlett-Packard 606-A Signal Generator

Second IF Test Cable (Figure 4)

Second IF Alignment Fixtures (Figure 5)

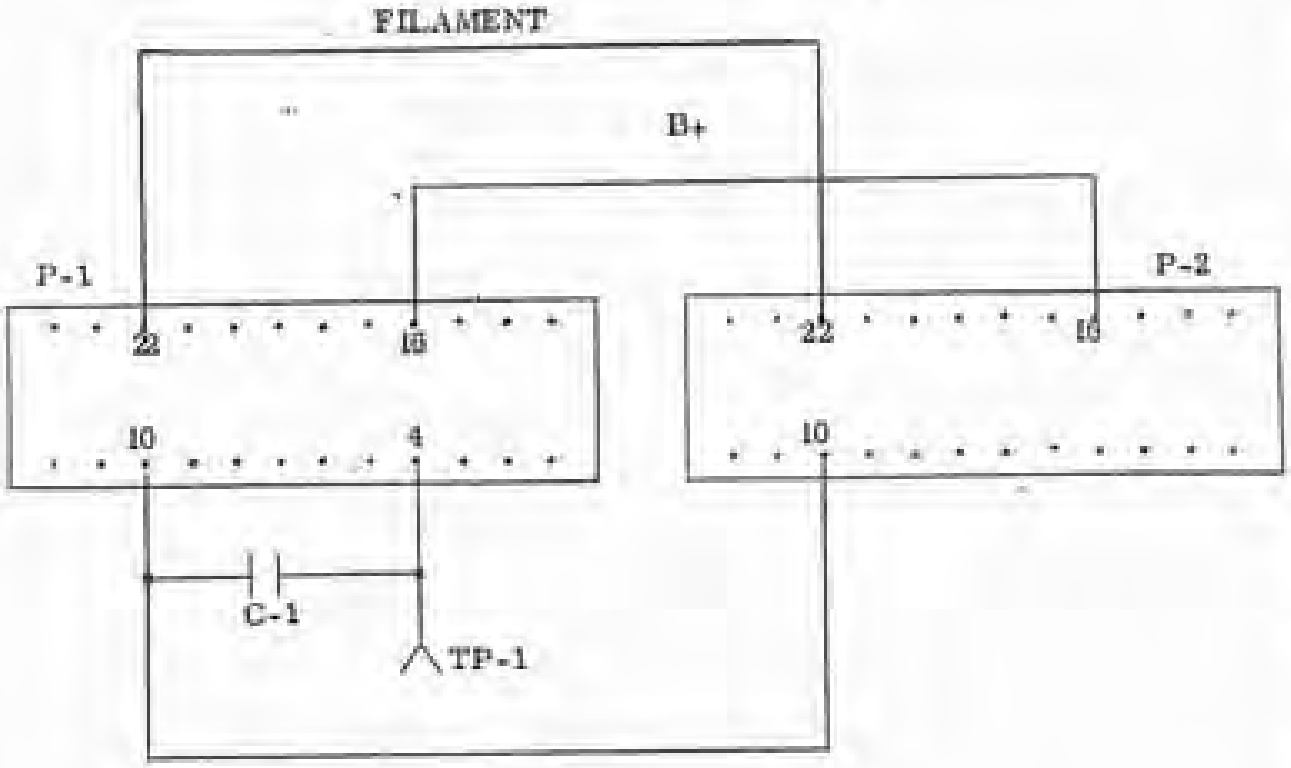
Coaxial cable to replace the IF-VF output cable normally supplied with the WR-59C. Cable is RG-62/U, 3 feet 10 inches long with a UG-260/U coaxial connector on one end and an Amphenol 75-MC1F microphone connector on the other. For those with the Jerrold Sweep Frequency Generator, a coaxial cable with UG-260/U connector on both ends is suggested.

Walsco #2541 alignment tool, two six-inch clip leads and a 10 k carbon resistor.

GENERAL INSTRUCTIONS - This procedure is used for all LC second IF Amplifiers from 50 kc and up.

References to R & C numbers apply equally well to 300, 400 or 500 series units. References to bandwidth should be made to the particular amplifier under alignment.

A low capacity cable, such as RG-62/U coaxial cable, should be used for connection to the oscilloscope. Cable capacity plus oscilloscope input capacity should be held to a maximum of 100 mmf. The direct-coupled, vertical amplifier of the oscilloscope should be used to display the response. The marker generator signals should be coupled as are required to produce a suitable marker pip. If too much marker is used the baseline of the response will be shifted. In general, a minimum of marker signal should be used. The frequency of the marker signal should be very accurately set.




C-1 Capacitor, fixed ceramic disc, .0015 uf + 100% - 20%
Erie CK81Y152Z

P-1 Plug, 24 contact, Amphenol Miniature Blue Ribbon No. 57-20240

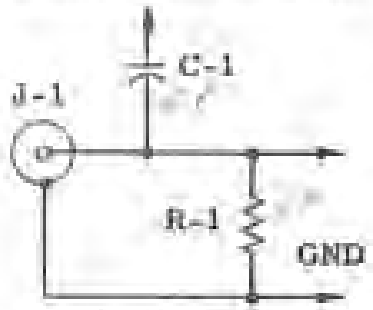
P-2 Plug, 24 contact, Amphenol Miniature Blue Ribbon No. 57-10240

TP-1 Feed-thru terminal USECO No. 1430

FIGURE 4

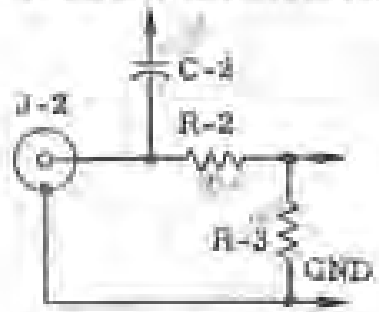
SECOND IF TEST CABLE

MARKER GENERATOR



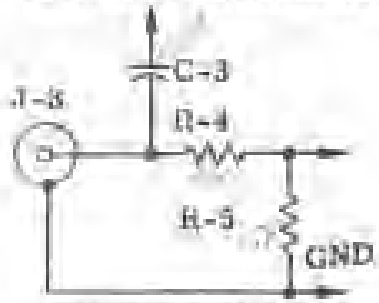

FIXTURE A

MARKER GENERATOR




FIXTURE B

MARKER GENERATOR




FIXTURE C

C-1 Capacitor, Fixed Ceramic Tubular 4.7 ± 0.25 uuf Erie NPO-A

C-2 Capacitor, Fixed Ceramic Tubular 4.7 ± 0.25 uuf Erie NPO-A

C-3 Capacitor, Fixed Ceramic Tubular 4.7 ± 0.25 uuf Erie NPO-A

J-1 Connector, Coaxial UG-1094/U

J-2 Connector, Coaxial UG-1094/U

J-3 Connector, Coaxial UG-1094/U

R-1 Resistor, Fixed composition 91 ohms ± 5% Allen Bradley EB9105

R-2 Resistor, Fixed composition 82 ohms ± 5% Allen Bradley EB8205

R-3 Resistor, Fixed composition 10 ohms ± 5% Allen Bradley EB1005

R-4 Resistor, Fixed composition 91 ohms ± 5% Allen Bradley EB9105

R-5 Resistor, Fixed composition 4.7 ohms ± 10% Allen Bradley GB47G1

FIGURE 5

SECOND IF ALIGNMENT FIXTURES

The IF alignment fixtures (Figure 5) should be made using short leads. These fixtures should be soldered in place as required during the alignment procedure. The sweep input cable and the marker input cable should be dressed towards the input end of the IF sub-chassis away from the stages already tuned. The oscilloscope input cable should be dressed away from the IF sub-chassis.

## ALIGNMENT OF L-C SECOND IF AMPLIFIER

1. Remove the amplifier sub-chassis from the receiver. Remove its bottom cover. Set the sub-chassis on the top edge of the side cover dropping the studs on the sub-chassis sidewall through the holes in the top of the side cover provided for this purpose. Connect the IF amplifier test cable. Connect the limiter discriminator input cable to J-302. Solder a 10K resistor to the feed-thru terminal on the test cable and connect the oscilloscope to this resistor and ground on the sidewall of the sub-chassis. Short out the AGC line by connecting a short clip lead from feed-thru capacitor C-342 to ground on the sub-chassis sidewall. If the signal level meter was in approximate adjustment prior to the alignment, do not disturb the adjustment of R-332 and R-337. If the signal level meter was not in approximate adjustment, set R-332 and R-337 to the center of their range. Set the Local Oscillator switch to either position and remove the crystal, if one is installed.

2. Connect alignment fixture (Figure 5) between the grid pin 1 of V-304 and ground on the strap-nut for this tube. Connect the sweep generator. Connect the marker generator between the 4.7 mmf capacitor on the alignment fixture and ground on the sidewall of the IF sub-chassis. Connect a short clip lead from terminal D of T-304A to ground on the upper sidewall of the sub-chassis.

Adjust the output of the sweep generator for a 1-volt response amplitude. Feed in marker signal as required. Adjust the tuning cores in T-305A and B as required to produce a response curve centered at 10 mc with respect to the 5% down points on the response curve. The response curve should be flat-topped or slightly overcoupled.

Remove the alignment fixture and clip lead.

3. Connect alignment fixture (Figure 5) between the grid pin 1 of V-303 and ground on the strap-nut for this tube. Connect the sweep generator. Connect the marker generator. Connect a short clip lead from terminal D of T-303A to ground on the upper sidewall of the sub-chassis.

Adjust the output of the sweep generator for a 1-volt response amplitude. Feed in marker signal as required. Adjust the tuning cores in T-304A and B as required to produce a response curve centered at 10 mc with respect to the 10% down points on the response curve.

Adjust the output of the sweep generator for a 10-volt response amplitude. Adjust the tuning core in T-305B as required to remove tilt in the response curve. The response curve should be flat-topped or slightly overcoupled.

Remove the alignment fixture and clip lead.

4. Connect alignment fixture (Figure 5) between the grid pin 1 of V-302 and ground on the strap-nut for this tube. Connect the sweep generator. Connect the marker generator. Connect a short clip lead from terminal D of T-302A to ground on the upper sidewall of the sub-chassis.

Adjust the output of the sweep generator for a 10-volt response amplitude. Feed in the marker signal as required. Adjust the tuning cores in T-303A and B as required to produce a response curve centered at 10 mc with respect to the 15% down points on the response curve. The response curve should be flat-topped or slightly overcoupled.

Remove the alignment fixture and clip lead.

5. Connect alignment fixture (Figure 5) between the grid pin 1 of V-301 and ground on the strap-nut for this tube. Connect the sweep generator. Connect the marker generator. Connect a short clip lead from terminal D of T-301A to ground on the upper sidewall of the sub-chassis.

Adjust the output of the sweep generator for a 10-volt response amplitude. Feed in marker signal as required. Adjust the tuning cores in T-303A and B as required to produce a response curve centered at 10 mc with respect to the 25% down points on the response curve. The response curve should be flat-topped or slightly overcoupled.

Remove the alignment fixture and clip lead. Install the second IF subassembly bottom cover and install the subassembly in the receiver. Short out the AGC line by connecting a short clip lead from C-343 to ground on the lip of the side cover.

6. The output lead from the AM detector connects to a test point at TP-101 or TP-102. Pull out V-101 and/or 102 as required. Connect the oscilloscope to feed-thru capacitor C-101 and/or 102 test points and to a convenient ground point. Remove the front end subassembly cover. Connect alignment fixture (Figure 5) between the grid pin 1 of V-209 and ground at terminal D of T-202B. Connect a short clip lead from terminal B of T-203B to the sidewall of the front end subassembly.

Adjust the output of the sweep generator for a 10-volt response amplitude. Feed in marker signal as required. Note: If a marker is present due to the second local oscillator adjust the Vernier Tuning of the receiver until this marker coincides with the marker due to the marker signal fed in. Adjust the tuning cores in T-301A and B as required to produce a response curve centered at 10 mc with respect to the 3 db down points on the response curve. The response curve should be flat-topped or slightly overcoupled.

IF bandwidth can be checked if desired as follows: Connect a VTVM to C-101. Disconnect the sweep generator and connect the marker generator to the alignment fixture. Set the input frequency at 10 mc and the input level for a 10-volt dc reading on the VTVM. Vary the input frequency until the meter reading drops to 7.07 volts and note the frequency. Vary the frequency until the meter reading drops to 7.07 volts on the other side of the response curve. Note the frequency and the bandwidth.

Disconnect the alignment fixture, clip lead, and oscilloscope. Replace the tube and install the front end subassembly bottom cover. Remove the short from the AGC line.

## ALIGNMENT PROCEDURE FOR CRYSTAL SECOND IF AMPLIFIER

### RECOMMENDED EQUIPMENT

Hewlett Packard 150A Oscilloscope

Boonton 202F Signal Generator

Note: No attempt should ever be made to align this 10 kc amplifier using conventional sweep generators which have sweeping frequencies as high as 60 cycles per second. In the event that a slow sweep source is not available, a point-by-point tuning process is possible.

### ALIGNMENT OF CRYSTAL SECOND IF AMPLIFIER

These alignment instructions apply to both 10 kc and 30 kc IF Amplifiers.

1. Set LOCAL OSC Switch to either XTAL 1 or XTAL 2 and remove crystal.

2. With a short clip lead, short out the AGC buss of the crystal IF Amplifier by grounding TP-501 (C-537).

3. Connect a cable from the SWEEP OUTPUT jack (available in the top compartment) of the HP 150A Oscilloscope to FM EXT OSC of the Boonton Signal Generator.

4. Connect a cable from the Boonton 202F RF OUTPUT to the NGI-A Receiver ANTENNA INPUT jack.

5. On the Boonton set INT MOD to OFF position and on the HP set SWEEP TIME/CM to 5 millisecond position.

6. Connect the signal probe of the HP Oscilloscope to C-101 of the Receiver and remove V-101 and/or V-102 as required.

7. Set SWEEP MODE switch on the HP Oscilloscope to INT and adjust red knob clockwise (toward FREE RUN) until a trace appears on the screen.

8. Vary the FREQUENCY dial on the BOONTON 202F until a somewhat rectangular wave shape is presented on the oscilloscope.

9. On the 11GI-A Receiver, adjust VERNIER and TUNING dials for maximum signal. Repeat this step several times and occasionally during the balance of the tuning procedure to compensate for drift of the signal generator in view of the very narrow bandwidth.

10. Adjust L-505, L-504 and L-503 in that order for maximum deflection on the scope. Continually reduce the signal output from the generator to ensure that signal saturation is not being experienced.

C-554 and C-555 SHOULD NEVER BE ADJUSTED UNLESS THE CRYSTAL FILTER HAS BEEN REPLACED.

11. In the event that the crystal filter is replaced, the matching networks C-554 and C-555 should be adjusted alternately several times to produce the best compromise between amplitude and square-shaped response.

12. Repeat L-503, L-504 and L-505.

13. Tighten all locking nuts on the slug shafts, ensuring that their tuning is not altered during the locking process.

14. Remove the AGC grounding clip, replace V-101-V-102 and replace all covers.

ADJUSTMENT SECOND LOCAL OSCILLATOR

RECOMMENDED EQUIPMENT

VTVM RCA Model WV98A

Electronic Counter, HP 525A or equivalent

Walsco #2521 Tuning Tool

ALIGNMENT PROCEDURE

1. Remove bottom cover of RF head.

2. Preset voltage from R-253 to 0 volts measured at C-2002.

3. Set VERNIER dial, R-252, fully clockwise. Preset voltage from R-248 to +50 volts measured at C-2003.

4. Set VERNIER dial, R-252, fully counter-clockwise. Preset voltage from R-249 to +30 volts measured at C-2003.

5. Set VERNIER dial, R-252 to zero. Measure voltage at C-2003. The voltage should be approximately +40 volts.

6. Connect counter to C-275.

7. Adjust C-292 until counter reads 40.000 mc.

8. Measure oscillator drive to converter at C-275. Peak up L-234 at 40 mc oscillator frequency.

9. Vary VERNIER both directions from zero. Total frequency excursion should be approximately ± 200 kc from 40 mc. If the excursion is less than +200 kc in CW position, increase the voltage output from R-248. If the excursion is greater than +200 kc, decrease the voltage from R-248.

10. If the excursion is less than -200 kc in CCW position, decrease the voltage from R-249. If the excursion is greater than -200 kc, increase the voltage from R-249.

11. Repeat Steps 4 and 5 until a total of 400 kcs is covered by rotation of the VERNIER dial.

12. Set VERNIER dial to zero, check center frequency. If slightly different from 40 mc, readjust C-292.

13. Final Check - Rotation in CW direction must result in +150 kc or greater; rotation in CCW direction must result in -150 kc or greater.

## ALIGNMENT PROCEDURE FOR FIRST IF AMPLIFIER

### RECOMMENDED EQUIPMENT

RCA WR-50C Sweep Generator

Dumont 403-A Oscilloscope

Hewlett-Packard 606-A Signal Generator

First IF alignment fixture (Figure 6)

A 45-volt battery, a 10K carbon resistor, a .001 mf disc capacitor, Erie CK62Y102Z or equal, and a 4.7 uuf ceramic capacitor, Erie NPO-A or equal.

GENERAL INSTRUCTIONS - A low capacity cable such as RG-62/U coaxial cable should be used for connection to the oscilloscope. Cable capacity plus oscilloscope input capacity should be held to a maximum of 100 uuf. The direct coupled, vertical amplifier of the oscilloscope should be used to display the response. The marker generator signal should be coupled in (through a 4.7 uuf capacitor connected to the sweep generator lead) as required to produce a suitable marker pip. If too much marker is used, the baseline of the response will be shifted. In general, a minimum of marker signal should be used.

The IF alignment fixture (Figure 6) should be made using reasonably short leads and should be soldered in place during the alignment procedure. The sweep input and marker input cables should be dressed away from the stage being aligned or already aligned. The oscilloscope cable should be dressed away from the front end sub-chassis.

### ALIGNMENT PROCEDURE

1. Connect the first IF alignment fixture (Figure 6). Remove V-210. Connect the 45-volt battery negative terminal through a 10K resistor to feed-thru capacitor C-275. Ground the positive terminal of the battery. Set the Local Oscillator switch to XTAL and remove the crystal if one is installed. Disconnect the lead to pin 1 of V-209 at terminal D of T-201B. Connect the sweep generator between pin 1 of V-209 and ground on the side-wall of the front end sub-chassis. Connect the marker signal generator through a 4.7 uuf capacitor between pin of V-209 and ground on the side-wall of the front end sub-chassis.

2. Adjust the sweep generator for a suitable sweep width centered at 30 mc and set the sweep generator output for a 0.5 volt response amplitude. Feed in marker signal as required. Adjust the tuning cores in T-202A and B to produce a response curve centered at 30 mc. The response curve should be flat-topped or slightly overcoupled and tuning should be adjusted for symmetry about the ± 500 kc points.

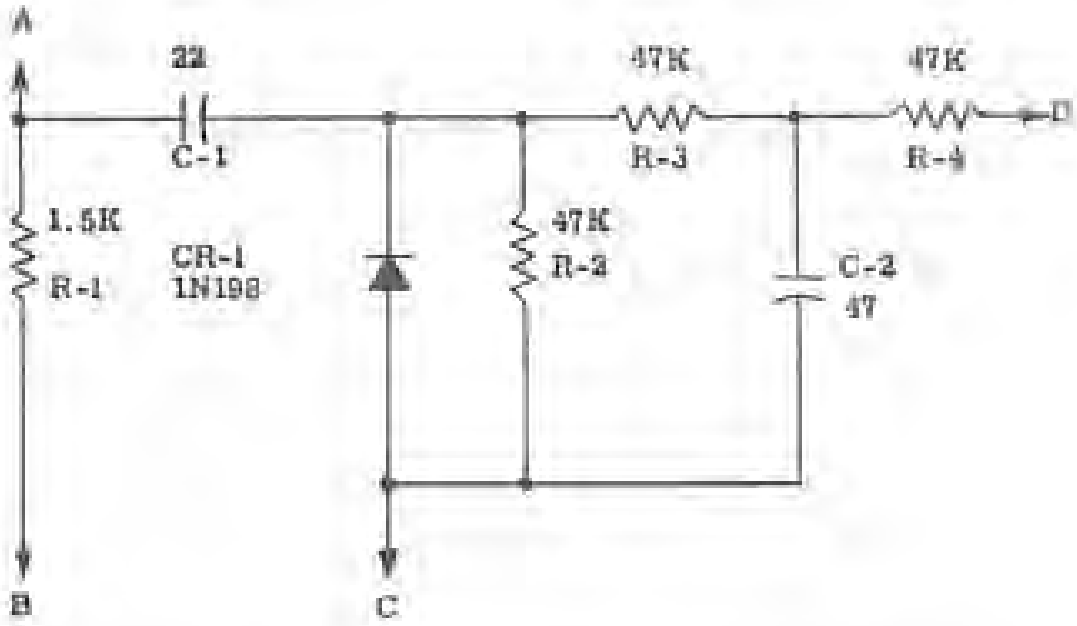
Remove the sweep and marker generator leads. Reconnect the lead to terminal D of T-201B.

3. Solder a .001 uf capacitor to pin 1 of V-203. Connect a short clip lead across C-284. Connect the sweep generator to this capacitor and to ground on the partial shield in the front end sub-chassis. Connect the marker generator through a 4.7 unf capacitor to the .001 uf capacitor and ground on the partial shield. Adjust the sweep generator output for a 0.5 volt response amplitude. Feed in marker signal as required. Adjust the tuning cores in T-201A and B. The response curve should be flat-topped or slightly overcoupled and tuning should be adjusted for symmetry about the ± 500 kc points.

Remove all of the test fixtures and replace V-210.

Note: If the receiver is to be used with a GEL type 1402 Frequency Display Unit, an alternate method of adjustment should be used to provide the best (most constant) response over the ± 1.5 mc frequency range displayed by the FDU. This alternate method is used for factory alignment.

The response shape at the FDU output jack is slightly different than the response at the grid of V-208 due to chassis currents which tend to tilt the response. In this alternate procedure T-201 is adjusted for symmetrical response about the ± 500 kc points at the FDU output using an auxiliary amplifier and detector. The overall IF response is then slightly tilted and this tilt is taken out by adjusting T-202B.




C-1 Capacitor, Fixed, Ceramic tubular, 22 uuf ± 5% Erie NPO-A

R-1 Resistor, Fixed, Composition, 1.5K ± 5% Allen Bradley EB1525

R-2 Resistor, Fixed, Composition, 47K ± 10% Allen Bradley EB4731

R-3 Resistor, Fixed, Composition, 47K ± 10% Allen Bradley EB4731

R-4 Resistor, Fixed, Composition, 47K ± 10% Allen Bradley EB4731

CR-1 Diode, Germanium, Type 1N198

C-2 Capacitor, Fixed, Ceramic tubular, 47 uuf ± 5% Erie NPO-T

Connection A - To plate Pin 5 of V-209

Connection B - To B plus at junction (tie point) of L-230, R-235, R-237 and R-238

Connection C - To ground on strap nut of V-208 (near Pin 7)

Connection D - To oscilloscope

FIGURE 6

FIRST IF ALIGNMENT FIXTURE

## ALIGNMENT PROCEDURE FOR RF AMPLIFIER

GENERAL INSTRUCTIONS - Since the RF circuitry of the receiver contains two sections, an input network and a double-tuned interstage, with widely differing criteria for proper tuning and tracking, separate alignment procedures are given for each stage.

### ALIGNMENT OF RF INTERSTAGE

#### RECOMMENDED EQUIPMENT

1. VTVM, RCA Model WV-98A
2. Signal Generator, Hewlett-Packard Model 608-D
3. 8V Bias Battery (Figure 7)
4. Crystal, McCoy CR-33/U 21.3333 mc
5. Crystal, McCoy CR-33/U 23.5000 mc

#### ALIGNMENT

1. Install 300 kc bandwidth second IF. Connect bias battery to C-342. Connect VTVM to C-215. Connect signal generator to antenna input. Set signal generator output attenuator to 100 uv. Set receiver dial at 226 mc. Tune generator to 226 mc ± .005%. (Tune generator for zero tuning meter reading on XTAL operation with 21.3 mc xtal). Ground C-261 with a short clip lead. Set bias for a convenient VTVM reading (4-5 VDC).

2. Adjust C-216 and C-220 for maximum VTVM reading, readjusting bias to keep VTVM below 5v.

3. Tune generator to 252 mc ± .005% (with receiver dial set at 252, tune generator for zero tuning meter reading on XTAL operation with 23.5 mc xtal).

4. Adjust C-216 and C-220 for maximum VTVM reading, noting which one has the most effect and whether capacity is added to or taken out of each circuit.

5. If the change in VTVM reading caused by Step 4 is less than about 4%, the RF interstage can be considered aligned. If the change is more than this amount, the end inductors, L-207 and/or L-209 will require adjustment.

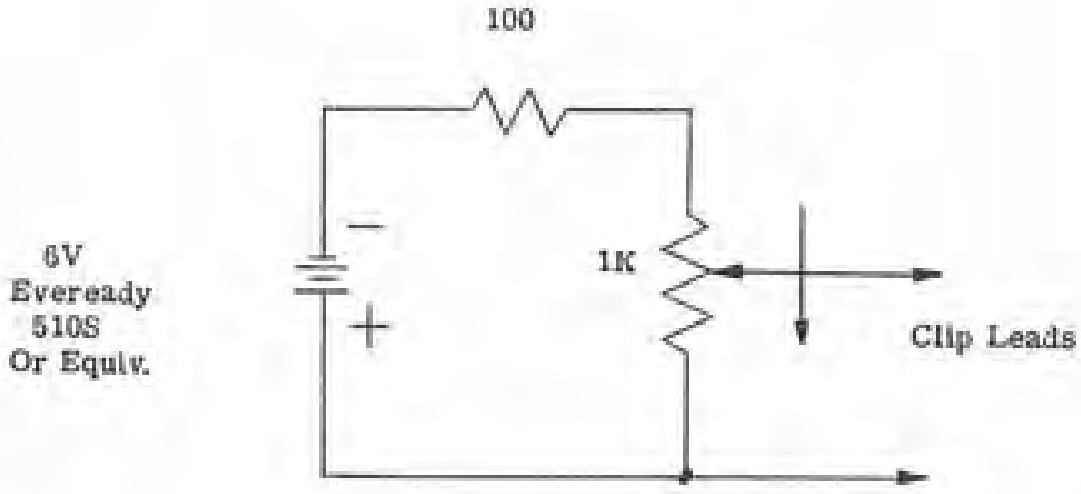



FIGURE 7

BATTERY CONNECTION

6. Adding capacity to a circuit in this instance indicates that the circuit has too much tuning range and the inductance of the coil must be increased. To increase the inductance of the coil compress the turns and/or move the entire coil away from the chassis. Adjust L-207 if most of the change in Step 4 was due to C-218. Adjust L-209 if the change was due to C-220.

7. After adjusting the coil, peak the circuits again at 228 mc and check the tuning at 252 mc (Steps 2-5). Repeat as often as necessary for tracking.

ALIGNMENT OF RF INPUT NETWORK

RECOMMENDED EQUIPMENT

See Appendix under Noise Figure Measurements.

ALIGNMENT

1. Using VFO operation of the receiver, make noise figure (NF) measurements at 214 mc, 235 mc and 268 mc. If the NF is less than 7 db at these three points, the input circuit can be considered aligned. If this is not the case, the input circuit must be adjusted.

2. Set the receiver to 266 mc and make an incremental adjustment of C-205 (¼ turn). Make an NF measurement.

3. Repeat Step 2 until the capacitor setting for minimum NF at 268 mc is determined. Set capacitor to this point.

4. Measure NF at 235 mc and 214 mc. Less than 7 db NF at these two points indicates satisfactory alignment. More than 7 db NF indicates that an adjustment of L-202 is required.

5. Set the tuning dial to 235 mc and determine setting of C-205 for minimum NF as in Step 2. If the setting for minimum NF is far more capacity than the setting determined in Step 3, the circuit has too little tuning range. To increase the tuning range, compress the coils of L-202 slightly.

6. Repeat Steps 2-5 as required.

ADJUSTMENT OF OSCILLATOR RADIATION CANCELLING NETWORK

RECOMMENDED EQUIPMENT

1. Receiver, GEL Type 11G1-A or equivalent.

2. Signal Generator, Hewlett-Packard 608-D.

3. 20 db Attenuator Pad, Microlab AF-20.

4. Bias Battery (Figure 7).

PROCEDURE

1. Disconnect everything but the power input from the receiver. Connect a 20 db pad to the antenna input. Connect long cable to pad and to antenna input of auxiliary receiver. Locate auxiliary receiver at least 15 feet away from receiver under test. Connect bias battery to C-342 of auxiliary receiver. Connect VTVM to C-101 of auxiliary receiver. Set both receivers to VFO operation.

2. Set tuning of receiver under test to 235 mc. Tune in its local oscillator (30 mc higher in frequency) on the auxiliary receiver. Adjust bias for a convenient VTVM reading (approximately 5v). Adjust the wire loop on the printed circuit capacitor for a minimum VTVM reading, re-adjusting the bias on the auxiliary receiver to increase resolution.

3. Disconnect 20 db pad from receiver under test and connect to signal generator. Tune in signal at 265 mc by varying generator frequency. Adjust generator output to repeat VTVM reading. Read local oscillator radiation in microvolts from generator attenuator.

4. Repeat Steps 56 and 57 at 214 mc (244 mc oscillator frequency) without adjusting the capacitor. The oscillator radiation is specified as being less than 100 uv over the tuning range, but should not be more than about 10 uv at 235 mc.

## ALIGNMENT PROCEDURE FOR FIRST LOCAL OSCILLATOR

GENERAL INSTRUCTIONS - The RF circuits and the oscillator-multiplier circuits are provided with adjustments for both the low end and the high end of the band. The high end adjustments are end inductors or padding inductors. These are adjusted by moving the coils of the inductor. The low end adjustments are trimmer capacitors. In general, adjustment of the circuit capacity using the trimmers will suffice when replacing tubes or when performing routine alignment.

The signal generator should be set to the specified frequency within 0.005%, which is more accurate than the calibrators of most signal generators. If facilities are not available to set frequency to this accuracy, crystals of the appropriate frequencies should be obtained and the signal generator set to frequency using crystal-controlled operation of the receiver. Since the tuning meter would be used as an indication of generator tuning, the tuning meter zero and second local oscillator frequency should be checked before using this procedure. See appropriate alignment sections.

### ALIGNMENT OF OSCILLATOR MULTIPLIER CHAIN

#### RECOMMENDED EQUIPMENT

1. VTVM, RCA Model WV-98A
2. Crystal, McCoy CR-33/U, 20.3333 MC
3. Crystal, McCoy CR-33/U, 24.6666 MC

#### ALIGNMENT CHECK

1. Connect VTVM to TP-203. Set front panel tuning dial to 214 mc. Set local oscillator control to XTAL operation. Insert 20.3 mc Xtal in front panel socket. Adjust C-244 for maximum VTVM reading.

2. Connect VTVM to TP-204. Adjust C-251 for maximum VTVM reading.

3. Connect VTVM to C-224. Adjust C-254 for maximum VTVM reading.

4. Connect VTVM to TP-203. Set tuning dial to 266 mc. Insert 24.6 mc xtal in socket. Adjust C-244 for maximum VTVM reading. If the change in VTVM reading is more than about 5% with this adjustment, L-217 will require adjustment - see complete Alignment Procedure.

5. Connect VTVM to TP-204. Adjust C-251 for maximum VTVM reading. If the change in VTVM reading is more than about 10%, L-220 will require adjustment. See complete Alignment Procedure.

6. Connect VTVM to C-224. Adjust C-254 for maximum VTVM reading. If the change in VTVM reading is more than about 15%, L-224 will require adjustment. See complete Alignment Procedure.

## COMPLETE ALIGNMENT OF OSCILLATOR MULTIPLIER CHAIN

1. Connect VTVM to TP-203. Set front panel tuning dial to 214 mc. Switch front panel local oscillator control to Xtal operation. Insert 20.3 mc. Xtal in front panel Xtal socket. Adjust C-244 for maximum VTVM reading (approximately -10v to -15v).

Note: Maximum capacity in C-244 occurs when the arrow molded into the top of the capacitor points directly toward the rear apron of the receiver.

2. Connect VTVM to TP-204. Adjust C-251 for maximum VTVM reading (approximately -20 to -30v).

3. Connect VTVM to TP-203. Set tuning dial to 266 mc. Insert 24.6 mc Xtal. Check circuit tuning by adjusting C-244. A decrease in the capacity required to produce a peak VTVM reading indicates that the circuit has too little tuning range. To increase the tuning range, spread the coils of L-217 and/or move the coil closer to the chassis, thereby decreasing its inductance.

4. Adjust C-244 for peak VTVM reading.

5. Connect VTVM to TP-204. Check circuit tuning by adjusting C-251. A decrease in the capacity required to produce a peak VTVM reading indicates that the circuit has too little tuning range. To increase the tuning range, spread the coils of L-220 and/or move the coil closer to the chassis, thereby decreasing its inductance.

6. Adjust C-251 for peak VTVM reading.

7. Connect VTVM to C-224. Adjust C-254 for maximum VTVM reading (approximately -1.5v).

8. Connect VTVM to TP-203. Set the dial to 214 mc. Insert 20.3 mc Xtal. Check tuning by adjusting C-244. An increase in capacity required to give a peak VTVM reading indicates too little tuning range. Reduce inductance of L-217 to increase range. (Refer to Step 3).

9. Adjust C-224 for peak VTVM reading.

10. Connect VTVM to TP-204. Check tuning by adjusting C-251. An increase in capacity required to give a peak VTVM reading indicates too little tuning range. Reduce inductance of L-220 to increase range. (Refer to Step 5).

11. Adjust C-251 for peak VTVM reading.

12. Connect VTVM to C-224. Check circuit tuning by adjusting C-254. An increase in the capacity required to give a peak VTVM reading indicates that the circuit has too little tuning range. To increase the tuning range, compress the coils of L-224 and/or move the entire coil away from the chassis, thereby increasing its inductance.

13. Adjust C-254 for peak VTVM reading.

14. Repeat Steps 3-5.

15. Connect VTVM to C-224. Check tuning by adjusting C-254. A decrease in capacity required to give a peak VTVM reading indicates too little tuning range. Increase inductance of L-224 to increase range. (Refer to Step 12).

Note: Bending L-223 closer to the chassis will have the effect of increasing the tuning range.

16. Adjust C-254 for peak VTVM reading.

17. Repeat Steps 8-16 as required for circuit tracking and tuning range.

## ALIGNMENT OF VFO

### RECOMMENDED EQUIPMENT

1. VTVM RCA Model WV-98A
2. Signal Generator, Hewlett-Packard Model 608-D
3. Crystal, McCoy CR-33/U, 20.3333 mc
4. Crystal, McCoy CR-33/U, 24.6666 mc
5. Cables, adapters and clipleads as required
6. Oscilloscope, Dumont Model 401-A

ALIGNMENT CHECK

1. Check the zero adjustment of the tuning meter and the second local oscillator frequency for zero setting of the vernier tuning dial. See appropriate alignment procedures.

2. Connect signal generator to antenna input connector. Set generator output to 214 mc ± .005% and 1 mv (tune generator on XTAL operation at 214 mc with 20.3 mc xtal). Switch to VFO operation and tune in the signal. If the tuning dial does not read correctly, set it to 214 mc and adjust C-235 for a zero reading on the tuning meter.

3. Set the input frequency to 265 mc ± .005% (tune generator on XTAL operation at 265 mc with 24.6 mc xtal). Switch to VFO operation and tune in the signal. If the tuning dial reads 260 mc, the adjustment is complete. If the dial error is less than approximately 200 kc it is better to split the error at the band edges by adjusting C-235 as required than to attempt further adjustment. If the dial error is excessive, L-213 will require adjustment according to the following procedure.

COMPLETE ALIGNMENT OF VFO

1. Connect the signal generator to antenna input of receiver, using coaxial cable. Set generator output to 3 millivolts. Place partial bottom cover on front end chassis. Set receiver tuning dial to 214 mc. Insert 20.3 mc xtal. Set local oscillator control for XTAL operation. Tune generator to exactly 214 mc as indicated by the receiver tuning meter. Switch to VFO operation and adjust C-235 for tuning meter zero.

2. Connect FM Video output to oscilloscope vertical input. Switch to XTAL operation. Set R-183 for minimum hum pattern as displayed on the oscilloscope (approximately .03 v peak-to-peak).

3. Switch to VFO operation. If the peak-to-peak hum pattern is more than about three times as great on VFO as on XTAL operation, V-204 will require changing. Select a tube which meets this hum requirement.

Note: The VFO must be retuned according to the procedure in Step 1, each time the tube is changed.

4. Set dial to 265 mc. Insert 24.6 mc xtal. Switch to XTAL operation. Tune generator to 265 mc as indicated by the tuning meter. Switch to VFO operation. Check circuit tuning by adjusting C-235 for correct tuning meter reading. If a decrease in capacity is required, the circuit has too little tuning range. Reduce inductance of L-213 by spreading coils and/or moving entire coil closer to chassis to increase range.

5. Adjust C-235 for tuning meter zero.

6. Set dial to 214 mc. Insert 20.3 mc xtal. Switch to XTAL operation. Tune generator to 214 mc as indicated by the tuning meter. Switch to VFO operation. Check circuit tuning by adjusting C-235 for correct tuning meter reading. If an increase in capacity is required, the circuit has too little tuning range. Reduce inductance of L-213 to increase range. (Refer to Step 4).

7. Adjust C-235 for tuning meter zero.

8. Repeat Steps 4-7 as required for tracking and tuning range.

9. Set dial to 214 mc. Insert 20.3 mc Xtal. Switch to Xtal operation. Tune generator to 214 mc as indicated by tuning meter. Switch to VFO operation. Zero tuning meter by varying receiver tuning control. Note tuning dial offset.

10. Repeat Step 9 at 226 mc, 238 mc, 252 mc and 266 mc. The dial error should be essentially zero at 214 and 266, as these are the oscillator tracking points. If the other points are off by more than about 0.2 mc, the oscillator will have to be adjusted.

11. If the errors are predominately on one side and are not too great the dial error may be split by adjusting C-235 so that there is less error at the worst point and taking a slight error at the ends of the band.

12. If the errors are too great or Step 11 will not reduce the dial error to less than 0.2 mc, L-214 will have to be adjusted. If the dial reads high when tuned to 253 mc, move L-214 closer to the chassis.

13. Repeat Step 1.

14. Repeat Steps 4-13 as required.

15. Switch to VFO operation. Connect VTVM to C-224. Adjust C-251 for most nearly constant VTVM reading while tuning across the range.

# ALIGNMENT PROCEDURE FOR PHASE LOCK DEMODULATOR

## RECOMMENDED EQUIPMENT

Oscilloscope - Tektronix 545-D with Dual Trace Plug in Type CA

Signal Generator, Measurement, Model 65D (for use as marker)

Sweep Generator, Jerrold, Model 602 or equivalent

## GENERAL INSTRUCTIONS

In commencing the alignment of a series 900 Phase Lock Demodulator, consideration should be given to the theory of operation. A section devoted to this is found on Page III - 8 of this Instruction Book.

As a practical matter in initially considering this alignment, it seems noteworthy to emphasize that, contained in the Phase Lock circuitry are two separate detection loops; i. e., loop one - the Phase Loop and loop two - the indicator light loop.

While loop two is dependent on the proper operation of loop one, it should be a point of caution that adjustment of synchronized operation of loop two in no way degradates the performance of loop one.

Functionally, the two loops behave in approximately the following manner:

Loop One: A 10 megacycle signal injected in J-901 at a level of 2 - 4 volts peak-to-peak is amplified by V-903, the grid and plate of which are resonated at 10 mc by T-903 and T-904 respectively. The grid resonant circuit is fairly broad and consequently not a critically adjustment circuit. However, the plate circuit is considerably more narrow and therefore, care should be excercised to assure that this circuitry is "peaked" at 10 megacycles. This signal is then coupled to the diode mixing bridge via T-904. The opposite side of this bridge is used to drive the video output stage V-904. At the junction of R-907 and R-908 of the mixing bridge, a comparator signal from the local oscillator doubler circuit is injected at initially a frequency of 10 megacycles. When the incoming signal approaches 10 megacycles, there is produced a D. C. component proportional to the

phase difference between the incoming signal and the local oscillator. This D. C. component is then fed back to the control grid of the oscillator, V-908, which causes a frequency change in that oscillator and which results in an injected comparator frequency at the mixer bridge more nearly that of the incoming information. When this condition is arrived at, it is said the local oscillator is "locked" on to the incoming information. This "locked" condition will now hold for a F of 10 mc ± 250 kc, approximately.

Loop Two: When loop one is in the "locked" condition described above, a portion of the local oscillator is applied to the control grid of V-901. The plate circuit of V-901 is tuned slightly off 10 megacycles and the output is applied to grid No. 3 of V-902 (pin 4). The input signal (from the first amplifier V-903) is fed to the control grid of V-902 and at an input signal frequency of 10 mc/s. When these two incoming signals are of the proper phase, a DC voltage is developed to trigger V-906, which will energize the light located on the front panel of the receiver.

Once the adjustments are complete, it should be observed that the phase lock-light turns-on at an input signal of 10 mcs and remains lit while adjusting the input frequency to 10 mc ± 250 kc.

NOTE: The following alignment procedure pre-supposes that the receiver in which the subject "Phase Lock" is installed, is in proper alignment.

ALIGNMENT PROCEDURE

1. Place the Phase Lock Demodulator in an operating 11Gi-A Receiver and allow a 5 minute warm up period.

2. Install a 500KC second IF Amplifier, and energize the Amplifier by the Front Panel Switch, IF BAND #1. Place the Phase Lock Bandwidth Selector in the WIDE position.

3. Disconnect the 500 KC IF Amplifier input cable, W-401, from Relay K-102 and connect to a sweep generator.

4. Connect input Channel A of the oscilloscope to the respective IF output Test point, C-102.

5. Adjust the sweep generator to produce an output covering, the frequency range of approximately, 8 to 12 mcs.

6. Adjust the oscilloscope sweep circuits for a presentation on Channel A of the second IF response.

7. Adjust the power output from the sweep generator for an unsaturated second IF response (approximately 10 volts peak-to-peak). Remove power from the ILS Receiver.

8. Loosen the five DZUS fasteners holding the unit in place. Remove the unit from its mounting but Do Not remove the input power connector. Remove both top and bottom preforated covers.

9. Adjust the unit physically so as to observe the circuits which are normally not visiable (up side down).

10. Connect the Input Channel B of the oscilloscope to the center tap of T-903 located inside shielded box housing T-903.

Apply power to the ILS Receiver allowing a respectable warm up period of approximately five minutes.

11. Adjust Channel B gain and positioning controls to show a RF output which is in synchronization with the 2nd IF Response on Channel A.

12. Inject into the 2nd IF a 10 mcs marker from the Model 65B signal generator. This marker is evident in the 2nd IF output on Channel A of the oscilloscope.

13. Connect Channel B of the oscilloscope to the junction of C-902, R-901, C-901 and T-903. Adjust T-903 for maximum output as observed on the oscilloscope's Channel B.

14. Remove the 5 mcs multivibrator tube V503.

15. Connect Channel B of the oscilloscope to either side secondary of T504 and adjust for maximum output as observed on the oscilloscope's Channel B.

16. Physically adjust R-917 to maximum resistance (approximately 500 ohm).

17. Physically adjust L-902 for maximum inductance. (slug all the way in)

18. Replace tube, V-503.

19. Connect the oscilloscope Channel B to the Phase Lock output, J-902, and adjust oscilloscope controls on Channel B for a diagonal discriminator response similar to figure 8.

20. Adjustment of R-917 will control the point at which the discriminator output crosses the base line of the oscilloscope. Reducing the inductance of L-902 (screwing slug out), will increase the bandwidth of the discriminator. With simultaneous adjustment of R-917 and L-902 the response of figure 8 should be obtained. This response is for reference only and, depending on various variables, may be considerably wider in bandwidth and not necessarily symmetrical. The criteria in the adjustment of R-917 and L-902 will be discussed in the following steps.

21. Remove the sweep generator from the input to the second IF Amplifier, and replace with a signal generator Model 65B or equivalent.

22. Set Channel A of the oscilloscope for DC coupling.

23. Tune the signal generator to 10 mcs. with minimum output.

24. Observing the Channel A, DC coupled, oscilloscope, increase the signal generator output until the oscilloscope indicates an increase to 10 VDC from the AM detector Test Point C-102.

25. Connect Channel B of the oscilloscope, for DC coupling, to the junction of R-913 and C-900.

26. Observing the DC output, from the Phase Lock, on Channel B of the oscilloscope, slowly change the frequency of the Model 65B signal generator from 10 mcs to a point at which the DC voltage on Channel B of the oscilloscope becomes unstable. Note the frequency of the Model 65B signal generator.

27. Readjust the Model 65B to 10 mcs and adjust the frequency slowly in the opposite direction from step 26 until the instability again occurs. Note the frequency of the Model 65B signal generator. The frequency difference between that noted in step 26 and that noted in step 27 is the Phase Lock Bandwidth. Should the Bandwidth of the Phase Lock not be at least ± 250KC, readjustment of L-902 and R-917 will be necessary.

NOTE:

The above alignment - steps 1 through 27 will normally produce satisfactory operation of the Phase Lock Demodulator - although, it must be emphasized that the criteria of satisfactory operation is determined by overall receiver operation.

28. Reconnect the sweep generator to the input of the 2nd IF Amplifier.

29. Connect Channel A of the oscilloscope to the Phase Lock output, J-902, adjusting the sweep generator and oscilloscope controls for the Phase Lock Discriminator response.

30. Connect Channel B of the oscilloscope to the junction of CR-901 and R-940.

31. By simultaneous adjustment of C-921 and L-903 a response similar to figure 9 should be obtainable on Channel B.

NOTE:

It is necessary to have a response which is negative, with respect to the oscilloscope's baseline during the time that the Phase Lock is locked as evident on Channel A of the oscilloscope.

32. Reconnect all connections to place the HGIA receiver in operation.

33. Connect a 200 uv CW signal to the Antenna input, and tune the receiver to this signal.

34. Reduce the CW signal to 2 uv.

35. Adjust R-942 until the front panel Phase Lock ON lamp extinguishes. Readjust R-942 until the lamp just comes on.

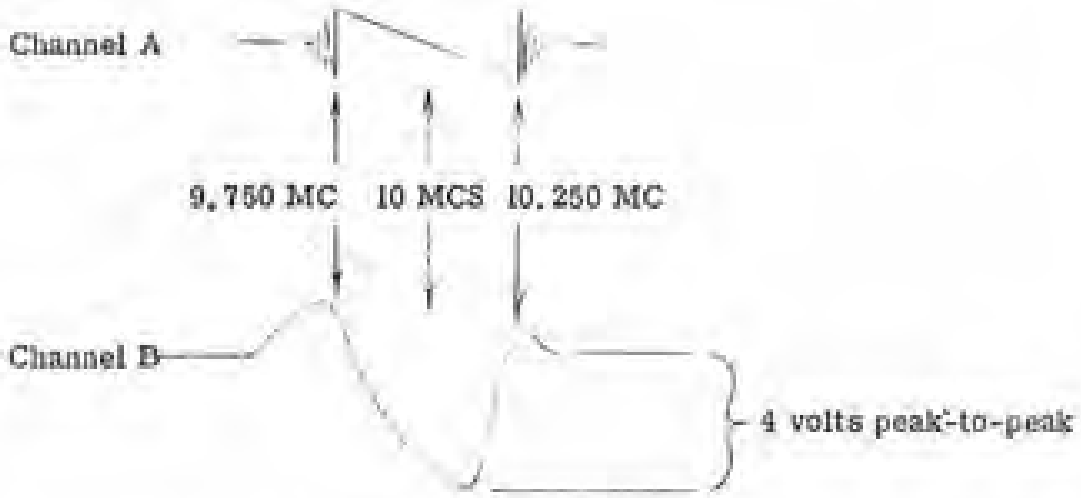
36. Decrease the signal generator output power to minimum. The Phase Lock ON lamp should go out. Increase the signal generator output and observe the Phase Lock ON lamp. It should come ON before 3 uv of input power is applied.

37. With a 3 uv CW signal applied, detune the receiver until an appreciable increase in noise is heard from the receiver. The Phase Lock ON light should extinguish before or just as the noise is observed.

38. Retune the signal to center frequency. The Phase Lock ON light should be ON.

39. When steps 33 through 38 are all satisfied, adjustment of R-942 is complete.


Figure 8. PHASE LOCK OUTPUT




All frequencies are approximate

Figure 9. OSCILLOSCOPE RESPONSE,
JUNCTION CR-901 and R-940

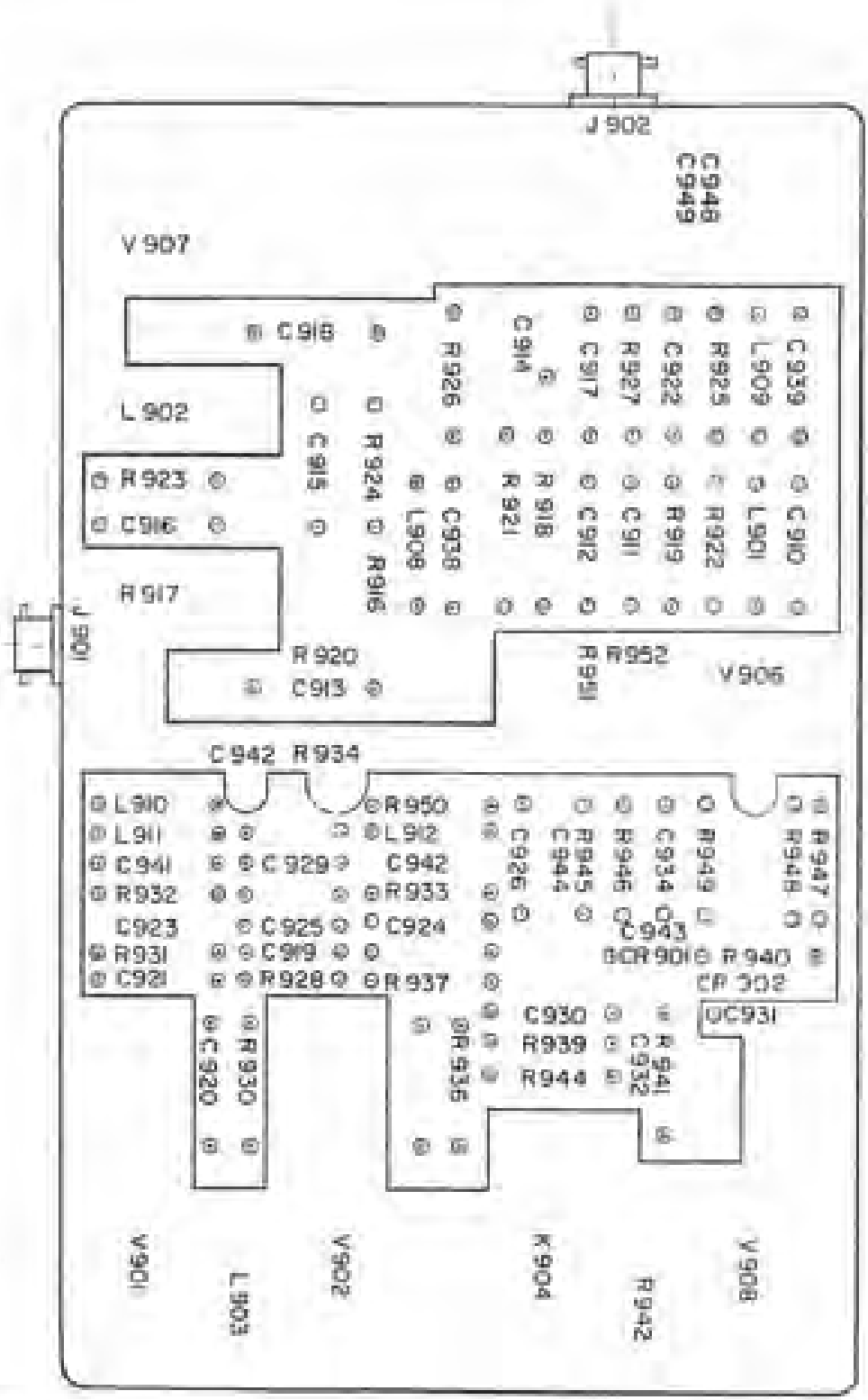



FIGURE 10 TOP VIEW
PHASE LOCK LOOP CHASSIS
IX-27

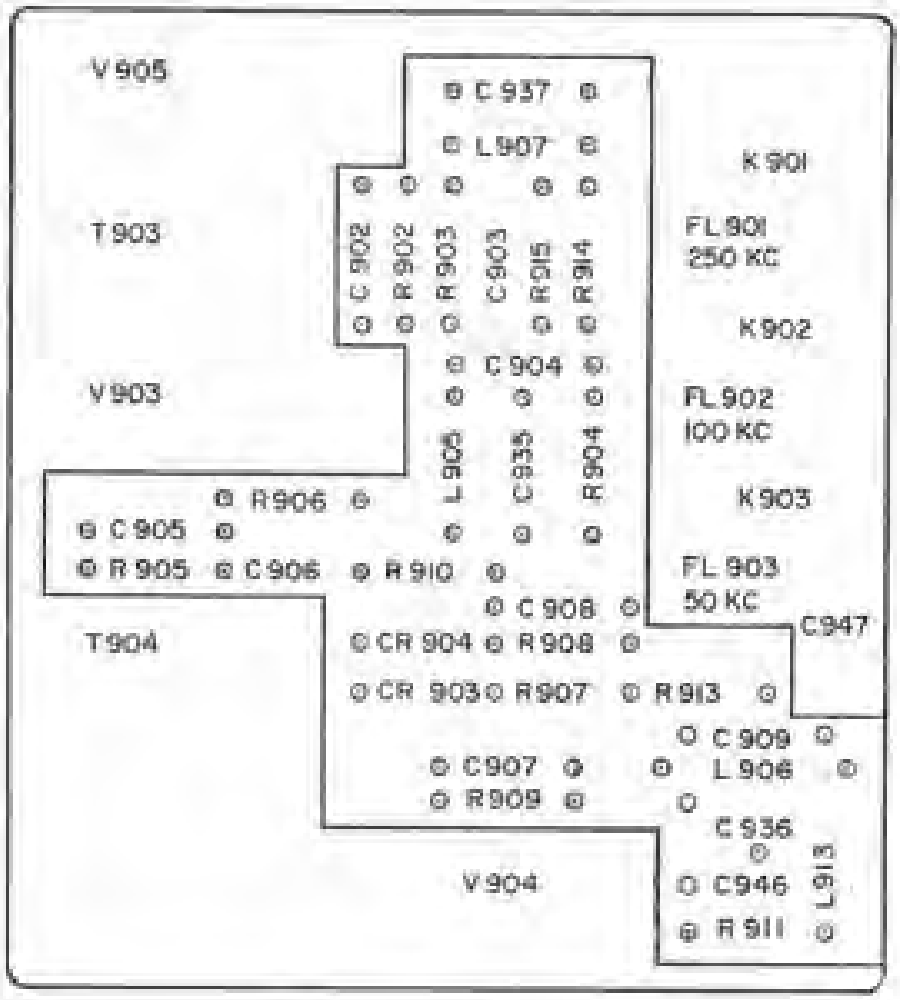



FIGURE 11 BOTTOM VIEW
PHASE LOCK LOOP CHASSIS

## ADJUSTMENT OF HUM BALANCE CONTROL

### RECOMMENDED EQUIPMENT

Hewlett-Packard 606-A Signal Generator

Dumont 401-A Oscilloscope

PROCEDURE - Remove the input cable to the second IF amplifier and connect the signal generator to this cable. Connect the oscilloscope to the FM VIDEO OUTPUT. Set the generator output frequency to 10 mc and set the output level as required to quiet the video output to the point where noise does not mask the hum.

Adjust HUM BALANCE control for a minimum amount of hum output (this control balances the hum generated in the 6DN6 discriminator).

## ADJUSTMENT OF SIGNAL LEVEL METER

### RECOMMENDED EQUIPMENT

Boonton 202-F Signal Generator

GENERAL INSTRUCTIONS - The signal level meter should normally be set up using a power line voltage of 115 volts. Separate adjustments are provided for each second IF sub-chassis and these are located on the sub-chassis.

Install the second IF amplifier to be adjusted. Connect the signal generator to the ANTENNA INPUT (J-101). Set the generator frequency to 238 mc. Set the Local Oscillator switch to VFO and tune in the signal.

### ADJUSTMENT ON IF STRIP

1. Set the attenuator on the signal generator to 2 uv. Adjust R-337 (or R-437, R-537 as required) for a reading of 2 uv on the signal level meter.

2. Set the attenuator on the signal generator to 10K uv. Adjust R-332 for a full-scale reading on the signal level meter, (or R-432, R-532).

3. Repeat steps 1 and 2 above until the signal level meter reads correctly at both points.

## ADJUSTMENT OF DEVIATION METER

### RECOMMENDED EQUIPMENT

Boonton 202-F Signal Generator

Hewlett-Packard 200-CD Audio Oscillator

Hewlett-Packard 400-D Vacuum Tube Voltmeter

GENERAL INSTRUCTIONS - The frequency response of the deviation meter amplifier is set by C-1005 and the calibration is set by R-1012, DEV. METER ADJ. The deviation meter calibration should be checked periodically while the frequency response requires only an occasional check.

Check the zero on the deviation meter by observing the position of the pointer when the receiver has been turned off long enough for the tubes to cool.

ADJUSTMENT OF R-1012 - Connect the signal generator to the antenna input. Set the generator frequency to 238 mc and its output to 5000 uv. Set the Local Oscillator switch to VFO and tune in the signal.

Observe the incidental meter reading with no modulation. The meter indication should be no more than the equivalent of 500 cycles deviation greater than the zero indication as checked above. If there is an excessively high meter indication, this condition should be corrected.

Set the Deviation Range switch to the 150 kc range. Set the generator modulation for 125 kc deviation at 1000 cycles. Adjust R-1012 for a deviation meter reading of 125 kc.

ADJUSTMENT OF C-1005 - Disconnect the coaxial cable from the input to the DEVIATION METER, J-1001. Set the DEVIATION RANGE switch to the 150 kc range. Connect the audio oscillator through a suitable connector to J-1001. Connect the voltmeter to this same point.

Set the oscillator frequency to 1000 cps and adjust its output for a convenient indication on the deviation meter. Note the voltmeter reading.

Set the oscillator frequency to 200 kc and adjust its output for the same voltmeter reading as above. Adjust C-1005 to produce the same deviation meter reading as above.

Remove the voltmeter and oscillator connections. Replace the cable to the module.

Note: After C-1005 has been adjusted, recheck the calibration of the deviation meter.

## ADJUSTMENT OF TUNING METER

### RECOMMENDED EQUIPMENT

Boonton Univerter

Vacuum Tube Voltmeter

### GENERAL INSTRUCTIONS

Alignment of the Tuning Meter Circuitry in the HGI-A for "zero" center coincidence with centered carrier can be uniquely accurate. The HGI-A has a self contained absolute center frequency reference which is activated as the meter drive when the DEVIATION RANGE switch is in the "narrow" or 25 kc position.

In this switch position, the meter receives its "tuning reference" signal from a "crystal discriminator", the output of which is "zero" at coincidence with 10 megacycles. Assuming alignment of the 2nd L. O., this is indicative of a centered carrier.

In the event it is suspected that the 2nd L. O. is improperly aligned, 10 mc may be fed directly to the 2nd I. F. via the I. F. input coax cable at a sufficient level to "quiet", and the alignment procedure may be performed without being adversely affected by a malaligned 2nd. L. O.

NOTE: It should be stated that alignment of the tuning meter circuitry can only be accomplished when the module is installed in a subject receiver.

### ADJUSTMENT PROCEDURE

1. Connect the output of the Boonton Univerter, tuned for 10 mc at a level of 300K micro-volts, to the input of the 2nd I. F. Amplifier. Set the DEVIATION RANGE switch to 25 kc.

2. With a DC VTVM monitor, the DC voltage at J-1003 or pin 2 of V-1003) and at the center frequency of 10 mc this should read "zero" volts. Adjust R-1026 until "zero" volts is indicated at pin 7 of V-1003. The Tuning Meter should read "zero". In the event the meter does not read "zero", adjust R-1017 until meter reads "zero". Lock these adjustments.

3. Switch the DEVIATION RANGE switch to 75 kc position and adjust R-1027 for a zero center indication.

4. Switch the DEVIATION RANGE switch to the 150 kc and adjust R-1028 for a zero center indication.

5. Switch the DEVIATION RANGE switch to the 250 kc position and adjust R-1029 until meter reads "zero". Lock all adjustments.

6. Rotate the DEVIATION RANGE switch through each position and observe that the tuning meter reads zero on all positions.

NOTE: If it is desirable to align or realign the tuning meter circuitry with a RF included in the system, the above procedure is still proper with the exception, that a Boonton Signal Generator should be fed into the antenna input and its frequency adjusted appropriately and the level adjusted for at least 20 db "quieting".

## ADJUSTMENT OF OUTPUT LEVEL METER

### RECOMMENDED EQUIPMENT

Boonton 202-F Signal Generator

GENERAL INSTRUCTIONS - The OUTPUT LEVEL Meter is generally for reference only and should be adjusted for a level convenient to the operator.

PROCEDURE - With the IIGI-A receiver operating normally, connect the Boonton 202-F Signal Generator to the ANT. INPUT of the receiver. Set the output of the Signal Generator for 1K uv and adjust its frequency to that for which the receiver is tuned. Carefully peak both MAIN TUNING and VERNIER Tuning.

Use 1000 cps modulation and FM deviation of 150 kc. Set DEVIATION RANGE switch to 150 kc. Set SIGNAL LEVEL/OUTPUT switch in OUTPUT position. Make sure FM VIDEO GAIN control is at maximum. Adjust OUTPUT METER ADJ for 0 db on the dial.

## ALIGNMENT PROCEDURE FOR PRE-DETECTION RECORD/PLAYBACK UNIT

NOTE: This alignment procedure describes the set-up for the 10 mc - 600 kc pre-detection RECORD/PLAYBACK unit. Alignment of the 10 mc - 5 mc PLAYBACK unit is made in the same manner except that 5 mc is substituted for 600 kc. In addition, the 10 mc - 5 mc unit does not provide a record feature.

### RECOMMENDED EQUIPMENT

Jerrold Model 602 Sweep Generator or Equivalent

Tektronix 545 with High gain preamplifier and probe

Hewlett-Packard 808-D or Equivalent

A Test Receiver GEL Model 1101-A

Boonton 202-E with Univerter 207-E or Equivalent

HP-650-A Wide Band Oscillator

HP-410-B Vacumm Tube Voltmeter

### ALIGNMENT

1. Connect the input cable of T-1101 to it's IF Output (Note: The capacity of this cable forms a part of the tuned input circuit of T-1101).

2. Connect a sweep generator to the receiver adjusted to sweep its bandwidth.

3. Disable the crystal oscillator by removing its crystal.

4. Connect the oscilloscope probe to the detected side of either of the mixing Diodes (CR-1101 or CR-1102).

5. Tune T-1101 and T-1102 (Top and Bottom) for a symmetrical response centered at 10.0 mc with a 500 kc bandwidth.

6. Compare the amplitudes of the detected responses from each of the mixer diodes. If the amplitudes are not equal, readjust T2, Top and Bottom,

to acquire a more favorable balance (i. e.; decrease the inductance of T-1102, Top, and increase the inductance of T-1102, Bottom, or vice-versa), the objective being equal output responses of the mixer diodes.

7. Replace the crystal.

8. Connect the HP-410B, vacumm tube voltmeter, to the junction of C-1104 (4-30 uuf trimmer) and C-1107 (4.3 uuf).

9. Adjust C-1112 (JFD piston) for maximum output - approximately 1.5 vrms.

10. Connect the Boonton 202E and univerter adjusted for maximum RF output at 890 kc, 1 kc, FM Modulation Rate, and 100 kc Deviation to J-1102 PLAYBACK.

11. Make the necessary switching to insure that the test receiver is acting to demodulate the Boonton FM Signal.

12. Observing the FM Video output from the test receiver adjust C-1104 (4-30 trimmer) and C-1105 (4-30 trimmer) in conjunction with L-1101 and L-1102 for best undistorted signal to noise ratio.

13. Connect a 220 ohm resistor to J-1103 RECORD output.

14. Make the necessary switching to insure that the test receiver is acting to supply the PRE-DETECTION RECORDER with its 10 mc IF output.

15. Using the HP-608D, tune the test receiver to a 1 mv, 30% AM signal.

16. Connect an oscilloscope across the 220 ohm resistor at J-1103 RECORD output. Observe a 30% AM signal with a 1 mc carrier. The amplitudes of this signal is determined by the Test Receiver's AGC characteristics (minimum 200 mv).

17. Adjust L-1103 for best signal to noise ratio.

## FACTORY ALIGNMENT PROCEDURE FOR MULTI-BANDWIDTH LIMITER DISCRIMINATOR

### RECOMMENDED EQUIPMENT

Boonton 202-F Signal Generator

Boonton 207-F Univerter

Hewlett-Packard 415-B Standing Wave Indicator (used as a 1000 cps tuned amplifier)

Hewlett-Packard 524-B Electronic Counter with 525-A Frequency Converter

Hewlett-Packard 410-B VTVM

RCA WR-59C Sweep Generator

Dumont 401-A Oscilloscope

Fluke 803 Differential Voltmeter

A auxiliary-tuned amplifier with approximately 30 db gain having an essentially flat response from 8.5 mc to 11.5 mc when connected to the limiter input cable W-601. The amplifier output should have a low resistance dc return to ground.

ALIGNMENT OF INPUT AMPLIFIER - Connect the auxiliary-tuned amplifier to the limiter input cable W-601. Connect the sweep generator to the auxiliary amplifier. Connect the oscilloscope to the feed-thru capacitory C-652.

Adjust the sweep generator for a sweep width of approximately 4 mc centered at 10 mc. Set the sweep generator output to maximum. Adjust the tuning cores in L-605 and L-606 to produce a response curve that is flat within 2 db from 9 to 11 mc. The response is that of an overcoupled, double-tuned circuit.

ALIGNMENT OF CRYSTAL DISCRIMINATOR - With the input limiter section aligned, a single adjustment is all that is required to align the crystal discriminator section.

Amplify the Univerter output with the auxiliary amplifier and apply this signal to J-601. Connect the 410B VTVM to the output feed-thru capacitor C-660. Set the Univerter frequency to 10.040 mc and adjust L-603 for a maximum DC voltage indication on the VTVM. This should be about 1.5V DC.

ALIGNMENT OF MULTI-BANDWIDTH DISCRIMINATOR - Adjust the sweep generator to about 450 kc bandwidth and setup as described under the input amplifier procedure. Connect the oscilloscope to the output feed-thru capacitor C-657. Rotate the bandwidth switch to the 20 kc position which places trimpot R-651 in the diode biasing circuit and energizes relay K-601 for narrow band operation. Rotate R-651 to the maximum counter-clockwise position and tune L-607 to about 9.8 mc and L-608 to 10.2 mc. The oscilloscope presentation should show this as two similarly peaked responses, one positive going and the other negative going from a reference voltage of about +12V DC. These two respones should be adjusted until their slopes and amplitudes are nearly identical. If they differ greatly in size, check tube matching by interchanging V-603 and V-604. If this causes more than a 20% change in relative amplitudes then tubes should be selected which are more nearly matched. To further equalize the two curves add triming capacitance C-605 or C-651 to increase the response of the smaller peak. The Q factor of the two curves may then be adjusted by means of C-629 on the low side and C-631 on the high frequency side. To increase the circuit Q rotate the adjustment screw of either C-629 or C-631 in a clockwide direction.

Next, adjust R-651 bias control fully clockwise and reduce the bandwidth between response peaks to about 340 kc by means of L-607 and L-608. With this accomplished, readjust the bias, Q, C-605 and/or C-651, as required to give a symmetrical and visually linear presentation on the oscilloscope. Linearity may then be evaluated by scanning the discriminator's range from 9.930 mc to 10.070 mc with the Boonton Inverter set for 1 kc FM modulation and with a center frequency swing of ± 1 kc. A slope plot may then be made using the 415B to indicate the detected output at J-603. If the slope plot indication is satisfactory, plot a point by point discriminator response curve using the 803 differential voltmeter to measure the DC static response at C-657. All data points on this curve should lie along a straight line within a tolerance of ± 1% of the maximum output signal for the band. After adjusting the discriminator circuit adjust the tuning meter for electrical zero by using a 10 mc CW reference frequency which produces a zero DC voltage level at the crystal discriminator output, C-660.

With the narrow band alignment completed, switch the bandwidth control to the 350 kc position for the alignment of L-609, L-610, C-634, C-636 and R-654. Relays K-602 and K-604 should energize to accomplish the required switching action of coils and capacitors. Using the methods outlined for the narrow band, align the 350 kc discriminator band for 1% linearity from 9.825 to 10.175 mc. Adjust the tuning meter to zero on this band as in the narrow band.

Complete the discriminator alignment by switching the bandwidth control to the 1.68 mc position for the alignment of L-611, L-612, C-639, C-640 and R-657. These elements are tuned in a manner similar to that employed in aligning the 70 kc and 350 kc bandwidth discriminators. The 1% linear range is to be adjusted to extend a minimum bandwidth of 1.68 mc from 9.16 to 11.68 mc.

To complete the procedure, adjust the tuning meter electrical zero on this band to read zero with a 10 mc reference frequency. This is the frequency which causes the tuning meter to read zero with the video bandwidth switch in the crystal discriminator position.

APPENDIX (A)

## NOISE FIGURE MEASUREMENT - TYPE 11G1-A RECEIVER

### EQUIPMENT REQUIRED

Hewlett-Packard 608D Signal Generator or Equivalent

PRD type 904 Noise Generator or Equivalent

DC VTVM

Bias battery (Figure 7)

3-ft. cable - RG-58A/U cable with UG-709A/U connector on one end and UG-536A/U connector on the other end.

Clip lead

### DETECTOR CALIBRATION

Connect the VTVM to C-101. Connect the bias battery between C-342 (for the 300 kc bandwidth second IF strip) and ground. Connect the signal generator. Set the LOCAL OSC switch to VFO and tune the receiver to the desired frequency.

Adjust the bias battery for maximum (approximately) bias. Set the generator to the required frequency and set its output level for a 2.0 volt reading on the VTVM. Reduce the generator output to zero and observe that the VTVM indication drops to nearly zero. There will be a small indication due to contact potential of the detector diode. Set the generator output for 2.0 volt reading on the VTVM. Increase the generator output by 3 db and note the VTVM reading.

### NOISE FIGURE MEASUREMENT

Connect the noise generator. With the noise generator output reduced to zero, adjust the bias as required, to produce a reading of 2.0 volts on the VTVM. Increase the output of the noise generator for the same VTVM as noted above and read the noise figure.

## IMAGE REJECTION MEASUREMENT - TYPE 11G1-A RECEIVER

### EQUIPMENT REQUIRED

Hewlett-Packard 608D or equivalent

DC VTVM

Bias battery (Figure 7)

### PROCEDURE

Connect the bias battery between C-342 (for the 300 kc bandwidth second IF amplifier) and ground. Connect the VTVM to C-101. C-342 is located on the second IF subassembly. C-101 is located on the main chassis near V-106.

Tune the receiver to the desired signal frequency. Connect the signal generator to the receiver through a suitable cable and tune it to the desired signal frequency. Set the signal generator output to -90 dbm (approximately 7 uv). Adjust the bias for a 5-volt reading on the VTVM.

Set the signal generator to the image frequency and increase its output as required to produce a 5-volt reading on the VTVM. Note the generator output in dbm and calculate the image rejection.

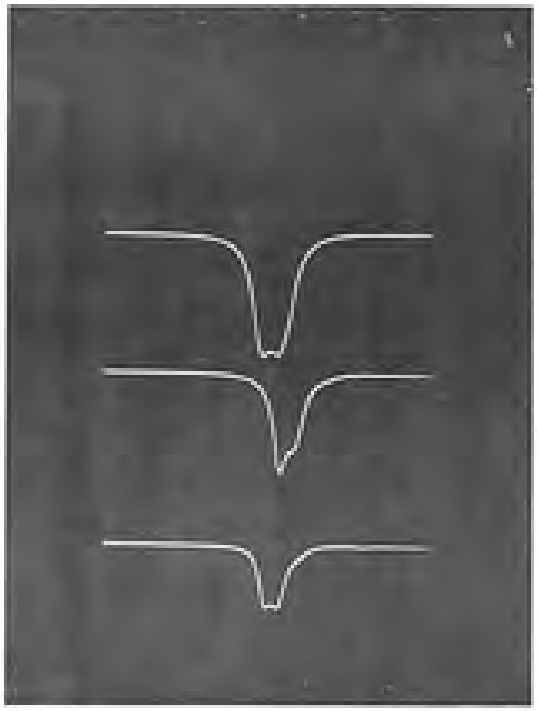


Figure 12 - RF Bandwidth at Test Point C224 on RF Head with Swept RF Input of 5 MC

| | |
|---|---|
| Upper trace | Fi = 260 mc |
| Middle trace | Fi = 230 mc |
| Lower trace | Fi = 215 mc |

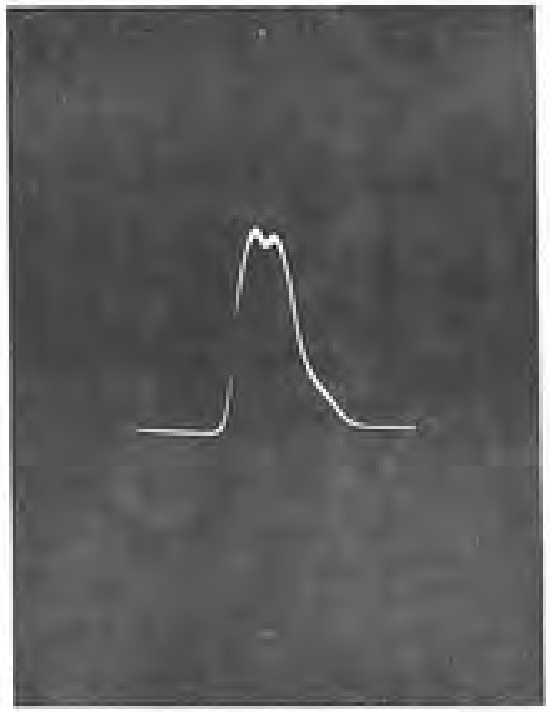


Figure 13 - Typical 300 KC IF Output with Swept 10 MC Input

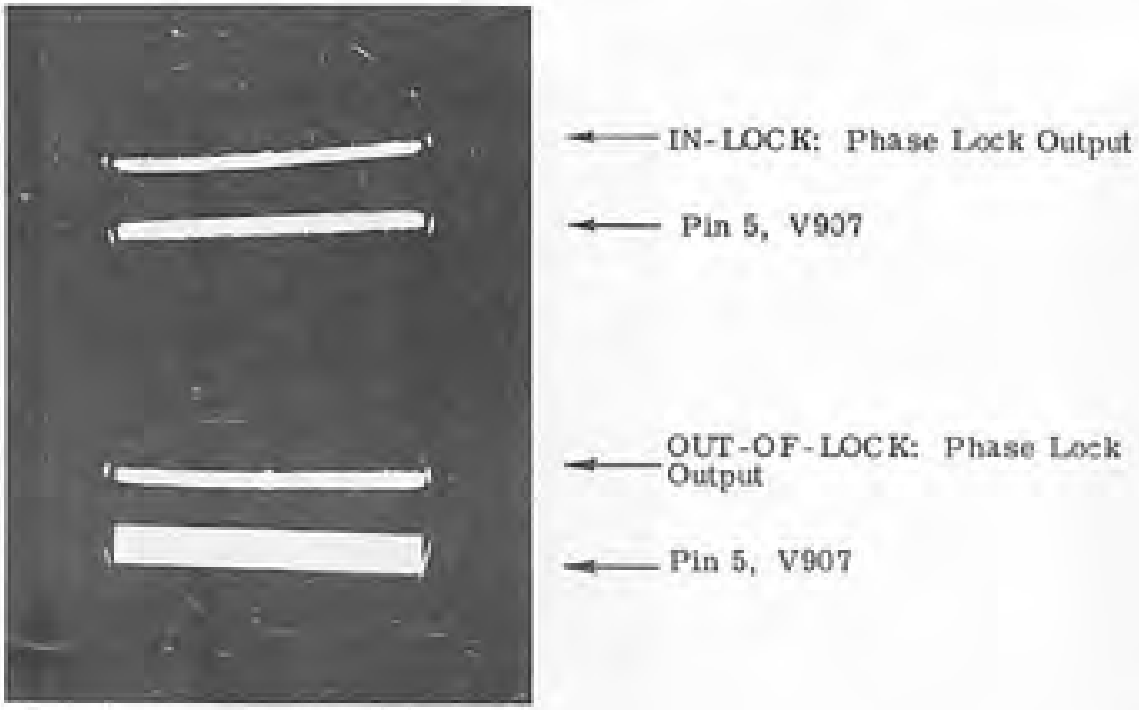



Figure 14 - Continuous wave Input to Phase Lock (2 volts peak-to-peak in)

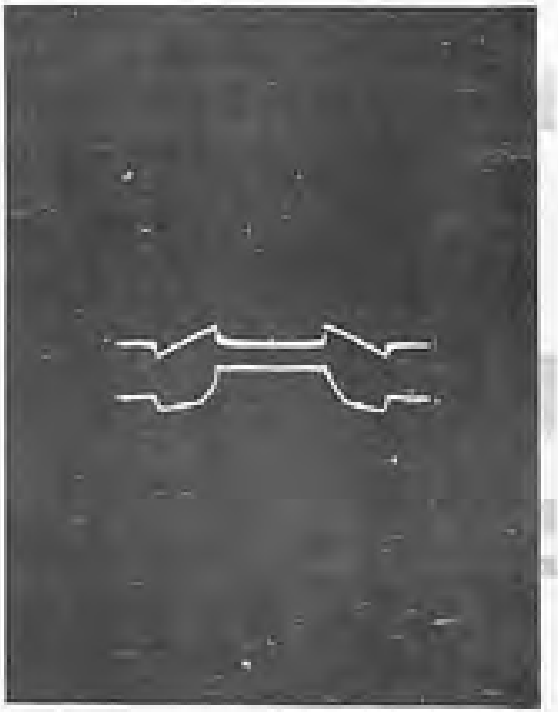


Figure 15 - Swept Input
Upper trace: Phase Lock Output
Lower trace: Junction of CR901 and R940

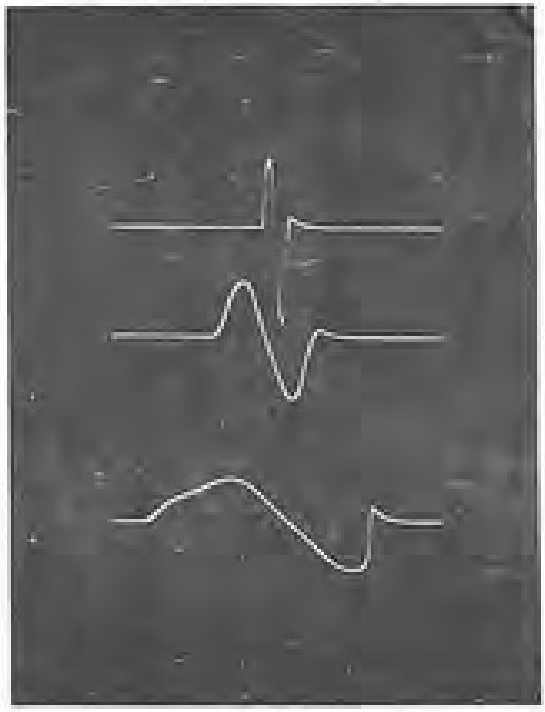


Figure 16 - Discriminator Output with Boonton Swept through Antenna Input

Upper trace - 25 KC BW
Middle trace - 150 KC BW (75 KC)
Lower trace - 250 KC BW

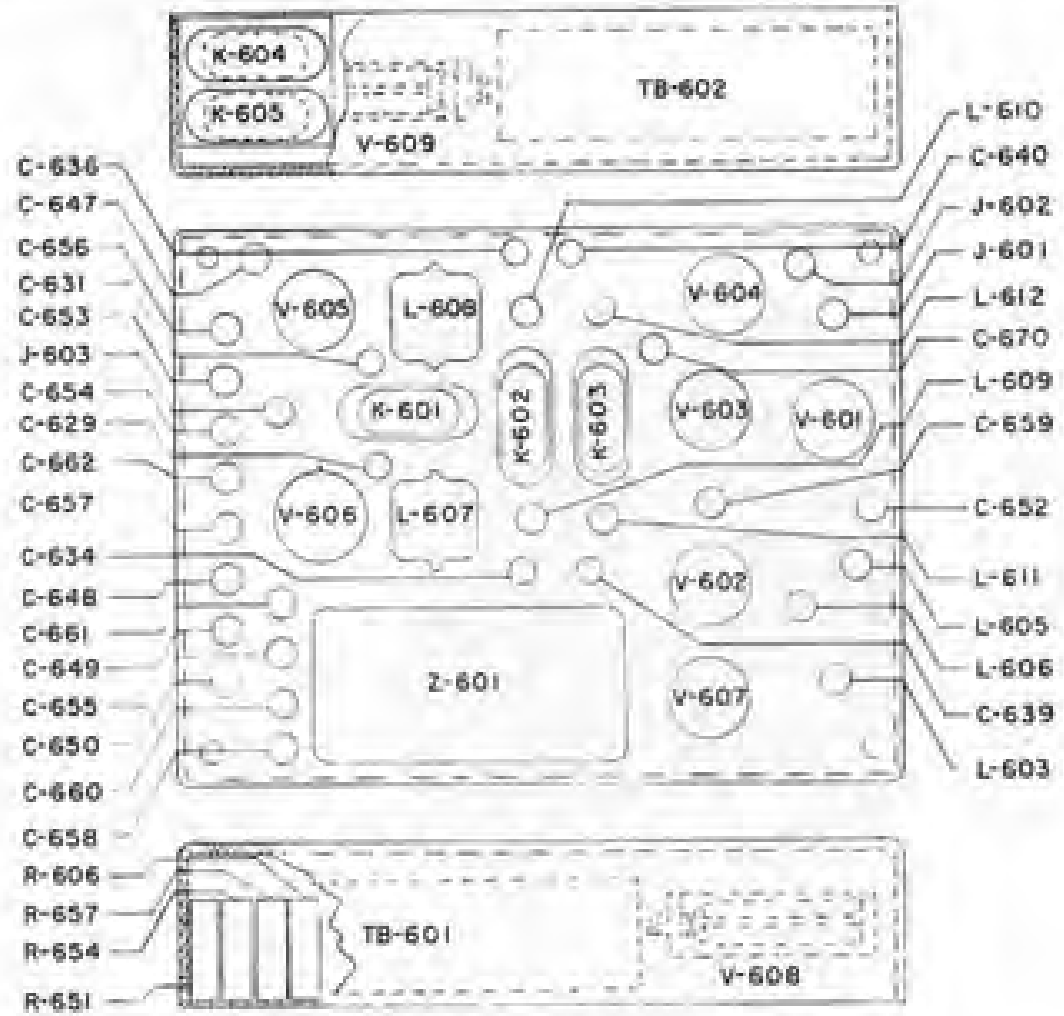



FIGURE 17 LIMITER DISCRIMINATOR

## GAINS AND LIMITS

### TUNING RANGE - VFO OPERATION

The following limits apply under the following conditions, using an electronic counter connected to the output of the VFO oscillator at test point, TP-203.

| Receiver in Operation at | (1) VFO Frequency of Operation | Limit ((1) - counter reading) |
|---|---|---|
| 215 mc | 61.25 mc | ± 50 kc maximum |
| 235 mc | 65.25 mc | ± 50 kc maximum |
| 259 mc | 72.3 mc | ± 50 kc maximum |

### LOCAL OSCILLATOR OPERATION

Changes in the local oscillator with changes in the vernier control setting are as follows:

1) 2nd Local Oscillator at + 150 kc Limit: 150 kc ±20%.

2) 2nd Local Oscillator at - 150 kc Limit: 150 kc ±20%.

### LOCAL OSCILLATOR RADIATION

Limit of 100 microvolts maximum measured at the antenna input, J101, at the frequency of the 1st Local Oscillator.

### OVER-ALL FM HARMONIC DISTORTION

The following limits apply with the DEVIATION RANGE switch in the following position utilizing a 1.0 mc IF amplifier.

| Position | Deviation at 3 kc rate | Limit (470 ohm load) | Output Limit |
|---|---|---|---|
| 25 kc | 17 kc | 40 db minimum | 2.4 vac rms minimum |
| 75 kc | 50 kc | 40 db minimum | 2.3 vac rms minimum |

| Position | Deviation at 5 kc rate | Limit (470 ohm load) | Output Limit |
|---|---|---|---|
| 150 kc | 105 kc | 40 db minimum | 2.5 vac rms minimum |
| 250 kc | 175 kc | 40 db minimum | 2.5 vac rms minimum |

OVER-ALL PHASE-LOCK HARMONIC DISTORTION

The following limits apply with the DEVIATION RANGE switch in the following positions utilizing a 500 kc IF amplifier:

| Position | Deviation at 5 kc rate | Limit (470 ohm load) |
|---|---|---|
| 50 kc | 125 kc | 40 db minimum |
| 100 kc | 125 kc | 40 db minimum |
| 230 kc | 200 kc | 34 db minimum |
| WIDE | 200 kc | 34 db minimum |

IF OUTPUTS (50 ohm load)

The following limits apply to the following outputs with a 100 uv antenna input.

Gain to FDU output Limit: 8 db minimum

Gain to IF (10 mcs) output Limit: 50 db minimum (taken with a 1.0 mc IF Amplifier installed).

INTERNAL PREDETECTION RECORDING & PLAYBACK
(500 kc IF Bandwidth, 250 kc Deviation Range, 300 kc Video Bandwidth)

The following limits apply with the following conditions:

600 kc output level into 91 ohm load with 1 mv input. Limit: 1.0 vac minimum

Input at 600 kc to achieve 10 db of quieting at FM output.

Limit: 200 mv maximum.

Input at 5 mc to achieve 10 db of quieting at FM output. Limit: 100 mv maximum.

MIXER INJECTION VOLTAGE

The mixer injection voltage at test point C-224 is approximately 1/2 - 2 vdc.

AFC IMPROVEMENT

The AFC improvement ratio is approximately 10:1.

GAIN OF VIDEO AMPLIFIER

The minimum gain of the video amplifier is 22db.

HUM AND RIPPLE

The maximum hum and ripple is 50 uv.

MAIN CHASSIS

| SYMBOL | DESCRIPTION |
|---|---|
| A-101 | RF Head (215-265 mc) GEL Dwg. No. R14-489 |
| A-102 | Predetection Record/Playback, 5 mc, GEL Dwg. No. R14-775 |
| A-103 | Predetection Record/Playback, 600 kc, GEL Dwg. No. R-14-775 |
| A-104 | IF Amplifier |
| A-105 | IF Amplifier |
| A-106 | Multiband Limiter Discriminator, GEL Dwg. No. R-14-767 |
| A-107 | Phase Lock Demodulator, GEL Dwg. No. R14-834 |
| A-108 | Metering Circuit, GEL Dwg. No. R14-557 |
| A-109 | FM Video Amplifier, GEL Dwg. No. R14-255 |
| AT-101 | Attenuator, Termination, 75 ohms, Integral Part of K-108 |
| AT-102 | Attenuator, Termination, 75 ohms, Integral Part of K-108 |
| B-101 | Blower, Fan Motor, Rotron Muffin, Fan Series F-1, GEL Part No. 18901 |
| B-102 | Same as B-101 |
| C-101 | Capacitor, Fixed Ceramic Disc, 47 uuf ± 10%, Erie HR-839-X5F, GEL Part No. 12081 |
| C-102 | Capacitor, Fixed Ceramic Feedthru, 47 uuf ± 20%, Erie GP1-327, GEL Part No. 12149 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-103 | Capacitor, Fixed Silvered Mica, 220 uuf ± 5%, CM15E221J, GEL Part No. 12522 |
| C-104 | Capacitor, Fixed Silvered Mica, 360 uuf ± 5%, CM15E361J, GEL Part No. 12503 |
| C-105 | Capacitor, Fixed Silvered Mica, 1100 uuf ± 5%, CM20E112J, GEL Part No. 12598 |
| C-106 | Capacitor, Fixed Silvered Mica, 2200 uuf ± 5%, CM20B222J, GEL Part No. 12526 |
| C-107 | Capacitor, Fixed Silvered Mica, 5600 uuf ± 5%, CM30E562J, GEL Part No. 12603 |
| C-108 | Capacitor, Fixed Ceramic Disc, .1 uf + 80%, - 20%, 50 VDCW, Sprague P10, GEL Part No. 12770 |
| C-109 | Capacitor, Fixed Ceramic Disc, .001 uf + 100% - 20%, CK61Y102Z, GEL Part No. 12070 |
| C-110 | Not Assigned |
| C-111 | Same as C-102 |
| C-112 | Capacitor, Fixed Paper, .22 uf, 200 VDCW, Aerovox P123ZGNP, GEL Part No. 12920 |
| C-113 | Capacitor, Fixed Electrolytic, 20 uf, 50 VDCW, Sprague Type TE-1305, GEL Part No. 12783 |
| C-114 | Capacitor, Fixed Paper, .47 uf, 200 VDCW, Aerovox P123ZNGP, GEL Part No. 12910 |
| C-115 | Capacitor, Fixed Paper, 1.0 uf, 200 VDCW, Aerovox P123ZGP, GEL Part No. 12926 |
| C-116 | Capacitor, Fixed Ceramic Disc, .0033 uf ± 20%, Erie IR5KV-332, GEL Part No. 12961 |
| C-117 | Same as C-116 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-118 | Same as C-115 |
| C-119 | Same as C-115 |
| C-120 | Capacitor, Fixed Electrolytic, 45-45 uf, 450 VDCW, CE52D450Q, GEL Part No. 12701 |
| C-121 | Capacitor, Fixed Electrolytic, 70-70 uf, 300 VDCW, CE52C700N, GEL Part No. 12702 |
| C-122 | Capacitor, Fixed Paper, .1 ufd, 400 VDCW, Aerovox P1232GP, GEL Part No. 12940 |
| C-123 | Capacitor, Fixed Electrolytic, 100 uf, 300 VDCW, Mallory PB 139, GEL Part No. 12908 |
| C-124 | Same as C-120 |
| C-125 | Same as C-122 |
| C-126 | Same as C-122 |
| CP-101 | Junction, Coaxial Tee, BNC, UG-274/U, GEL Part No. 17480 |
| CP-102 | Same as CP-101 |
| CR-101 | Diode, Germanium, IN270, GEL Part No. 14541 |
| CR-102 | Diode, Silicon, IN547, GEL Part No. 14526 |
| CR-103 | Same as CR-102 |
| CR-104 | Same as CR-102 |
| CR-105 | Same as CR-102 |
| CR-106 | Same as CR-102 |
| CR-107 | Same as CR-102 |
| CR-108 | Same as CR-102 |

| SYMBOL | DESCRIPTION |
|---|---|
| CR-109 | Same as CR-102 |
| CR-110 | Same as CR-102 |
| CR-111 | Same as CR-102 |
| CR-112 | Same as CR-102 |
| CR-113 | Same as CR-102 |
| CR-114 | Diode, Silicon Zener, 50 watt, 50M050Z5, GEL Part No. 14597 |
| CR-115 | Diode, Silicon Zener, 50 watt, 50M100ZR5, GEL Part No. 14578 |
| CR-116 | Diode, Silicon Zener, 50 watt, 50M120Z5, GEL Part No. 14595 |
| * | |
| DS-101 | Lamp, Pilot, GE #328, GEL Part No. 17802 |
| DS-102 | Indicator, Digital Readouts, In-line, IEEI Series 120000 with No. 328 lamps: Characters: 10 kc, 30 kc, 50 kc, 100 kc, 200 kc, 300 kc, 50 kc, 750 kc, 1.0 mc, 2.4 mc. Color projection: White: Screen; Standard V-line viewing, GEL Part No. 18523 |
| DS-103 | Same as DS-101 |
| DS-104 | Same as DS-101 |
| E-101 | Short, Coaxial, BNC CW-159/U, GEL Part No. 17504 |
| F-101 | Fuse, 3AG, 5 Amp Slo-Blo, GEL Part No. 17914 |
| F-102 | (Spare) Same as F-101 |
| FL-101 | Filter, Low Pass; 1.2 kc, 18 DB/Octave, Burnell #S-87350, GEL Dwg. No. C15-073 |

* See CR-117 to CR-119 on Page V-17

| SYMBOL | DESCRIPTION |
|---|---|
| J-101 | Connector, Bulkhead Jack, UG-704/U, Integral Part of W-101 |
| J-102 | Connector, Bulkhead Jack, UG-909/U, Integral Part of W-102 |
| J-103 | Connector, Receptacle, AN3102A-14S-5P, GEL Part No. 17500 |
| J-104 | Connector, Receptacle, BNC, UG-1094/U, GEL Part No. 17314 |
| J-105 | Same as J-104 |
| J-106 | Connector, Integral Part of K-106 |
| J-107 | Connector, Bulkhead Jack, UG-949/U, Integral Part of W-103 |
| J-108 | Connector, Bulkhead Jack, UG-910/U, Integral Part of W-125 |
| J-109 | Connector, Bulkhead Jack, UG-910/U, Integral Part of W-104 |
| J-110 | Connector, Male Motorbase, Rubber #7486-G, GEL Part No. 17325 |
| J-111 | Same as J-104 |
| J-112 | Connector, Phone Jack, Switchcraft C-12-A, GEL Part No. 17358 |
| J-113 | Connector, Receptacle, Winchester MRE-20S-G, GEL Part No. 17481 |
| J-114 | Same as J-113 |
| J-115 | Same as J-113 |
| J-116 | Connector, Receptacle, 24 contact, Amphenol 37-20240, GEL Part No. 17490 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-117 | Same as J-113 |
| J-118 | Same as J-113 |
| J-119 | Same as J-113 |
| J-120 | Same as J-113 |
| J-121 | Same as J-113 |
| J-122 | Connector, Integral part of K-108 |
| J-123 | Connector, Integral part of K-101 |
| J-124 | Connector, Integral part of K-101 |
| J-125 | Connector, Integral part of K-101 |
| J-126 | Connector, Integral part of K-103 |
| J-127 | Connector, Integral part of K-103 |
| J-128 | Connector, Integral part of K-103 |
| J-129 | Connector, Integral part of K-105 |
| J-130 | Connector, Integral part of K-105 |
| J-131 | Connector, Integral part of K-105 |
| J-132 | Connector, Integral part of K-107 |
| J-133 | Connector, Integral part of K-107 |
| J-134 | Connector, Integral part of K-107 |
| J-135 | Connector, Integral part of K-102 |
| J-136 | Connector, Integral part of K-102 |
| J-137 | Not Assigned |
| J-138 | Connector, Integral part of K-109 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-139 | Connector, Integral part of K-109 |
| J-140 | Connector, Integral part of K-109 |
| J-141 | Connector, Integral part of K-105 |
| J-142 | Connector, Integral part of K-1051 |
| J-143 | Connector, Integral part of K-105 |
| J-144 | Connector, Part of K-108 |
| J-145 | Connector, Part of K-102 |
| K-101 | Relay, Coaxial, SPDT, 28 VDC, FXR #317-010202-3 GEL Part No. 20511 |
| K-102 | Same as K-101 |
| K-103 | Same as K-101 |
| K-104 | Relay, Miniature, 4PDT, 28.5 VDC, GE #CR2701G12LA, GEL Part No. 20515 |
| K-105 | Same as K-101 |
| K-106 | Relay, Coaxial, SPDT, 28 VDC, FXR #318-010407-3, GEL Part No. 20516 |
| K-107 | Same as K-106 |
| K-108 | Relay, Coaxial SPDT, 28 VDC, FXR #317-011052-3, GEL Part No. 10317 |
| K-109 | Same as K-901 |
| L-101 | Inductor, Fixed RF Choke, 1.8 uh, per GEL Dwg. No. A10-373 |
| L-102 | Same as L-101 |
| L-103 | Inductor, Fixed Power Choke, 3 hy, 150 ma, per GEL Dwg. No. B12-393 |

| SYMBOL | DESCRIPTION |
|---|---|
| L-104 | Inductor, Fixed Power Choke, 1.5 hy, 225 ma, per GEL Dwg. No. B12-393 |
| LS-101 | Speaker, RCA 70373, GEL Part No. 18700 |
| M-101 | Meter, Deviation, 0-50 ua DC, Marion #111012, GEL Dwg. No. B10-417 |
| P-101 | Connector, Integral Part of W-101, BNC, UG-88/U |
| P-102 | Connector, Integral Part of W-102, BNC, UG-88/U |
| P-103 | Connector, Integral Part of W-103, IPC 83225 |
| P-104 | Connector, Integral Part of W-104, IPC 83225 |
| P-105 | Connector, Integral Part of W-105, IPC 83225 |
| P-106 | Connector, Integral Part of W-103, IPC 83225 |
| P-107 | Connector, Integral Part of W-105, BNC UG-250/U |
| P-108 | Connector, Integral Part of W-107, BNC UG-250/U |
| P-109 | Connector, Integral Part of W-107, BNC UG-250/U |
| P-110 | Connector, Integral Part of W-108, BNC UG-250/U |
| P-111 | Connector, Integral Part of W-108, IPC 83225 |
| P-112 | Connector, Integral Part of W-109, IPC 83225 |
| P-113 | Connector, Integral Part of W-109, BNC UG-250/U |

| SYMBOL | DESCRIPTION |
|---|---|
| P-114 | Connector, Integral Part of W-110, BNC UG-260/U |
| P-115 | Connector, Integral Part of W-110, IPC 86225 |
| P-116 | Connector, Integral Part of W-111, BNC UG-260/U |
| P-117 | Connector, Integral Part of W-111, IPC 86225 |
| P-118 | Connector, Integral Part of W-112, IPC 86225 |
| P-119 | Connector, Integral Part of W-112, BNC UG-260/U |
| P-120 | Connector, Integral Part of W-113, BNC UG-260/U |
| P-121 | Connector, Integral Part of W-113, BNC UG-260/U |
| P-122 | Connector, Integral Part of W-113, BNC UG-260/U |
| P-123 | Connector, Integral Part of W-114, IPC 86225 |
| P-124 | Connector, Integral Part of W-115, BNC UG-260/U |
| P-125 | Connector, Integral Part of W-115, IPC 86225 |
| P-126 | Connector, Integral Part of W-116, BNC UG-260/U |
| P-127 | Connector, Integral Part of W-116, BNC UG-260/U |
| P-128 | Connector, Integral Part of W-117, BNC UG-260/U |
| P-129 | Connector, Integral Part of W-117, BNC UG-260/U |
| P-130 | Connector, Integral Part of W-118, BNC UG-260/U |
| P-131 | Connector, Integral Part of W-118, BNC UG-260/U |
| P-132 | Connector, Integral Part of W-116, BNC UG-260/U |
| P-133 | Connector, Integral Part of W-119, IPC 45025 |
| P-134 | Connector, Integral Part of W-120, IPC 45025 |
| P-135 | Connector, Integral Part of W-120, IPC 86225 |

| SYMBOL | DESCRIPTION |
|---|---|
| P-136 | Connector, Integral Part of W-121, IPC 45025 |
| P-137 | Connector, Integral Part of W-122, BNC UG-260/U |
| P-138 | Connector, Integral Part of W-123, BNC UG-260/U |
| P-139 | Connector, Integral Part of W-124, BNC UG-260/U |
| P-140 | Connector, Integral Part of W-129, BNC UG-260/U |
| P-141 | Connector, Integral Part of W-130, BNC UG-260/U |
| P-142 | Connector, Integral Part of W-131, BNC UG-260/U |
| R-101 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, RC20GF104J, GEL Part No. 10430 |
| R-102 | Resistor, Fixed Composition, 7.5K ± 5%, 1/2W RC20GF752J, GEL Part No. 10415 |
| R-103 | Resistor, Fixed Composition, 1.8M ± 5%, 1/2W, RC20GF185J, GEL Part No. 10431 |
| R-104 | Same as R-101 |
| R-105 | Resistor, Fixed Composition, 22K ± 5%, 1/2W RC20GF223J, GEL Part No. 10427 |
| R-106 | Resistor, Fixed Composition, 18K ± 5%, 1W, RC30GF183J, GEL Part No. 11039 |
| R-107 | Same as R-105 |
| R-108 | Same as R-101 |
| R-109 | Same as R-105 |
| R-110 | Same as R-106 |
| R-111 | Same as R-105 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-112 | Resistor, Variable Carbon, 50K ± 20%, 1/4W, Bourns Model #215S, GEL Part No. 14074 |
| R-113 | Resistor, Same as R-112 |
| R-114 | Same as R-112 |
| R-115 | Same as R-112 |
| R-116 | Resistor, Fixed Composition, 10K ± 5%, 1/2W, RC20GF103J, GEL Part No. 10408 |
| R-117 | Same as R-103 |
| R-118 | Resistor, Fixed Composition, 3.9K ± 5%, 1/2W, RC20GF392J, GEL Part No. 10404 |
| R-119 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, RC20GF203J, GEL Part No. 10420 |
| R-120 | Resistor, Fixed Composition, 100 ohms ± 5%, 1/2W RC20GF101J, GEL Part No. 10447 |
| R-121 | Resistor, Variable Composition, 5K, 1/2W, Allen Bradley GA2NO56P502UA, GEL Part No. 14075 |
| R-122 | Resistor, Fixed Composition, 5.1K ± 5%, 1/2W, RC20GF512J, GEL Part No. 10415 |
| R-123 | Resistor, Fixed Composition, 1.5K ± 5%, 1/2W, RC20GF152J, GEL Part No. 10470 |
| R-124 | Resistor, Fixed Composition, 1.3K ± 5%, 1/2W, RC20GF132J, GEL Part No. 10469 |
| R-125 | Same as R-101 |
| R-126 | Resistor, Fixed Composition, 470 ohms ± 5%, 1/2W, RC20GF471J, GEL Part No. 10457 |
| R-127 | Resistor, Fixed Composition, 2K ± 5%, 1W, RC30GF202J, GEL Part No. 10410 |
| R-128 | Same as R-101 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-129 | Resistor, Fixed Composition, 510 ohms ± 5%, 2W, RC42GF511J, GEL Part No. 11500 |
| R-130 | Resistor, Variable Composition, 10K, 1/2W, GA2N050P103UA, GEL Part No. 14097 |
| R-131 | Resistor, Fixed Composition, 2.2K ± 5%, 1/2W, RC20GF222J, GEL Part No. 10411 |
| R-132 | Same as R-105 |
| R-133 | Resistor, Fixed Composition, 1.1 meg ± 5%, 1/2W, RC20GF115J, GEL Part No. 10464 |
| R-134 | Resistor, Fixed Composition, 560K ± 5%, 1/2W, RC20GF564J, GEL Part No. 10433 |
| R-135 | Same as R-120 |
| R-136 | Resistor, Fixed Composition, 10K ± 10%, 2W, RC42GF103K, GEL Part No. 11406 |
| R-137 | Resistor, Fixed Composition, 330 ohms ± 5%, 1/2W, RC20GF331J, GEL Part No. 10410 |
| R-138 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, RC20GF473J, GEL Part No. 10480 |
| R-139 | Resistor, Variable Composition, 100K, 1/2W, Allen Bradley GA2N050P104UA, GEL Part No. 10468 14097 |
| R-140 | Not Assigned |
| R-141 | Resistor, Fixed Composition, 470K ± 10%, 1/2W, RC20GF474K, GEL Part No. 10423 |
| R-142 | Resistor, Fixed Composition, 75K ± 10%, 1/2W, RC20GF753K, GEL Part No. 10552 |
| R-143 | Resistor, Variable Composition, 10K ± 20%, 1/2W, Ohmite AS3507, Linear Taper, GEL Part No. 14098 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-144 | Resistor, Fixed Wire Wound, 200 ohms ± 3%, 50W, Dale Products Co. RH-50, GEL Part No. 11381 |
| R-145 | Resistor, Wire Wound, 43 ohms ± 3%, 25W, Dale Products Co. RH-25, GEL Part No. 11509 |
| R-146 | Resistor, Fixed Wire Wound, 510 ohms ± 3%, 50W, Dale Products Co. RH-50, GEL Part No. 11578 |
| R-147 | Resistor, Fixed Wire Wound, 3 ohm ± 3% 5W, Sprague Koolohm 453E3R03, GEL Part No. 11574 |
| R-148 | Resistor, Fixed Composition, 200 ohms ± 2%, 25W, Dale Products Co. RH-25, GEL Part No. 11511 |
| R-149 | Resistor, Fixed Composition, 2.5K ± 2%, 25W, Dale Products Co. RH-25, GEL Part No. 11551 |
| R-150 | Resistor, Variable Composition, 500 ohms ± 20%, 1/2W, Linear Taper, Ohmite AB 3503, GEL Part No. 14007 |
| R-151 | Resistor, Variable Composition, 50K, 1/2W, Linear Taper, Ohmite AB3506, GEL Part No. 14050 |
| R-152 | Not Assigned |
| R-153 | Resistor, Fixed Wire Wound, 510 ohms ± 3%, 10W, Dale Products, RH10, GEL Part No. 11570 |
| R-154 | Resistor, Fixed Composition, 51K ± 5%, 1/2W, RC20GF513J, GEL Part No. 10461 |
| R-155 | Same as R-154 |
| R-156 | Same as R-138 |
| R-157 | Same as R-123 |
| R-158 | Same as R-123 |

| SYMBOL | DESCRIPTION |
|---|---|
| S-101 | Switch, Toggle, DPST, Smith #522, GEL Part No. 18004 |
| S-102 | Switch, Rotary, 6P2T Shorting Type, Centralab PS-118, GEL Part No. 18053, Modified per GEL Dwg. #B12-551-23 |
| S-103 | Switch, Rotary, 8P4T, Non-Shorting, Centralab PA-202T, GEL Part No. 18052 Modified per GEL Dwg. #B12-551-19 |
| S-104 | Switch, Rotary, 4P2T, Non-Shorting, Centralab, PS-113, GEL Part No. 18053 Modified per GEL Dwg. #B12-551-18 |
| S-105 | Switch, Rotary, 5P-12T Shorting Type, Centralab PA-2018, GEL Part No. 18051 Modified per GEL Dwg. #B12-551-20 |
| S-106 | Switch, Rotary, 4P3T, Non-Shorting, Centralab PA-2011, GEL Part No. 18010, per GEL Dwg. No. B12-551-21 |
| S-107 | Switch, Thermostat, SPST, GEL Dwg. No. B110188, GEL Part No. 18024 |
| S-108 | Switch, Toggle, 3PDT, Smith #521, GEL Dwg. No. 18001 |
| T-101 | Transformer, Audio Output, Chicago AMS-6 GEL Part No. 13252 |
| T-102 | Transformer, Power, per GEL D13-074, GEL Part No. 13024 |
| V-101 | Tube, Electron, 12AT7WA, GEL Part No. 14775 |
| V-102 | Same as V-101 |
| V-103 | Same as V-101 |
| V-104 | Tube, Electron, 5687, GEL Part No. 14844 |

| SYMBOL | DESCRIPTION |
|---|---|
| W-101 | Cable Assy, Coaxial RB-55 per GEL Dwg. No. C15-015-1 |
| W-102 | Cable Assy, Coaxial RG-55 per GEL Dwg. No. C15-015-2 |
| W-103 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-3 |
| W-104 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-26 |
| W-105 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-27 |
| W-106 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-6 |
| W-107 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C-15-015-7 |
| W-108 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-8 |
| W-109 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-9 |
| W-110 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-10 |
| W-111 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-11 |
| W-112 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-28 |
| W-113 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-13 |
| W-114 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-14 |
| W-115 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-15 |

| SYMBOL | DESCRIPTION |
|---|---|
| W-115 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-16 |
| W-117 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-17 |
| W-118 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-17 |
| W-119 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-19 |
| W-120 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-20 |
| W-121 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-21 |
| W-122 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-32 |
| W-123 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-23 |
| W-124 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-24 |
| W-125 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-25 |
| W-126 | Not Assigned |
| W-127 | Not Assigned |
| W-128 | Not Assigned |
| W-129 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-29 |
| W-130 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-30 |
| W-131 | Cable Assy, Coaxial RG-62 per GEL Dwg. No. C15-015-31 |

| SYMBOL | DESCRIPTION |
|---|---|
| CR-117 | Same as CR-102 |
| CR-118 | Same as CR-102 |
| CR-119 | Same as CR-102 |

ELECTRICAL PARTS LIST

RF HEAD (215-255 MC)

| SYMBOL | DESCRIPTION |
|---|---|
| C-201 | Capacitor, Fixed, Ceramic Tubular, 4.7 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12014 |
| C-202 | Capacitor, Fixed, Ceramic Tubular, 10 uuf ± 5%, Erie NPO-A, GEL Part No. 12021 |
| C-203 | Capacitor, Fixed, Ceramic Tubular, 24 uuf ± 5%, Erie NPO-A, GEL Part No. 12032 |
| C-204 | Same as C-203 |
| C-205 | Capacitor, Variable, Piston, 0.8-8.5 uuf, JFD-VC-20G, GEL Part No. 13305 |
| C-206 | Capacitor, Fixed, Ceramic Tubular, 5.8 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12018 |
| C-207 | Capacitor, Fixed, Ceramic Feed-thru, .001 uf ± 20%, Erie GP2-327, GEL Part No. 12057 |
| C-208 | Capacitor, Fixed, Ceramic Disc, 100 uuf ± 10%, Erie HR-839-X5T, GEL Part No. 12082 |
| C-209 | Capacitor, Fixed, Ceramic Feed-thru, .001 uuf ± 20%, Erie GP2-2443, GEL Part No. 12047 |
| C-210 | Same as C-208 |
| C-211 | Same as C-207 |
| C-212 | Same as C-208 |
| C-213 | Capacitor, Fixed, Ceramic Stand-off, .0015 uf ± 20%, Erie 326, GEL Part No. 12069 |
| C-214 | Same as C-203 |
| C-215 | Capacitor, Fixed, Ceramic Tubular, 18 uuf ± 5%, Erie NPO-A, GEL Part No. 13029 |
| C-216 | Capacitor, Variable, Piston, 0.8-4.5 uuf, JFD-VC-21G, GEL Part No. 13309 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-217 | Capacitor, Fixed, Ceramic Tubular, 1.0 uuf ± .1 uuf, Erie NPO-A, GEL Part No. 12089 |
| C-218 | Same as C-216 |
| C-219 | Capacitor, Fixed, Ceramic Tubular, 0.68 uuf ± .1 uuf, Erie NPO-A, GEL Part No. 12001 |
| C-220 | Same as C-216 |
| C-221 | Capacitor, Fixed, Ceramic Tubular, 8.2 uuf ± .5 uuf, Erie NPO-A, GEL Part No. 12020 |
| C-222 | Capacitor, Fixed, Ceramic Tubular, 0.51 uuf ± .1 uuf, Erie NPO-A, GEL Part No. 12000 |
| C-223 | Capacitor, Fixed, Ceramic Disc, .001 uuf +100% -20%, Erie CK61Y102Z, GEL Part No. 12070 |
| C-224 | Capacitor, Fixed, Ceramic Feed-thru, 47 uuf ± 20%, GP1-327, GEL Part No. 12140 |
| C-225 | Same as C-223 |
| C-226 | Capacitor, Fixed, Ceramic Tubular, 2.2 uuf ± .1 uuf, Erie NPO-A, GEL Part No. 12006 |
| C-227 | Same as C-205 |
| C-228 | Same as C-202 |
| C-229 | Capacitor, Fixed, Ceramic Tubular, 30 uuf ± 5%, Erie NPO-A, GEL Part No. 12031 |
| C-230 | Same as C-207 |
| C-231 | Same as C-223 |
| C-232 | Same as C-207 |
| C-233 | Capacitor, Fixed, Ceramic Tubular, 33 uuf ± 5%, Erie NPO-T, GEL Part No. 12035 |
| C-234 | Same as C-233 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-235 | Capacitor, Variable, Piston, 0.7-12 uuf, JFD-VC-22G, GEL Part No. 13307 |
| C-236 | Capacitor, Fixed, Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T, GEL Part No. 12040 |
| C-237 | Same as C-202 |
| C-238 | Capacitor, Fixed, Ceramic Tubular, 3.9 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12012 |
| C-239 | Same as C-213 |
| C-240 | Same as C-223 |
| C-241 | Same as C-236 |
| C-242 | Capacitor, Fixed, Ceramic Tubular, 39 uuf ± 5%, Erie NPO-T, GEL Part No. 12037 |
| C-243 | Same as C-239 |
| C-244 | Capacitor, Variable, Glass, .8-18 uuf, JFD-VC-23G, GEL Part No. 13314 |
| C-245 | Same as C-207 |
| C-246 | Same as C-236 |
| C-247 | Same as C-223 |
| C-248 | Same as C-213 |
| C-249 | Same as C-203 |
| C-250 | Same as C-201 |
| C-251 | Same as C-205 |
| C-252 | Same as C-203 |
| C-253 | Capacitor, Fixed, Ceramic Tubular, 15 uuf ± 5%, Erie NPO-A, GEL Part No. 12027 |
| C-254 | Same as C-205 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-255 | Same as C-213 |
| C-256 | Same as C-223 |
| C-257 | Same as C-223 |
| C-258 | Capacitor, Fixed, Ceramic Tubular, 3.6 uuf ± .1 uuf, Erie NPO-A, GEL Part No. 12011 |
| C-259 | Same as C-221 |
| C-260 | Capacitor, Fixed, Ceramic Tubular, 6.2 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12017 |
| C-261 | Same as C-207 |
| C-262 | Capacitor, Fixed, Silvered Mica, 470 uuf ± 5%, Elmenco CM15E471J, GEL Part No. 12524 |
| C-263 | Same as C-236 |
| C-264 | Same as C-235 |
| C-265 | Same as C-223 |
| C-266 | Capacitor, Fixed, Ceramic Disc, .001 uuf ± 10%, Erie HR-809-X5T, GEL Part No. 13087 |
| C-267 | Same as C-256 |
| C-268 | Same as C-207 |
| C-269 | Same as C-202 |
| C-270 | Capacitor, Fixed, Ceramic Tubular, 4.3 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12013 |
| C-271 | Capacitor, Fixed, Ceramic Tubular, 5.6 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12015 |
| C-272 | Capacitor, Fixed, Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A, GEL Part No. 12057 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-273 | Capacitor, Fixed, Ceramic Disc, .0047 uf +100% -20%, Erie CK52Y472Z, GEL Part No. 12050 |
| C-274 | Same as C-203 |
| C-275 | Same as C-224 |
| C-276 | Same as C-273 |
| C-277 | Same as C-273 |
| C-278 | Same as C-207 |
| C-279 | Same as C-233 |
| C-280 | Capacitor, Fixed, Ceramic Disc, .0015 uf +100% -20%, Erie CK51Y152Z, GEL Part No. 12053 |
| C-281 | Capacitor, Fixed, Ceramic Tubular, 27 uuf ± 5%, Erie NPO-T, GEL Part No. 12034 |
| C-282 | Same as C-280 |
| C-283 | Same as C-204 |
| C-284 | Same as C-207 |
| C-285 | Same as C-213 |
| C-286 | Same as C-207 |
| C-287 | Same as C-206 |
| C-288 | Same as C-207 |
| C-289 | Same as C-213 |
| C-290 | Same as C-280 |
| C-291 | Capacitor, Fixed, Ceramic Tubular, 4.70 uuf ± 10%, Erie GP4-301, GEL Part No. 12062 |
| C-292 | Same as C-236 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-293 | Capacitor, Fixed, Mica, 62 uuf ± 5%, Elmenco CM15E620J, GEL Part No. 12531 |
| C-294 | Capacitor, Fixed, Mica, 100 uuf ± 5%, Elmenco CM15E101J, GEL Part No. 12511 |
| C-295 | Same as C-265 |
| C-296 | Capacitor, Fixed, Ceramic Disc, .01 uf +100% - 20%, CK63Y103Z, GEL Part No. 12046 |
| C-297 | Same as C-273 |
| C-298 | Capacitor, Voltage Variable, PSI V27E, GEL Part No. 13331 |
| C-299 A&B | Capacitor, Printed, GEL Dwg. No. B-11-600 |
| C-2001 | Same as C-266 |
| C-2002 | Same as C-207 |
| C-2003 | Same as C-207 |
| C-2004 | Same as C-202 |
| C-2005 | Capacitor, Fixed, Ceramic Tubular, 10 uuf ± 5%, Erie N1500P3, GEL Part No. 12172 |
| C-2006 | Capacitor, Fixed, Tantalum, 2 uf, 150V DC, Sprague #110D205X0150G1, GEL Part No. 13136 |
| C-2007 | Same as C-2006 |
| C-2008 | Same as C-207 |
| C-2009 | Capacitor, Fixed, Paper, .47 uf, 200 VDCW, Aerovox P123ZNGP, GEL Part No. 12911 |
| C-2010 | Same as C-296 |
| C-2011 | Same as C-296 |
| C-2012 | Same as C-295 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-201 | Receptacle, Coaxial, BNC, UG-1094/U, GEL Part No. 17314 |
| J-202 | Same as J-201 |
| J-203 | Same as J-201 |
| J-204 | Same as J-201 |
| J-205 | Receptacle, UG-1098/U |
| L-201 | Inductor, Fixed, #1.8 Copper Wire, GEL Part Dwg. No. A-15-255 |
| L-202 | Inductor, Adjustable, GEL Part Dwg. No. A-10-786 |
| L-203 | Inductor, Fixed, 1.1 uh, GEL Part Dwg. No. A10-779 |
| L-204 | Inductor, Fixed, GEL Part Dwg. No. A-10-780 |
| L-205 | Inductor, Fixed, 0.64 uh, GEL Part Dwg. No. A-10-781 |
| L-206 | Same as L-203 |
| L-207 | Inductor, Adjustable, GEL Part Dwg. No. A-10-787 |
| L-208 | Inductor, Fixed, GEL Part Dwg. No. A-10-782 |
| L-209 | Same as L-207 |
| L-210 | Same as L-208 |
| L-211 | Same as L-205 |
| L-212 | Inductor, Fixed, 11.5 uh, GEL Dwg. No. A-10-153 |
| L-213 | Inductor, Adjustable, GEL Part Dwg. No. A-10-788 |
| L-214 | Inductor, Fixed, GEL Part Dwg. No. A-10-783 |
| L-215 | Inductor, Fixed, 10.5 uh, GEL Part Dwg. No. A-10-784 |
| L-216 | Inductor, Fixed, 3.7 uh, GEL Part Dwg. No. A-10-785 |
| L-217 | Inductor, Adjustable, GEL Part Dwg. No. A-10-789 |

| SYMBOL | DESCRIPTION |
|---|---|
| L-218 | Same as L-214 |
| L-219 | Same as L-203 |
| L-220 | Same as L-217 |
| L-221 | Same as L-214 |
| L-222 | Same as L-205 |
| L-223 | Same as L-201 |
| L-224 | Same as L-202 |
| L-225 | Inductor, Fixed, 2.7 uh, GEL Part Dwg. No. B-10-103, GEL Part No. 17001 |
| L-226 | Integral Part of T-201A |
| L-227 | Integral Part of T-201B |
| L-228 | Integral Part of T-202A |
| L-229 | Integral Part of T-202B |
| L-230 | Same as L-225 |
| L-231 | Same as L-225 |
| L-232 | Same as L-225 |
| L-233 | Inductor, Fixed, 1.8 uh, GEL Part Dwg. No. A-10-374 |
| L-234 | Inductor, Variable, GEL Part Dwg. No. A-11-308 |
| L-235 | Inductor, Variable, Mallory Inductuner, GEL Part Dwg. No. B-10-756-1, GEL Part No. 49011 |
| L-236 | Inductor, Variable, Mallory Inductuner, GEL Part Dwg. No. B-10-756-2, GEL Part No. 49012 |
| L-237 | Inductor, Corning #5811173, 1.20 uh, GEL Part No. 17045 |

| SYMBOL | DESCRIPTION |
|---|---|
| L-238 | Same as L-225 |
| L-239 | Same as L-225 |
| L-240 | Inductor, 16 uh, GEL Dwg. No. B-14-896 |
| M-201 | Meter, Signal Level/Output, GEL Dwg. No. B-13-108 |
| M-202 | Meter, Tuning, GEL Dwg. No. B-10-420 |
| P-201 | Not Assigned |
| P-202 | Plug, Integral Part of W-202 |
| P-203 | Plug, Integral Part of W-202 |
| P-204 | Not Assigned |
| P-205 | Plug, 20 Pin, Winchester Type MRE-20P-G plus Hood MRE-20H, GEL Part No. 17432 |
| R-201 | Resistor, Fixed, Composition, 220K ± 10%, 1/2W, Allen Bradley EB-2241, GEL Part No. 10438 |
| R-202 | Same as R-201 |
| R-203 | Resistor, Fixed, Composition, 220 Ω ± 5%, 1/2W, Allen Bradley EB-2215, GEL Part No. 10454 |
| R-204 | Resistor, Fixed, Composition, 910 Ω ± 5%, 2W, Allen Bradley HB-9115, GEL Part No. 11493 |
| R-205 | Resistor, Fixed, Composition, 10 Ω ± 10%, 1/2W, Allen Bradley EB-1001, GEL Part No. 10497 |
| R-206 | Resistor, Fixed, Composition, 58 Ω ± 5%, 1/2W, Allen Bradley EB-5805, GEL Part No. 10444 |
| R-207 | Resistor, Fixed, Composition, 100 Ω ± 10%, 1/2W, Allen Bradley EB-1011, GEL Part No. 10448 |
| R-208 | Resistor, Fixed, Composition, 470K ± 10%, 1/2W, Allen Bradley EB-4341, GEL Part No. 10426 |
| R-209 | Same as R-208 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-210 | Resistor, Fixed, Composition, 120K ± 5%, 1/2W, Allen Bradley EB-1245, GEL Part No. 10431 |
| R-211 | Resistor, Fixed, Composition, 22K ± 5%, 1/2W, Allen Bradley EB-2235, GEL Part No. 10427 |
| R-212 | Resistor, Fixed, Composition, 1 meg ± 10%, 1/2W, Allen Bradley EB-1051, GEL Part No. 10525 |
| R-213 | Resistor, Fixed, Composition, 13K ± 5%, 1/2W, Allen Bradley EB-1335, GEL Part No. 10409 |
| R-214 | Resistor, Fixed, Composition, 10K ± 5%, 1/2W, Allen Bradley EB-1035, GEL Part No. 10408 |
| R-215 | Same as R-212 |
| R-216 | Same as R-213 |
| R-217 | Same as R-212 |
| R-218 | Resistor, Fixed, Composition, 100K ± 5%, 1/2W, Allen Bradley EB-1045, GEL Part No. 10430 |
| R-219 | Resistor, Fixed, Composition, 20K ± 5%, 1/2W, Allen Bradley EB-2035, GEL Part No. 10420 |
| R-220 | Same as R-205 |
| R-221 | Same as R-212 |
| R-222 | Same as R-213 |
| R-223 | Resistor, Fixed, Composition, 18 meg ± 5%, 1/2W, Allen Bradley EB-1855, GEL Part No. 10456 |
| R-224 | Same as R-210 |
| R-225 | Resistor, Fixed, Composition, 1K ± 10%, 1/2W, Allen Bradley EB-1021, GEL Part No. 10400 |
| R-226 | Resistor, Fixed, Composition, 2.2K ± 5%, 1/2W, Allen Bradley EB-2225, GEL Part No. 10411 |
| R-227 | Same as R-210 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-228 | Resistor, Fixed, Composition, 51 Ω ± 5%, 1/2W, Allen Bradley EB-5105, GEL Part No. 10443 |
| R-229 | Resistor, Fixed, Composition, 120 Ω ± 5%, 1/2W, Allen Bradley EB-1215, GEL Part No. 10449 |
| R-230 | Resistor, Fixed, Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335, GEL Part No. 10549 |
| R-231 | Resistor, Fixed, Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535, GEL Part No. 10419 |
| R-232 | Same as R-225 |
| R-233 | Same as R-225 |
| R-234 | Same as R-201 |
| R-235 | Same as R-214 |
| R-236 | Resistor, Fixed, Composition, 7.5K ± 5%, 1/2W, Allen Bradley EB-7525, GEL Part No. 10416 |
| R-237 | Same as R-225 |
| R-238 | Same as R-214 |
| R-239 | Resistor, Fixed, Composition, 47K ± 5%, 1/2W, Allen Bradley EB-4735, GEL Part No. 10429 |
| R-240 | Resistor, Fixed, Composition, 56K ± 5%, 1W, Allen Bradley GB-5635, GEL Part No. 11425 |
| R-241 | Resistor, Fixed, Composition, 3.3K ± 10%, 1/2W, Allen Bradley EB-3321, GEL Part No. 10413 |
| R-242 | Resistor, Fixed, Composition, 3K ± 5%, 2W, Allen Bradley HB-3025, GEL Part No. 10403 |
| R-243 | Resistor, Fixed, Composition, 200 Ω ± 10%, 2W, Allen Bradley HB-2011, GEL Part No. 11427 |
| R-244 | Resistor, Fixed, Composition, 910K ± 5%, 1/2W, Allen Bradley EB-9145, GEL Part No. 10441 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-245 | Same as R-203 |
| R-246 | Resistor, Fixed, Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1031, GEL Part No. 10474 |
| R-247 | Not Assigned |
| R-248 | Resistor, Variable, 100K ± 20%, 1/4 Watt, Bourns 215S, GEL Part No. 14031 |
| R-249 | Same as R-248 |
| R-250 | Same as R-212 |
| R-251 | Same as R-212 |
| R-252 | Potentiometer, Variable, 500K ± 20%, CU 5041 Allen Bradley, GEL Part No. 14013, Modified per GEL Dwg. No. B-12-552-14 |
| R-253 | Same as R-248 |
| R-254 | Resistor, Fixed, Composition, 13K ± 5%, 1W, Allen Bradley GB-1335, GEL Part No. 10914 |
| R-255 | Resistor, Fixed, Composition, 2.0 meg ± 5%, 1/2W, Allen Bradley EB-2055, GEL Part No. 10455 |
| S-201 | Switch, Ceramic Wafer Modified per GEL Dwg. No. A-14-493 |
| S-202 | Switch, Toggle, DPDT H.H. Smith #523, GEL Part No. 18000 |
| S-203 | Same as S-202 |
| T-201A | IF Transformer, GEL Part Dwg. No. B-10-808 |
| T-201B | IF Transformer, GEL Part Dwg. No. B-10-809 |
| T-202A | IF Transformer, GEL Part Dwg. No. B-10-810 |
| T-202B | IF Transformer, GEL Part Dwg. No. B-10-811 |

| SYMBOL | DESCRIPTION |
|---|---|
| TP-201 | Feed-thru, Glass-in-metal seal, Hermetic Seal Corp. ESC-150-400-AA, GEL Part No. 14808 |
| TP-202 | Same as TP-201 |
| TP-203 | Same as TP-201 |
| TP-204 | Same as TP-201 |
| V-201 | Tube, Electron, Type 5843/417A, GEL Part No. 14804 |
| V-202 | Same as V-201 |
| V-203 | Tube, Electron, Type 5654/6AK5W, GEL Part No. 14758 |
| V-204 | Tube, Electron, Type 6AU8WA, GEL Part No. 14776 |
| V-205 | Tube, Electron, Type 6AL3, GEL Part No. 14778 |
| V-206 | Same as V-203 |
| V-207 | Same as V-203 |
| V-208 | Tube, Electron, Type 5749/12AT7W, GEL Part No. 14823 |
| V-209 | Tube, Electron, Type 5725, GEL Part No. 14759 |
| V-210 | Same as V-205 |
| W-201 | Not Assigned |
| W-202 | Cable Assy, GEL Dwg. No. C-13-090-12 |
| Y-201 | Crystal, CR-33/U |
| Z-201 | Coil Assembly, GEL Part Dwg. No. C-14-438 |

## MULTICHANNEL LIMITER DISCRIMINATOR

| SYMBOL | DESCRIPTION |
|---|---|
| C-601 | Capacitor, Fixed, Ceramic Disc, .001 mfd +100% - 20%, Erie CK61Y102Z, GEL Part No. 12070 |
| C-602 | Capacitor, Fixed, Ceramic Disc, .0047 mfd +100% - 20%, Erie CK62Y472Z, GEL Part No. 12050 |
| C-603 | Same as C-601 |
| C-604 | Capacitor, Fixed, Ceramic Tubular, 20 mmf ± 5%, Erie NPO-A, GEL Part No. 12031 |
| C-605 | Capacitor, Fixed, Ceramic Tubular, value to be determined in test |
| C-606 | Same as C-601 |
| C-607 | Same as C-601 |
| C-608 | Same as C-602 |
| C-609 | Same as C-601 |
| C-610 | Same as C-601 |
| C-611 | Same as C-601 |
| C-612 | Same as C-602 |
| C-613 | Same as C-601 |
| C-614 | Capacitor, Fixed, Ceramic Tubular, 11 mmf ± 5%, GEL Part No. 12023 |
| C-615 | Capacitor, Fixed, Ceramic Tubular, 0.1 mmf ± .1 mmf, GEL Part No. 12009 |
| C-616 | Capacitor, Fixed, Ceramic Tubular, 47 mmf ± 5%, Erie NPO-T, GEL Part No. 12040 |
| C-617 | Same as C-601 |
| C-618 | Same as C-602 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-619 | Same as C-601 |
| C-620 | Same as C-602 |
| C-621 | Same as C-601 |
| C-622 | Same as C-601 |
| C-623 | Same as C-601 |
| C-624 | Same as C-601 |
| C-625 | Same as C-601 |
| C-626 | Same as C-601 |
| C-627 ** | Capacitor, Fixed, Silvered Mica, 220 uuf ± 5% Elmenco CM15E221J, GEL Part No. 12522 |
| C-628 ** | Capacitor, Fixed, Silvered Mica, 270 uuf ± 5%, Elmenco CM15E271J, GEL Part No. 12500 |
| C-630 | Same as C-601 |
| C-631 | Same as C-629 |
| C-632 | Capacitor, Fixed, Silvered Mica, 82 uuf ± 5%, Elmenco CM15E111J, GEL Part No. 12508 |
| C-633 | Same as C-632 |
| C-634 | Capacitor, Variable, 1-12 uuf, JFD VC22G, GEL Part No. 13307 |
| C-635 | Same as C-601 |
| C-636 | Same as C-634 |
| C-637 | Capacitor, Fixed, Ceramic Tubular, 30 uuf ± 5%, Erie NPO-T, GEL Part No. 12106 |
| C-638 | Same as C-604 |

** Exact value is determined in test.

| SYMBOL | DESCRIPTION |
|---|---|
| C-639 | Same as C-634 |
| C-640 | Same as C-634 |
| C-641 | Capacitor, Fixed, Ceramic Tubular, NPO, Value to be determined in test |
| C-642 | Capacitor, Fixed, Ceramic Tubular, Value to be determined in test |
| C-643 | Capacitor, Fixed, Paper, .1 uf 200V DC, Aerovox P123ZGP, GEL Part No. 12917 |
| C-644 | Same as C-601 |
| C-645 | Same as C-602 |
| C-646 | Capacitor, Miniature Electrolytic, 10 uf 25V DC, Sprague TE1204, GEL Part No. 12717 |
| C-647 | Capacitor, Fixed, Ceramic Feed-thru, 1000 uuf ± 20%, Erie #327, GEL Part No. 12067 |
| C-648 | Same as C-647 |
| C-649 | Same as C-647 |
| C-650 | Same as C-647 |
| C-651 | Capacitor, Ceramic Tubular, NPO, Value to be determined in test |
| C-652 | Same as C-647 |
| C-653 | Same as C-647 |
| C-654 | Same as C-647 |
| C-655 | Same as C-647 |
| C-656 | Same as C-647 |
| C-657 | Same as C-647 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-658 | Same as C-647 |
| C-659 | Same as C-647 |
| C-660 | Same as C-647 |
| C-661 | Same as C-457 |
| C-662 | Same as C-601 |
| C-663 | Same as C-601 |
| C-664 | Same as C-601 |
| C-665 | Same as C-602 |
| C-666 | Same as C-604 |
| C-667 | Not Assigned |
| C-668 | Same as C-632 |
| C-669 * | Not Assigned |
| J-601 | Connector, Panel Jack, Type MB, IPC #46025, GEL Part No. 17302 |
| J-602 | Same as J-601 |
| J-603 | Same as J-601 |
| K-601 | Relay, Filters Inc., No. P26A1H5AS, GEL Part No. 20519 |
| K-602 | Same as K-601 |
| K-603 | Same as K-601 |
| K-604 | Same as K-601 |
| K-605 | Same as K-601 |

* See C-670 to C-673 on Page V-40

| SYMBOL | DESCRIPTION |
|---|---|
| L-601 | Inductor, Fixed, 27 uh, Delevan 1537-48, GEL Part No. 17053 |
| L-602 | Not Assigned |
| L-603 | Not Assigned |
| L-604 | Same as L-609 |
| L-605 | Inductor, Variable, 3.2-6.3 uh, Cambion 1505-4, GEL Part No. 16237 |
| L-606 | Inductor, Variable, 1.7-3.5 uh, Cambion 1505-3, GEL Part No. 16246 |
| L-607 | Inductor, Variable, GEL Dwg. No. C14-721-2 |
| L-608 | Inductor, Variable, GEL Dwg. No. C14-721-1 |
| L-609 | Same as L-606 |
| L-610 | Same as L-606 |
| L-611 | Same as L-605 |
| L-612 | Same as L-605 |
| L-613 | Same as L-601 |
| L-614 | Not Assigned |
| L-615 | Inductor, Fixed, 2.7 uh, GEL Dwg. No. B10-103, GEL Part No. 17001 |
| L-616 | Same as L-615 |
| L-616 | Not Assigned |
| P-601 | Plug, Male, Winchester, 20 Pins, MRE20P-G with MRE20H Hood, GEL Part No. 17483 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-601 | Resistor, Fixed Composition, 22K ± 5%, 1/2W, Allen Bradley EB-2235, GEL Part No. 10427 |
| R-602 | Resistor, Fixed Composition, 130 ohm ± 5%, 1/2W, Allen Bradley EB-1315, GEL Part No. 10450 |
| R-603 | Resistor, Fixed Composition, 7.5K ± 5%, 1W, Allen Bradley GB-7525, GEL Part No. 11050 |
| R-604 | Resistor, Fixed Composition, 130K ± 5%, 1/2W, Allen Bradley EB-1345, GEL Part No. 10437 |
| R-605 | Resistor, Fixed Composition, 11K ± 5%, 1/2W, Allen Bradley EB-1135, GEL Part No. 10417 |
| R-606 | Potentiometer, Trimpot, Vourns No. 3155-1-104, GEL Part No. 14061 |
| R-607 | Resistor, Fixed Composition, 1.6K ± 5%, 1W, Allen Bradley GB-1625, GEL Part No. 11029 |
| R-608 | Resistor, Fixed Composition, 220K ± 5%, 1/2W, Allen Bradley EB-2245, GEL Part No. 10590 |
| R-609 | Resistor, Fixed Composition, 10 ohms ± 5%, 1/2W, Allen Bradley EB-1005, GEL Part No. 10442 |
| R-610 | Resistor, Fixed Composition, 620 ohms ± 5%, 1/2W, Allen Bradley EB-6215, GEL Part No. 10551 |
| R-611 | Resistor, Fixed Composition, 5.1K ± 5%, 1/2W, Allen Bradley EB-5125, GEL Part No. 10415 |
| R-612 | Resistor, Fixed Composition, 13K ± 5%, 1/2W, Allen Bradley EB-1335, GEL Part No. 10409 |
| R-613 | Resistor, Fixed Composition, 12K ± 5%, 1/2W, Allen Bradley EB-1235, GEL Part No. 10418 |
| R-614 | Same as R-602 |
| R-615 | Same as R-603 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-616 | Same as R-604 |
| R-617 | Resistor, Fixed Composition, 150 ohms ± 5%, 1/2W, Allen Bradley EB-1515, GEL Part No. 10451 |
| R-618 | Resistor, Fixed Composition, 1K ± 5%, 1/2W, Allen Bradley EB-1025, GEL Part No. 10401 |
| R-619 | Same as R-609 |
| R-620 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, Allen Bradley EB-1045, GEL Part No. 10430 |
| R-621 | Resistor, Fixed Composition, 3K ± 5%, 1/2W, Allen Bradley EB-3025, GEL Part No. 10403 |
| R-622 | Resistor, Fixed Composition, 47K ± 5%, 1/2W, Allen Bradley EB-4735, GEL Part No. 10429 |
| R-623 | Same as R-620 |
| R-624 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535, GEL Part No. 10470 |
| R-625 | Same as R-602 |
| R-626 | Same as R-624 |
| R-627 | Same as R-602 |
| R-628 | Same as R-603 |
| R-629 | Same as R-603 |
| R-630 | Same as R-604 |
| R-631 | Same as R-605 |
| R-632 | Same as R-604 |
| R-633 | Same as R-605 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-634 | Resistor, Fixed Composition, 820 ohm ± 5%, 1/2W, Allen Bradley EB-8215, GEL Part No. 10509 |
| R-635 | Same as R-634 |
| R-636 | Same as R-634 |
| R-637 | Same as R-634 |
| R-638 | Same as R-611 |
| R-639 | Same as R-611 |
| R-640 | Resistor, Fixed Composition, 27K ± 5%, 1/2W, Allen Bradley EB-2735, GEL Part No. 10477 |
| R-641 | Same as R-640 |
| R-642 | Same as R-618 |
| R-643 | Same as R-618 |
| R-644 | Same as R-605 |
| R-645 | Same as R-611 |
| R-646 | Resistor, Fixed Composition, 22K ± 5%, 1W, Allen Bradley GB-2235, GEL Part No. 11062 |
| R-647 | Resistor, Fixed Composition, 180 ohms ± 5%, 1/2W, Allen Bradley EB-1815, GEL Part No. 10453 |
| R-648 | Resistor, Fixed Composition, 510 ohms ± 5%, 1 W, Allen Bradley GB-5115, GEL Part No. 11015 |
| R-649 | Resistor, Fixed Composition, 510K ± 5%, 1/2W Allen Bradley EB-5145, GEL Part No. 10440 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-650 | Resistor, Fixed Composition, 43K ± 5%, 1W, Allen Bradley GB-4335, GEL Part No. 10917 |
| R-651 | Potentiometer, Wirewound, Trim-Pot, 2K, Bourns 200L-202, GEL Part No. 14060 |
| R-652 | Resistor, Fixed Composition, 3.3K ± 5%, 1/2W, Allen Bradley EB-3325, GEL Part No. 10545 |
| R-653 | Same as R-650 |
| R-654 | Same as R-651 |
| R-655 | Same as R-652 |
| R-656 | Same as R-650 |
| R-657 | Same as R-651 |
| R-658 | Same as R-652 |
| R-659 | Same as R-634 |
| R-660 | Same as R-634 |
| R-661 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1531, GEL Part No. 10508 |
| * | |
| V-601 | Tube, Electron, 6BN6, GEL Part No. 14780 |
| V-602 | Same as V-601 |
| V-603 | Same as V-601 |
| V-604 | Same as V-601 |
| V-605 | Tube, Electron, 6AL5, GEL Part No. 14764 |
| V-606 | Tube, Electron, 5687, GEL Part No. 14844 |
| V-607 | Tube, Electron, 6AQ5, GEL Part No. 14754 |

* See R-662 to R-667 on Page V-40

| SYMBOL | DESCRIPTION |
|---|---|
| V-608 | Tube, Electron, 6112, GEL Part No. 14811 |
| V-609 | Tube, Electron, 6814, GEL Part No. 14847 |
| Z-601 | Discriminator, Crystal, 50KC P-P, Damon #5001 DA, GEL Part No. CS 1020 |
| CR-602 | Deleted |
| CR-603 | Deleted |
| R-662 | Resistor, Fixed Composition, 36K ± 5%, 1/2W, Allen Bradley EB-3635, GEL Part No. 10479 |
| R-663 | Resistor, Fixed Composition, 51K ± 5%, 1/2W, Allen Bradley EB-5135, GEL Part No. 10481 |
| R-664 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335, GEL Part No. 10549 |
| R-665 | Same as R-662 |
| R-666 | Resistor, Fixed Composition, 1M ± 5%, 1/2W, Allen Bradley EB-1055, GEL Part No. 11424 |
| R-667 | Resistor, Fixed Composition, 300K ± 5%, 1/2W, Allen Bradley EB-3045, GEL Part No. 10491 |
| C-670 | Same as C-647 |
| C-671 | Capacitor, Fixed Ceramic Disc, .01 mfd + 100%, - 20%, CK63Y103Z, GEL Part No. 12046 |
| C-672 | Same as C-604 |
| C-673 | Same as C-637 |

## VIDEO AMPLIFIER

| SYMBOL | DESCRIPTION |
|---|---|
| C-801 | Capacitor, Electrolytic, Plug-in, 20-20-20 at 450V, Aerovox AEP444J, GEL Part No. 12775 |
| C-802 | Capacitor, Fixed Paper, 0.22 mf 200VDCW, Aerovox P123ZNGP, GEL Part No. 12920 |
| C-803 | Capacitor, Fixed Electrolytic, 150 ufd (80 ufd in In parallel with 80 ufd) 150 wv, Gen. Instr. Type-DO, GEL Part No. 12754 |
| C-804 | Capacitor, Fixed Electrolytic, 4 ufd 150V, Sprague TE1503, |
| C-805 | Capacitor, Fixed Paper, 1 ufd 200 wvdc, Aerovox P123ZGP, GEL Part No. 12926 |
| C-806 | Not Assigned |
| C-807 | Capacitor, Fixed Electrolytic, 20 ufd 25 VDC, Sprague TE-1206, 8013 |
| C-808 | Not Assigned |
| C-809 | Capacitor, Fixed Paper, 0.02 uf 200 volts, Aerovox P123ZNGP |
| C-810 | Capacitor, Variable Piston, 0.8-8.5 pf, JFD VC20G, GEL Part No. 13305 |
| C-811 | Capacitor, Fixed Ceramic Tubular, 22 pf ± 5%, Erie NPO-A, GEL Part No. 13077 |
| C-813 * | Not Assigned |
| J-801 | Receptacle, Coaxial, BNC, UG-1094/U |
| J-802 | Same as J-801 |
| J-803 | Same as J-801 |
| J-804 | Same as J-801 |

* See C-813 on Page V-43

| SYMBOL | DESCRIPTION |
|---|---|
| J-805 | Same as J-801 |
| P-801 | Plug, 20 contact, Winchester Electronics Inc. MRE-20P-G with MRE-20H Hood |
| R-801 | Resistor, Fixed Composition, 10K ohms ± 5%, 1/2W, Allen Bradley EB-1035, GEL Part No. 10401 |
| R-802 | Resistor, Fixed Composition, 27K ohms ± 5%, 1/2W, Allen Bradley EB-2735, GEL Part No. 10477 |
| R-803 | Not Assigned |
| R-804 | Resistor, Fixed Composition, 10K ohms ± 5%, 1W, Allen Bradley GB-1035, GEL Part No. 10900 |
| R-805 | Resistor, Fixed Composition, 22K ohms ± 5%, 1/2W, Allen Bradley EB-2235, GEL Part No. 10427 |
| R-806 | Resistor, Fixed Composition, 91K ohms ± 5%, 1/2W, Allen Bradley EB-9135, GEL Part No. 10547 |
| R-807 | Resistor, Fixed Composition, 240 ohm ± 5%, 2W, Allen Bradley HB-2415, GEL Part No. 11481 |
| R-808 | Not Assigned |
| R-809 | Resistor, Fixed Composition, 470K ± 10%, 1/2W, Allen Bradley EB-4741, GEL Part No. 10425 |
| R-810 | Resistor, Variable, Linear Taper, 2.5K, 1/2W, Locking Type AS, Ohmite Cat. No. 3505, GEL Part No. 14010 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-811 | Resistor, Fixed Composition, 200 ohms ± 5%, 1/2W, Allen Bradley EB-2015, GEL Part No. 10640 |
| R-812 | Same as R-801 |
| R-813 | Resistor, Fixed Composition, 150 ohms ± 5%, 1/2W, Allen Bradley EB-1515, GEL Part No. 10451 |
| R-814 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335, GEL Part No. 10549 |
| R-815 | Resistor, Fixed Composition, 10 ohm ± 5%, 1/2W, Allen Bradley EB-1005, GEL Part No. 10442 |
| R-816 | Resistor, Fixed Composition, 100 ohms ± 5%, 1/2W, Allen Bradley EB-1015, GEL Part No. 10447 |
| R-817 | Resistor, Fixed, Wirewound, 750 ohms ± 5%, 10W Dalohm RH-10, GEL Part No. 11618 |
| R-818 | Same as R-801 |
| R-819 | Resistor, Fixed Composition, 5.6K ± 5%, 1/2W, Allen Bradley EB-5625, GEL Part No. 10394 |
| V-801 | Tube, Electron, 3654, GEL Part No. 14752 |
| V-802 | Tube, Electron, 6688, GEL Part No. 14770 |
| V-803 | Tube, Electron, 5687, GEL Part No. 14644 |
| L-801 | Coil, 10 uh, per GEL Dwg. A15-121 |
| C-813 | Capacitor, Fixed Ceramic Tubular, 15 pf ± 5%, Erie NPO-A, GEL Part No. 12027 |

## METERING CIRCUIT

| SYMBOL | DESCRIPTION |
|---|---|
| C-1001 | Capacitor, Fixed Silver Mica, .002 uf ± 5%, 500V, Elmenco CM20E202J, GEL Part No. 12514 |
| C-1002 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, Erie Cl52Y472Z, GEL Part No. 12050 |
| C-1003 | Capacitor, Fixed Paper, 0.47 uf, 200V, Sprague 81P474Q2S15, GEL Part No. 12966 |
| C-1004 | Capacitor, Fixed Paper, .47 uf, 400V, Aerovox P-1232NGP, GEL Part No. 12910 |
| C-1005 | Capacitor, Variable Air Dielectric, 4.5 to 100 uf Hammarlund MAPC-100, GEL Part No. 13312 |
| C-1006 | Capacitor, Fixed Silvered Mica, 130 uuf ± 5%, 500V, Elmenco CM15F131J, GEL Part No. 12512 |
| C-1007 | Capacitor, Fixed Paper, .47 ufd, 200V, Aerovox P-1232GP, GEL Part No. 12910 |
| C-1008 | Same as C-1003 |
| C-1009 | Capacitor, Fixed Paper, .1 uf, 200V, Sprague 81P10492S15, GEL Part No. 12965 |
| C-1010 | Same as C-1008 |
| C-1011 | Capacitor, Fixed Paper, 0.22 ufd, 200VDCW, Aeroxox P1232NGP, GEL Part No. 12520 |
| C-1012 | Same as C-1007 |
| CR-1001 | Diode, Germanium, IN198, GEL Part No. 14517 |
| CR-1002 | Same as CR-1001 |
| CR-1003 | Same as CR-1001 |
| CR-1004 | Same as CR-1001 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-1001 | Receptacle, Coax, BNC, UG-1094/U, GEL Part No. 17314 |
| J-1002 | Same as J-1001 |
| P-1001 | Plug, 20 Contact Winchester MRE-20PG with Hood MRE-20H, GEL Part No. 17482 |
| R-1001 | Resistor, Fixed Composition, 470K ± 5%, 1/2W, Allen Bradley EB-4745, GEL Part No. 10541 |
| R-1002 | Resistor, Fixed Composition, 180 ohms ± 5%, 1/2W, Allen Bradley EB-1815, GEL Part No. 10453 |
| R-1003 | Resistor, Fixed Composition, 20K ± 5%, 2W, Allen Bradley HB-2035C, GEL Part No. 11404 |
| R-1004 | Resistor, Fixed Composition, 33K ± 5%, 1/2W Allen Bradley EB-3335, GEL Part No. 10547 |
| R-1005 | Resistor, Fixed Composition, 220K ± 5%, 1/2W, Allen Bradley EB-2245, GEL Part No. 10550 |
| R-1006 | Resistor, Fixed Composition, 5.1 meg ± 5%, 1/2W, Allen Bradley EB-5155, GEL Part No. 10462 |
| R-1007 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, Allen Bradley EB-2035, GEL Part No. 10420 |
| R-1008 | Resistor, Fixed Composition, 3.9K ± 5%, 1/2W, Allen Bradley EB-3925, GEL Part No. 10420 |
| R-1009 | Resistor, Fixed Composition, 10K ± 5%, 2W Allen Bradley HB-1035, GEL Part No. 11408 |
| R-1010 | Resistor, Fixed Composition, 100 ohms ± 10%, 1/2W, Allen Bradley EB-1011, GEL Part No. 10448 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-1011 | Resistor, Fixed Composition, 470K ± 5%, 1/2W, Allen Bradley EB-4745, GEL Part No. 10541 |
| R-1012 | Potentiometer, Composition, Linear Taper, 500K ± 10%, 1/2W, Ohmite AS 3612, GEL Part No. 14070 |
| R-1013 | Same as R-1001 |
| R-1014 | Resistor, Fixed Composition, 8.2K ± 5%, 1/2W, Allen Bradley EB 8225, GEL Part No. 10407 |
| R-1015 | Resistor, Fixed Composition, 3.3K ± 5%, 1/2W, Allen Bradley EB-3325, GEL Part No. 10545 |
| R-1016 | Same as R-1015 |
| R-1017 | Potentiometer, Composition, 25K ± 20%, 1/2W, Ohmite AS 3608, GEL Part No. 14058 |
| R-1018 | Resistor, Fixed Composition, 91K ± 5%, 1/2W, Allen Bradley EB-9135, GEL Part No. 10457 |
| R-1019 | Not Assigned |
| R-1020 | Not Assigned |
| R-1021 | Resistor, Fixed Composition, 30K ± 5%, 1/2W, Allen Bradley EB-3035, GEL Part No. 10599 |
| R-1022 | Not Assigned |
| R-1023 | Same as R-1021 |
| R-1024 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, Allen Bradley EB-4731, GEL Part No. 10419 |
| R-1025 | Same as R-1024 |
| R-1026 | Potentiometer, Composition, 10K, 1/2W, Linear Taper, Ohmite Type AS-3007, GEL Part No. 14008 |
| R-1027 | Same as R-1026 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-1028 | Same as R-1026 |
| R-1029 | Same as R-1026 |
| R-1030 | Resistor, Fixed Composition, 150K ± 5%, 1/2W Allen Bradley EB-1545, GEL Part No. 10424 |
| R-1031 | Resistor, Fixed Composition, 62K ± 5%, 1/2W, Allen Bradley EB-6235, GEL Part No. 10423 |
| R-1032 | Same as R-1031 |
| R-1033 | Same as R-1031 |
| V-1001 | Tube, Electron, 6AH6WA, GEL Part No. 14776 |
| V-1002 | Tube, Electron, 5814A, GEL Part No. 14781 |
| V-1003 | Tube, Electron, 12AT7WA, GEL Part No. 14775 |
| V-1004 | Same as V-1002 |

PHASE LOCK LOOP INDICATOR

| SYMBOL | DESCRIPTION |
|---|---|
| C-901 | Capacitor, Fixed Ceramic, 36 pf ±5%, Erie NPO-T GEL Part #12036 |
| C-902 | Capacitor, Fixed Ceramic, 33 pf ±5%, Erie NPO-T GEL Part No. 12035 |
| C-903 | Capacitor, Fixed Ceramic Disc, 1500 pf + 100% - 20%, CK61Y152Z GEL Part No. 12053 |
| C-904 | Same as C-903 |
| C-905 | Capacitor, Fixed, Ceramic Disc, 4700 pf + 100% - 20%, CK62Y472Z GEL Part No. 12050 |
| C-906 | Capacitor, Fixed Silver Mica, 51 pf ± 5%, CM15E510J, GEL Part No. 12520 |
| C-907 | Capacitor, Fixed Ceramic, 22 pf ± 5%, Erie NPO-A GEL Part No. 12057 |
| C-908 | Same as C-907 |
| C-909 | Capacitor, Fixed Tantalum, 6 uf ± 5%, Chmite CL35BD060MP3 GEL Part No. 13135 |
| C-910 | Same as C-903 |
| C-911 | Capacitor, Fixed Ceramic, 12 pf ± 5%, Erie NPO-A GEL Part No. 12024 |
| C-912 | Same as C-911 |
| C-913 | Same as C-905 |
| C-914 | Capacitor, Fixed Ceramic, 15 pf ± 5%, Erie NPO-A GEL Part No. 12027 |
| C-915 | Capacitor, Fixed Ceramic, 5.1 pf ± .25 pf, Erie NPO-A GEL Part No. 12015 |
| C-916 | Same as C-903 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-917 | Same as C-903 |
| C-918 | Capacitor, Fixed Silver Mica, 150 pf ± 5%, CM15E151J, GEL Part No. 12570 |
| C-919 | Same as C-903 |
| C-920 | Capacitor, Fixed Ceramic, 20 pf ±5%, Erie NPO-A, GEL Part No. 12050 |
| C-921 | Capacitor, Variable Ceramic, 3-12 pf, Erie CV11A120, GEL Part No. 13335 |
| C-922 | Same as C-903 |
| C-923 | Same as C-903 |
| C-924 | Capacitor, Fixed, Silver Mica, 110 pf ± 5%, CM15E111J, GEL Part No. 12575 |
| C-925 | Capacitor, Fixed Ceramic, Disc, .0013 uf ± 20%, Erie HR615X5F, GEL Part No. 12076 |
| C-926 | Same as C-903 |
| C-927 | Not Assigned |
| C-928 | Not Assigned |
| C-929 | Same as C-903 |
| C-930 | Capacitor, Fixed Ceramic Disc, 1000 pf + 100% - 20%, C701Y102Z, GEL Part No. 12070 |
| C-931 | Same as C-903 |
| C-932 | Same as C-903 |
| C-933 | Not Assigned |
| C-934 | Same as C-924 |
| C-935 | Same as C-930 |
| C-936 | Same as C-930 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-937 | Same as C-930 |
| C-938 | Same as C-930 |
| C-939 | Same as C-930 |
| C-940 | Same as C-930 |
| C-941 | Same as C-930 |
| C-942 | Same as C-930 |
| CR-901 | Diode, Germanium, Type 1N198, GEL Part No. 14517 |
| CR-902 | Same as CR-901 |
| CR-903 | Diode, Germanium, 1N695A, GEL Part No. 14599 |
| CR-904 | Diode, Same as CR-903 |
| FL-901 | Filter, 250KC per GEL Dwg. No. C-14-917-1 |
| FL-902 | Filter, 100KC per GEL Dwg. No. C14-915 |
| FL-903 | Filter, 50KC per GEL Dwg. No. C14-913 |
| FL-904 | Filter, per GEL Dwg. No. C14-917-2 |
| J-901 | Connector, Coaxial BNC, UG-1094/U, GEL Part No. 17314 |
| J-902 | Same as J-901 |
| K-901 | Relay, Micro Miniature, DPDT, G.E. #3S2751G200-N9 GEL Part No. 20522 |
| K-902 | Same as K-901 |
| K-903 | Same as K-901 |

| SYMBOL | DESCRIPTION |
|---|---|
| K-904 | Relay, Micro Miniature, DPT, G.E. #3S2791G210-N13 GEL Part No. 20523 |
| L-901 | Inductor, Fixed RF Choke, 82 uh, Delevan #1537-86 GEL Part No. 17040 |
| L-902 | Inductor, Variable, 3.2-8.3 uh, Cambion 1505-4 GEL Part No. 15237 |
| L-903 | Same as L-902 |
| L-904 | Not Assigned |
| L-905 | Inductor, Fixed RF Choke, .33 uh, Delevan # 1537-04 GEL Part No. 17014 |
| L-906 | Same as L-905 |
| L-907 | Same as L-905 |
| L-908 | Same as L-905 |
| L-909 | Same as L-905 |
| L-910 | Same as L-905 |
| L-911 | Same as L-905 |
| L-912 | Same as L-906 |
| P-901 | Connector, Cable, 20 contact, Winchester MRE 20-PGH GEL Part No. 17483 |
| R-901 | Resistor, Fixed Composition, 1K ± 5%, 1/2W RC20GF102J, GEL Part No. 10401 |
| R-902 | RESISTOR, Fixed Composition, 47K ± 5%, 1/2W, RC20GF473J, GEL Part No. 10429 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-903 | Resistor, Fixed Composition, 91 ohms ± 5%, 1/2W, RC20GF910J, GEL Part No. 10446 |
| R-904 | Resistor, Fixed Composition, 22K ± 5%, 1/2W, RC20GF223J, GEL Part No. 10427 |
| R-905 | Resistor, Fixed Composition, 470 ohms ± 5%, 1/2W, RC20GF471J, GEL Part No. 10457 |
| R-906 | Same as R-901 |
| R-907 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, RC20GF153J, GEL Part No. 10419 |
| R-908 | Same as R-907 |
| R-909 | Resistor, Fixed Composition, 10K ± 5%, 1/2W, RC20GF103J, GEL Part No. 10409 |
| R-910 | Same as R-909 |
| R-911 | Resistor, Fixed Composition, 100 ohms ± 5%, 1/2W, RC20GF101J, GEL Part No. 10447 |
| R-912 | Not Assigned |
| R-913 | Same as R-901 |
| R-914 | Same as R-911 |
| R-915 | Same as R-911 |
| R-916 | Resistor, Fixed Composition, 220 ohms ± 5%, 1/2W, RC20GF221J, GEL Part No. 10454 |
| R-917 | Resistor, Variable, 500 ohms ± 10%, 1/2W, Ohmite AS 3503, GEL Part No. 14007 |
| R-918 | Resistor, Fixed Composition, 3.6K ± 5%, 2W, RC42GF362J, GEL Part No. 11523 |
| R-919 | Resistor, Fixed Composition, 1.1K ± 5%, 1/2W, RC20GF112J, GEL Part No. 10467 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-920 | Resistor, Fixed Composition, 62 ohms ± 5%, 1/2W, RC20GF620J, GEL Part No. 10502 |
| R-921 | Same as R-918 |
| R-922 | Same as R-919 |
| R-923 | Same as R-905 |
| R-924 | Resistor, Fixed Composition, 2.4K ± 5%, 1/2W, RC20GF242J, GEL Part No. 10402 |
| R-925 | Same as R-902 |
| R-926 | Resistor, Fixed Composition, 3.3K ± 5%, 1/2W, RC20GF332J, GEL Part No. 10545 |
| R-927 | Same as R-911 |
| R-928 | Resistor, Fixed Composition, 430 ohms ± 5%, 1/2W, RC20GF431J, GEL Part No. 10520 |
| R-929 | Not Assigned |
| R-930 | Resistor, Fixed Composition, 7.5K ± 5%, 1/2W, RC20GF752J, GEL Part No. 10416 |
| R-931 | Resistor, Fixed Composition, 91K ± 5%, 1/2W, RC20GF913J, GEL Part No. 10547 |
| R-932 | Resistor, Fixed Composition, 910 ohms ± 5%, 1/2W, RC20GF911J, GEL Part No. 10510 |
| R-933 | Resistor, Fixed Composition, 56K ± 5%, 1/2W, RC20GF563J, GEL Part No. 11435 |
| R-934 | Resistor, Fixed Composition, 3K ± 5%, 1/2W, RC20GF302J, GEL Part No. 10403 |
| R-935 | Not Assigned |
| R-936 | Same as R-907 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-937 | Same as R-905 |
| R-938 | Not Assigned |
| R-939 | Resistor, Fixed Composition, 24K ± 5%, 1/2W, RC20GF243J, GEL Part No. 10428 |
| R-940 | Resistor, Fixed Composition, 300K ± 5%, 1/2W, RC20GF304J, GEL Part No. 10491 |
| R-941 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, RC20GF333J, GEL Part No. 10600 |
| R-942 | Resistor, Variable, 10K ± 10%, 1/2W, Ohmite AS 3607, GEL Part No. 14008 |
| R-943 | Not Assigned |
| R-944 | Same as R-939 |
| R-945 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, RC20GF203J, GEL Part No. 10420 |
| R-946 | Resistor, Fixed Composition, 150K ± 5%, 1/2W, RC20GF154J, GEL Part No. 10424 |
| R-947 | Same as R-932 |
| R-948 | Resistor, Fixed Composition, 5.1K ± 5%, 1/2W, RC20GF512J, GEL Part No. 10413 |
| R-949 | Resistor, Fixed Composition, 51K ± 5%, 1/2W, RC20GF513J, GEL Part No. 10481 |
| R-950 | Same as R-906 |
| R-951 | Same as R-903 |
| R-952 | Same as R-903 |
| T-901 | Not Assigned |
| T-902 | Not Assigned |

| SYMBOL | DESCRIPTION |
|---|---|
| T-903 | Transformer, RF, per GEL Dwg. No. A14-842 |
| T-904 | Transformer, RF, per GEL Dwg. No. A14-843 |
| V-901 | Tube, Electron, 5702, GEL Part No. 14817 |
| V-902 | Tube, Electron, 5636, GEL Part No. 14816 |
| V-903 | Same as V-901 |
| V-904 | Tube, Electron, 5639, GEL Part No. 14815 |
| V-905 | Tube, Electron, 6021, GEL Part No. 14814 |
| V-906 | Same as V-905 |
| V-907 | Same as V-904 |
| V-908 | Tube, Electron, 5111, GEL Part No. 14756 |
| C-943 | Same as C-903 |
| C-944 | Same as C-903 |
| L-913 | Inductor, Fixed, 16 uh, per GEL Dwg. No. B14-836 |
| C-945 | Not Assigned |
| C-946 | Capacitor, Fixed Silvered Mica, 56 pf ± 5%, CM15E560J, GEL Part No. 12555 |
| C-947 | Capacitor, Variable 0.8-18, JFDVC23G, GEL Part No. 13314 |
| C-948 | Same as C-903 |
| C-949 | Same as C-903 |

PRE-DETECTION RECORD/PLAYBACK

| SYMBOL | DESCRIPTION |
|---|---|
| C-1101 | Capacitor, Fixed Ceramic Tubular, 16 pf ± 5%, Erie NPO-A, GEL Part No. 12028 |
| C-1102 | Capacitor, Fixed Ceramic Tubular, 6.8 pf ± .25 pf, Erie NPO-A, GEL Part No. 12018 |
| C-1103 | Same as C-1102 |
| C-1104 & C-1105 | Capacitor, Variable, Two Section, 4-30 pf each section, Erie Style CV21C300, 4-30 pf, GEL Part No. 13320 |
| C-1106 | Capacitor, Fixed Ceramic Tubular, 20 pf ± 5%, Erie NPO-A, GEL Part No. 12031 |
| C-1107 | Capacitor, Fixed Ceramic Tubular, 4.3 pf ± .25 pf Erie NPO-A, GEL Part No. 12013 |
| C-1108 | Capacitor, Fixed Ceramic Standoff, .0015 uf ± 20%, Erie #326, GEL Part No. 12059 |
| C-1109 | Capacitor, Fixed Ceramic Tubular, 18 pf ± 5%, Erie NPO-A, GEL Part No. 12029 |
| C-1110 | Capacitor, Fixed Ceramic Disc, .0047 uf +100% - 20%, CK52Y472Z, GEL Part No. 12050 |
| C-1111 | Same as C-1110 |
| C-1112 | Capacitor, Variable, Piston, 0.8-10 uf, JFD VC23G, GEL Part No. 13314 |
| C-1113 | Same as C-1108 |
| C-1114 | Same as C-1108 |
| C-1115 | Same as C-1109 |
| C-1116 | Capacitor, Fixed Ceramic Tubular, 1000 pf, Erie GP2-331, GEL Part No. 12063 |
| C-1117 | Same as C-1110 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-1118 | Capacitor, Fixed Ceramic Tubular, 20 pf ± 5%, Erie NPO-A, GEL Part No. 12031 |
| C-1119 | Same as C-1118 |
| C-1120 | Same as C-1116 |
| C-1121 | Capacitor, Fixed Ceramic Disc, .001 uf + 100% - 20%, Erie CK51Y102Z, GEL Part No. 12070 |
| C-1122 | Same as C-1116 |
| C-1123 | Same as C-1121 |
| C-1124 | Capacitor, Fixed Ceramic Disc, .01 uf + 100% - 20%, Erie CK53Y103Z, GEL Part No. 12046 |
| C-1125 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK51Y152Z, GEL Part No. 12053 |
| C-1126 | Same as C-1112 |
| C-1127 | Same as C-1109 (omit for 5 mc) |
| C-1128 | Same as C-1118 |
| C-1129 | Capacitor, Fixed Ceramic Tubular, 12 pf ± 5%, NPO-A, GEL Part No. 12024 |
| CR-1101 | Diode, Germanium, Sylvania D1820, GEL Part No. 14528 |
| CR-1102 | Same as CR-1101 |
| J-1101 | Connector, Coaxial Receptacle, BNC, UG-1094/U GEL Part No. 17314 |
| J-1102 | Same as J-1101 |
| J-1103 | Same as J-1101 |

| SYMBOL | DESCRIPTION |
|---|---|
| L-1101 | Inductor, Variable, 7.8 - 15 uh, Cambion 1505-5 GEL Part No. 16236 |
| L-1102 | Same as L-1101 |
| L-1103 | Inductor, Variable, 338-450 uh, Cambion 2060-9 GEL Part No. 17050 |
| L-1104 | Inductor, Fixed, 15 uh, Wilco 1015-15, GEL Part No. 17025 |
| L-1105 | Inductor, Fixed, GEL Dwg. #D14-800 (for 600 kc) GEL Dwg. #D14-899 (for 5 mc) |
| L-1106 | Inductor, Fixed, RF Choke, 2.70 uh ± 10%, Delevan Part No. 1537-22, GEL Part No. 17054 |
| L-1107 | Same as L-1105 |
| L-1108 | Same as L-1105 |
| P-1101 | Connector, Cable, Male, 20 contact Winchester MRE-20P-G with MRE-20H Hood, GEL Part No. 17483 |
| R-1101 | Not Assigned |
| R-1102 | Resistor, Fixed, Composition, 5.6K ± 5%, 1/2W, RC20GF562J, GEL Part No. 10594 |
| R-1103 | Resistor, Fixed Composition, 18K ± 5%, 1/2W, RC20GF183J, GEL Part No. 10426 |
| R-1104 | Resistor, Fixed Composition, 3.3K ± 5%, 1/2W, RC20GF332J, GEL Part No. 10545 |
| R-1105 | Same as R-1104 |
| R-1106 | Resistor, Fixed Composition, 4.7K ± 5%, 1/2W, RC20GF472J, GEL Part No. 10414 |
| R-1107 | Same as R-1106 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-1108 | Resistor, Fixed Composition, 240 ohms ± 5%, 1/2W, RC20GF241J, GEL Part No. 10521 |
| R-1109 | Same as R-1108 |
| R-1110 | Resistor, Fixed Composition, 2K ± 5%, 1/2W, RC20GF202J, GEL Part No. 10410 |
| R-1111 | Resistor, Fixed Composition, 150K ± 5%, 1/2W, RC20GF154J, GEL Part No. 10424 |
| R-1112 | Resistor, Fixed Composition, 6.8K ± 5%, 1/2W, RC20GF682J (omit for 5 mc) GEL Part No. 10408 |
| R-1113 | Resistor, Fixed Composition, 300 ohms ± 5%, 1/2W, RC20GF301J, GEL Part No. 10506 |
| R-1114 | Resistor, Fixed Composition, 1K ± 5%, 1/2W, RC20GF102J, GEL Part No. 10401 |
| R-1115 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, RC20GF104J, GEL Part No. 10430 |
| R-1116 | Same as R-1103 |
| R-1117 | Same as R-1115 |
| R-1118 | Resistor, Fixed Composition, 200 ohms ± 5%, 1/2W, RC20GF201J, GEL Part No. 10578 |
| R-1119 | Resistor, Fixed Composition, 5.1K ± 5%, 1/2W, RC20GF512J, GEL Part No. 10415 |
| R-1120 | Resistor, Fixed Composition, 51K ± 5%, 1/2W RC20GF513J, GEL Part No. 10421 |
| R-1121 | Same as R-1106 |
| R-1122 | Same as R-1118 |
| R-1123 | Resistor, Fixed Composition, 47K ± 5%, 1/2W, RC20GF473J, GEL Part No. 11549 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-1124 | Same as R-1114 |
| R-1125 | Same as R-1108 |
| R-1126 | Same as R-1108 |
| R-1127 | Resistor, Fixed Composition, 2.7K ± 5%, 1/2W, RC20GF272J, GEL Part No. 10412 |
| V-1101 | Tube, Electron, 5654, GEL Part No. 14834 |
| V-1102 | Tube, Electron, 12AT7WA, GEL Part No. 14773 |
| V-1103 | Tube, Electron, 5670, GEL Part No. 14769 |
| Y-1101 | Xtal, Quartz, Type CR-35/U, 10.6 mc or 15 mc |
| T-1101 | Transformer, RF, per GEL Dwg. #C14-889 |
| T-1102 | Transformer, RF, per GEL Dwg. #C14-898 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-301 | Capacitor, Fixed, Silvered Mica, 470 uuf ± 5%, CM15E471J per MIL-C-5, GEL Part No. 12524 |
| C-302 | Capacitor, Fixed Ceramic Disc, .001 uf + 100% - 20%, CK31Y102Z per MIL-C-11015A, GEL Part No. 12070 |
| C-303 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% -20%, CK32Y472Z per MIL-C-11015A, GEL Part No. 12050 |
| C-304 | Same as C-303 |
| C-305 | Capacitor, Fixed Ceramic Standoff, .001 uf - 20%, CK80A102M per MIL-C-11272, GEL Part No. 12049 |
| C-306 | Capacitor, Fixed Silvered Mica, 300 uuf ± 5%, CM15E301J per MIL-C-5, GEL Part No. 12501 |
| C-307 | Capacitor, Fixed Silvered Mica, 10 uuf ± 5%, CM15E100J per MIL-C-5, GEL Part No. 12533 |
| C-308 | Not Assigned |
| C-309 | Same as C-305 |
| C-310 | Same as C-307 |
| C-311 | Same as C-303 |
| C-312 | Same as C-302 |
| C-313 | Same as C-303 |
| C-314 | Same as C-303 |
| C-315 | Same as C-303 |
| C-316 | Same as C-303 |
| C-317 | Capacitor, Fixed Silvered Mica, 11 uuf ± 5%, CM15E110J per MIL-C-5, GEL Part No. 12530 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-518 | Same as C-502 |
| C-519 | Same as C-503 |
| C-520 | Same as C-505 |
| C-521 | Capacitor, Fixed Ceramic Disc, .0015 uf ± 10%, Erie 801-XST, GEL Part No. 12142 |
| C-522 | Same as C-503 |
| C-523 | Same as C-503 |
| C-524 | Same as C-505 |
| C-525 | Same as C-505 |
| C-526 | Same as C-517 |
| C-527 | Same as C-502 |
| C-528 | Same as C-502 |
| C-529 | Same as C-503 |
| C-530 | Same as C-506 |
| C-531 | Same as C-502 |
| C-532 | Same as C-505 |
| C-533 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 5%, Erie GP2-331, GEL Part No. 12052 |
| C-534 | Capacitor, Fixed Ceramic Tubular, 15 uuf ± 2% CC20CH150G per MIL-C-20B, GEL Part No. 12025 |
| C-535 | Same as C-503 |
| C-536 | Same as C-505 |
| C-537 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, CK80A102M per MIL-C-11321, GEL Part No. 12040 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-538 | Same as C-505 |
| C-539 | Capacitor, 4 ufd, Tantalum CL44BX0405P3, MIL-C-18211, GEL Part No. 13134 |
| C-540 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 2%, CC25CH470G per MIL-C-20B, GEL Part No. 12104 |
| C-541 | Same as C-505 |
| C-542 | Same as C-502 |
| C-543 | Same as C-502 |
| C-544 | Same as C-502 |
| C-545 | Same as C-502 |
| C-546 | Same as C-502 |
| C-547 | Same as C-505 |
| C-548 | Same as C-505 |
| C-549 | Same as C-505 |
| C-550 | Same as C-505 |
| C-551 | Same as C-505 |
| C-552 | Capacitor, Fixed Ceramic Tubular, 30 uuf ± 5%, NPO-A, GEL Part No. 12108 |
| C-553 | Capacitor, JFD VC 23G, Variable Trimmer, GEL Part No. 13314 |
| C-554 | Same as C-553 |
| C-555 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A, GEL Part No. 12105 |
| C-556 | Capacitor, Fixed Silvered Mica, 620 uuf ± 5%, CM20D621J, GEL Part No. 12518 |

* See FL-501 on Page V-67

| SYMBOL | DESCRIPTION |
|---|---|
| J-501 | Not Assigned |
| J-502 | Receptacle, Coaxial, BNC, UG-1094/U, GEL Part No. 17314 |
| J-503 | Same as J-502 |
| P-501 | Connector, 24 contact, Amphenol #57-10240, Miniature Blue Ribbon Connector, GEL Part No. 17498 |
| * | |
| L-501 | Inductor, GEL Part No. B14-636 |
| L-502 | Inductor, Same as L-501 |
| L-503 | Inductor, GEL Part Dwg. C12-253-52 |
| L-504 | Inductor, GEL Part Dwg. C12-253-53 |
| L-505 | Inductor, GEL Part Dwg. C12-253-54 |
| L-506 | Inductor, 2.7 uh Jeffers Part #10100-33 per MIL-C-15305A, GEL Part No. 17020 |
| L-507 | Same as L-506 |
| L-508 | Same as L-506 |
| L-509 | Same as L-506 |
| L-510 | Inductor, 28 uh, Wilco #1038-15, GEL Part No. 17049 |
| L-511 | Same as L-506 |
| L-512 | Same as L-506 |
| L-513 | Same as L-506 |
| L-514 | Same as L-506 |
| L-515 | Same as L-506 |

* See P-502 on Page V-07

| SYMBOL | DESCRIPTION |
|---|---|
| L-516 | Same as L-506 |
| L-517 | Same as L-506 |
| L-518 | Inductor, CTC 1505-4, 3.2-8.3 uh, GEL Part No. 10237 |
| R-501 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, RC20GF104J per MIL-R-11, GEL Part No. 10430 |
| R-502 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W, RC20GF121J per MIL-R-11, GEL Part No. 10440 |
| R-503 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, RC20GF333J per MIL-R-11, GEL Part No. 10549 |
| R-504 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, RC20GF153J per MIL-R-11, GEL Part No. 10419 |
| R-505 | Resistor, Fixed Composition, 1K ± 5%, 1/2W, RC20GF102J per MIL-R-11, GEL Part No. 10401 |
| R-506 | Resistor, Fixed Composition, 47K ± 5%, 1/2W, RC20GF473J per MIL-R-11, GEL Part No. 10426 |
| R-507 | Same as R-501 |
| R-508 | Resistor, Fixed Composition, 100 ohm ± 5%, 1/2W, RC20GF101J per MIL-R-11, GEL Part No. 10447 |
| R-509 | Same as R-503 |
| R-510 | Same as R-502 |
| R-511 | Same as R-504 |
| R-512 | Not Assigned |
| R-513 | Same as R-505 |
| R-514 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, per MIL-R-11, GEL Part No. 10420 |
| R-515 | Same as R-502 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-516 | Same as R-503 |
| R-517 | Same as R-504 |
| R-518 | Same as R-520 |
| R-519 | Same as R-505 |
| R-520 | Resistor, Fixed Comp, 150K ± 5%, 1/2W, RC20GF154J, GEL Part No. 10424 |
| R-521 | Resistor, Fixed Composition, 300 ohm ± 5%, 1/2W RC20GF301J per MIL-R-11, GEL Part No. 10433 |
| R-522 | Resistor, Fixed Composition, 11K ± 5%, 1/2W, RC20GF113J per MIL-R-11, GEL Part No. 10417 |
| R-523 | Same as R-505 |
| R-524 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, RC20GF203J per MIL-R-11, GEL Part No. 10420 |
| R-525 | Resistor, Fixed Composition, 22K ± 5%, 1/2W, RC20GF223J per MIL-R-11, GEL Part No. 10427 |
| R-526 | Same as R-520 |
| R-527 | Potentiometer, Variable Composition, 10K, 1/2W, GEL Part No. 14008, Ohmite Type AS-3507 |
| R-528 | Resistor, Fixed Composition, 10K ± 5%, 1/2W, RC20GF103J, per MIL-R-11, GEL Part No. 10408 |
| R-529 | Same as R-528 |
| R-530 | Resistor, Fixed Composition, 220K ± 5%, 1/2W, RC20GF224J, MIL-R-11, GEL Part No. 10550 |
| R-531 | Resistor, Fixed Composition, 51K ± 5%, 1/2W, RC20GF513J per MIL-R-11, GEL Part No. 10447 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-532 | Potentiometer, Variable Composition, 100K, GEL Part No. 14009, Ohmite Type AS-3610 |
| R-533 | Resistor, Fixed Composition, 750 ohm ± 5%, 1/2W, RC20GF750J per MIL-R-11, GEL Part No. 10458 |
| R-534 | Same as R-533 |
| R-535 | Same as R-530 |
| R-536 | Resistor, Fixed Composition, 18K ± 5%, 1/2W, RC20GF183J, GEL Part No. 10420 |
| R-537 | Resistor, Fixed Composition, 51 ohms ± 5%, 1/2W, RC20GF510J, GEL Part No. 10444 |
| R-538 | Resistor, Fixed Composition, 10 ohms ± 5%, 1/2W, RC20GF100J, GEL Part No. 10442 |
| V-501 | Tube, Electron, JAN 5749/6BA6W per MIL-E-1C, GEL Part No. 14828 |
| V-502 | Same as V-501 |
| V-503 | Same as V-501 |
| V-504 | Tube, Electron, JAN 6AH8WA per MIL-E-1C, GEL Part No. 14770 |
| V-505 | Tube, Electron, JAN 5726/6AL5W per MIL-E-1C, GEL Part No. 14784 |
| FL-501 | Crystal Filter, McCoy Type 17B0, |
| P-502 | Connector, Coaxial, BNC, UG-260/U, GEL Part No. 17307 |
| W-501 | Cable, Coaxial, RG-62/U per GEL Dwg. No. B11-039-10 |

## 30KC IF STRIP

| SYMBOL | DESCRIPTION |
|---|---|
| C-501 | Capacitor, Fixed Silvered Mica, 470 uuf ± 5%, CM15E471J per MIL-C-5, GEL Part No. 12524 |
| C-502 | Capacitor, Fixed Ceramic Disc, .001 uf + 100%, - 20%, CK81Y102Z per MIL-C-11015A, GEL Part No. 12079 |
| C-503 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, CK82Y472Z per MIL-C-11015A, GEL Part No. 12038 |
| C-504 | Same as C-503 |
| C-505 | Capacitor, Fixed Ceramic Standoff, .001 uf ± 20%, CK80A102M per MIL-C-19321, GEL Part No. 12049 |
| C-506 | Capacitor, Fixed Silvered Mica, 300 uuf ± 5%, CM15E301J per MIL-C-5, GEL Part No. 12501 |
| C-507 | Capacitor, Fixed Silvered Mica, 10 uuf ± 5% CM15E100J per MIL-C-5, GEL Part No. 12523 |
| C-508 | Not Assigned |
| C-509 | Same as C-506 |
| C-510 | Same as C-507 |
| C-511 | Same as C-503 |
| C-512 | Same as C-502 |
| C-513 | Same as C-503 |
| C-514 | Same as C-503 |
| C-515 | Same as C-503 |
| C-516 | Same as C-506 |
| C-517 | Capacitor, Fixed Silvered Mica, 91 uuf ± 5%, CM15E910J per MIL-C-5, GEL Part No. 12560 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-518 | Same as C-502 |
| C-519 | Same as C-503 |
| C-520 | Same as C-505 |
| C-521 | Capacitor, Fixed Ceramic Disc, .0015 uf ± 10%, Erie 801-X5T, GEL Part No. 12142 |
| C-522 | Same as C-503 |
| C-523 | Same as C-503 |
| C-524 | Same as C-505 |
| C-525 | Same as C-505 |
| C-526 | Same as C-517 |
| C-527 | Same as C-502 |
| C-528 | Same as C-502 |
| C-529 | Same as C-503 |
| C-530 | Same as C-505 |
| C-531 | Same as C-502 |
| C-532 | Same as C-505 |
| C-533 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 5% Erie GP 2-331, GEL Part No. 12062 |
| C-534 | Capacitor, Fixed Ceramic Tubular, 12 uuf ± 2%, CC20CH120G per MIL-C-20B, GEL Part No. 12025 |
| C-535 | Same as C-503 |
| C-536 | Same as C-505 |
| C-537 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, CK80A102M per MIL-C-11272, GEL Part No. 12049 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-538 | Same as C-506 |
| C-539 | Capacitor, 4 ufd Tantalum CL44BK0405P3, MIL-C-18311, GEL Part No. 13134 |
| C-540 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 2%, CC25CH470G per MIL-C-20B, GEL Part No. 12103 |
| C-541 | Same as C-505 |
| C-542 | Same as C-502 |
| C-543 | Same as C-502 |
| C-544 | Same as C-502 |
| C-545 | Same as C-502 |
| C-546 | Same as C-502 |
| C-547 | Same as C-506 |
| C-548 | Same as C-505 |
| C-549 | Same as C-505 |
| C-550 | Same as C-505 |
| C-551 | Same as C-505 |
| C-552 | Capacitor, Fixed Ceramic Tubular, 30 uuf ± 5%, NPO-A, GEL Part No. 12100 |
| C-553 | Capacitor, JFD VC 23G, Variable Trimmer, GEL Part No. 13314 |
| C-554 | Same as C-553 |
| C-555 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Srie NPO-A, GEL Part No. 12105 |
| C-556 | Capacitor, Fixed Silvered Mica, 820 uuf ± 5%, CM20D821J, GEL Part No. 12518 |
| FL-301 | Crystal Filter, McCoy Type 17B10 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-501 | Not Assigned |
| * | |
| P-501 | Connector, 24 contact, Amphenol #57-10240, Miniature Blue Ribbon Connector, GEL Part No. 17498 |
| * | |
| L-501 | Inductor, GEL Part Nwg. #B14-037 |
| L-502 | Same as L-501 |
| L-503 | Inductor, GEL Dwg. #C12-253-52 |
| L-504 | Inductor, GEL Dwg. C12-253-53 |
| L-505 | Inductor, GEL Part Dwg. #C12-253-54 |
| L-506 | Inductor, 3.7 uh Jeffers Part #10100-36 per MIL-C-15305A, GEL Part No. 17026 |
| L-507 | Same as L-506 |
| L-508 | Same as L-506 |
| L-509 | Same as L-506 |
| L-510 | Inductor, 38 uh, Wilco #1038-15, GEL Part No. 17045 |
| L-511 | Same as L-503 |
| L-512 | Same as L-506 |
| L-513 | Same as L-506 |
| L-514 | Same as L-506 |
| L-515 | Same as L-506 |
| L-516 | Same as L-506 |
| L-517 | Same as L-506 |

* See J-502, J-503 on Page V-74
* See P-502 on Page V-74

| SYMBOL | DESCRIPTION |
|---|---|
| L-518 | Inductor, CTC 1508-4, 3.2-8.3 uh, GEL Part No. 10237 |
| R-501 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, RC20GF104J per MIL-R-11, GEL Part No. 10430 |
| R-502 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W, RC20GF121J per MIL-R-11, GEL Part No. 10449 |
| R-503 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, RC20GF333J per MIL-R-11, GEL Part No. 10549 |
| R-504 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, RC20GF153J per MIL-R-11, GEL Part No. 10419 |
| R-505 | Resistor, Fixed Composition, 1K ± 5%, 1/2W, RC20GF102J, per MIL-R-11, GEL Part No. 10401 |
| R-506 | Resistor, Fixed Composition, 47K ± 5%, 1/2W, RC20GF473J per MIL-R-11, GEL Part No. 10425 |
| R-507 | Same as R-501 |
| R-508 | Resistor, Fixed Composition, 100 ohm ± 5%, 1/2W, RC20GF101J per MIL-R-11, GEL Part No. 10447 |
| R-509 | Same as R-502 |
| R-510 | Same as R-503 |
| R-511 | Same as R-504 |
| R-512 | Not Assigned |
| R-513 | Same as R-505 |
| R-514 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, per MIL-R-11, GEL Part No. 10420 |
| R-515 | Same as R-502 |
| R-516 | Same as R-503 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-517 | Same as R-504 |
| R-518 | Same as R-529 |
| R-519 | Same as R-505 |
| R-520 | Same as R-514 |
| R-521 | Resistor, Fixed Composition, 300 ohm ± 5%, 1/2W, RC20GF301J per MIL-R-11, GEL Part NO. 10455 |
| R-522 | Resistor, Fixed Composition, 11K ± 5%, 1/2W, RC20GF113J per MIL-R-11, GEL Part No. 10417 |
| R-523 | Same as R-506 |
| R-524 | Same as R-514 |
| R-525 | Resistor, Fixed Composition, 22K ± 5%, 1/2W, RC20GF223J per MIL-R-11, GEL Part No. 10427 |
| R-526 | Resistor, Fixed Composition, 150K ± 5%, 1/2W, RC20GF154J, GEL Part No. 10424 |
| R-527 | Potentiometer, Variable Composition, 10K, 1/2W, Ohmite Type AS-3807, GEL Part No. 14008 |
| R-528 | Resistor, Fixed Composition, 10K ± 5%, 1/2W, RC20GF103J per MIL-R-11, GEL Part No. 10408 |
| R-529 | Same as R-528 |
| R-530 | Resistor, Fixed Composition, 220K ± 5%, 1/2W, RC20GF224J, MIL-R-11, GEL Part No. 10550 |
| R-531 | Resistor, Fixed Composition, 91K ± 5%, 1/2W RC20GF913J per MIL-R-11, GEL Part No. 10547 |
| R-532 | Potentiometer, Variable Composition, 100K, Ohmite Type AS-3810, GEL Part No. 14009 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-533 | Resistor, Fixed Composition, 2.4K ± 5%, 1/2W, RC20GF242J per MIL-R-11, GEL Part No. 10458 |
| R-534 | Same as R-533 |
| R-535 | Same as R-526 |
| R-536 | Resistor, Fixed Composition, 18K ± 5%, 1/2W, RC20GF183J, GEL Part No. 10420 |
| R-537 | Resistor, Fixed Composition, 51 ohms ± 5%, 1/2W, RC20GF510J, GEL Part No. 10443 |
| R-538 | Resistor, Fixed Composition, 10 ohms ± 5%, 1/2W, RC20GF100J, GEL Part No. 10442 |
| V-501 | Tube, Electron, JAN 5749/6BA6W per MIL-E-1C, GEL Part No. 14823 |
| V-502 | Same as V-501 |
| V-503 | Same as V-501 |
| V-504 | Tube, Electron, JAN 6AH6WA per MIL-E-1C, GEL Part No. 14773 |
| V-505 | Tube, Electron, JAN 5725/3AL5W per MIL-E-1C, GEL Part No. 14784 |
| J-502 | Receptacle, Coaxial, BNC, 1054/U, GEL Part No. 17314 |
| J-503 | Same as J-502 |
| P-502 | Connector, Coaxial, BNC, 259/U |
| W-501 | Cable, Coaxial, UG72/U per GEL Dwg. No. BII-045-43 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-501 | Not Assigned |
| C-502 | Capacitor, Fixed Ceramic Tubular, 3.3 uuf ± .1 uuf Erie NPO-A, GEL Part No. 12010 |
| C-503 | Capacitor, Fixed Ceramic Disc, 27 pf ± 5%, Erie NPO-T, GEL Part No. 12043 |
| C-504 | Same as C-502 |
| C-505 | Capacitor, Fixed Ceramic Tubular, 4.7 uuf ± 0.25 uuf, Erie NPO-A, GEL Part No. 12014 |
| C-506 | Capacitor, Fixed Silvered Mica, 180 uuf ± 5%, Arco CM15F181, GEL Part No. 12513 |
| C-507 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK06Y152Z, GEL Part No. 12053 |
| C-508 | Capacitor, Fixed Ceramic Disc, .0047 uf ± 20%, Erie HR-829X5T, GEL Part No. 12005 |
| C-509 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, Erie CK06Y472Z, GEL Part No. 12060 |
| C-510 | Same as C-509 |
| C-511 | Same as C-509 |
| C-512 | Capacitor, Fixed Ceramic Tubular, 3.9 uuf ± .1 pf, GEL Part No. 12006 |
| C-513 | Capacitor, Fixed Ceramic Disc, 68 pf ± 5%, Erie NPO, Disc 811-000 68J |
| C-514 | Same as C-512 |
| C-515 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T, GEL Part No. 12040 |
| C-516 | Same as C-506 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-517 | Same as C-507 |
| C-518 | Same as C-508 |
| C-519 | Same as C-509 |
| C-520 | Same as C-506 |
| C-521 | Same as C-502 |
| C-522 | Same as C-513 |
| C-523 | Same as C-503 |
| C-524 | Capacitor, Fixed Ceramic Tubular, 10 uuf ± 5%, Erie NPO-A, GEL Part No. 12021 |
| C-525 | Same as C-500 |
| C-526 | Same as C-507 |
| C-527 | Same as C-508 |
| C-528 | Same as C-509 |
| C-529 | Same as C-505 |
| C-530 | Same as C-512 |
| C-531 | Same as C-513 |
| C-532 | Same as C-512 |
| C-533 | Same as C-505 |
| C-534 | Same as C-500 |
| C-535 | Same as C-508 |
| C-536 | Same as C-509 |
| C-537 | Same as C-509 |
| C-538 | Not Assigned |

| SYMBOL | DESCRIPTION |
|---|---|
| C-539 | Same as C-506 |
| C-540 | Same as C-513 |
| C-541 | Same as C-500 |
| C-542 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, Erie GP2-327, GEL Part No. 12067 |
| C-543 | Capacitor, Fixed Ceramic Tubular, 4.3 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12013 |
| C-544 | Same as C-543 |
| C-545 | Capacitor, Fixed Silvered Mica, 100 uuf ± 5%, Elmenco CM15F101J, GEL Part No. 12511 |
| C-546 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A, GEL Part No. 12057 |
| C-547 | Capacitor, Fixed Silvered Mica, 300 uuf ± 5%, Elmenco CM15E301J, GEL Part No. 12501 |
| C-548 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 10%, Erie GP2-331, GEL Part No. 12063 |
| C-549 | Capacitor, Fixed Ceramic Tubular, 12 uuf ± 5%, Erie NPO-A, GEL Part No. 12024 |
| C-550 | Same as C-509 |
| C-551 | Same as C-509 |
| C-552 | Same as C-507 |
| C-553 | Same as C-507 |
| C-554 | Same as C-507 |
| C-555 | Same as C-507 |
| C-560 | Same as C-515 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-501 | Not Assigned |
| J-502 | Receptacle, Coaxial UG-1094/U, GEL Part No. 17314 |
| J-503 | Same as J-501 |
| L-501 | Inductor, Integral Part of T-501A |
| L-502 | Inductor, Integral Part of T-501B |
| L-503 | Inductor, Integral Part of T-502A |
| L-504 | Inductor, Integral Part of T-502B |
| L-505 | Inductor, Integral Part of T-503A |
| L-506 | Inductor, Integral Part of T-503B |
| L-507 | Inductor, Integral Part of T-504A |
| L-508 | Inductor, Integral Part of T-504B |
| L-509 | Inductor, Integral Part of T-505A |
| L-510 | Inductor, Integral Part of T-505B |
| L-511 | Inductor, Fixed 2.7 uh, GEL Part Dwg. PL-131 |
| L-512 | Inductor, Same as L-511 |
| L-513 | Same as L-511 |
| L-514 | Same as L-511 |
| L-515 | Inductor, Fixed 28 uh, Wilco #3038-15, GEL Part No. 17002 |
| P-501 | Plug, 24 contact, Amphenol Miniature Blue Ribbon 57-10249, |
| P-502 | Part of W-501 UG-260/U |

| SYMBOL | DESCRIPTION |
|---|---|
| R-501 | Not Assigned |
| R-502 | Not Assigned |
| R-503 | Resistor, Fixed Composition, 100K ± 10%, 1/2W, Allen Bradley EB-1041, GEL Part No. 10436 |
| R-504 | Resistor, Fixed Composition, 120 ohms ± 5%, 1/2W Allen Bradley EB-1215, GEL Part No. 10449 |
| R-505 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335, GEL Part No. 10549 |
| R-506 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535, GEL Part No. 10419 |
| R-507 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, Allen Bradley EB-4731, GEL Part No. 10480 |
| R-508 | Resistor, Fixed Composition, 1K ± 10%, 1/2W, Allen Bradley EB-1021, GEL Part No. 10400 |
| R-509 | Not Assigned |
| R-510 | Same as R-503 |
| R-511 | Same as R-504 |
| R-512 | Same as R-505 |
| R-513 | Same as R-506 |
| R-514 | Same as R-508 |
| R-515 | Not Assigned |
| R-516 | Same as R-503 |
| R-517 | Same as R-504 |
| R-518 | Same as R-505 |
| R-519 | Same as R-506 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-520 | Resistor, Fixed Composition, 150 ohms ± 10%, 1/2W, Allen Bradley EB-1511, GEL Part No. 10452 |
| R-521 | Same as R-508 |
| R-522 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, Allen Bradley EB-2035, GEL Part No. 10420 |
| R-523 | Same as R-503 |
| R-524 | Resistor, Fixed Composition, 150K ± 10%, 1/2W, Allen Bradley EB-1541, GEL Part No. 10432 |
| R-525 | Resistor, Fixed Composition, 430 ohms ± 5%, 1/2W, Allen Bradley EB-4315, GEL Part No. 10520 |
| R-526 | Resistor, Fixed Composition, 18K ± 5%, 1/2W, Allen Bradley EB-1835, GEL Part No. 10426 |
| R-527 | Same as R-508 |
| R-528 | Not Assigned |
| R-529 | Resistor, Fixed Composition, 51 ohms ± 5%, 1/2W, Allen Bradley EB-5105, GEL Part No. 10443 |
| R-530 | Resistor, Fixed Composition, 10 ohms ± 10%, 1/2W Allen Bradley EB-1001, GEL Part No. 10407 |
| R-531 | Resistor, Fixed Composition, 62K ± 5%, 1/2W, Allen Bradley EB-6235, GEL Part No. 10423 |
| R-532 | Potentiometer, Composition, Linear, 100K, 1/2W, Ohmite AS-3810, GEL Part No. 14009 |
| R-533 | Same as R-524 |
| R-534 | Resistor, Fixed Composition, 4.7 ohms ± 10%, 1W Allen Bradley GB-47G1, GEL Part No. 10604 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-535 | Same as R-503 |
| R-536 | Resistor, Fixed Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1031, GEL Part No. 10474 |
| R-537 | Potentiometer, Composition, Linear, 10K, 1/2W, Ohmite AS-3607, GEL Part No. 14008 |
| R-538 | Same as R-524 |
| R-539 | Resistor, Fixed Composition, 220K ± 10%, 1/2W, Allen Bradley EB-2241, GEL Part No. 10438 |
| R-540 | Same as R-507 |
| T-501A | IF Transformer Assembly, GEL Part Dwg. No. B-10-822 |
| T-501B | IF Transformer Assembly, GEL Part Dwg. No. B-10-824 |
| T-502A | Same as T-501A |
| T-502B | Same as T-501B |
| T-503A | Same as T-501A |
| T-503B | Same as T-501B |
| T-504A | Same as T-501A |
| T-504B | IF Transformer Assembly, GEL Part Dwg. No. B-10-823 |
| T-505A | Same as T-501A |
| T-505B | IF Transformer Assembly, GEL Part Dwg. No. B-14-380 |
| V-501 | Tube, Electron, 5749/6BA6W, GEL Part No. 14826 |
| V-502 | Same as V-501 |

| SYMBOL | DESCRIPTION |
|---|---|
| V-503 | Same as V-501 |
| V-504 | Tube, Electron, 6AU6AW, GEL Part No. 14762 |
| V-505 | Tube, Electron, 5726/6AL5W, GEL Part No. 14784 |
| W-501 | Cable Assembly, Coaxial, GEL Part Dwg. No. B11-039-18 |

100 KC BANDWIDTH IF AMPLIFIER

| SYMBOL | DESCRIPTION |
|---|---|
| C-501 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20% Erie CK82Y472Z |
| C-502 | Capacitor, Fixed Ceramic Tubular, 3.3 uuf ± .1 uuf Erie NPO-A |
| C-503 | Capacitor, Fixed Ceramic Disc, 27 uuf ± 5%, Erie NPO |
| C-504 | Capacitor, Fixed Ceramic Tubular, 4.7 uuf ± .25 uuf, Erie NPO-A |
| C-505 | Same as C-504 |
| C-506 | Capacitor, Fixed Silvered Mica, 180 uuf ± 5%, Arco CM15F181J |
| C-507 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK81Y152Z |
| C-508 | Capacitor, Fixed Ceramic Disc, .0047 uf ± 20%, Erie HR-829-X5T |
| C-509 | Same as C-501 |
| C-510 | Same as C-501 |
| C-511 | Same as C-501 |
| C-512 | Same as C-502 |
| C-513 | Capacitor, Fixed Ceramic Disc, 68 uuf ± 5%, Erie NPO Disc 811-000 68J |
| C-514 | Same as C-504 |
| C-515 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T |
| C-516 | Same as C-506 |
| C-517 | Same as C-507 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-518 | Same as C-508 |
| C-519 | Same as C-501 |
| C-520 | Same as C-501 |
| C-521 | Same as C-502 |
| C-522 | Same as C-513 |
| C-523 | Same as C-504 |
| C-524 | Capacitor, Fixed Ceramic Tubular, 10 uuf ± 5%, Erie NPO-A |
| C-525 | Same as C-506 |
| C-526 | Same as C-507 |
| C-527 | Same as C-508 |
| C-528 | Same as C-501 |
| C-529 | Same as C-501 |
| C-530 | Same as C-502 |
| C-531 | Same as C-513 |
| C-532 | Same as C-504 |
| C-533 | Same as C-504 |
| C-534 | Same as C-506 |
| C-535 | Same as C-508 |
| C-536 | Same as C-501 |
| C-537 | Same as C-501 |
| C-538 | Not Assigned |

| SYMBOL | DESCRIPTION |
|---|---|
| C-539 | Same as C-501 |
| C-540 | Same as C-513 |
| C-541 | Same as C-501 |
| C-542 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, Erie GP2-327 |
| C-543 | Capacitor, Fixed Ceramic Tubular, 5.6 uuf ± .25 uuf, Erie NPO-A |
| C-544 | Same as C-543 |
| C-545 | Capacitor, Fixed Silvered Mica, 130 uuf ± 5%, Arco CM15F131J |
| C-546 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A |
| C-547 | Capacitor, Fixed Silvered Mica, 820 uuf ± 5%, Arco CM20D821J |
| C-548 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 10%, Erie GP2-331 |
| C-549 | Capacitor, Fixed Ceramic Tubuair, 12 uuf ± 5%, Erie NPO-A |
| C-550 | Same as C-501 |
| C-551 | Same as C-501 |
| C-552 | Same as C-507 |
| C-553 | Same as C-507 |
| C-554 | Same as C-507 |
| C-555 | Same as C-507 |
| C-556 | Same as C-515 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-501 | Receptacle, Coaxial, BNC, UG-1094/U |
| J-502 | Receptacle, Coaxial, BNC, UG-1094/U |
| J-503 | Receptacle, Coaxial, BNC, UG-1094/U |
| L-501 | Integral Part of T-501A |
| L-502 | Integral Part of T-501B |
| L-503 | Integral Part of T-502A |
| L-504 | Integral Part of T-502B |
| L-505 | Integral Part of T-503A |
| L-506 | Integral Part of T-503B |
| L-507 | Integral Part of T-504A |
| L-508 | Integral Part of T-504B |
| L-509 | Integral Part of T-505A |
| L-510 | Integral Part of T-505B |
| L-511 | Inductor, Fixed 2.7 uh, GEL Part/Dwg. PL-151 |
| L-512 | Inductor, Fixed 2.7 uh, GEL Part/Dwg. PL-151 |
| L-513 | Same as L-511 |
| L-514 | Same as L-511 |
| L-515 | Inductor, Fixed 38 uh, Wilco # 3038-15 |
| P-501 | Plug, 24 contact, Amphenol Miniature Blue Ribbon 57-10240 |
| R-501 | Resistor, Fixed Composition, 1K ± 10%, 1/2W, Allen Bradley EB-1021 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-502 | Not Assigned |
| R-503 | Resistor, Fixed Composition, 100K ± 10%, 1/2W, Allen Bradley EB-1041 |
| R-504 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W, Allen Bradley EB-1215 |
| R-505 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335 |
| R-506 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535 |
| R-507 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, Allen Bradley EB-4731 |
| R-508 | Same as R-501 |
| R-509 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, Allen Bradley EB-2035 |
| R-510 | Same as R-503 |
| R-511 | Same as R-504 |
| R-512 | Same as R-505 |
| R-513 | Same as R-506 |
| R-514 | Same as R-501 |
| R-515 | Same as R-509 |
| R-516 | Same as R-503 |
| R-517 | Same as R-504 |
| R-518 | Same as R-505 |
| R-519 | Same as R-506 |
| R-520 | Resistor, Fixed Composition, 150 ohm ± 10%, 1/2W, Allen Bradley EB-1511 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-521 | Same as R-501 |
| R-522 | Same as R-509 |
| R-523 | Same as R-503 |
| R-524 | Resistor, Fixed Composition, 150K ± 10%, 1/2W, Allen Bradley EB-1541 |
| R-525 | Resistor, Fixed Composition, 430 ohm ± 5%, 1/2W Allen Bradley EB-4315 |
| R-526 | Resistor, Fixed Composition, 18K ± 5%, 1/2W, Allen Bradley EB-1835 |
| R-527 | Same as R-501 |
| R-528 | Not Assigned |
| R-529 | Resistor, Fixed Composition, 51 ohm ± 5%, 1/2W, Allen Bradley EB-5105 |
| R-530 | Resistor, Fixed Composition, 10 ohm ± 10%, 1/2W, Allen Bradley EB-1001 |
| R-531 | Resistor, Fixed Composition, 62K ±5%, 1/2W, Allen Bradley EB-6235 |
| R-532 | Potentiometer, Composition, Linear, 100K, 1/2W, Ohmite AS-3610 |
| R-533 | Same as R-524 |
| R-534 | Resistor, Fixed Composition, 4.7 ohm ± 10%, 1 W, Allen Bradley GB-47G1 |
| R-535 | Same as R-503 |
| R-536 | Resistor, Fixed Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1031 |
| R-537 | Potentiometer, Composition, Linear, 10K, 1/2W, Ohmite AS-3607 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-538 | Same as R-524 |
| R-539 | Resistor, Fixed Composition, 220K ± 10%, 1/2W, Allen Bradley ED-2241 |
| R-540 | Same as R-507 |
| T-501A | IF Transformer Assy, GEL Part/Dwg. #B-10-822 (incl. L-501, C-503) |
| T-501B | IF Transformer Ass'y, GEL Part/Dwg. #B-10-824 (incl. L-502, C-505, C-507, R-503) |
| T-502A | IF Transformer Ass'y, GEL Part/Dwg. #B-10-822 (incl. L-503, C-513, R-508) |
| T-502B | IF Transformer Ass'y, GEL Part/Dwg. #B-10-824 (incl. L-504, C-515, C-517, R-510) |
| T-503A | IF Transformer Ass'y, GEL Part/Dwg. #B-10-822 (incl. L-505, C-522, R-514) |
| T-503B | IF Transformer Ass'y, GEL Part/Dwg. #B-10-824 (incl. L-506, C-525, C-526, R-516) |
| T-504A | IF Transformer Ass'y, GEL Part/Dwg. #B-10-822 (incl. L-507, C-531, R-521) |
| T-504B | IF Transformer Ass'y, GEL Part/Dwg. #B-10-824 (incl. L-508, C-534, R-524) |
| T-505A | IF Transformer Ass'y, GEL Part/Dwg. #B-10-822 (incl. L-509, C-540, R-527) |
| T-505B | IF Transformer Ass'y, GEL Part/Dwg. #B-10-826 (incl. L-510, C-545, C-546, C-547) |
| V-501 | Electron Tube, Type 5749/6DA6W |
| V-502 | Same as V-501 |

| SYMBOL | DESCRIPTION |
|---|---|
| V-503 | Same as V-501 |
| V-504 | Electron Tube, Type 6AU6AW |
| V-505 | Electron Tube, Type 5726/6AL5W |
| W-501 | Cable Ass'y, GEL Dwg. #B11-039-16 |
| P-502 | Connector, UG-260B/U (Part of W-501) |

| SYMBOL | DESCRIPTION |
|---|---|
| C-301 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, Erie CK62Y472Z |
| C-302 | Capacitor, Fixed Ceramic Tubular, 6.2 uf ± .25 uuf Erie NPO-A |
| C-303 | Not Assigned |
| C-304 | Same as C-302 |
| C-305 | Same as C-302 |
| C-306 | Capacitor, Fixed Ceramic Disc, 38 uuf ± 5%, Erie NPO, Disc 811-000 38J |
| C-307 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK61Y152Z |
| C-308 | Capacitor, Fixed Ceramic Disc, .0047 uf ± 20%, Erie Hit-829-X5T |
| C-309 | Same as C-301 |
| C-310 | Same as C-301 |
| C-311 | Same as C-301 |
| C-312 | Capacitor, Fixed Ceramic Tubular, 5.6 uuf ± .25 uuf Erie NPO-A |
| C-313 | Capacitor, Fixed Ceramic Tubular, 27 uuf ± 5%, Erie NPO-T |
| C-314 | Same as C-312 |
| C-315 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T |
| C-316 | Same as C-306 |
| C-317 | Same as C-307 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-318 | Same as C-308 |
| C-319 | Same as C-301 |
| C-320 | Same as C-301 |
| C-321 | Same as C-302 |
| C-322 | Same as C-313 |
| C-323 | Same as C-302 |
| C-324 | Same as C-315 |
| C-325 | Same as C-309 |
| C-326 | Same as C-307 |
| C-327 | Same as C-308 |
| C-328 | Same as C-301 |
| C-329 | Same as C-301 |
| C-330 | Capacitor, Fixed Ceramic Tubular, 6.8 uuf ± .25 uuf, Erie NPO-A |
| C-331 | Same as C-313 |
| C-332 | Same as C-302 |
| C-333 | Same as C-302 |
| C-334 | Same as C-308 |
| C-335 | Capacitor, Fixed Ceramic Disc, .001 uf ± 20%, Erie HR-809-X5T |
| C-336 | Same as C-301 |
| C-337 | Same as C-301 |
| C-338 | Same as C-335 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-339 | Same as C-301 |
| C-340 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A |
| C-341 | Same as C-301 |
| C-342 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, Erie GP2-327 |
| C-343 | Same as C-302 |
| C-344 | Same as C-302 |
| C-345 | Not Assigned |
| C-346 | Same as C-340 |
| C-347 | Capacitor, Fixed Silvered Mica, 820 uuf ± 5%, Arco CM20D821J |
| C-348 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 10%, Erie GP2-331 |
| C-349 | Capacitor, Fixed Ceramic Tubular, 12 uuf ± 5%, Erie NPO-A |
| C-350 | Same as C-301 |
| C-351 | Same as C-301 |
| C-352 | Same as C-307 |
| C-354 | Same as C-307 |
| C-355 | Same as C-307 |
| C-356 | Same as C-315 |
| J-301 | Receptacle, Coaxial, BNC, UG-1094/U |
| J-302 | Same as J-301 |
| J-303 | Same as J-301 |

| SYMBOL | DESCRIPTION |
|---|---|
| L-301 | Integral Part of T-301A |
| L-302 | Integral Part of T-301B |
| L-303 | Integral Part of T-302A |
| L-304 | Integral Part of T-302B |
| L-305 | Integral Part of T-303A |
| L-306 | Integral Part of T-303B |
| L-307 | Integral Part of T-304A |
| L-308 | Integral Part of T-304B |
| L-309 | Integral Part of T-305A |
| L-310 | Integral Part of T-305B |
| L-311 | Inductor, Fixed, 2.7 uh, GEL Part/Dwg. FL-151 |
| L-312 | Same as L-311 |
| L-313 | Same as L-311 |
| L-314 | Same as L-311 |
| L-315 | Inductor, Fixed, 38 uh, Wilco # 3038-15 |
| P-301 | Plug, 24 contact, Amphenol Miniature Blue Ribbon 57-10240 |
| P-302 | Integral Part of W-301 (UG-260/U) |
| R-301 | Resistor, Fixed Composition, 1K ± 10%, 1/2W, 1 Allen Bradley EB-1021 |
| R-302 | Resistor, Fixed Composition, 5.1K ± 5%, 1/2W, Allen Bradley EB-5123 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-303 | Resistor, Fixed Composition, 100K ± 10%, 1/2W, Allen Bradley EB-1041 |
| R-304 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W, Allen Bradley EB-1215 |
| R-305 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335 |
| R-306 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535 |
| R-307 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, Allen Bradley EB-4731 |
| R-308 | Same as R-301 |
| R-309 | Same as R-302 |
| R-310 | Same as R-303 |
| R-311 | Same as R-304 |
| R-312 | Same as R-305 |
| R-313 | Same as R-306 |
| R-314 | Same as R-301 |
| R-315 | Resistor, Fixed Composition, 4.7K ± 5%, 1/2W, Allen Bradley EB-4725 |
| R-316 | Same as R-303 |
| R-317 | Same as R-304 |
| R-318 | Same as R-305 |
| R-319 | Same as R-305 |
| R-320 | Resistor, Fixed Composition, 150 ohm ± 10%, 1/2W, Allen Bradley EB-1511 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-321 | Same as R-301 |
| R-322 | Resistor, Fixed Composition, 3.6K ± 5%, 1/2W, Allen Bradley EB-3625 |
| R-323 | Same as R-303 |
| R-324 | Resistor, Fixed Composition, 150K ± 10%, 1/2W, Allen Bradley EB-1541 |
| R-325 | Resistor, Fixed Composition, 300 ohm ± 5%, 1/2W Allen Bradley EB-3015 |
| R-326 | Resistor, Fixed Composition, 11K ± 5%, 1/2W, Allen Bradley EB-1135 |
| R-327 | Same as R-301 |
| R-328 | Resistor, Fixed Composition, 20K ± 5%, 1/2W, Allen Bradley EB-2035 |
| R-329 | Resistor, Fixed Composition, 51 ohm ± 5%, 1/2W, Allen Bradley EB-5105 |
| R-330 | Resistor, Fixed Composition, 10 ohm ± 10%, 1/2W, Allen Bradley EB-1001 |
| R-331 | Resistor, Fixed Composition, 22K ± 5%, 1/2W. Allen Bradley EB-2235 |
| R-332 | Potentiometer, Composition, Linear, 100K 1/2W, Ohmite AS-3310 |
| R-333 | Resistor, Fixed Composition, 150K ± 10%, 1/2W, Allen Bradley EB-1541 |
| R-334 | Resistor, Fixed Composition, 4.7 ohm ± 10%, 1W, Allen Bradley GB-4701 |
| R-335 | Same as R-303 |
| R-336 | Resistor, Fixed Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1031 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-337 | Potentiometer, Composition, Linear, 10K, 1/2W, Ohmite AS-3007 |
| R-338 | Resistor, Fixed Composition, 150K, ± 10%, 1/2W, Allen Bradley EB-1541 |
| R-339 | Resistor, Fixed Composition, 220K ± 10%, 1/2W Allen Bradley EB-2241 |
| R-340 | Same as R-307 |
| T-301A | IF Transformer Assy, GEL Part/Dwg. B-12-819 (incl. L-301, C-303) |
| T-301B | IF Transformer Assy, GEL Part/Dwg. B-10-815 (incl. L-302, C-306, C-307, R-303) |
| T-302A | IF Transformer Assy, GEL Part/Dwg. B-10-817 (incl. L-303, C-313, R-308) |
| T-302B | IF Transformer Assy, GEL Part/Dwg. B-10-813 (incl. L-304, C-315, C-317, R-310) |
| T-303A | IF Transformer Assy, GEL Part/Dwg. B-10-817 (incl. L-305, C-322, R-314) |
| T-303B | IF Transformer Assy, GEL Part/Dwg. B-10-813 (incl. L-306, C-325, C-325, R-315) |
| T-304A | IF Transformer Assy, GEL Part/Dwg. B-10-817 (incl. L-307, C-331, R-321) |
| T-304B | IF Transformer Assy, GEL Part/Dwg. B-10-815 (incl. L-308, C-334, R-324) |
| T-305A | IF Transformer Assy, GEL Part/Dwg. B-10-814 (incl. L-339, C-340, R-327) |
| T-305B | IF Transformer Assy, GEL Part/Dwg. B-10-813 (incl L-310, C-345, C-346, C-347) |
| V-301 | Tube, Electron, Type 6AU8/6BA8W |

| SYMBOL | DESCRIPTION |
|---|---|
| V-302 | Same as V-301 |
| V-303 | Same as V-301 |
| V-304 | Tube, Electron, Type 6AH6 |
| V-305 | Tube, Electron, Type 5725/6AL5W |
| W-301 | Cable Assy, GEL Dwg. B11-039-7 |

2nd IF 300 KC

| SYMBOL | DESCRIPTION |
|---|---|
| C-401 | Not Assigned |
| C-402 | Capacitor, Fixed Ceramic Tubular, 9.1 uuf ± .5 uuf, Erie NPO-A, GEL Part No. 12022 |
| C-403 | Capacitor, Fixed Ceramic Tubular, 10 uuf ± .5 uuf, Erie NPO-A, GEL Part No. 12021 |
| C-404 | Capacitor, Fixed Ceramic Disc, 68 uuf ± 5%, Erie NPO-Disc 811-000 68J, GEL Part No. 12073 |
| C-405 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK61Y152Z, GEL Part No. 12053 |
| C-406 | Capacitor, Fixed Ceramic Disc, .0047 uf ± 20%, Erie HR-829-X5T, GEL Part No. 12055 |
| C-407 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, Erie CK62Y472Z, GEL Part No. 12050 |
| C-408 | Same as C-407 |
| C-409 | Same as C-407 |
| C-410 | Capacitor, Fixed Ceramic Tubular, 27 uuf ± 5%, Erie NPO-T, GEL Part No. 12034 |
| C-411 | Same as C-403 |
| C-412 | Same as C-404 |
| C-413 | Same as C-405 |
| C-414 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T, GEL Part No. 12040 |
| C-415 | Same as C-406 |
| C-416 | Same as C-407 |
| C-417 | Same as C-407 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-418 | Same as C-402 |
| C-419 | Same as C-410 |
| C-420 | Same as C-407 |
| C-421 | Same as C-403 |
| C-422 | Same as C-404 |
| C-423 | Same as C-406 |
| C-424 | Same as C-405 |
| C-425 | Same as C-407 |
| C-426 | Same as C-407 |
| C-427 | Same as C-402 |
| C-428 | Same as C-410 |
| C-429 | Same as C-403 |
| C-430 | Same as C-404 |
| C-431 | Capacitor, Fixed Ceramic Disc, .001 uf ± 20% Erie HR-809-X5T, GEL Part No. 13087 |
| C-432 | Same as C-407 |
| C-433 | Same as C-407 |
| C-434 | Same as C-407 |
| C-435 | Capacitor, Fixed Ceramic Tubular, 7.5 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12015 |
| C-436 | Same as C-403 |
| C-437 | Same as C-407 |
| C-438 | Capacitor, Fixed Ceramic Tubular, 15 uuf ± 5% Erie NPO-A, GEL Part No. 12028 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-439 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A, GEL Part No. 12057 |
| C-440 | Capacitor, Fixed Silvered Mica, 300 uuf ± 5%, CM15E301J, GEL Part No. 12501 |
| C-441 | Capacitor, Fixed Ceramic Tubular, 470 uuf ± 10%, Erie GP2-331, GEL Part No. 12130 |
| C-442 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, Erie GP2-327, GEL Part No. 12037 |
| C-443 | Same as C-407 |
| C-444 | Capacitor, Fixed Ceramic Tubular, 12 uuf ± 5%, Erie NPO-A, GEL Part No. 12024 |
| C-445 | Same as C-407 |
| C-446 | Same as C-407 |
| C-447 | Same as C-405 |
| C-448 | Same as C-405 |
| C-449 | Same as C-405 |
| C-450 | Same as C-414 |
| C-451 | Same as C-414 |
| C-452 | Not Assigned |
| C-453 | Same as C-431 |
| C-454 | Same as C-416 |
| C-455 | Same as C-414 |
| C-456 | Not Assigned |
| J-401 | Not Assigned |
| J-402 | Connector, Coaxial UG-1064/U, GEL Part No. 17314 |

| SYMBOL | DESCRIPTION |
|---|---|
| J-403 | Connector, Same as J-402 |
| L-401 | Coil, Integral Part of T-401A |
| L-402 | Coil, Integral Part of T-401B |
| L-403 | Coil, Integral Part of T-402A |
| L-404 | Coil, Integral Part of T-402B |
| L-405 | Choke, Fixed, 2.7 uh, GEL Dwg. No. B-10-103, GEL Part No. 17001 |
| L-406 | Coil, Integral Part of T-403A |
| L-407 | Coil, Integral Part of T-403B |
| L-408 | Same as L-405 |
| L-409 | Coil, Integral Part of T-404A |
| L-410 | Coil, Integral Part of T-404B |
| L-411 | Same as L-405 |
| L-412 | Coil, Integral Part of T-405A |
| L-413 | Coil, Integral Part of T-405B |
| L-414 | Same as L-405 |
| L-415 | Choke, Fixed, 38 uh, Wilco 3038-15, GEL Part No. 17002 |
| P-401 | Connector, 24 contact, Amphenol, Miniature Blue Ribbon 57-10240 |
| P-402 | Connector, Integral Part of W-401 (UG 260/U) |
| R-401 | Resistor, Fixed Composition, 1.0K ± 10%, 1/2W, Allen Bradley EB-1021, GEL Part No. 10400 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-402 | Resistor, Fixed Composition, 100K ± 5%, 1/2W<br>Allen Bradley EB-1045, GEL Part No. 10430 |
| R-403 | Resistor, Fixed Composition, 2.7K ± 5%, 1/2W<br>Allen Bradley EB-2725, GEL Part No. 17412 |
| R-404 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W<br>Allen Bradley EB-1215, GEL Part No. 10449 |
| R-405 | Resistor, Fixed Composition, 33K ± 5%, 1/2W<br>Allen Bradley EB-3335, GEL Part No. 10000 |
| R-406 | Resistor, Fixed Composition, 15K ± 5%, 1/2W<br>Allen Bradley EB-1535, GEL Part No. 10419 |
| R-407 | Same as R-401 |
| R-408 | Same as R-402 |
| R-409 | Resistor, Fixed Composition, 2.4K ± 5%, 1/2W,<br>Allen Bradley EB-2425, GEL Part No. 10402 |
| R-410 | Same as R-404 |
| R-411 | Same as R-405 |
| R-412 | Same as R-403 |
| R-413 | Same as R-401 |
| R-414 | Same as R-409 |
| R-415 | Same as R-404 |
| R-416 | Resistor, Fixed Composition, 150 ohm ± 5%, 1/2W,<br>Allen Bradley EB-1515, GEL Part No. 10451 |
| R-417 | Same as R-406 |
| R-418 | Same as R-401 |
| R-419 | Same as R-402 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-420 | Resistor, Fixed Composition, 2.2K ± 5%, 1/2W, Allen Bradley EB-2225, GEL Part No. 10411 |
| R-421 | Resistor, Fixed Composition, 300 ohm ± 5%, 1/2W, Allen Bradley EB-3015, GEL Part No. 10455 |
| R-422 | Resistor, Fixed Composition, 11K ±5%, 1/2W, Allen Bradley EB-1135, GEL Part No. 10417 |
| R-423 | Same as R-401 |
| R-424 | Same as R-421 |
| R-425 | Resistor, Fixed Composition, 51 ohm ± 5%, 1/2W, Allen Bradley EB-5105, GEL Part No. 10443 |
| R-426 | Resistor, Fixed Composition, 12K ± 5%, 1/2W, Allen Bradley EB-1235, GEL Part No. 10418 |
| R-427 | Resistor, Fixed Composition, 150K ± 5%, 1/2W, Allen Bradley EB-1545, GEL Part No. 10424 |
| R-428 | Same as R-427 |
| R-429 | Resistor, Fixed Composition, 4.7 ohm ± 10%, 1W, Allen Bradley GB-47G1, GEL Part No. 10904 |
| R-430 | Same as R-427 |
| R-431 | Same as R-402 |
| R-432 | Potentiometer, Composition, 100K ± 10%, 1/2W, Ohmite AS-3510, GEL Part No. 14009 |
| R-433 | Resistor, Fixed Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1021, GEL Part No. 10474 |
| R-434 | Resistor, Fixed Composition, 220K ±10%, 1/2W, Allen Bradley EB-2241, GEL Part No. 10550 |
| R-435 | Same as R-405 |
| R-436 | Resistor, Fixed Composition, 10 ohm ± 10%, 1/2W, Allen Bradley EB-1001, GEL Part No. 10497 |

| SYMBOL | DESCRIPTION |
|---|---|
| R-437 | Potentiometer, Composition, 10K ± 10%, 1/2W, Ohmite AS-3607, GEL Part No. 14008 |
| R-438 | Same as R-402 |
| R-439 | Resistor, Fixed Composition, 47K ± 10%, 1/2W, Allen Bradley EB-4731, GEL Part No. 10480 |
| R-440 | Same as R-439 |
| T-401A | IF Transformer, #B-15-050 |
| T-401B | IF Transformer, #B-10-816 |
| T-402A | IF Transformer, #B10-817 |
| T-402B | Same as T-401B |
| T-403A | Same as T-402A |
| T-403B | Same as T-401B |
| T-404A | Same as T-402A |
| T-404B | IF Transformer, GEL Dwg. #B-10-815 |
| T-405A | IF Transformer, GEL Dwg. #B-10-818 |
| T-405B | IF Transformer, GEL Dwg. #B-14-378 |
| V-401 | Tube, Electron 5749/6BA6W, GEL Part No. 14788 |
| V-402 | Same as V-401 |
| V-403 | Same as V-401 |
| V-404 | Tube, Electron, 6AH6, GEL Part No. 14775 |
| V-405 | Tube, Electron, 5725/6AL5W, GEL Part No. 14784 |
| W-401 | Cable Ass'y, GEL Dwg. #B-11-039-1 |

1.0 MC IF

| SYMBOL | DESCRIPTION |
|---|---|
| C-401 | Not Assigned |
| C-402 | Capacitor, Fixed Ceramic Tubular, 20 pf ± 5%, Erie NPO-A, BEL Part No. 12031 |
| C-403 | Not Assigned |
| C-404 | Capacitor, Fixed Ceramic Tubular, 22 uuf ± 5%, Erie NPO-A, GEL Part No. 12105 |
| C-405 | Capacitor, Fixed Ceramic Tubular, 33 uuf ± 5%, Erie NPO-T, GEL Part No. 12035 |
| C-406 | Capacitor, Fixed Ceramic Disc, .0047 uf + 100% - 20%, Erie CK82Y472Z, GEL Part No. 12050 |
| C-407 | Same as C-405 |
| C-408 | Same as C-406 |
| C-409 | Same as C-406 |
| C-410 | Same as C-420 |
| C-411 | Capacitor, Fixed Ceramic Tubular, 0.8 uuf ± .25 uuf, Erie NPO-A, GEL Part No. 12018 |
| C-412 | Same as C-404 |
| C-413 | Same as C-405 |
| C-414 | Not Assigned |
| C-415 | Capacitor, Fixed Ceramic Disc, .001 uf + 100% -20%, Erie CK81Y102Z, GEL Part No. 12070 |
| C-416 | Same as C-405 |
| C-417 | Same as C-405 |
| C-418 | Same as C-405 |
| C-419 | Same as C-405 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-420 | Capacitor, Fixed Ceramic Tubular, 7.5 ± .25 uuf, Erie NPO-A, GEL Part No. 12019 |
| C-421 | Same as C-411 |
| C-422 | Same as C-406 |
| C-423 | Same as C-404 |
| C-424 | Same as C-405 |
| C-425 | Not Assigned |
| C-426 | Same as C-406 |
| C-427 | Same as C-406 |
| C-428 | Same as C-406 |
| C-429 | Same as C-406 |
| C-430 | Same as C-420 |
| C-431 | Same as C-411 |
| C-432 | Same as C-404 |
| C-433 | Same as C-405 |
| C-434 | Same as C-415 |
| C-435 | Same as C-406 |
| C-436 | Same as C-406 |
| C-437 | Same as C-406 |
| C-438 | Capacitor, Fixed Ceramic 0.1 ± .5 uuf, Erie NPO-A, GEL Part No. 12022 |
| C-439 | Same as C-411 |
| C-440 | Same as C-406 |
| C-441 | Same as C-404 |

| SYMBOL | DESCRIPTION |
|---|---|
| C-442 | Capacitor, Fixed Ceramic Feedthru, .001 uf ± 20%, Erie GP2-327, GEL Part No. 12067 |
| C-443 | Capacitor, Fixed Silvered Mica, 300 uuf ± 5%, Elmenco CM15E301J, GEL Part No. 12501 |
| C-444 | Capacitor, Fixed Ceramic Tubular, 470 uuf + 100% - 20%, Erie CK32W471Z, GEL Part No. 12147 |
| C-445 | Capacitor, Fixed Ceramic Tubular, 18 uuf ± 5%, Erie NPO-A, GEL Part No. 12029 |
| C-446 | Capacitor, Fixed Ceramic Disc, .0015 uf + 100% - 20%, Erie CK81Y152Z, GEL Part No. 12053 |
| C-447 | Capacitor, Fixed Ceramic Tubular, 12 uuf ± 5%, Erie NPO-A, GEL Part No. 12024 |
| C-448 | Same as C-406 |
| C-449 | Same as C-406 |
| C-450 | Same as C-446 |
| C-451 | Same as C-446 |
| C-452 | Same as C-446 |
| C-453 | Capacitor, Fixed Ceramic Tubular, 47 uuf ± 5%, Erie NPO-T, GEL Part No. 12040 |
| C-454 | Capacitor, Fixed Silvered Mica, 100 uuf ± 5%, Elmenco CM15E101J, GEL Part No. 12523 |
| C-455 | Same as C-446 |
| C-456 | Same as C-446 |
| C-457 | Same as C-415 |
| C-458 | Same as C-415 |
| J-401 | Not Assigned |
| J-402 | Connector, Coaxial UG 1094/U, GEL Part No. 17314 |

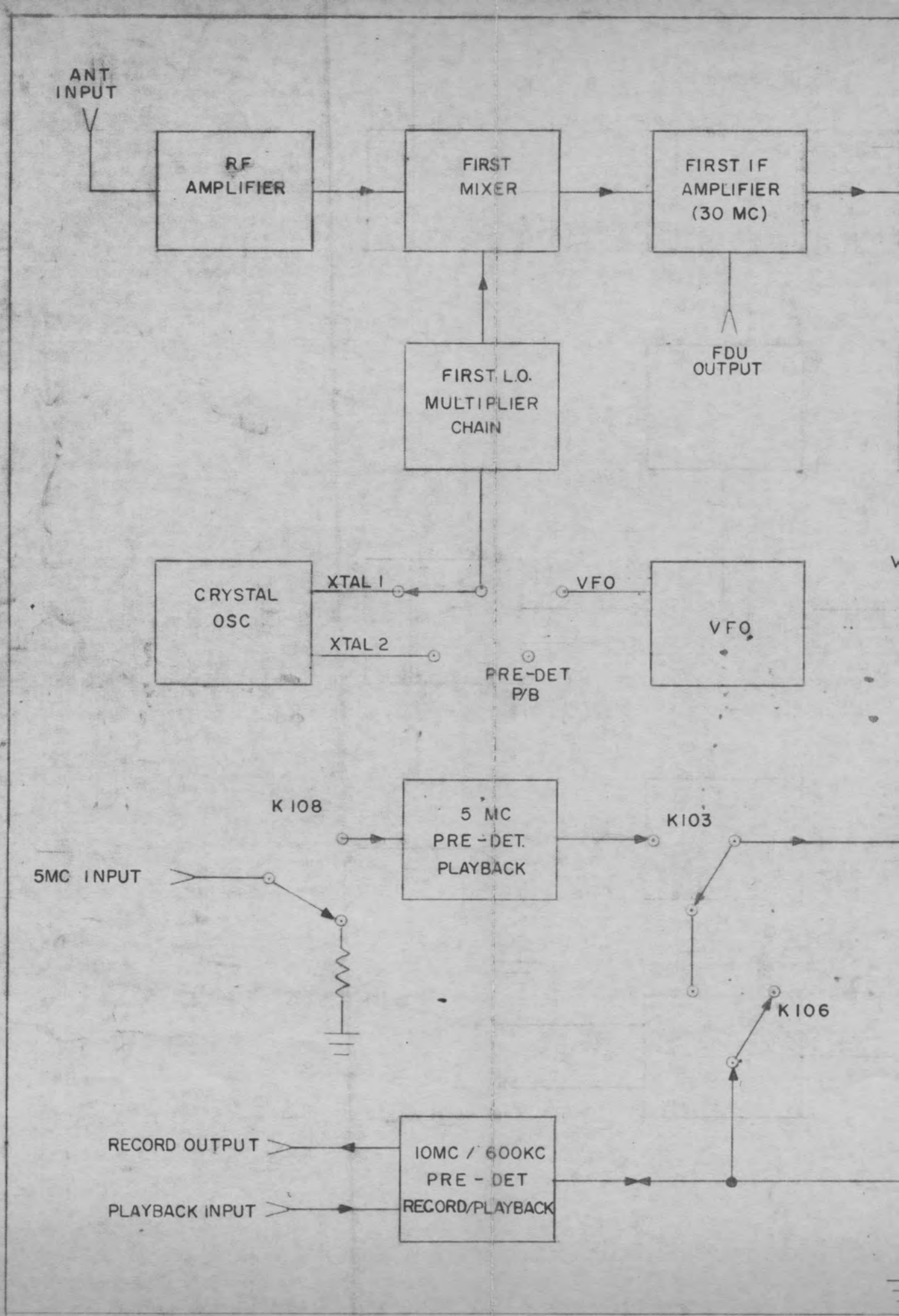
| SYMBOL | DESCRIPTION |
|---|---|
| J-403 | Same as J-402 |
| L-401 | Coil, Integral Part of T-401A |
| L-402 | Coil, Integral Part of T-401B |
| L-403 | Coil, Integral Part of T-402A |
| L-404 | Coil, Integral Part of T-402B |
| L-405 | Choke, Fixed, 2.7 uh, GEL Dwg. No. B-10-103, GEL Part No. 17001 |
| L-406 | Coil, Integral Part of T-403A |
| L-407 | Coil, Integral Part of T-403B |
| L-408 | Same as L-405 |
| L-409 | Coil, Integral Part of T-404A |
| L-410 | Coil, Integral Part of T-404B |
| L-411 | Same as L-405 |
| L-412 | Coil, Integral Part of T-405A |
| L-413 | Coil, Integral Part of T-405B |
| L-414 | Same as L-405 |
| L-415 | Choke, Fixed, 38 uh, Wilco 3038-15, GEL Part No. 17002 |
| P-401 | Connector, 24 contact, Amphenol 57-10340, Miniature Blue Ribbon Connector, GEL Part No. 17408 |
| P-402 | Connector, Part of W-401, UG 260/U |
| R-401 | Not Assigned |

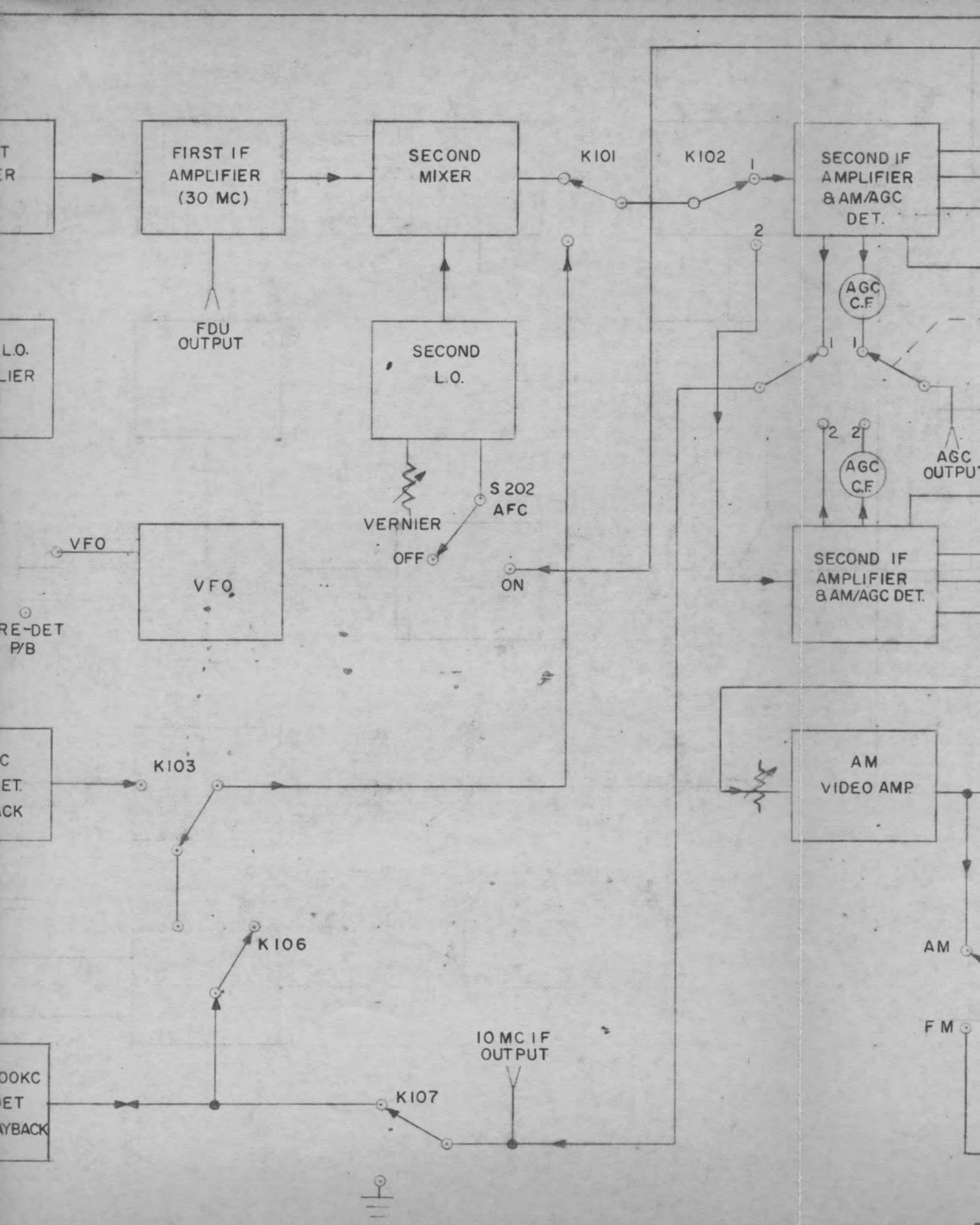
| SYMBOL | DESCRIPTION |
|---|---|
| R-402 | Resistor, Fixed Composition, 100K ± 5%, 1/2W, Allen Bradley EB-1045, GEL Part No. 10430 |
| R-403 | Resistor, Fixed Composition, 1.3K ± 5%, 1/2W, Allen Bradley EB-1325, GEL Part No. 10469 |
| R-404 | Resistor, Fixed Composition, 120 ohm ± 5%, 1/2W, Allen Bradley EB-1215, GEL Part No. 10449 |
| R-405 | Resistor, Fixed Composition, 33K ± 5%, 1/2W, Allen Bradley EB-3335, GEL Part No. 10500 |
| R-406 | Resistor, Fixed Composition, 15K ± 5%, 1/2W, Allen Bradley EB-1535, GEL Part No. 10419 |
| R-407 | Resistor, Fixed Composition, 1K ± 5%, 1/2W, Allen Bradley EB-1025, GEL Part No. 10401 |
| R-408 | Same as R-402 |
| R-409 | Resistor, Fixed Composition, 1.8K ± 5%, 1/2W, Allen Bradley EB-1825, GEL Part No. 10147 |
| R-410 | Same as R-404 |
| R-411 | Same as R-405 |
| R-412 | Same as R-406 |
| R-413 | Same as R-407 |
| R-414 | Same as R-409 |
| R-415 | Same as R-404 |
| R-416 | Resistor, Fixed Composition, 150 ohm ± 5%, 1/2W, Allen Bradley EB-1515, GEL Part No. 10451 |
| R-417 | Same as R-405 |
| R-418 | Same as R-409 |

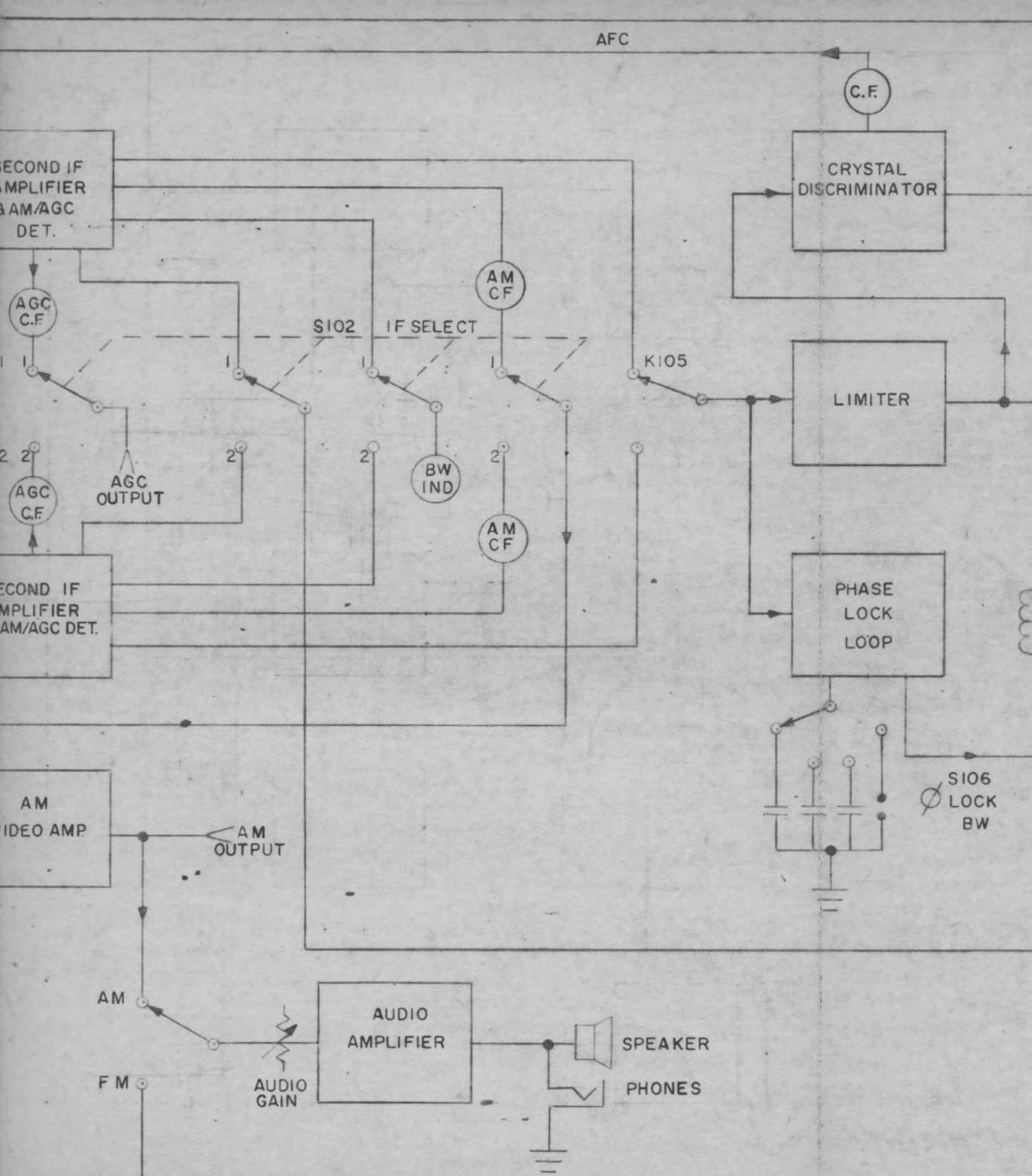
| SYMBOL | DESCRIPTION |
|---|---|
| R-419 | Same as R-402 |
| R-420 | Same as R-400 |
| R-421 | Resistor, Fixed Composition, 300 ohm ± 5%, 1/2W, Allen Bradley EB-3015, GEL Part No. 10455 |
| R-422 | Resistor, Fixed Composition, 11K ± 5%, 1/2W, Allen Bradley EB-1135, GEL Part No. 10417 |
| R-423 | Same as R-407 |
| R-424 | Same as R-408 |
| R-425 | Resistor, Fixed Composition, 51 ohm ± 5%, 1/2W, Allen Bradley EB-5105, GEL Part No. 10443 |
| R-426 | Resistor, Fixed Composition, 12K ± 5%, 1/2W, Allen Bradley EB-1235, GEL Part No. 10418 |
| R-427 | Not Assigned |
| R-428 | Resistor, Fixed Composition, 150K ± 5%, 1/2W, Allen Bradley EB-1545, GEL Part No. 10424 |
| R-429 | Resistor, Fixed Composition, 4.7 ohm ± 10%, 1 W, Allen Bradley GB-4761, GEL Part No. 10004 |
| R-430 ** | Resistor, Fixed Composition, 220K ± 5%, 1/2W, Allen Bradley EB-2245, GEL Part No. 10508 |
| R-431 | Same as R-430 |
| R-432 | Potentiometer, Composition, 250K ± 10%, 1/2W, Ohmite AS-3511, GEL Part No. 14041 |
| R-433 | Resistor, Fixed Composition, 10K ± 10%, 1/2W, Allen Bradley EB-1021, GEL Part No. 10474 |
| R-434 | Same as R-430 |

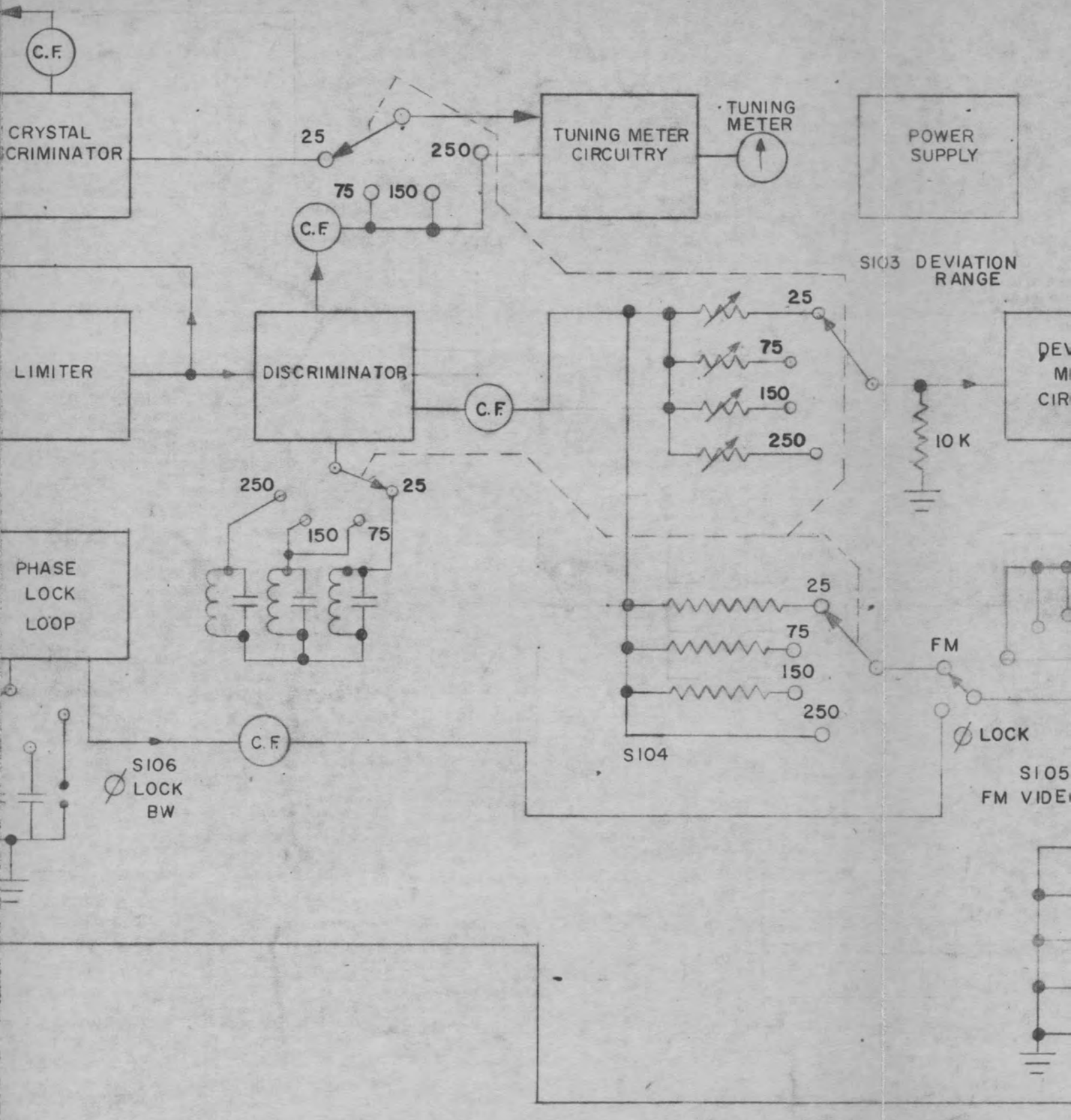
** Exact value to be determined in test

| SYMBOL | DESCRIPTION |
|---|---|
| R-435 | Resistor, Fixed Composition, 10 ohm ± 10%, 1/2W, Allen Bradley EB-1001, GEL Part No. 10442 |
| R-436 | Same as R-428 |
| R-437 | Potentiometer, Composition, 100K ± 10%, 1/2W, Ohmite AS-3610, GEL Part No. 14009 |
| R-438 | Same as R-402 |
| T-401A | IF Transformer, GEL Dwg. #B-14-003-3 |
| T-401B | IF Transformer, GEL Dwg. #B-14-004-2 |
| T-402A | IF Transformer, GEL Dwg. #B-10-974 |
| T-402B | Same as T-401B |
| T-403A | Same as T-402A |
| T-403B | IF Transformer, GEL Dwg. #B-10-971- 4 |
| T-404A | IF Transformer, GEL Dwg. #B10-974-3 |
| T-404B | IF Transformer, GEL Dwg. #B10-971-2 |
| T-405A | Same as T-402A |
| T-405B | IF Transformer, GEL Dwg. #B-14-381-2 |
| V-401 | Tube, Electron, 5749/6BA3W, GEL Part No. 14788 |
| V-402 | Same as V-401 |
| V-403 | Same as V-401 |
| V-404 | Tube, Electron, 6AH6, GEL Part No. 14775 |
| V-405 | Tube, Electron, 5726/6AL5W, GEL Part No. 14764 |
| W-401 | Cable Assy, GEL Dwg. No. B11-035-13 |


ANT INPUT
RF AMPLIFIER
FIRST MIXER
FIRST IF AMPLIFIER (30 MC)
FDU OUTPUT
FIRST L.O. MULTIPLIER CHAIN
CRYSTAL OSC
XTAL 1
XTAL 2
VFO
VFO
PRE-DET P/B
K 108
5 MC PRE-DET. PLAYBACK
K103
5MC INPUT
K106
RECORD OUTPUT
PLAYBACK INPUT
10MC / 600KC PRE - DET RECORD/PLAYBACK


FIRST IF AMPLIFIER (30 MC)
SECOND MIXER
K101
K102
SECOND IF AMPLIFIER & AM/AGC DET.
FDU OUTPUT
SECOND L.O.
AGC C.F.
AGC OUTPUT
VERNIER
S 202 AFC
OFF
ON
VFO
VFO
SECOND IF AMPLIFIER & AM/AGC DET.
K103
AM VIDEO AMP
K106
10 MC IF OUTPUT
K107
AM
FM


AFC
C.F.
CRYSTAL DISCRIMINATOR
SECOND IF AMPLIFIER & AM/AGC DET.
AM CF
AGC C.F.
S102 IF SELECT
K105
LIMITER
AGC OUTPUT
BW IND
AM CF
AGC C.F.
SECOND IF AMPLIFIER & AM/AGC DET.
PHASE LOCK LOOP
S106 LOCK BW
AM VIDEO AMP.
AM OUTPUT
AM
FM
AUDIO GAIN
AUDIO AMPLIFIER
SPEAKER
PHONES


C.F.
CRYSTAL CRIMINATOR
25
250
75
150
C.F.
TUNING METER CIRCUITRY
TUNING METER
POWER SUPPLY
S103 DEVIATION RANGE
LIMITER
DISCRIMINATOR
C.F.
25
75
150
250
10 K
250
25
150
75
PHASE LOCK LOOP
25
75
150
250
FM
S104
C.F.
S106 LOCK BW
LOCK
S105
FM VIDE

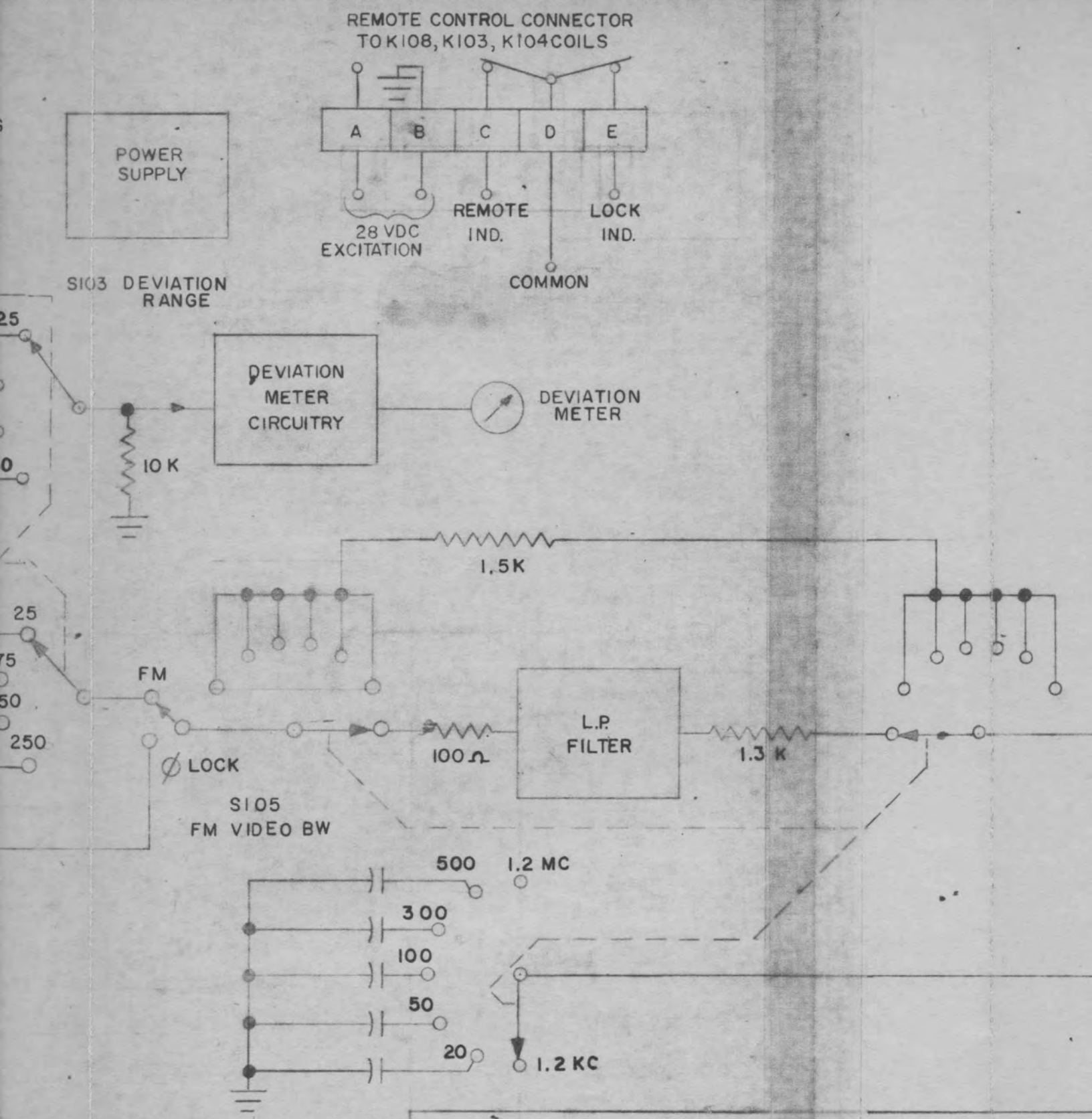
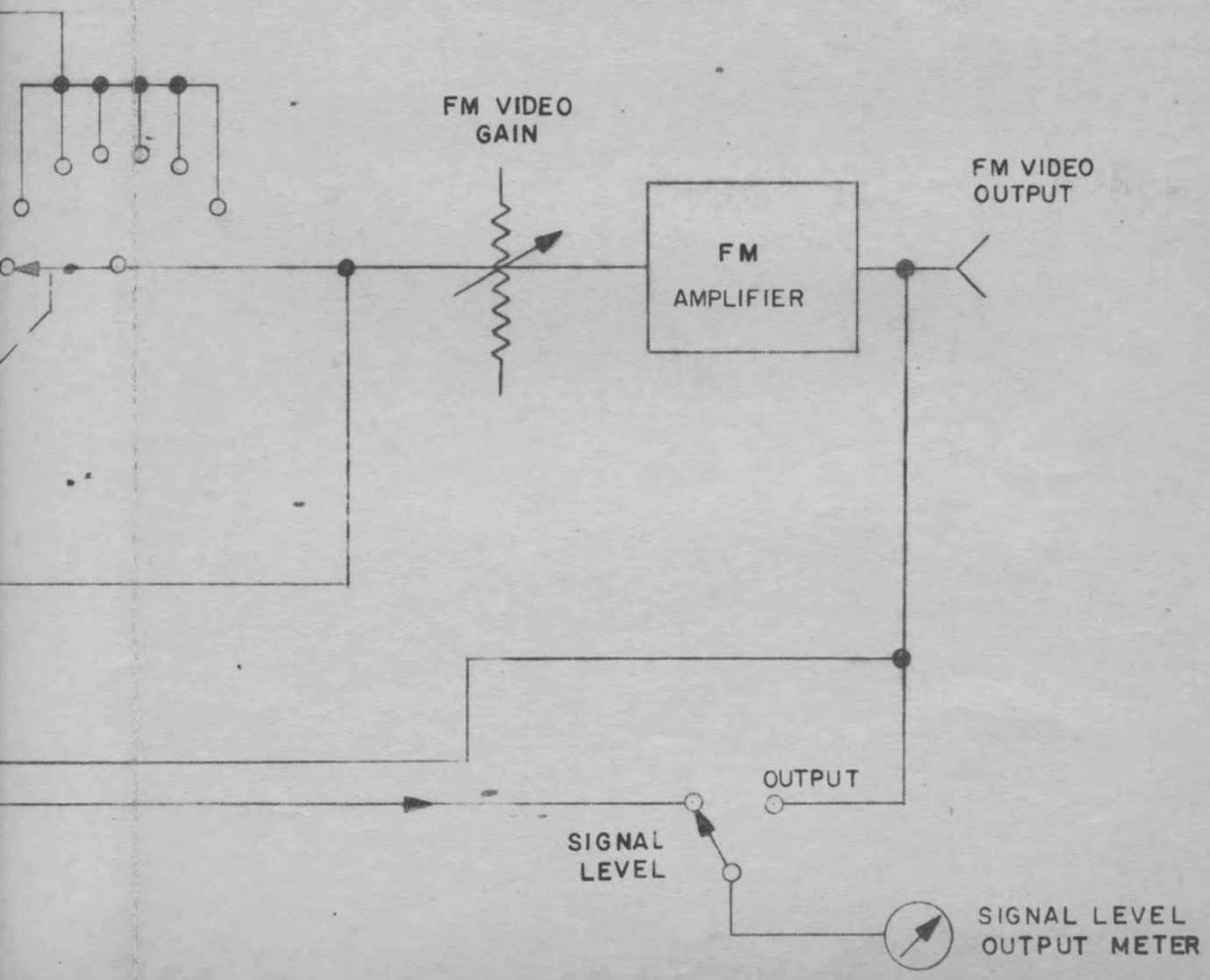
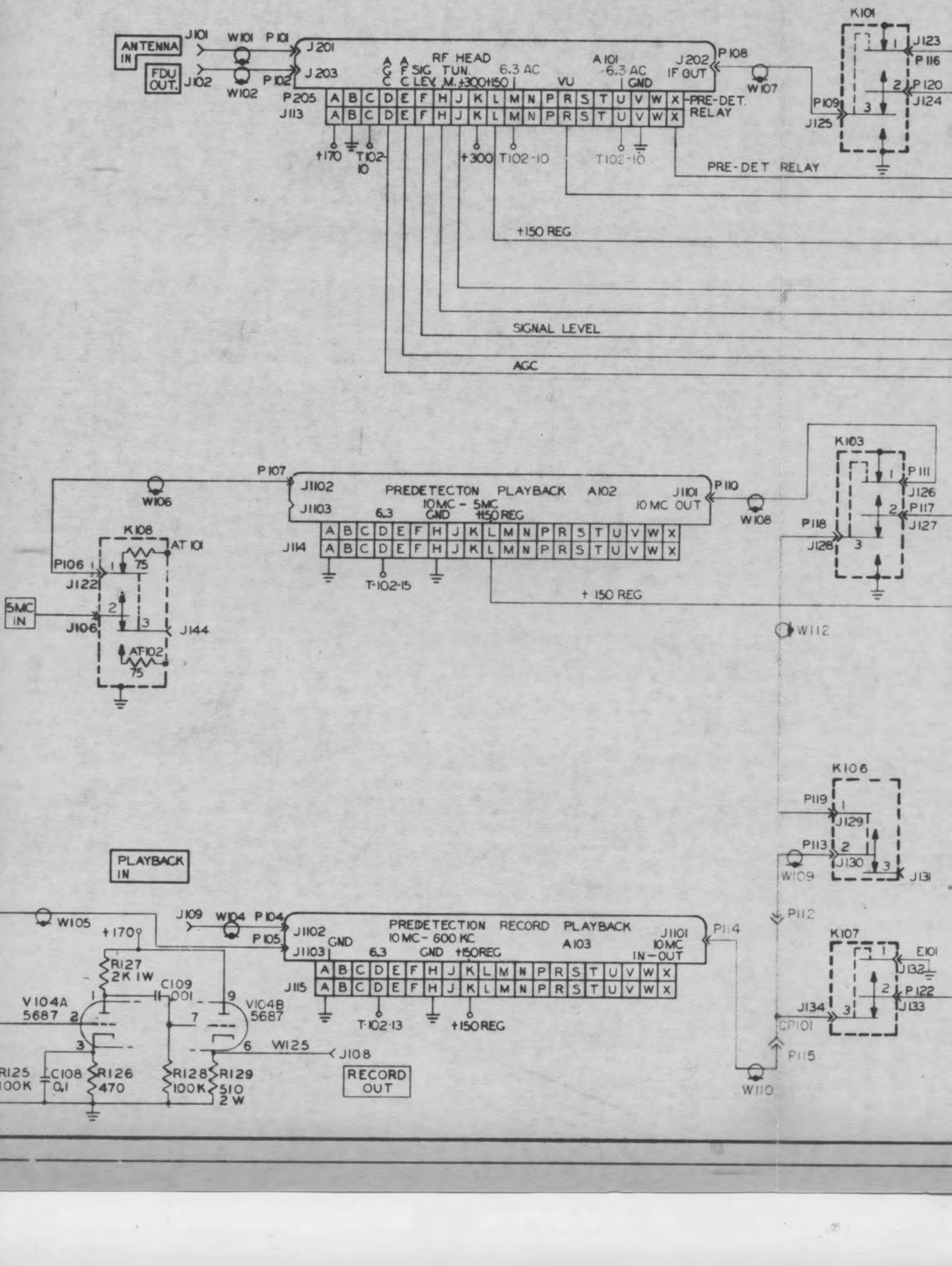
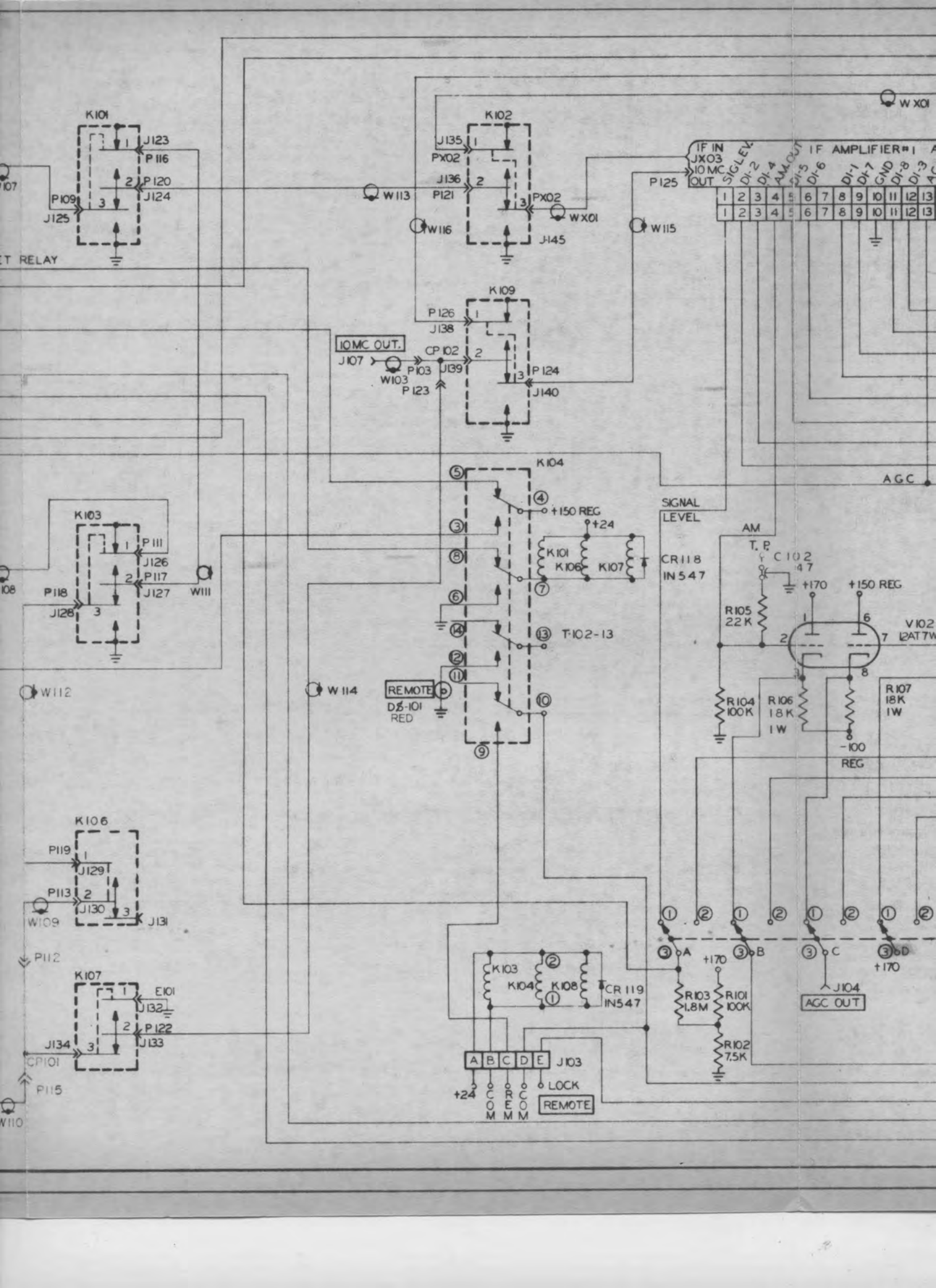
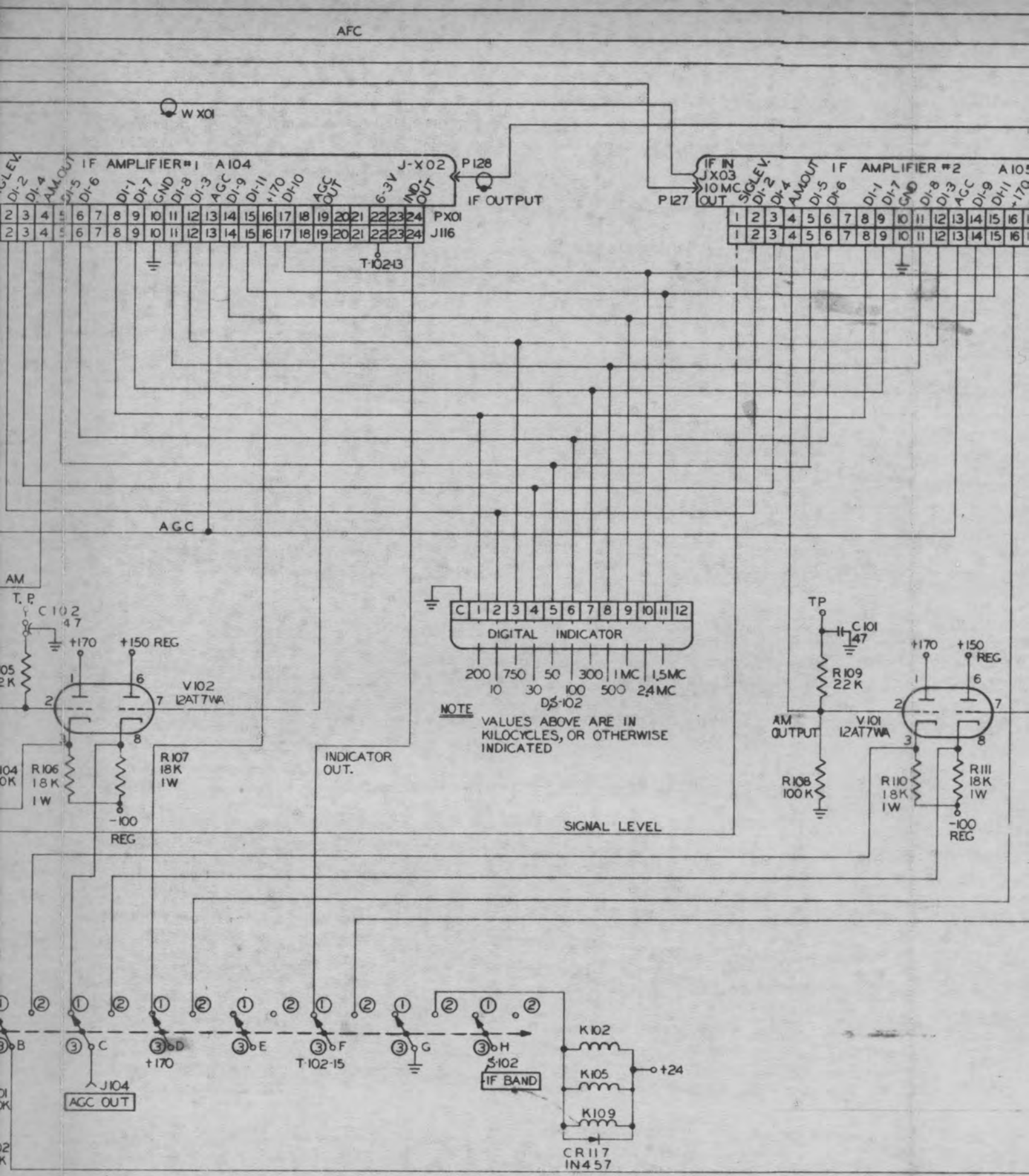


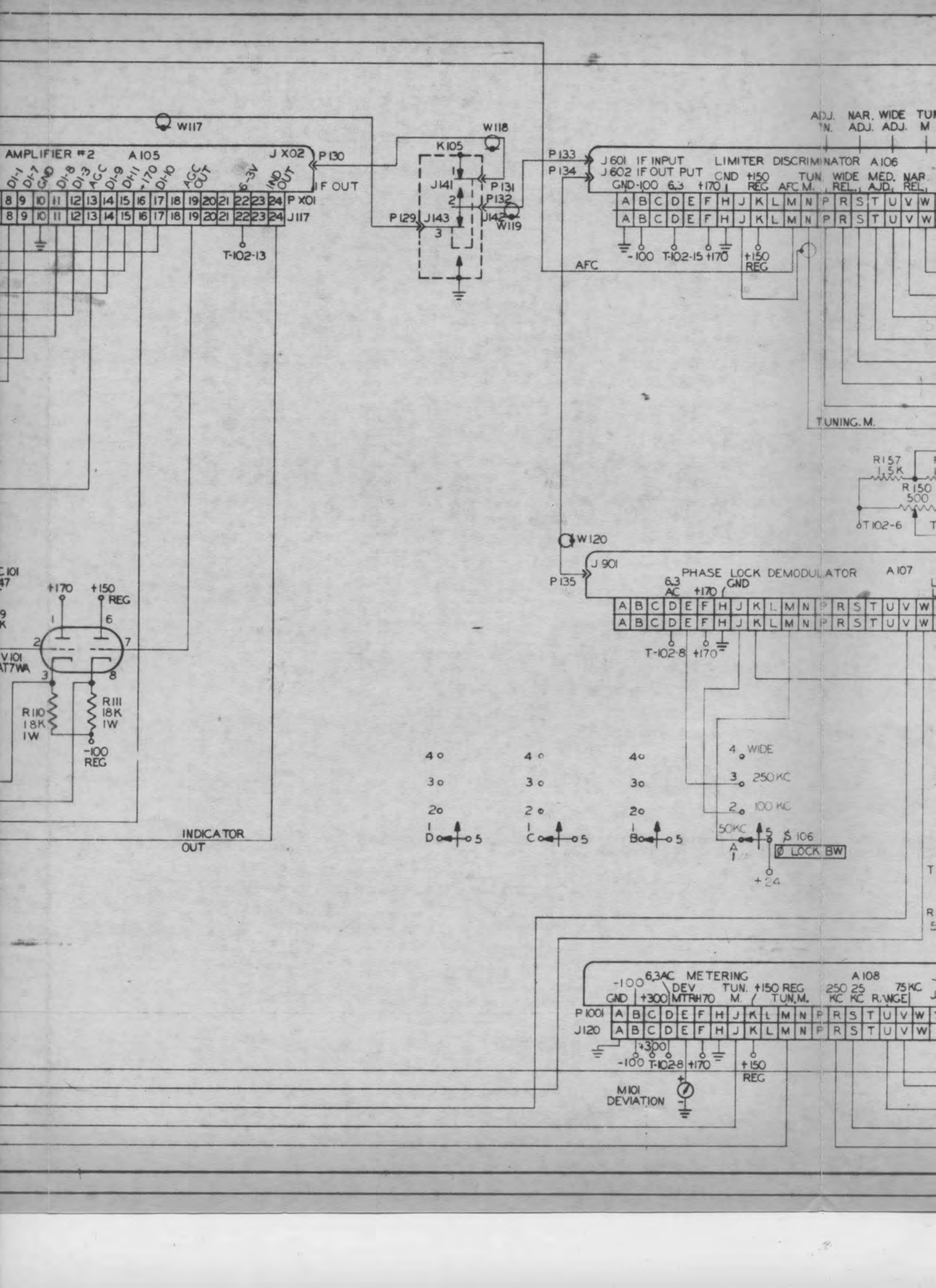

FIGURE 2
BLOCK DIAGRAM
TYPE 1161A
TELEMETRY RECEIVER
R14-701

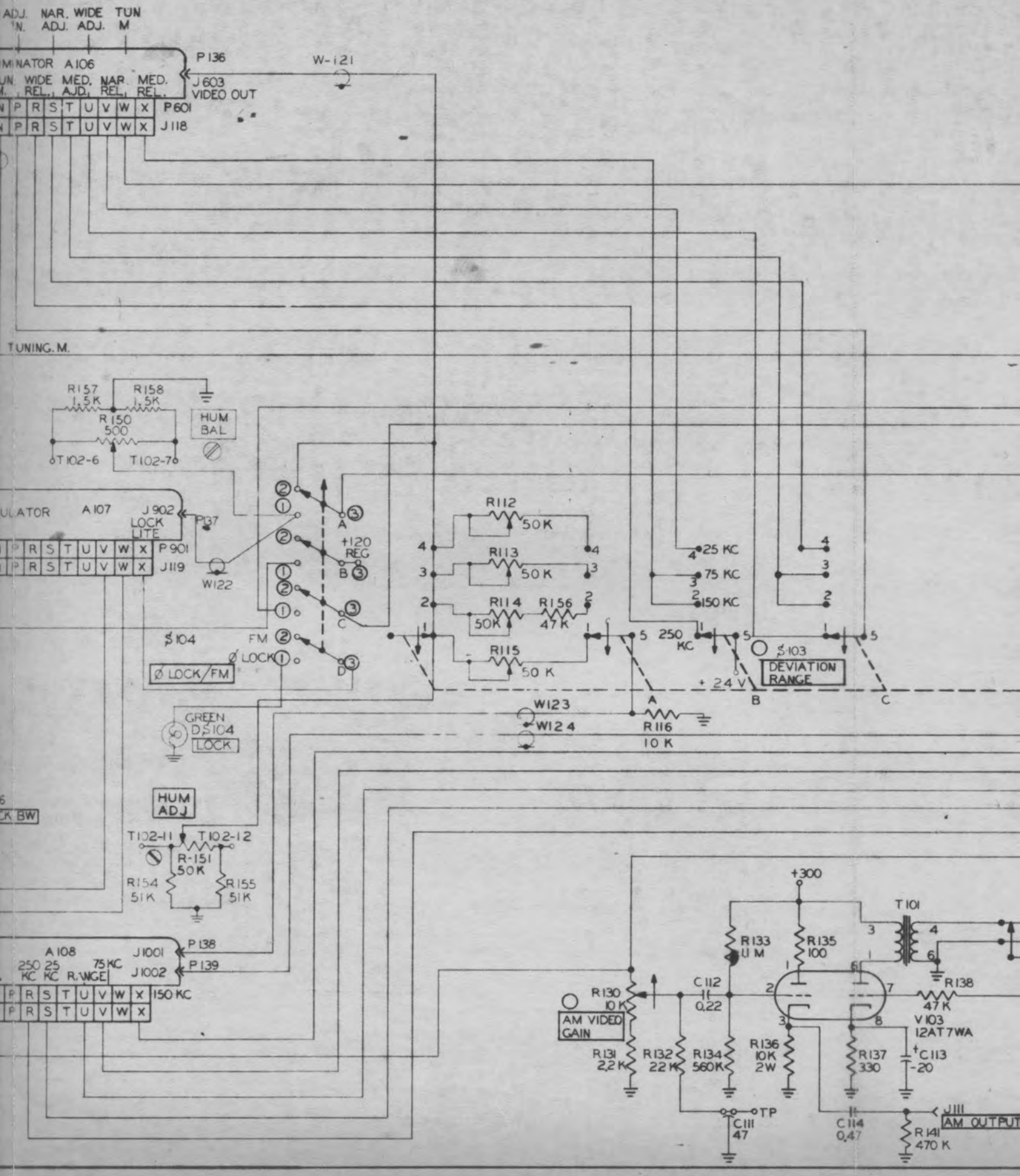

FM VIDEO
GAIN
FM VIDEO
OUTPUT
FM
AMPLIFIER
OUTPUT
SIGNAL
LEVEL
SIGNAL LEVEL
OUTPUT METER

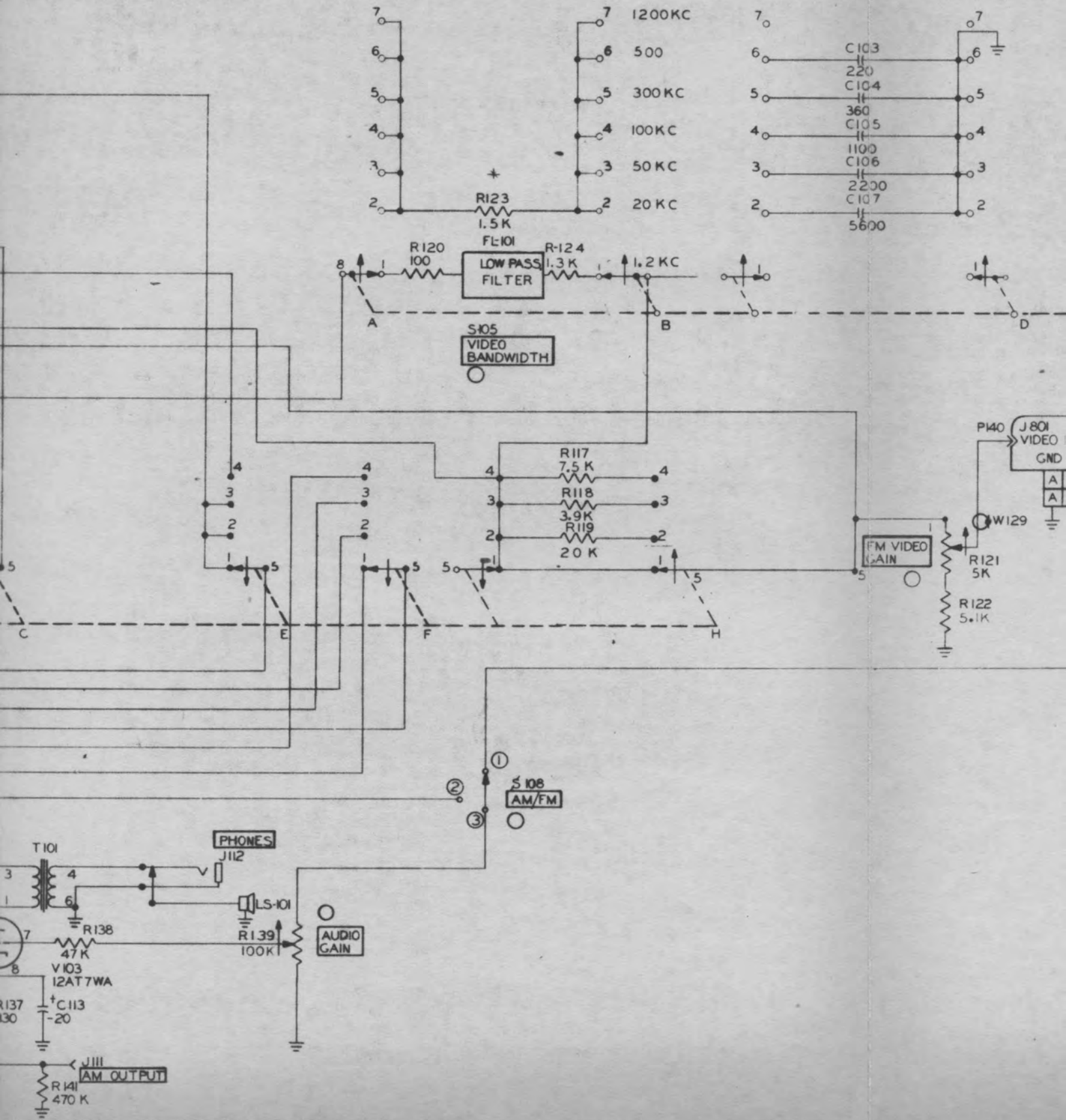

ANTENNA IN
J101
W101
P101
J201
FDU OUT.
J102
W102
P102
J203
RF HEAD
AGC
AFC
SIG LEV.
TUN. M.
6.3 AC
+300
+150
VU
A101
6.3 AC
GND
J202
IF OUT
P108
W107
P205
J113
PRE-DET. RELAY
+170
T102-10
+300
T102-10
T102-10
PRE-DET RELAY
+150 REG
SIGNAL LEVEL
AGC
K101
J123
P116
P120
J124
P109
J125
P107
W106
J1102
J1103
PREDETECTON PLAYBACK A102
10MC - 5MC
6.3
GND
+150 REG
J1101
10 MC OUT
P110
W108
J114
T-102-15
+ 150 REG
K103
P111
J126
P117
J127
P118
J128
K108
AT 101
P106
J122
75
5MC IN
J106
J144
AT102
75
W112
PLAYBACK IN
W105
+170
J109
W104
P104
P105
J1102
J1103
PREDETECTION RECORD PLAYBACK
10MC - 600 KC
A103
GND
6.3
GND
+150REG
J1101
10MC
IN-OUT
P114
J115
T-102-13
+150REG
R127
2K 1W
C109
.001
V104A
5687
V104B
5687
W125
J108
R125
100K
C108
0.1
R126
470
R128
100K
R129
510
2W
RECORD OUT
K106
P119
J129
P113
J130
W109
J131
P112
K107
E101
J132
P122
J133
J134
CP101
P115
W110

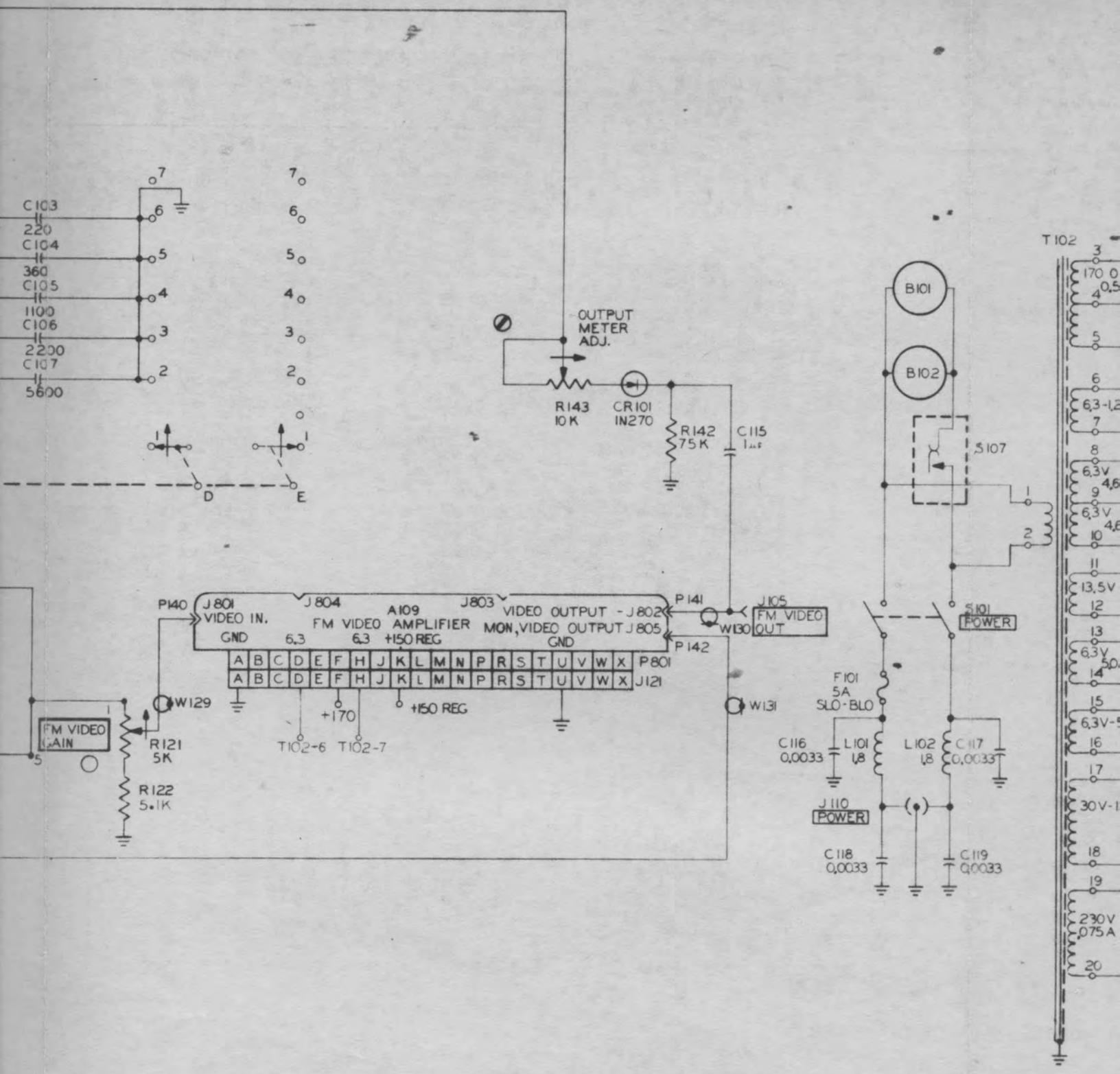

K101
J123
P116
P120
J124
P109
J125
T RELAY
K102
J135
PX02
J136
P121
W113
W116
J145
W X01
IF IN
JX03
10 MC
OUT
SIGLEV
DI-2
DI-4
AM OUT
DI-5
DI-6
DI-1
DI-7
GND
DI-8
DI-3
P125
IF AMPLIFIER #1
W115
K109
P126
J138
10 MC OUT.
J107
CP102
P103
W103
P123
J139
P124
J140
AGC
K104
+150 REG
+24
K101
K106
K107
CR118
IN547
SIGNAL
LEVEL
AM
T. P.
C102
.47
+170
+150 REG
R105
22K
V102
12AT7W
T-102-13
K103
P111
J126
P117
J127
P118
J128
W111
W112
W114
REMOTE
DS-101
RED
R104
100K
R106
18K
1W
R107
18K
1W
-100
REG
K106
P119
J129
P113
J130
J131
W109
P112
K107
E101
J132
P122
J133
J134
CP101
P115
W110
K103
K104
K108
CR119
IN547
R103
1.8M
R101
100K
R102
7.5K
J104
AGC OUT
A B C D E
J103
+24
COM
REM
COM
LOCK
REMOTE
+170

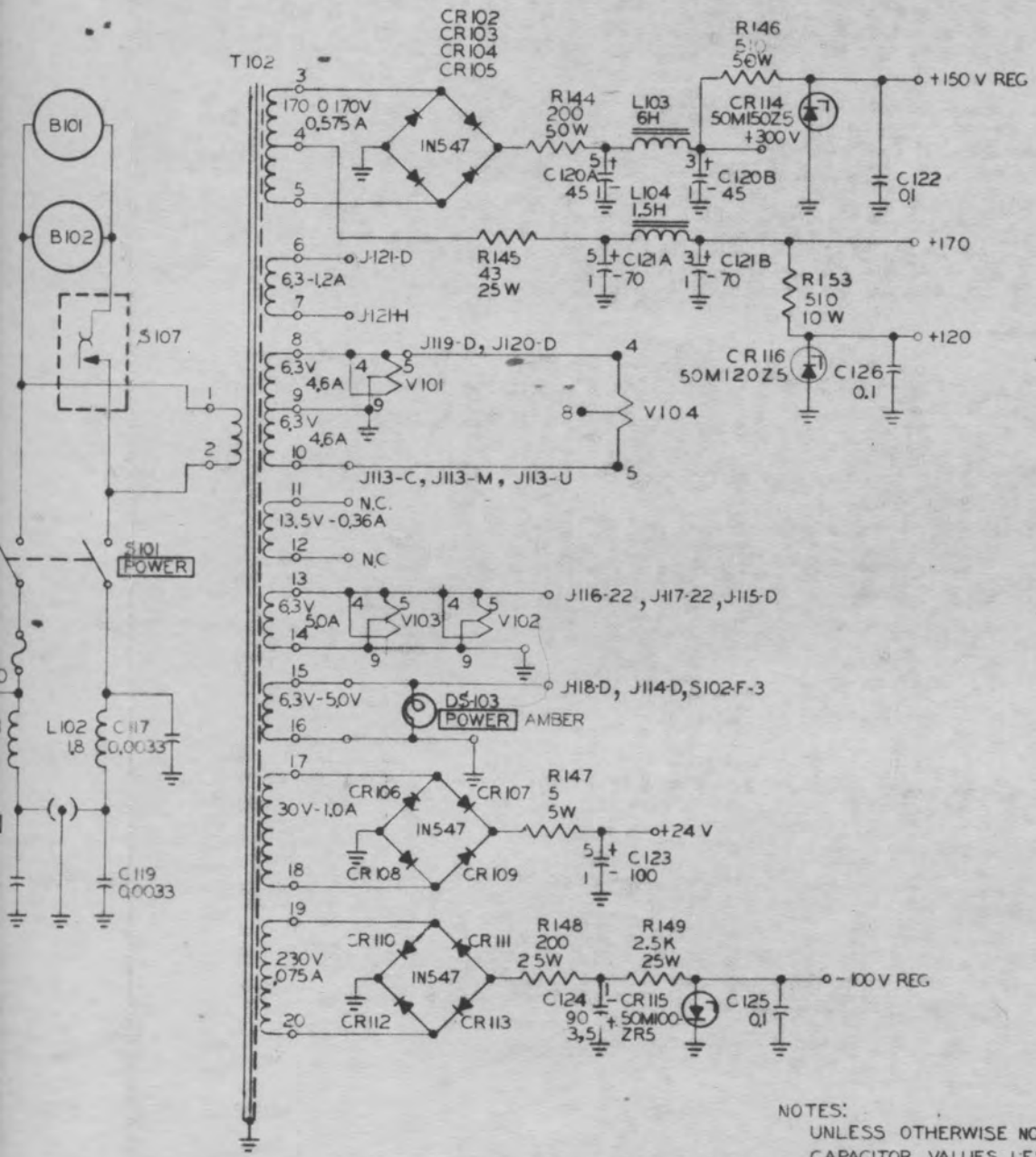

AFC
W X01
IF AMPLIFIER #1 A104
J-X02
P128
IF OUTPUT
P127
IF IN J X03 10 MC OUT
IF AMPLIFIER #2 A105
PX01
J116
T-102-13
AGC
AM
T. P.
C102 47
+170
+150 REG
V102 12AT7WA
R106 18K 1W
R107 18K 1W
-100 REG
INDICATOR OUT.
C 1 2 3 4 5 6 7 8 9 10 11 12
DIGITAL INDICATOR
200 750 50 300 1 MC 1.5 MC
10 30 100 500 2.4 MC
D5-102
NOTE
VALUES ABOVE ARE IN KILOCYCLES, OR OTHERWISE INDICATED
TP
C101 47
R109 22K
AM OUTPUT
V101 12AT7WA
R108 100K
R110 18K 1W
R111 18K 1W
SIGNAL LEVEL
B
C
D
E
F
G
H
+170
T-102-15
S-102
IF BAND
J104
AGC OUT
K102
K105
K109
+24
CR117 IN457
TUNING METER


W117
AMPLIFIER #2 A105
J X02
P130
DI-1
DI-7
GND
DI-8
DI-3
AGC
DI-9
DI-11
-170
DI-10
AGC OUT
6.3V
IND OUT
IF OUT
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 P X01
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 J117
T-102-13
W118
K105
J141
P131
P132
J142
W119
P129
J143
P133
P134
J601 IF INPUT
J602 IF OUT PUT
LIMITER DISCRIMINATOR A106
GND -100 6.3 +170 GND +150 REG AFC M. TUN. REL. WIDE ADJ. MED. ADJ. NAR. REL.
A B C D E F H J K L M N P R S T U V W
-100
T-102-15
+170
+150 REG
AFC
ADJ. IN.
NAR. ADJ.
WIDE ADJ.
TUNING. M.
R157 1.5K
R150 500
T102-6
W120
J 901
P135
PHASE LOCK DEMODULATOR A107
6.3 AC
+170
GND
T-102-8
+170
+170
+150 REG
V101 6AT7WA
R110 18K 1W
R111 18K 1W
-100 REG
INDICATOR OUT
4 3 2 1 D 5
4 3 2 1 C 5
4 3 2 1 B 5
4 WIDE
3 250 KC
2 100 KC
50KC
S 106
A 1
Ø LOCK BW
+24
6.3AC METERING
A108
-100 GND
+300
DEV MTR
+170
TUN. M.
+150 REG TUN.M.
250 KC
25 KC
75KC R.WIDGE
P1001
J120
A B C D E F H J K L M N P R S T U V W
+300
-100
T-102-8
+170
+150 REG
M101 DEVIATION


ADJ.
NAR. ADJ.
WIDE ADJ.
TUN M
P136
W-121
J603 VIDEO OUT
P601
J118
WIDE REL.
MED. ADJ.
NAR. REL.
MED. REL.
TUNING. M.
R157 1.5K
R158 1.5K
R150 500
HUM BAL
T102-6
T102-7
A107
J902
LOCK LITE
P137
P901
J119
W122
+120 REG
$104
FM
Ø LOCK
Ø LOCK/FM
R112 50K
R113 50K
R114 50K
R156 47K
R115 50 K
25 KC
75 KC
150 KC
250 KC
$103
DEVIATION RANGE
+ 24 V
W123
W124
R116 10 K
GREEN D.S104 LOCK
HUM ADJ
T102-11
T102-12
R-151 50K
R154 51K
R155 51K
A108
J1001
J1002
P138
P139
250 KC
25 KC
75KC
R.WGE
150 KC
+300
T101
R133 1.1 M
R135 100
R130 10 K
AM VIDEO GAIN
C112 0.22
R138 47 K
V103 12AT7WA
R131 2.2K
R132 22K
R134 560K
R136 10K 2W
R137 330
+C113 -20
TP
C111 47
C114 0.47
J111
AM OUTPUT
R141 470 K


1200KC
500
300KC
100KC
50KC
20KC
R123
1.5K
C103
220
C104
360
C105
1100
C106
2200
C107
5600
FL101
LOW PASS FILTER
R120
100
R124
1.3K
1.2KC
S105
VIDEO BANDWIDTH
A
B
D
R117
7.5K
R118
3.9K
R119
20K
C
E
F
H
P140
J801
VIDEO
GND
W129
FM VIDEO GAIN
R121
5K
R122
5.1K
S108
AM/FM
PHONES
J112
T101
LS-101
R138
47K
R139
100K
AUDIO GAIN
V103
12AT7WA
C113
-20
J111
AM OUTPUT
R141
470K


C103
220
C104
360
C105
1100
C106
2200
C107
5600
OUTPUT METER ADJ.
R143 10K
CR101 IN270
R142 75K
C115 1μF
D
E
B101
B102
S107
T102
S101 POWER
J105 FM VIDEO OUT
W130
P141
P142
P140
J801 VIDEO IN.
J804
A109 FM VIDEO AMPLIFIER
J803 VIDEO OUTPUT - J802
MON, VIDEO OUTPUT J805
GND
6.3
6.3
+150 REG
GND
A B C D E F H J K L M N P R S T U V W X P801
A B C D E F H J K L M N P R S T U V W X J121
W129
W131
+170
+150 REG
T102-6
T102-7
FM VIDEO GAIN
R121 5K
R122 5.1K
F101 5A SLO-BLO
C116 0.0033
L101 1.8
L102 1.8
C117 0.0033
J110 POWER
C118 0.0033
C119 0.0033
170 0
6.3-1.2
6.3V
6.3V
13.5V
6.3V
6.3V-
30V-1
230V .075A




NOTES:

UNLESS OTHERWISE NOTED:

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.

INDUCTANCE VALUES ARE IN MICROHENRYS.

RESISTOR VALUES ARE IN OHMS-1/2 WATT.

K 1,000 M 1,000,000

○ OPERATING CONTROL

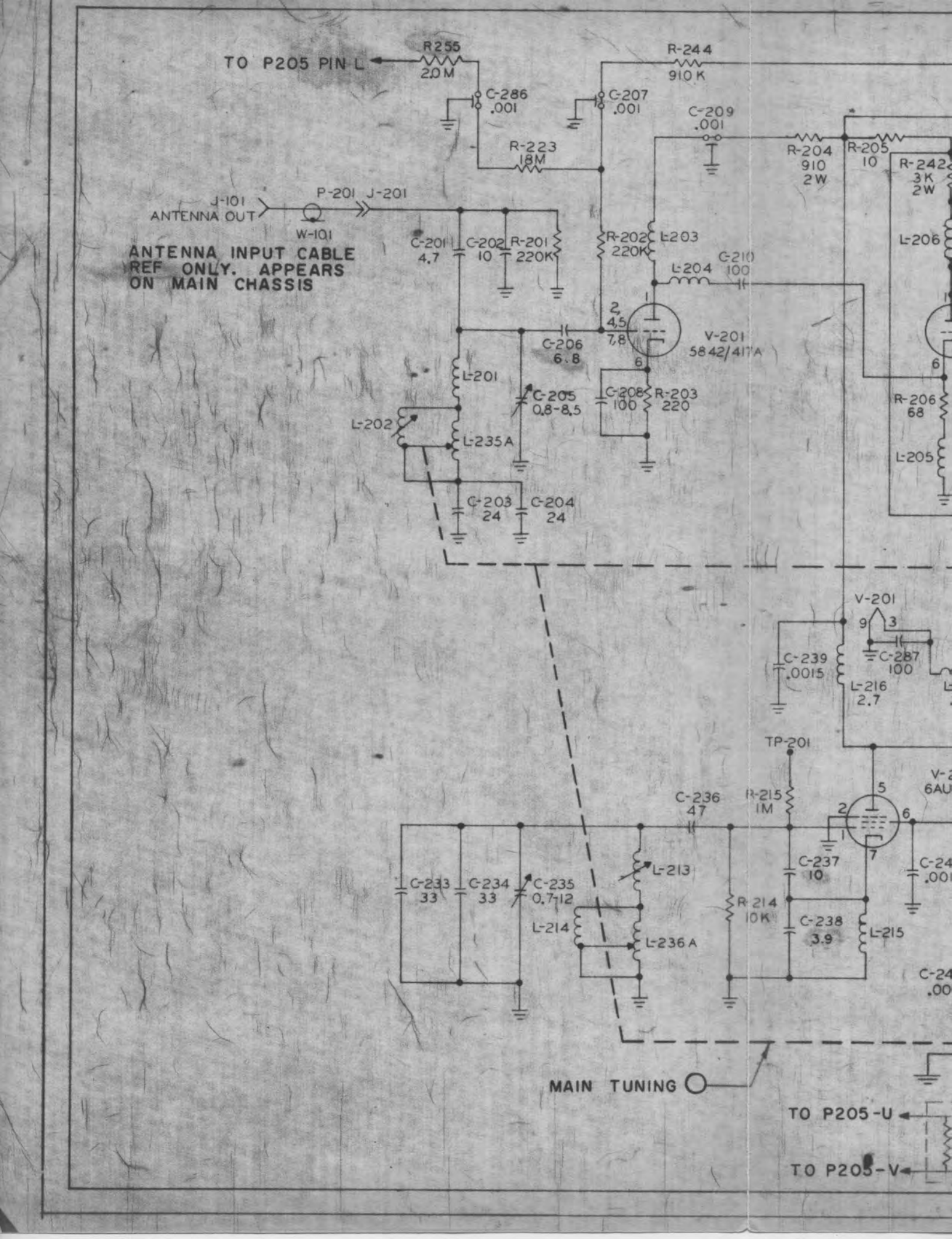
⊘ INTERNAL ADJ.

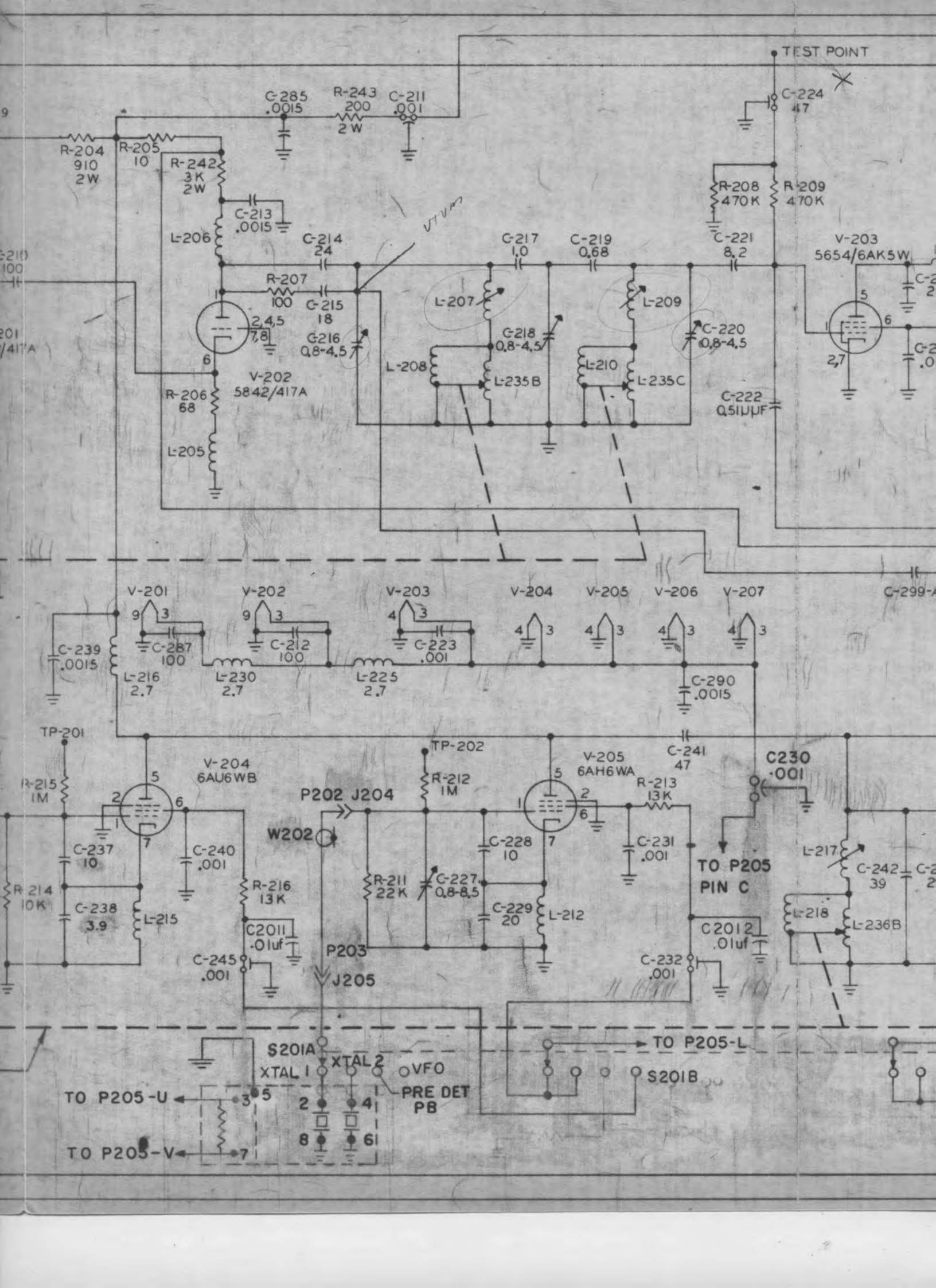
ARROW DENOTES CLOCKWISE ROTATION

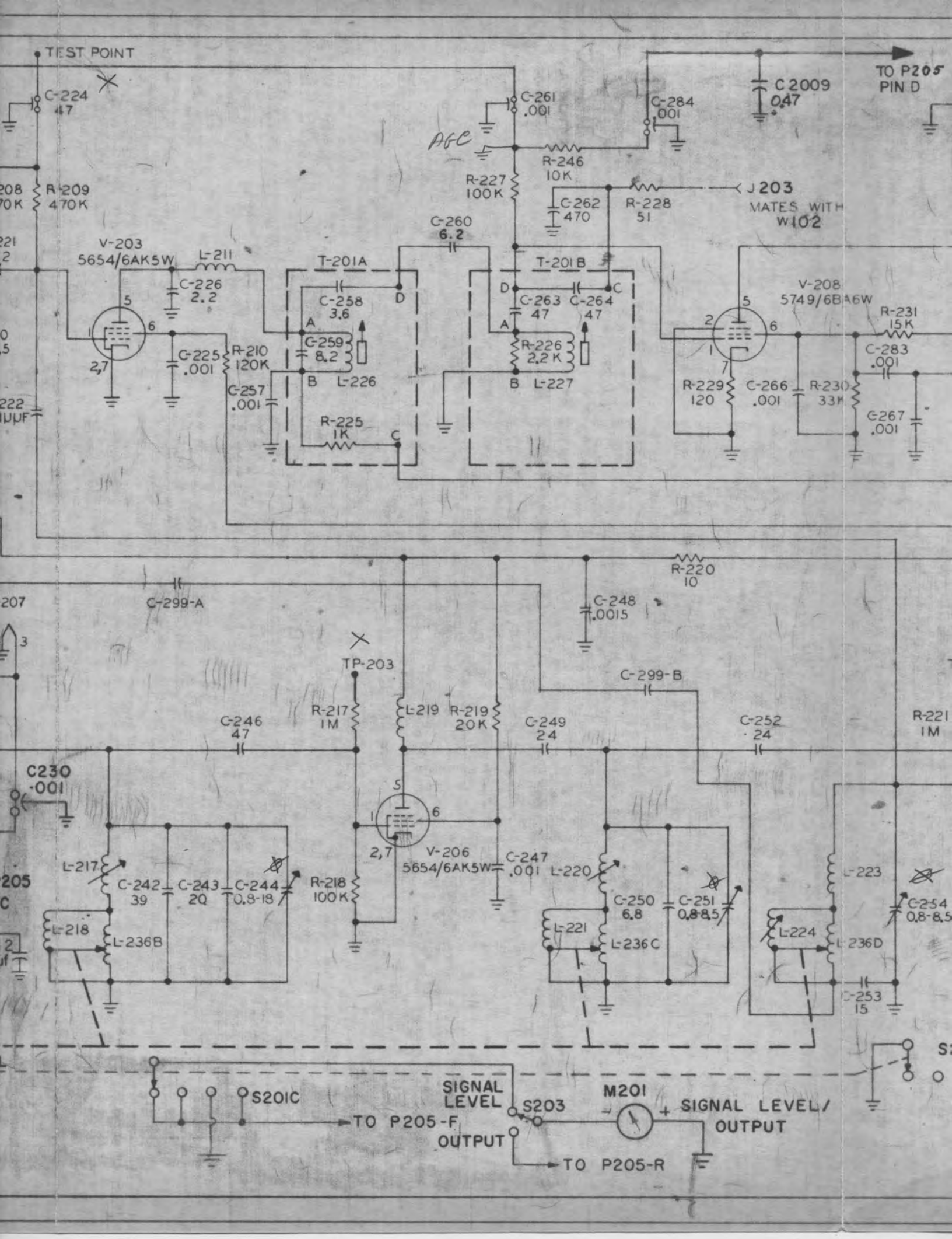
* TO BE DETERMINED IN TEST

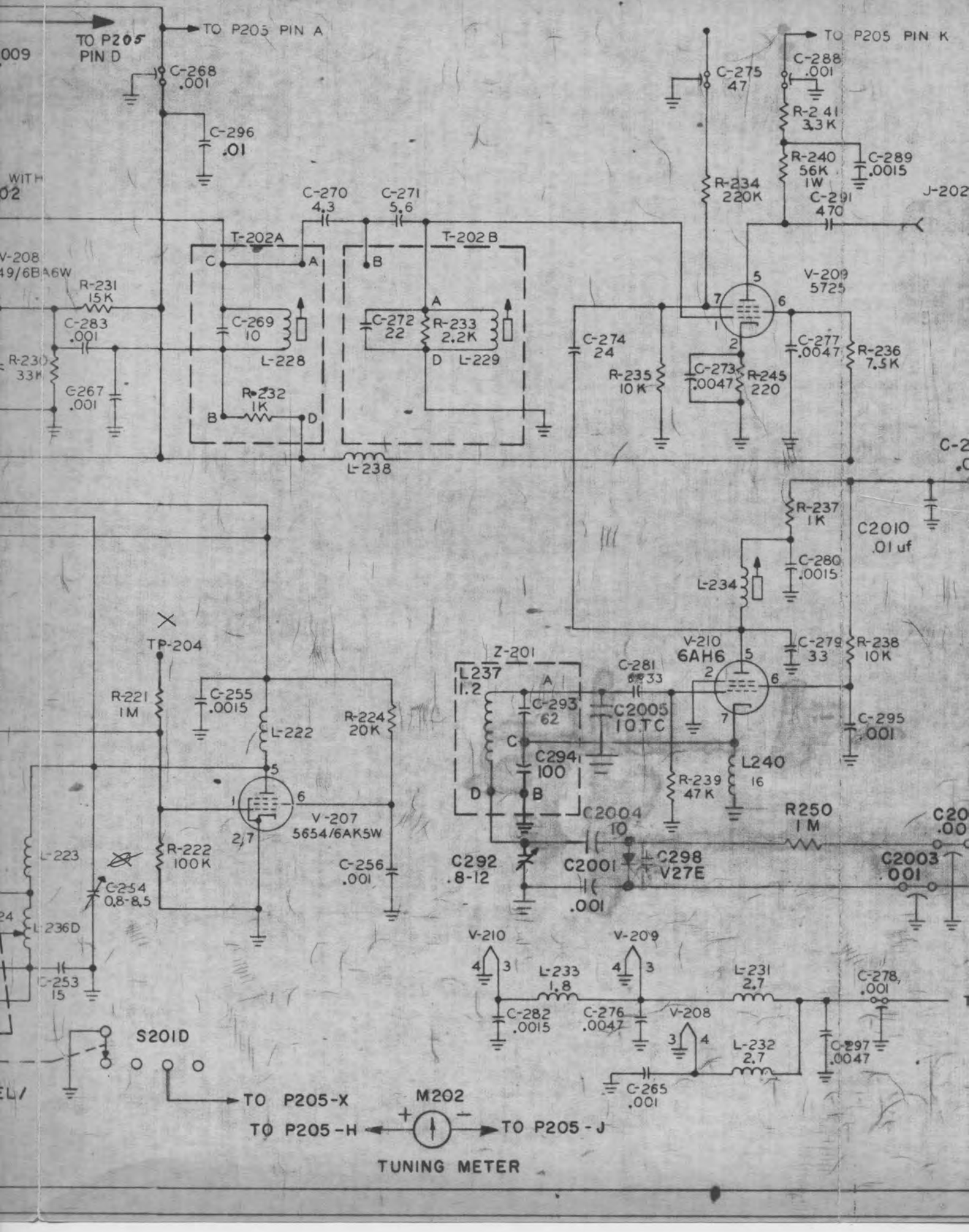
MAIN CHASSIS

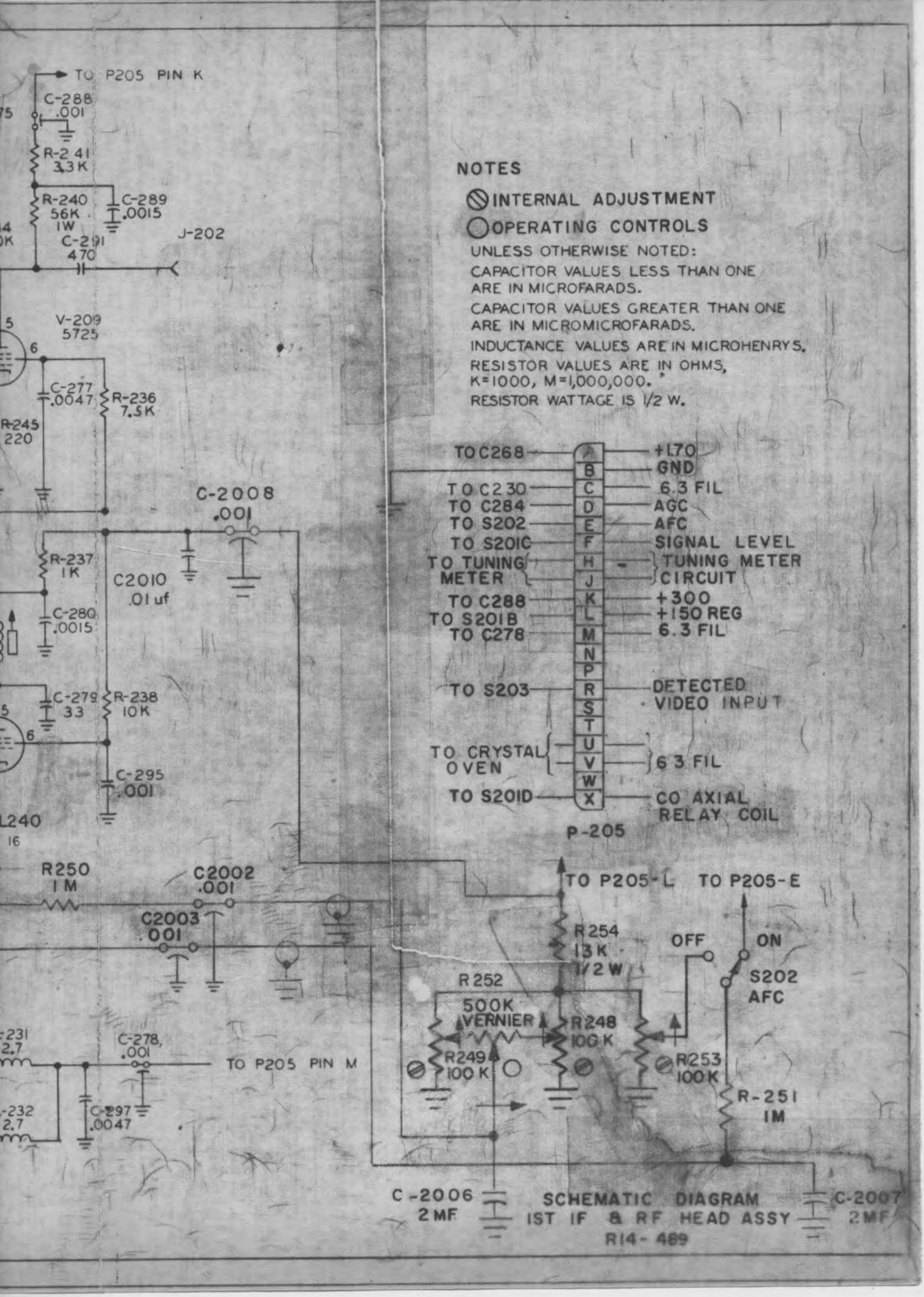
R-14-766


TO P205 PIN L
R255
20M
C-286
.001
C-207
.001
R-244
910K
C-209
.001
R-223
18M
R-204
910
2W
R-205
10
R-242
3K
2W
J-101
ANTENNA OUT
P-201
J-201
W-101
ANTENNA INPUT CABLE
REF ONLY. APPEARS
ON MAIN CHASSIS
C-201
4.7
C-202
10
R-201
220K
R-202
220K
L-203
C-210
100
L-204
L-206
2,
4,5
7,8
V-201
5842/417A
C-206
6.8
L-201
C-205
0.8-8.5
C-208
100
R-203
220
R-206
68
L-205
L-202
L-235A
C-203
24
C-204
24
V-201
C-239
.0015
C-287
100
L-216
2.7
TP-201
C-236
47
R-215
1M
C-237
10
C-233
33
C-234
33
C-235
0.7-12
L-213
L-214
L-236A
R-214
10K
C-238
3.9
L-215
MAIN TUNING
TO P205-U
TO P205-V

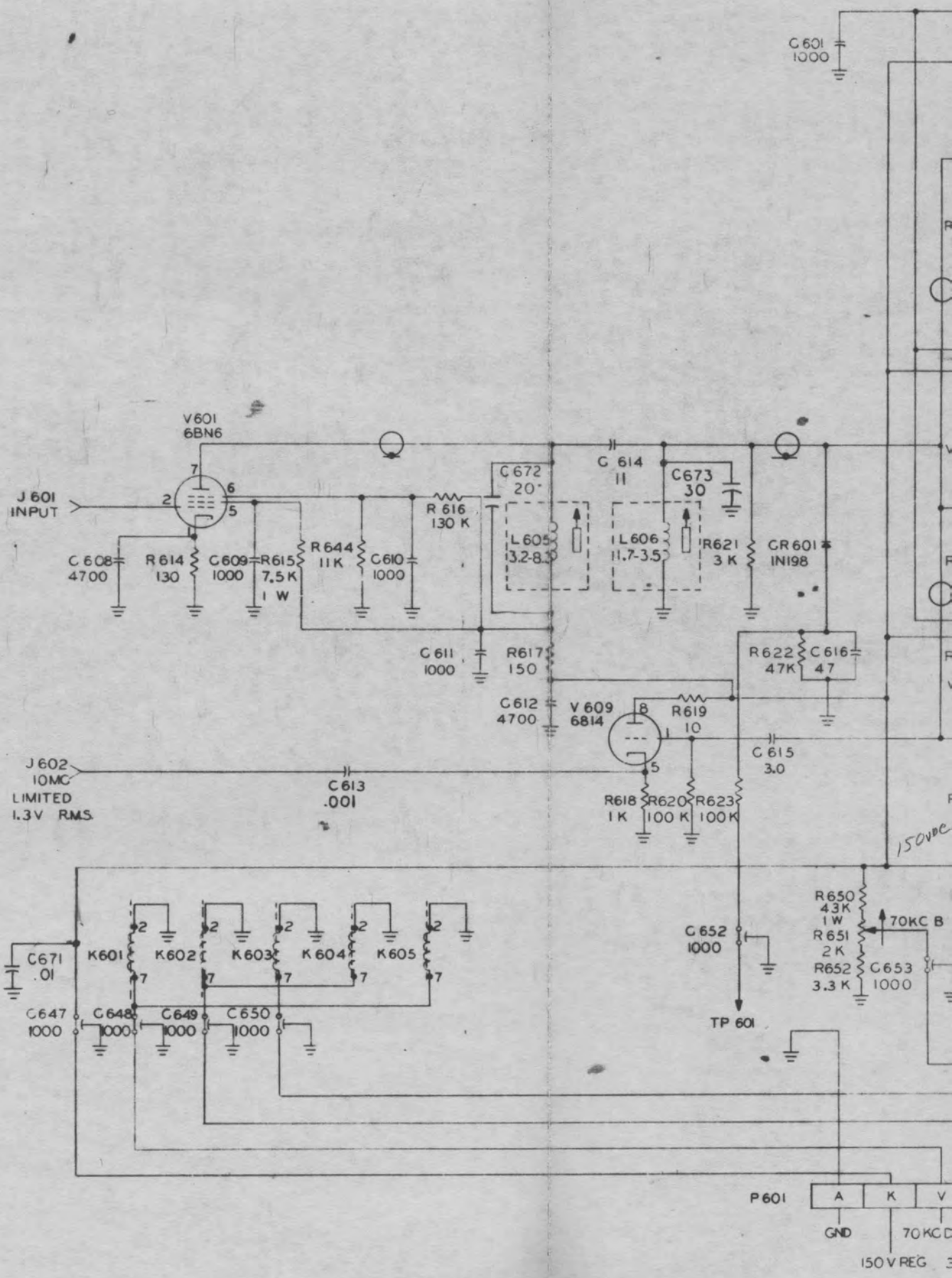

TEST POINT
C-285 .0015
R-243 200 2W
C-211 .001
C-224 47
R-204 910 2W
R-205 10
R-242 3K 2W
C-213 .0015
L-206
C-214 24
R-208 470K
R-209 470K
C-221 8.2
V-203 5654/6AK5W
R-207 100
C-215 18
C-216 0.8-4.5
L-207
L-209
C-217 1.0
C-219 0.68
C-218 0.8-4.5
C-220 0.8-4.5
L-208
L-235B
L-210
L-235C
C-222 0.5IUUF
V-202 5842/417A
R-206 68
L-205
V-201
V-202
V-203
V-204
V-205
V-206
V-207
C-239 .0015
C-287 100
C-212 100
C-223 .001
L-216 2.7
L-230 2.7
L-225 2.7
C-290 .0015
TP-201
TP-202
V-204 6AU6WB
V-205 6AH6WA
C-241 47
C230 .001
R-215 1M
R-212 1M
R-213 13K
P202 J204
W202
C-237 10
C-240 .001
C-228 10
C-231 .001
TO P205 PIN C
L-217
C-242 39
R-214 10K
C-238 3.9
L-215
R-216 13K
R-211 22K
C-227 0.8-8.5
C-229 20
L-212
L-218
L-236B
C2011 .01uf
C2012 .01uf
C-245 .001
P203
J205
C-232 .001
S201A
XTAL 1
XTAL 2
VFO
PRE DET PB
TO P205-L
S201B
TO P205-U
TO P205-V

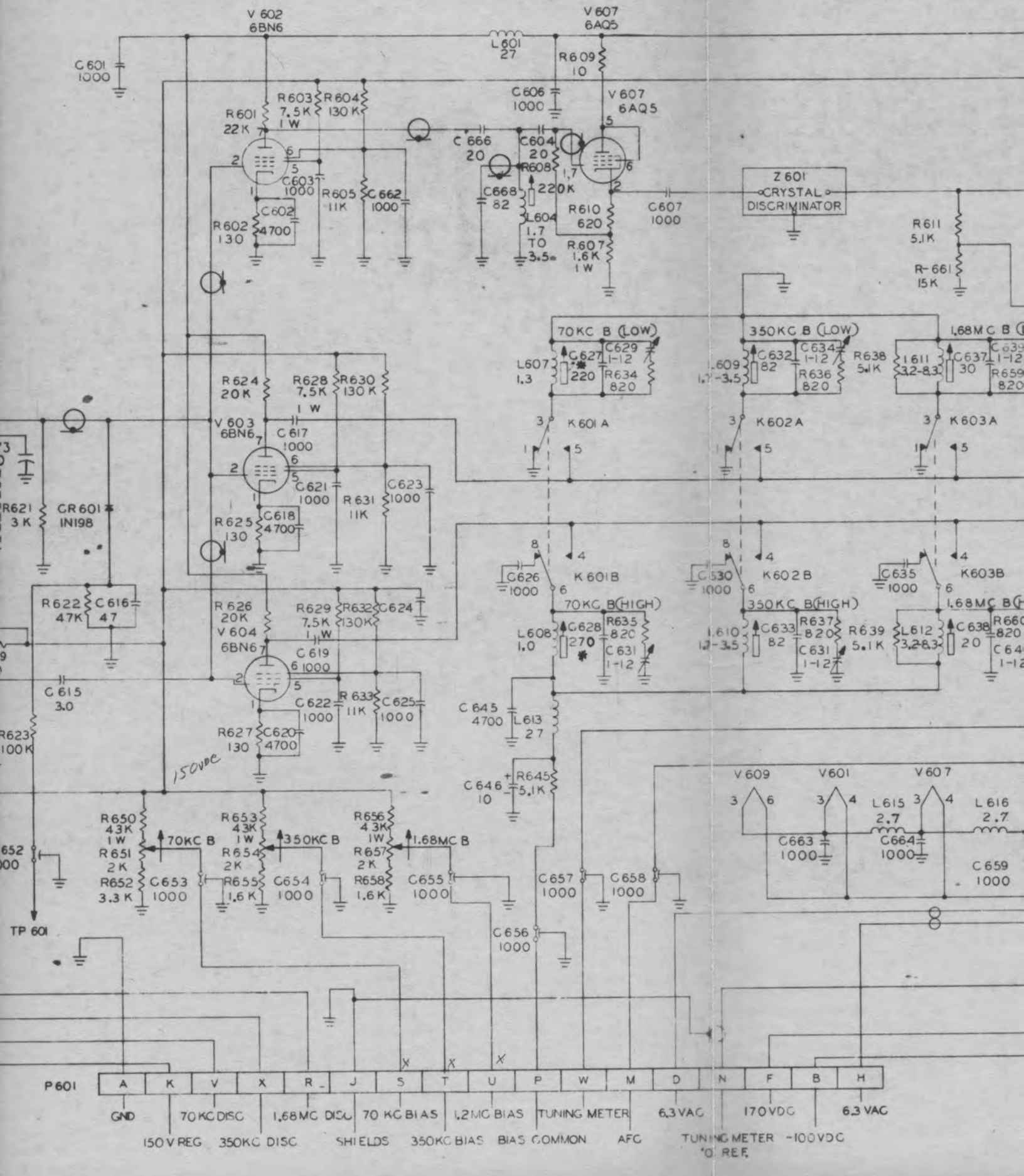

TEST POINT
C-224 47
R-209 470K
V-203 5654/6AK5W
L-211
C-226 2.2
C-225 .001
R-210 120K
C-257 .001
T-201A
C-258 3.6
C-259 8.2
L-226
R-225 1K
C-260 6.2
T-201B
C-263 47
C-264 47
R-226 2.2K
L-227
C-261 .001
AGC
R-246 10K
R-227 100K
C-262 470
R-228 51
C-284 001
C 2009 .047
TO P205 PIN D
J 203 MATES WITH W102
V-208 5749/6BA6W
R-231 15K
C-283 .001
R-229 120
C-266 .001
R-230 33K
C-267 .001
R-220 10
C-248 .0015
C-299-A
C-299-B
TP-203
R-217 1M
L-219
R-219 20K
C-246 47
C-249 24
C-252 24
R-221 1M
C230 .001
V-206 5654/6AK5W
C-247 .001
R-218 100K
L-217
C-242 39
C-243 20
C-244 0.8-18
L-218
L-236B
L-220
C-250 6.8
C-251 0.8-8.5
L-221
L-236C
L-223
C-254 0.8-8.5
L-224
L-236D
C-253 15
S201C
TO P205-F
SIGNAL LEVEL OUTPUT
S203
M201
SIGNAL LEVEL/ OUTPUT
TO P205-R

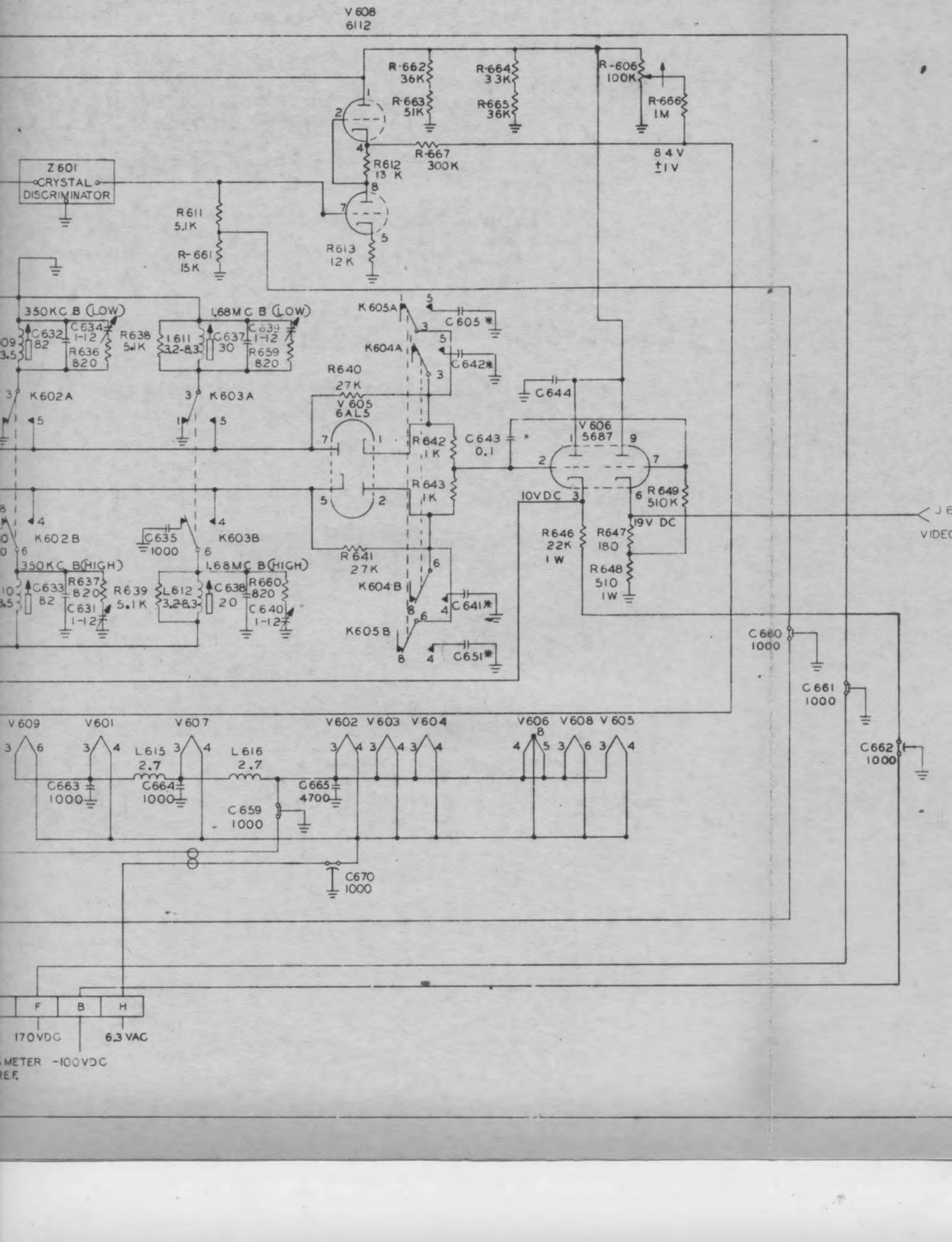

TO P205 PIN D
TO P205 PIN A
TO P205 PIN K
C-268 .001
C-296 .01
C-270 4.3
C-271 5.6
T-202A
T-202B
C-275 47
C-288 .001
R-241 3.3K
R-240 56K 1W
C-289 .0015
C-291 470
R-234 220K
J-202
V-209 5725
R-231 15K
C-283 .001
C-269 10
L-228
C-272 22
R-233 2.2K
L-229
R-230 33K
C-267 .001
R-232 1K
L-238
C-274 24
R-235 10K
C-273 .0047
R-245 220
C-277 .0047
R-236 7.5K
R-237 1K
C2010 .01 uf
C-280 .0015
L-234
TP-204
V-210 6AH6
C-279 33
R-238 10K
Z-201
L237 1.2
C-281 .0033
C-293 62
C2005 10 TC
C-295 .001
C2941 100
L240 16
R-239 47K
R-221 1M
C-255 .0015
L-222
R-224 20K
V-207 5654/6AK5W
R-222 100K
C-256 .001
C2004 10
R250 1M
C292 .8-12
C2001 .001
C298 V27E
C2003 .001
L-223
C-254 0.8-8.5
L 236D
C-253 15
V-210
V-209
L-233 1.8
L-231 2.7
C-278, .001
C-282 .0015
C-276 .0047
V-208
L-232 2.7
C-297 .0047
C-265 .001
S201D
TO P205-X
M202
TO P205-H
TO P205-J
TUNING METER

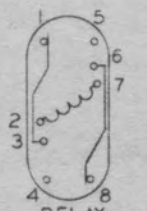



SCHEMATIC DIAGRAM
IST IF & RF HEAD ASSY
R14-489


C601 1000
V601 6BN6
J601 INPUT
R616 130 K
C672 20
C614 11
C673 30
L605 3.2-8.3
L606 11.7-3.5
R621 3 K
CR601 IN198
C608 4700
R614 130
C609 1000
R615 7.5K 1 W
R644 11K
C610 1000
C611 1000
R617 150
R622 47K
C616 47
C612 4700
V609 6814
R619 10
C615 3.0
J602 10MC LIMITED 1.3V RMS
C613 .001
R618 1K
R620 100 K
R623 100K
150VDC
R650 4.3K 1W
R651 2K
R652 3.3 K
70KC B
C653 1000
C652 1000
TP 601
C671 .01
K601
K602
K603
K604
K605
C647 1000
C648 1000
C649 1000
C650 1000
P601
A
K
V
GND
150 V REG
70KC D


V 602
6BN6
V607
6AQ5
L601
27
C601
1000
R609
10
C606
1000
V607
6AQ5
R601
22K
R603
7.5K
1 W
R604
130K
C666
20
C604
20
R608
1.7
220K
C668
82
L604
1.7
TO
3.5
R610
620
R607
1.6K
1W
C607
1000
Z601
CRYSTAL
DISCRIMINATOR
R611
5.1K
R-661
15K
C603
1000
R605
11K
C662
1000
C602
4700
R602
130
70KC B (LOW)
350KC B (LOW)
1.68MC B
L607
1.3
C627
220
C629
1-12
R634
820
C632
82
C634
1-12
R636
820
R638
5.1K
C637
30
R624
20K
R628
7.5K
1 W
R630
130K
V603
6BN6
C617
1000
K601A
K602A
K603A
C621
1000
R631
11K
C623
1000
R621
3K
CR601
IN198
R625
130
C618
4700
K601B
K602B
K603B
C626
1000
C630
1000
C635
1000
R622
47K
C616
47
R626
20K
V604
6BN6
R629
7.5K
1 W
R632
130K
C624
C619
1000
70KC B(HIGH)
350KC B(HIGH)
1.68MC B
L608
1.0
C628
270
R635
820
C631
1-12
C633
82
R637
820
R639
5.1K
L612
3.2-8.3
C638
20
C615
3.0
C622
1000
R633
11K
C625
1000
R627
130
C620
4700
150VDC
C645
4700
L613
27
C646
10
R645
5.1K
V609
V601
V607
L615
2.7
L616
2.7
C663
1000
C664
1000
C659
1000
R650
43K
1W
R651
2K
R652
3.3K
C653
1000
70KC B
R653
43K
1W
R654
2K
R655
1.6K
C654
1000
350KC B
R656
43K
1W
R657
2K
R658
1.6K
C655
1000
1.68MC B
C657
1000
C658
1000
C656
1000
TP 601
P601
A
K
V
X
R
J
S
T
U
P
W
M
D
N
F
B
H
GND
70KC DISC
1.68MC DISC
70 KC BIAS
1.2MC BIAS
TUNING METER
6.3VAC
170VDC
6.3 VAC
150 V REG
350KC DISC
SHIELDS
350KC BIAS
BIAS COMMON
AFC
TUNING METER "0" REF.
-100VDC


V608
6112
R-662
36K
R-663
51K
R-664
3.3K
R-665
36K
R-606
100K
R-666
1M
R-667
300K
84V
±1V
R612
13K
Z601
CRYSTAL
DISCRIMINATOR
R611
5.1K
R-661
15K
R613
12K
350KC B (LOW)
C632
82
C634
1-12
R636
820
R638
5.1K
1.68MC B (LOW)
1611
3.2-8.3
C637
30
C639
1-12
R659
820
K602A
K603A
K605A
C605*
K604A
C642*
R640
27K
V605
6AL5
C644
V606
5687
R642
1K
C643
0.1
R643
1K
10VDC
R649
510K
19V DC
R646
22K
1W
R647
180
R648
510
1W
K602B
K603B
C635
1000
350KC B(HIGH)
C633
82
R637
820
C631
1-12
R639
5.1K
1.68MC B(HIGH)
L612
3.2-8.3
C638
20
R660
820
C640
1-12
R641
27K
K604B
C641*
K605B
C651*
C660
1000
C661
1000
C662
1000
V609
V601
V607
V602
V603
V604
V606
V608
V605
L615
2.7
L616
2.7
C663
1000
C664
1000
C665
4700
C659
1000
C670
1000
F
B
H
170VDC
6.3VAC
METER -100VDC
REF.
J8
VIDEO




RELAY
K601-K605

J 603
VIDEO OUTPUT

C660
1000

C661
1000

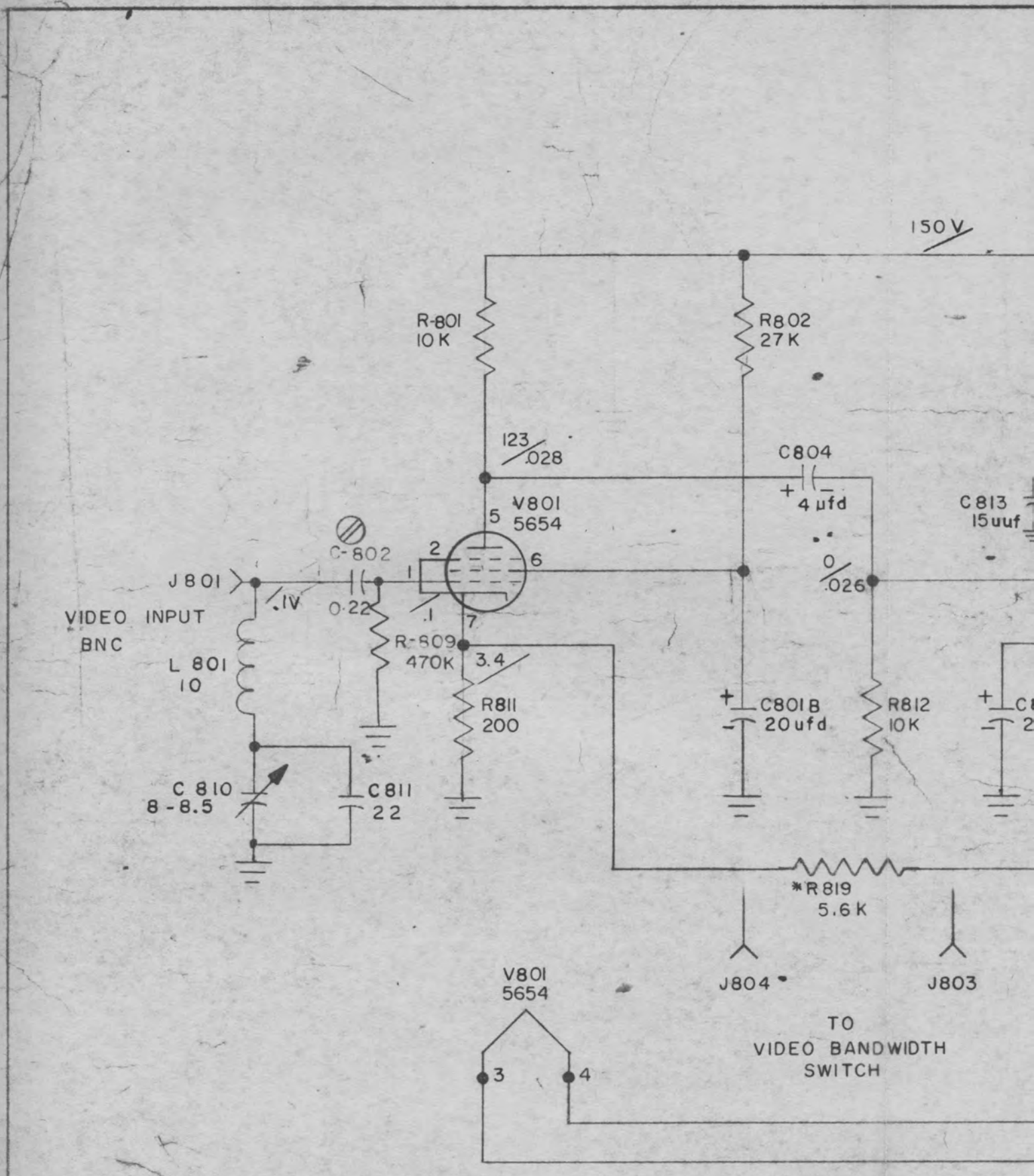
C662
1000

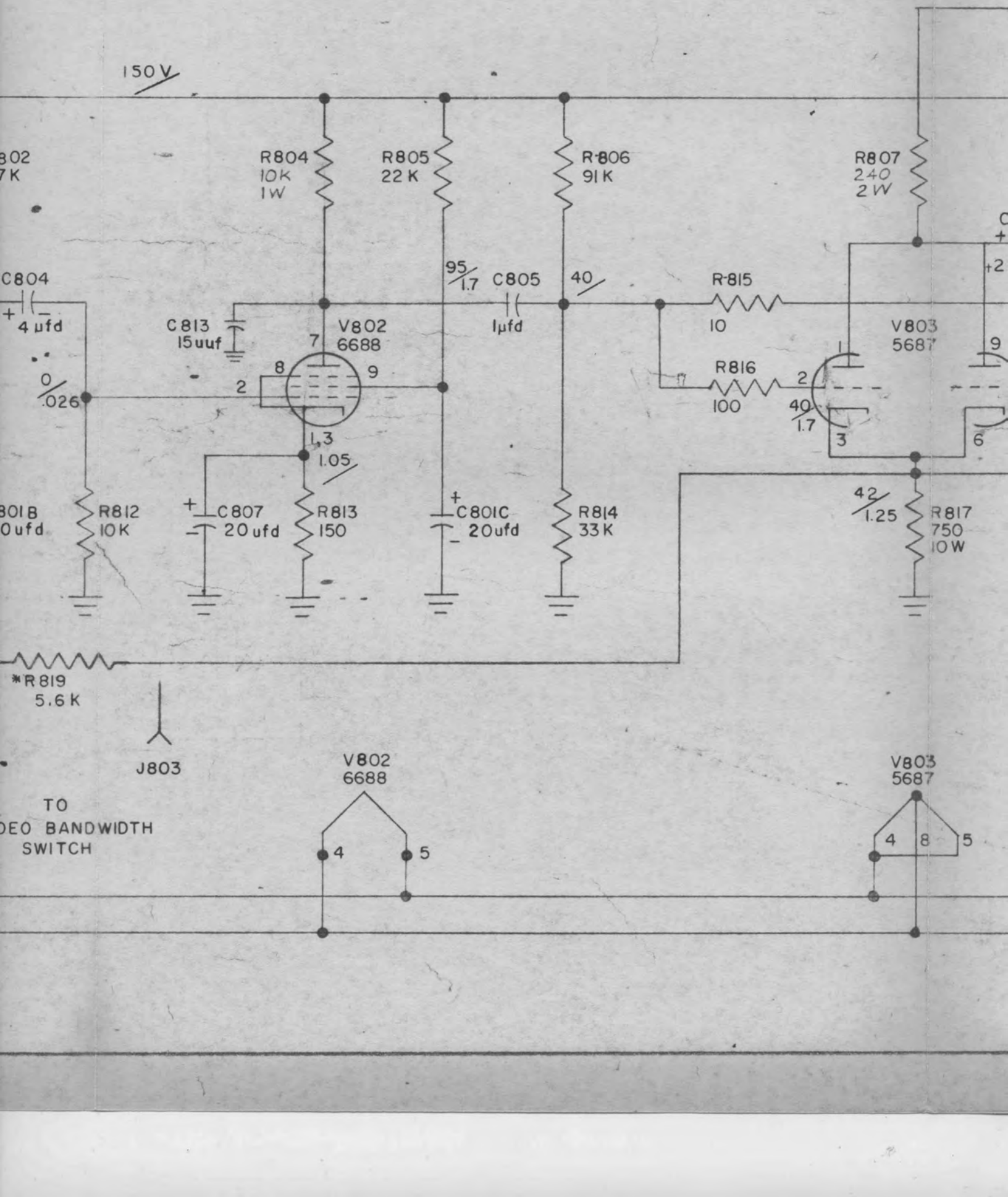
NOTE
UNLESS OTHERWISE INDICATED
CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS
CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS
INDUCTANCE VALUES ARE IN MICROHENRIES
RESISTOR VALUES ARE IN OHMS, 1/2 WATT
K=1000 M=1 000 000

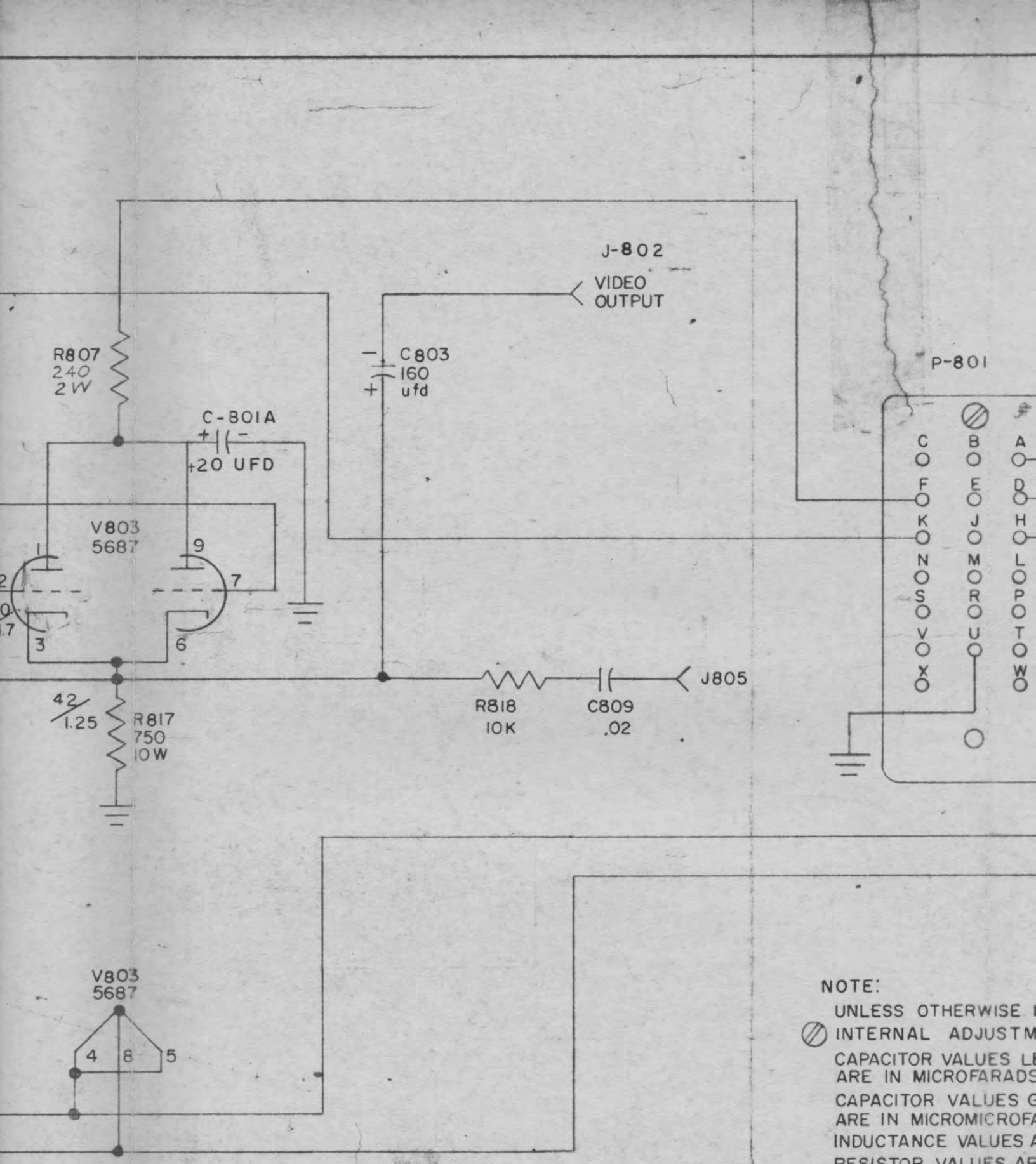
ARROW DENOTES CLOCWISE ROTAION

* CORRECT VALUES ARE TO BE DETERMINED IN TEST

MULTIBAND LIMITER DISCRIMINATOR
R14-767


150 V
R-801
10 K
R802
27 K
123
.028
C804
+ 4 µfd −
C813
15uuf
V801
5654
5
2
6
1
7
C-802
J 801
VIDEO INPUT
BNC
.1V
0.22
.1
0
.026
R-809
470K
3.4
L 801
10
R811
200
C801B
20 ufd
R812
10K
C 810
8 - 8.5
C811
22
*R819
5.6 K
J804
J803
V801
5654
3
4
TO
VIDEO BANDWIDTH
SWITCH


150 V
R804
10K
1W
R805
22 K
R806
91K
R807
240
2W
C804
4 µfd
C813
15uuf
V802
6688
95
1.7
C805
1µfd
40
R815
10
V803
5687
R816
100
40
1.7
0
.026
1.3
1.05
R812
10K
C807
20 ufd
R813
150
C801C
20ufd
R814
33K
42
1.25
R817
750
10W
*R819
5.6K
J803
TO
DEO BANDWIDTH
SWITCH
V802
6688
V803
5687




NOTE:

UNLESS OTHERWISE

INTERNAL ADJUSTM

CAPACITOR VALUES LE
ARE IN MICROFARADS

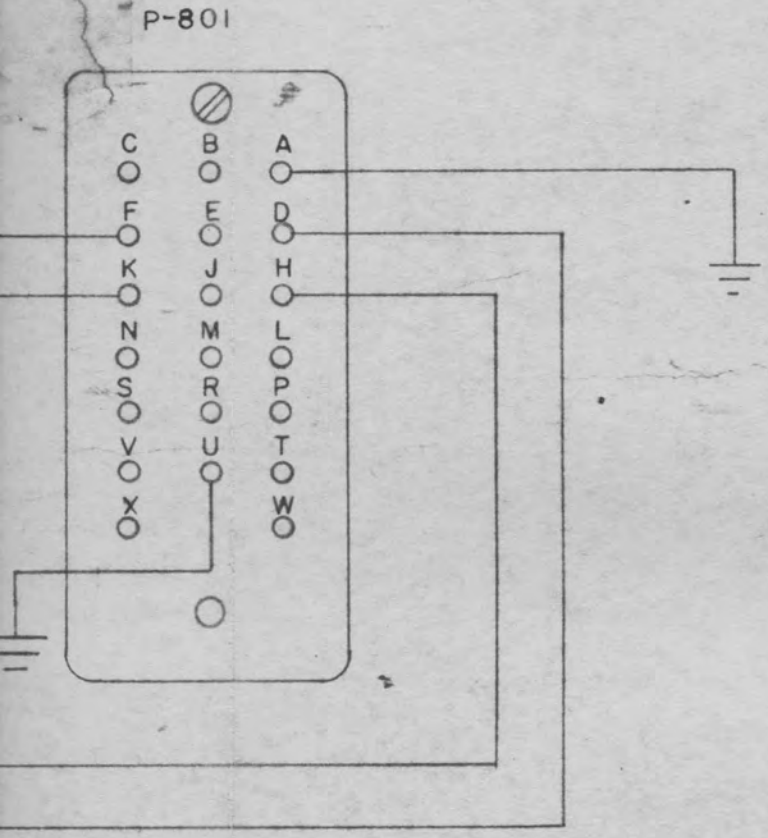
CAPACITOR VALUES G
ARE IN MICROMICROFA

INDUCTANCE VALUES A

RESISTOR VALUES AR

K=1,000 M=1,000,000

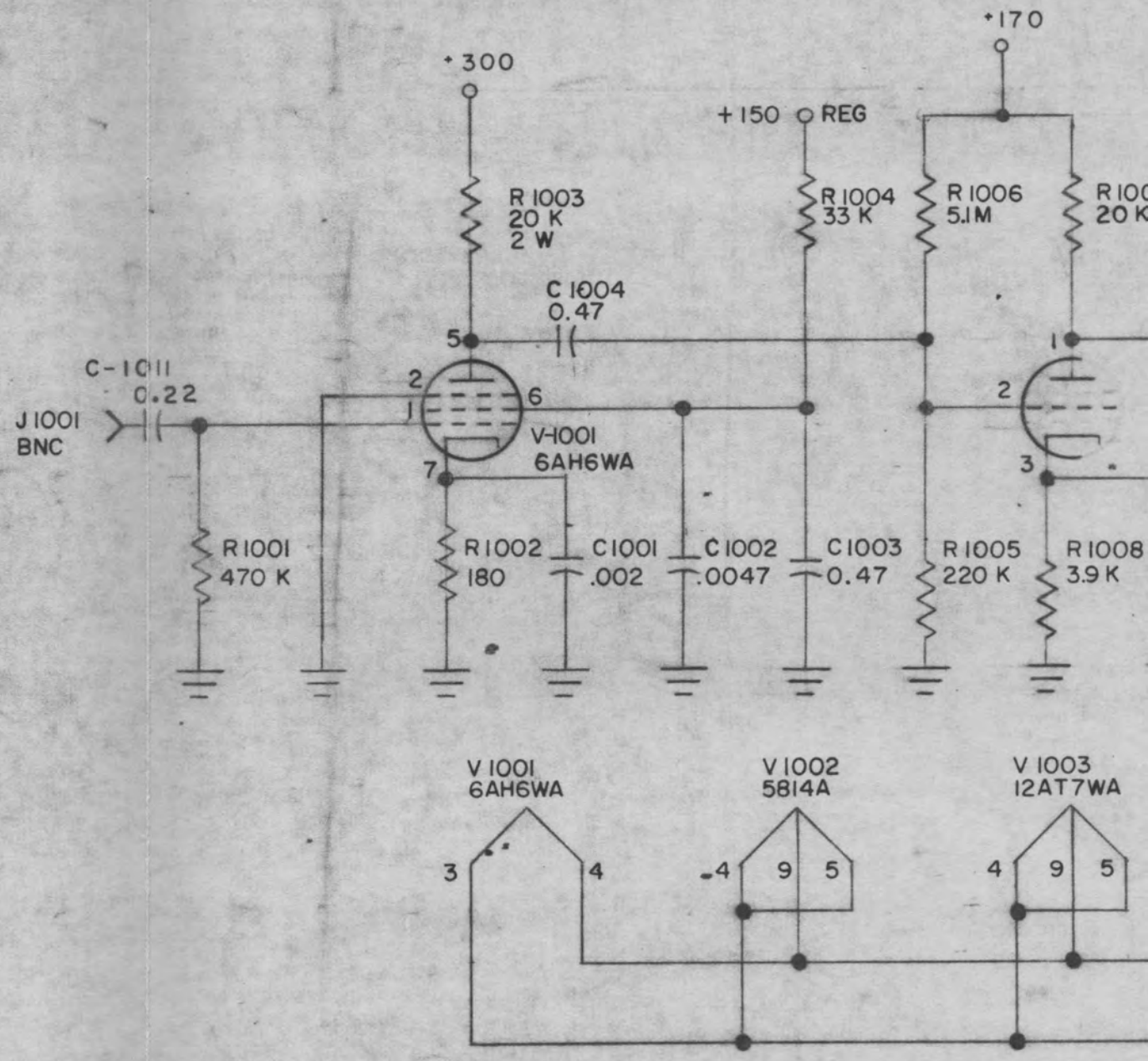
DC/AC VALUES ABOVE S
DC VOLTAGE BE

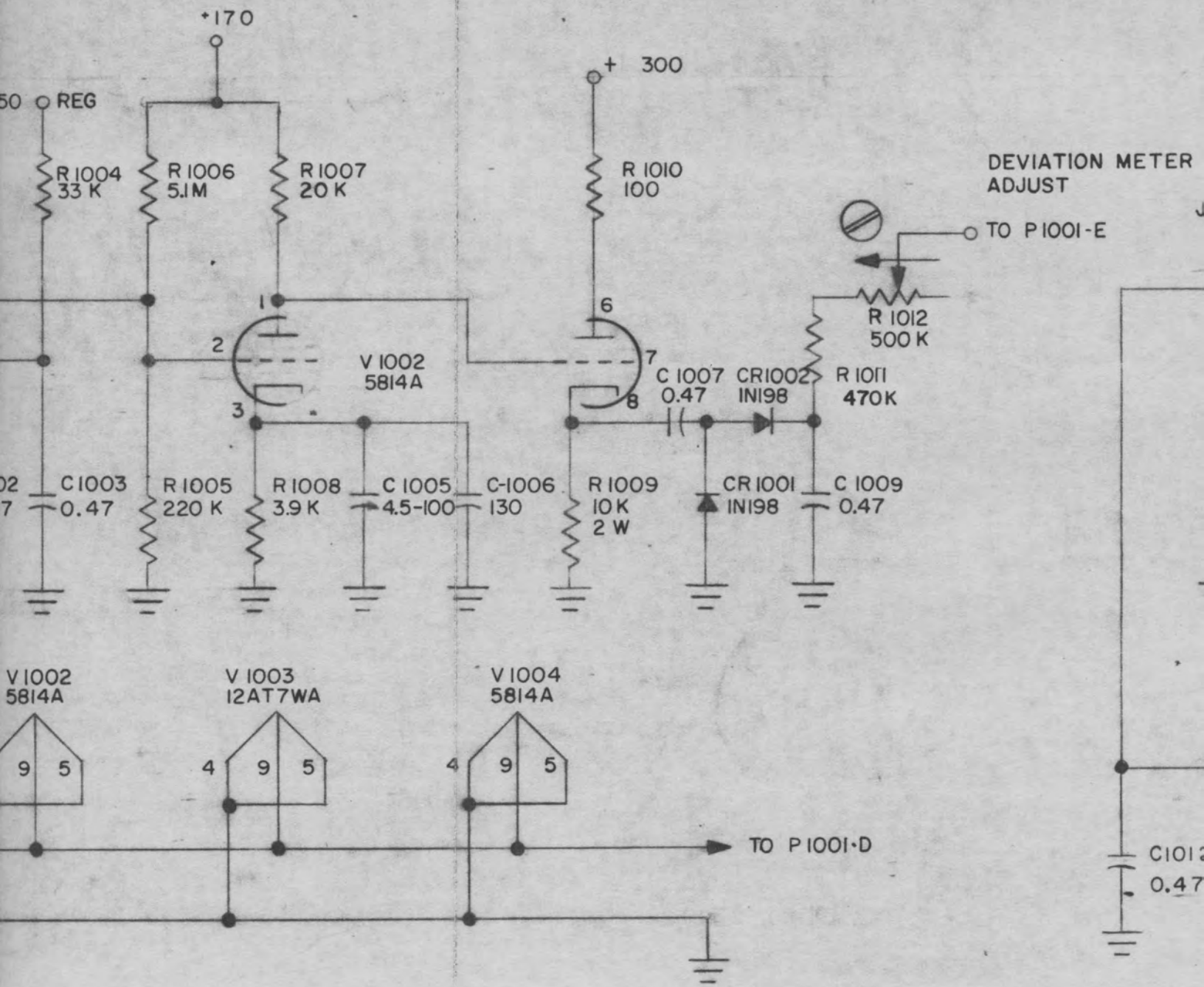


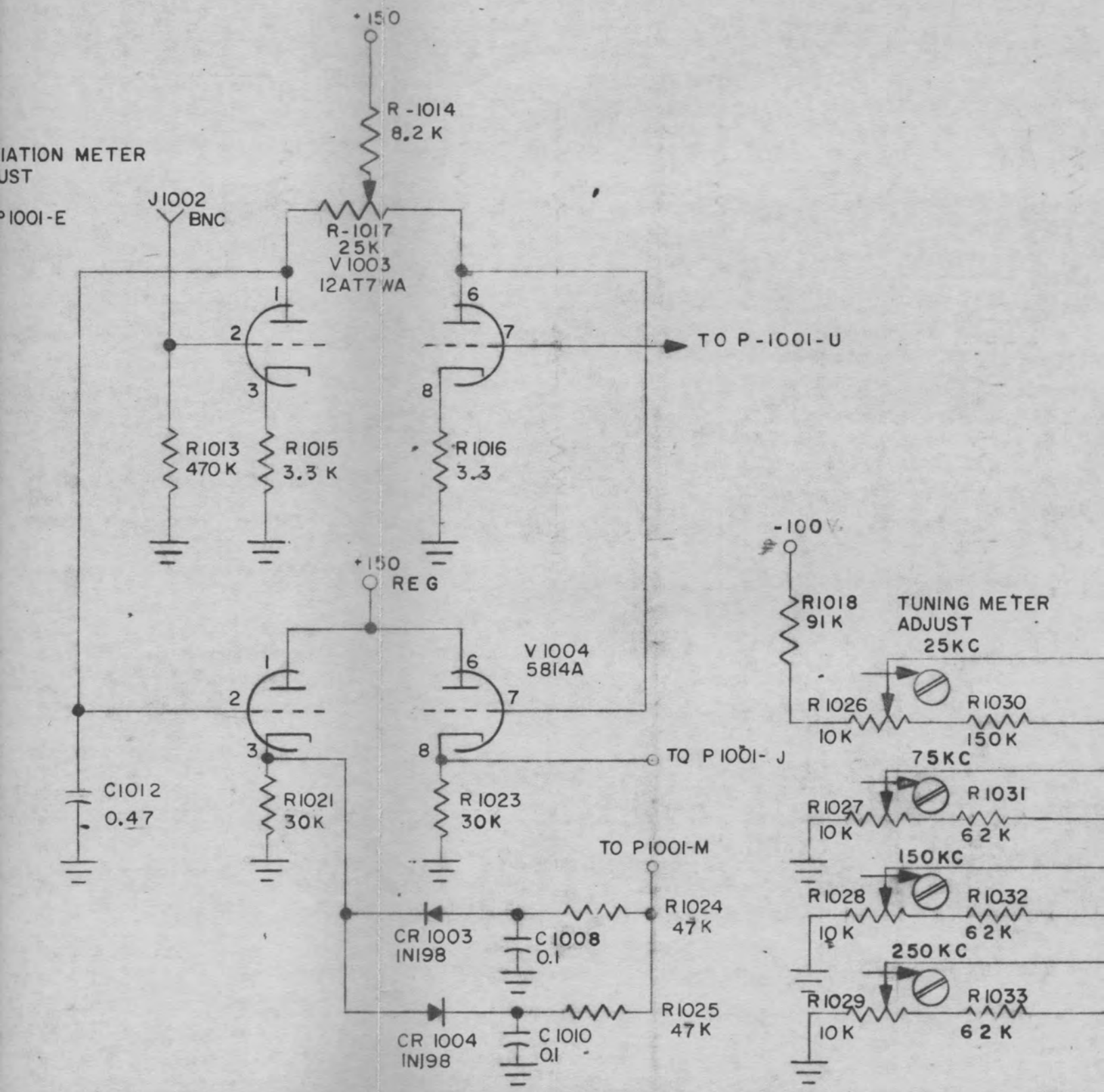

OTE:
UNLESS OTHERWISE NOTED
NTERNAL ADJUSTMENT
CAPACITOR VALUES LESS THAN ONE
ARE IN MICROFARADS.
CAPACITOR VALUES GREATER THAN ONE
ARE IN MICROMICROFARADS.
NDUCTANCE VALUES ARE IN MICROHENRYS.
RESISTOR VALUES ARE IN OHMS, 1/2 WATT.
K=1,000 M=1,000,000
DC/AC VALUES ABOVE SLANTED LINE REPRESENT DC VOLTAGE BELOW AC VOLTAGE

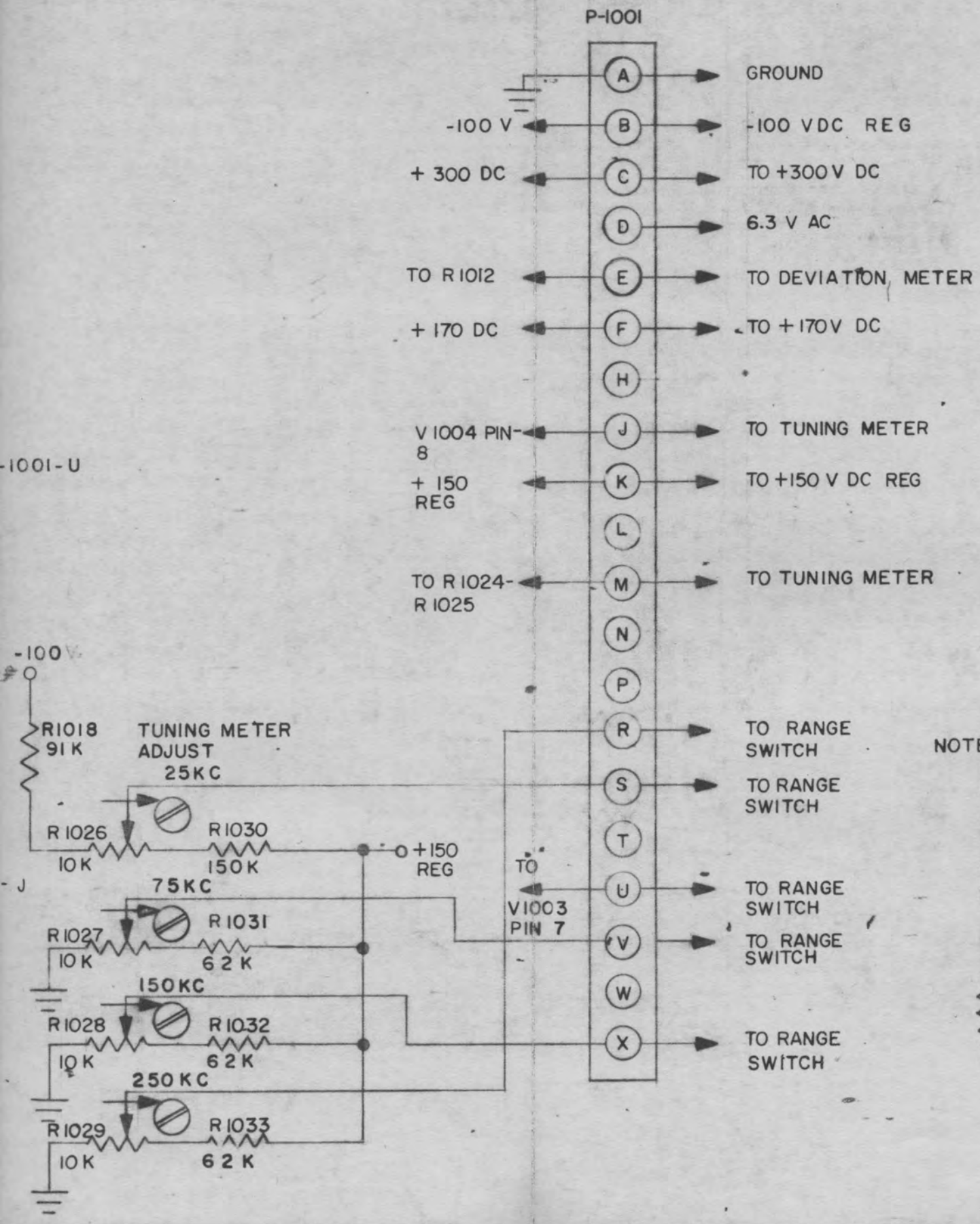
NOTE:
* THIS VALUE TO BE ADJUSTED IN TEST

SCHEMATIC
VIDEO AMPLIFER
R14-255


+300
+150 REG
+170
R 1003
20 K
2 W
R 1004
33 K
R 1006
5.1M
R 100
20 K
C 1004
0.47
C-1011
0.22
J 1001
BNC
V-1001
6AH6WA
R1001
470 K
R1002
180
C1001
.002
C1002
.0047
C1003
0.47
R1005
220 K
R1008
3.9 K
V 1001
6AH6WA
V 1002
5814A
V 1003
12AT7WA

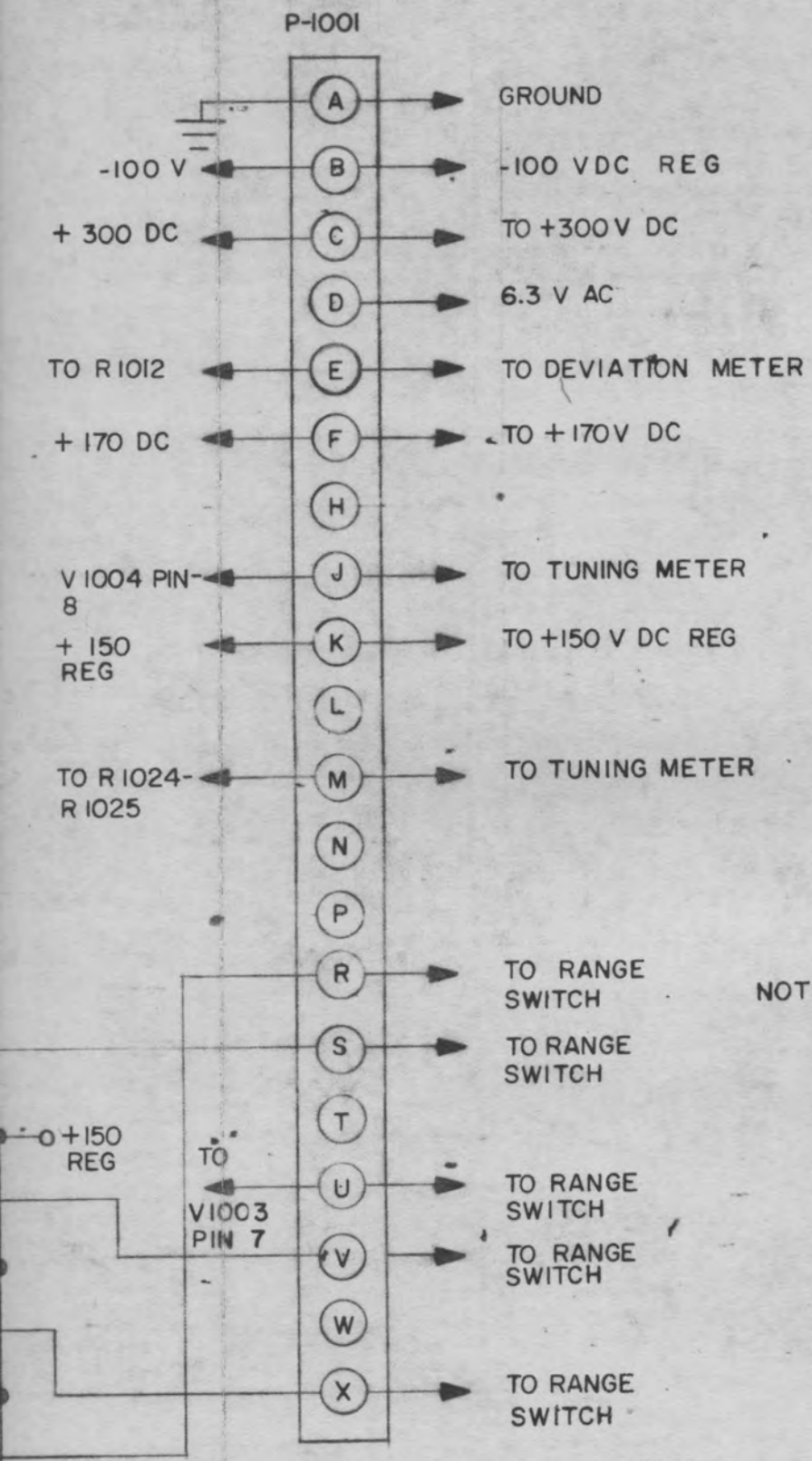

+170
+ 300
50 REG
R 1004
33 K
R 1006
5.1M
R 1007
20 K
R 1010
100
DEVIATION METER
ADJUST
TO P1001-E
R 1012
500 K
R 1011
470K
V 1002
5814A
C 1007
0.47
CR1002
IN198
C1003
0.47
R 1005
220 K
R 1008
3.9 K
C 1005
4.5-100
C-1006
130
R 1009
10 K
2 W
CR 1001
IN198
C 1009
0.47
V1002
5814A
V 1003
12AT7WA
V1004
5814A
TO P1001-D


+150
R-1014
8.2 K
IATION METER
UST
P1001-E
J1002
BNC
R-1017
25K
V1003
12AT7WA
1
2
3
6
7
8
TO P-1001-U
R1013
470K
R1015
3.3 K
R1016
3.3
+150
REG
V1004
5814A
-100
R1018
91K
TUNING METER
ADJUST
25KC
R1026
10K
R1030
150K
75KC
R1027
10K
R1031
62K
150KC
R1028
10K
R1032
62K
250KC
R1029
10K
R1033
62K
TO P1001-J
C1012
0.47
R1021
30K
R1023
30K
TO P1001-M
R1024
47K
CR1003
IN198
C1008
0.1
R1025
47K
CR1004
IN198
C1010
0.1


P-1001
A
B
C
D
E
F
H
J
K
L
M
N
P
R
S
T
U
V
W
X
GROUND
-100 VDC REG
TO +300V DC
6.3 V AC
TO DEVIATION METER
TO +170V DC
TO TUNING METER
TO +150 V DC REG
TO TUNING METER
TO RANGE SWITCH
TO RANGE SWITCH
TO RANGE SWITCH
TO RANGE SWITCH
TO RANGE SWITCH
-100 V
+ 300 DC
TO R 1012
+ 170 DC
V 1004 PIN 8
+ 150 REG
TO R 1024-R 1025
-1001-U
-100
R1018 91K
TUNING METER ADJUST 25KC
R 1026 10K
R1030 150K
+150 REG
75KC
R1027 10K
R 1031 62K
150KC
R1028 10K
R1032 62K
250KC
R1029 10K
R1033 62K
TO V1003 PIN 7
NOTES:
UNLESS OTH
CAPACITOR V
ARE IN MICR
CAPACITOR V
ONE ARE IN
RESISTOR VA
K=1,000 M=
INTERN
ARR
ROT

TITLE

DWG N




NOTES:

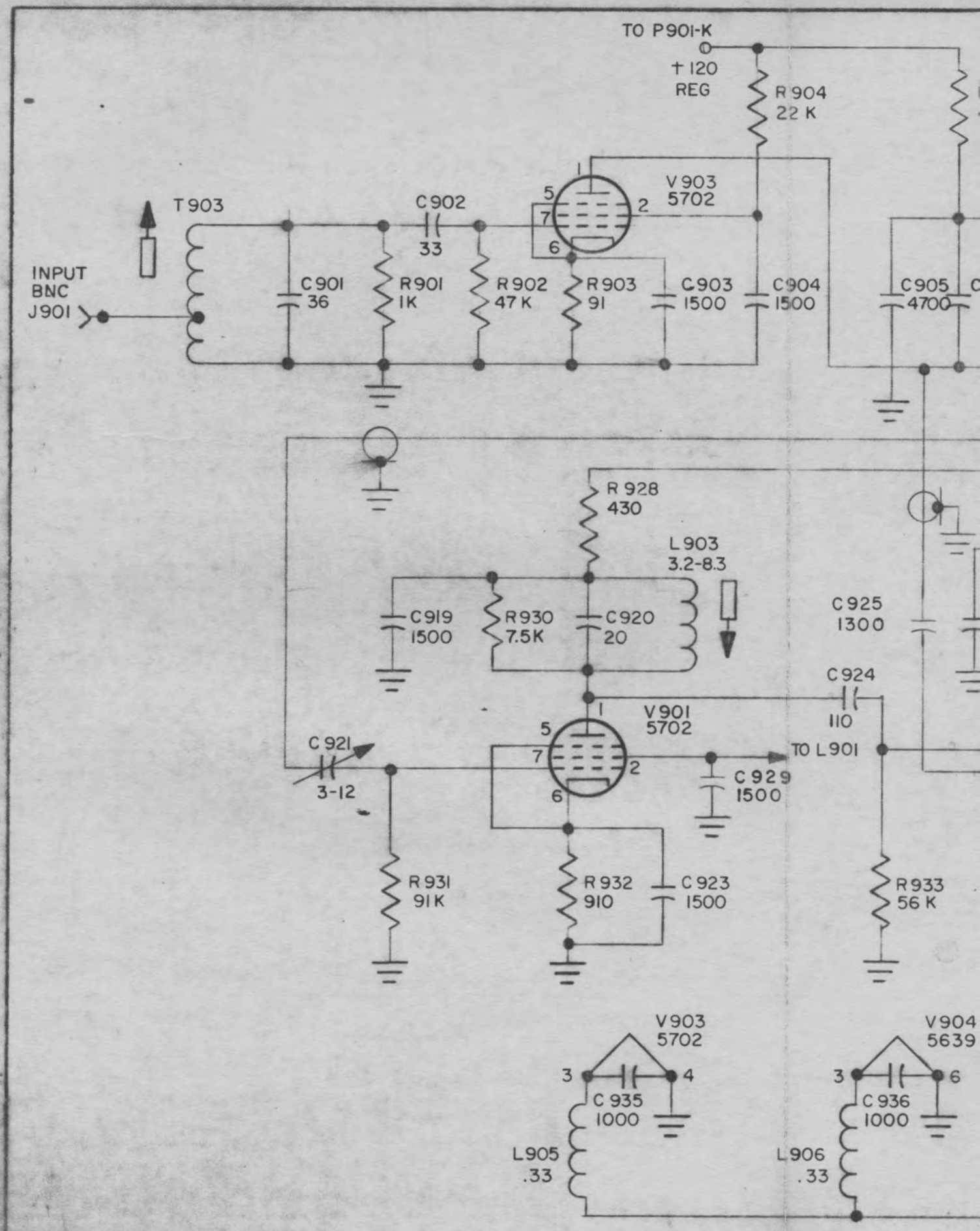
UNLESS OTHERWISE NOTED:
CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.
CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.
RESISTOR VALUES ARE IN OHMS
K=1,000 M=1,000,000

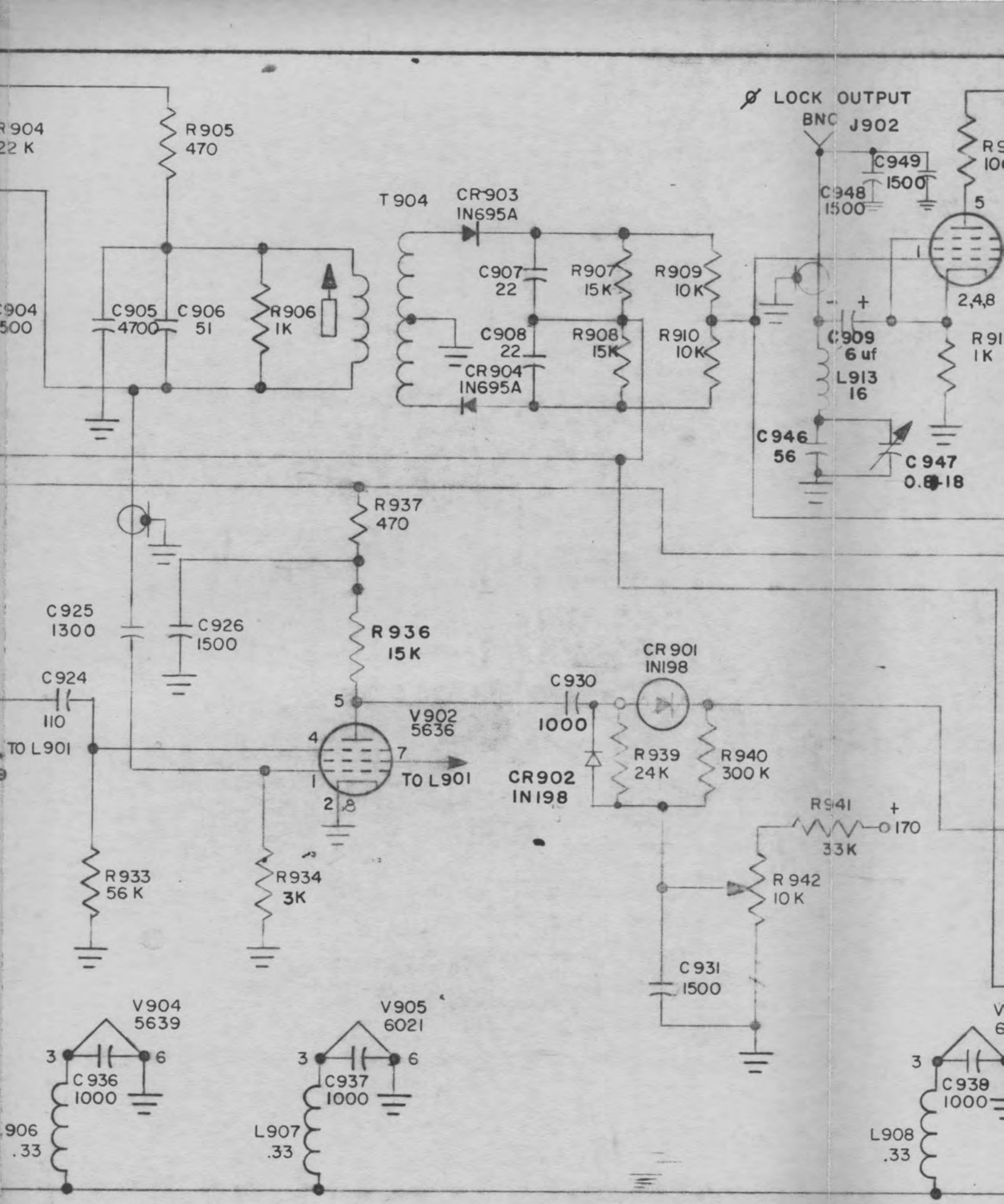
INTERNAL ADJUSTMENT

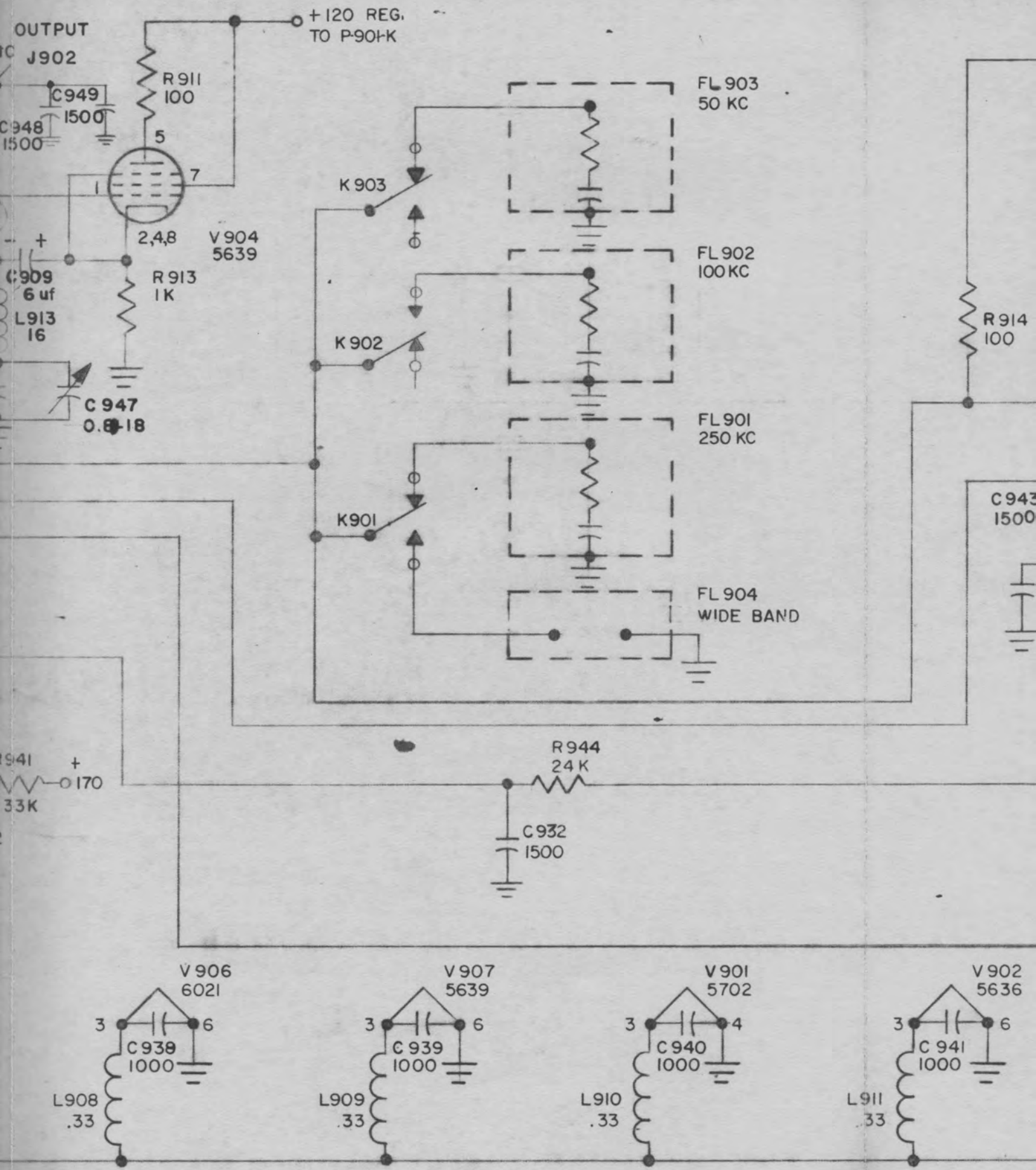
ARROW DENOTES CLOCKWISE ROTATION.

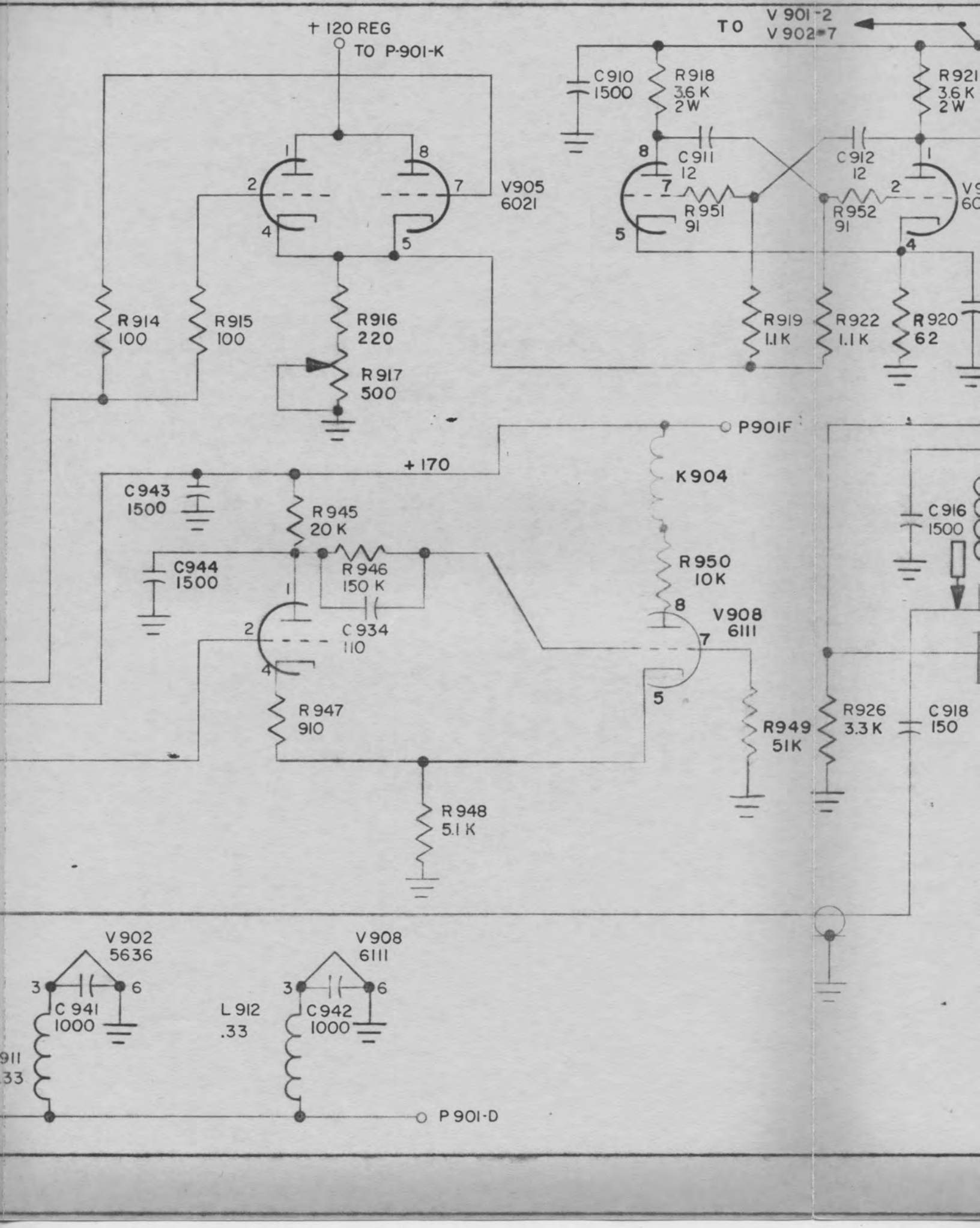
TITLE = METERING CIRCUITRY

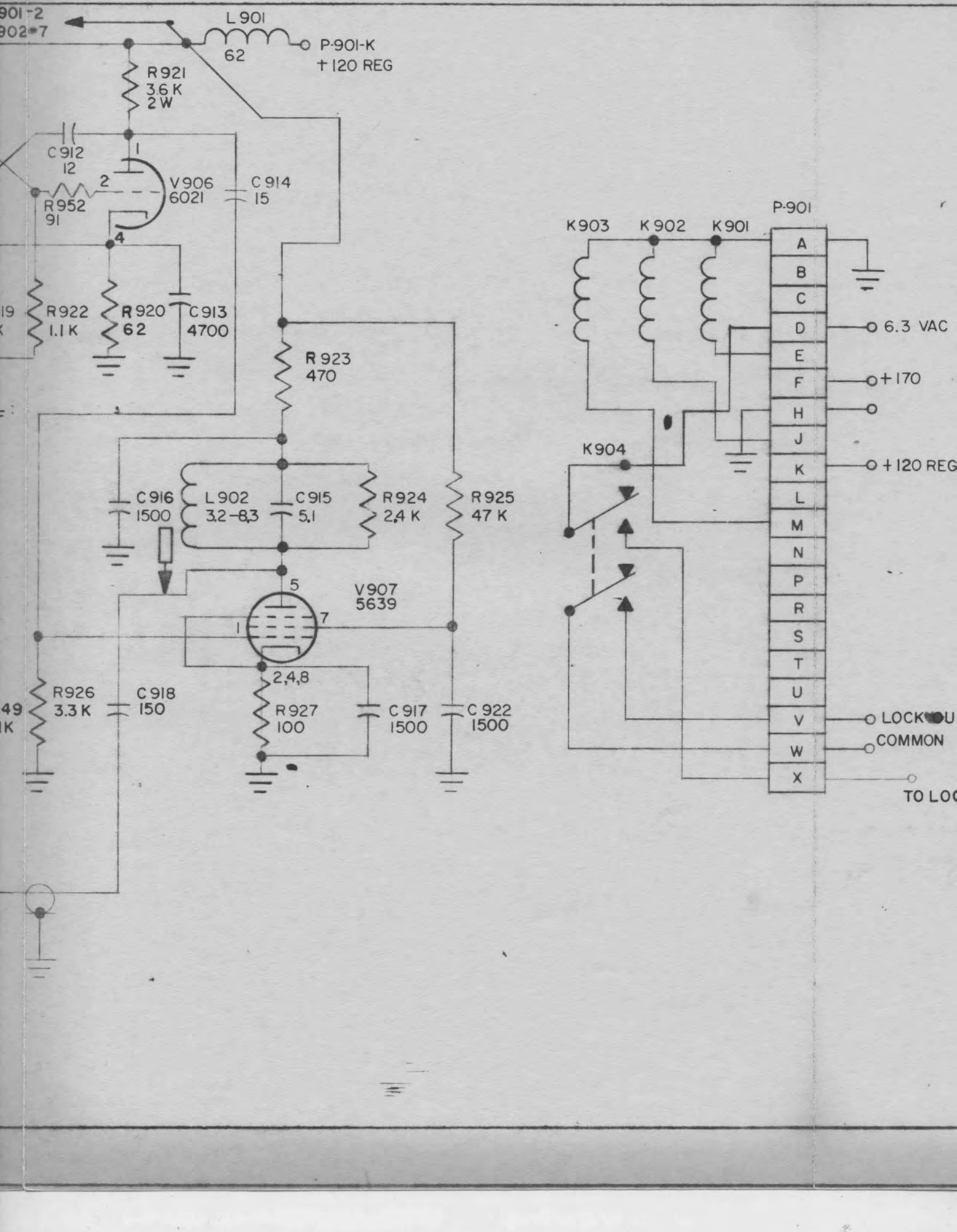
DWG NO= R-14-557

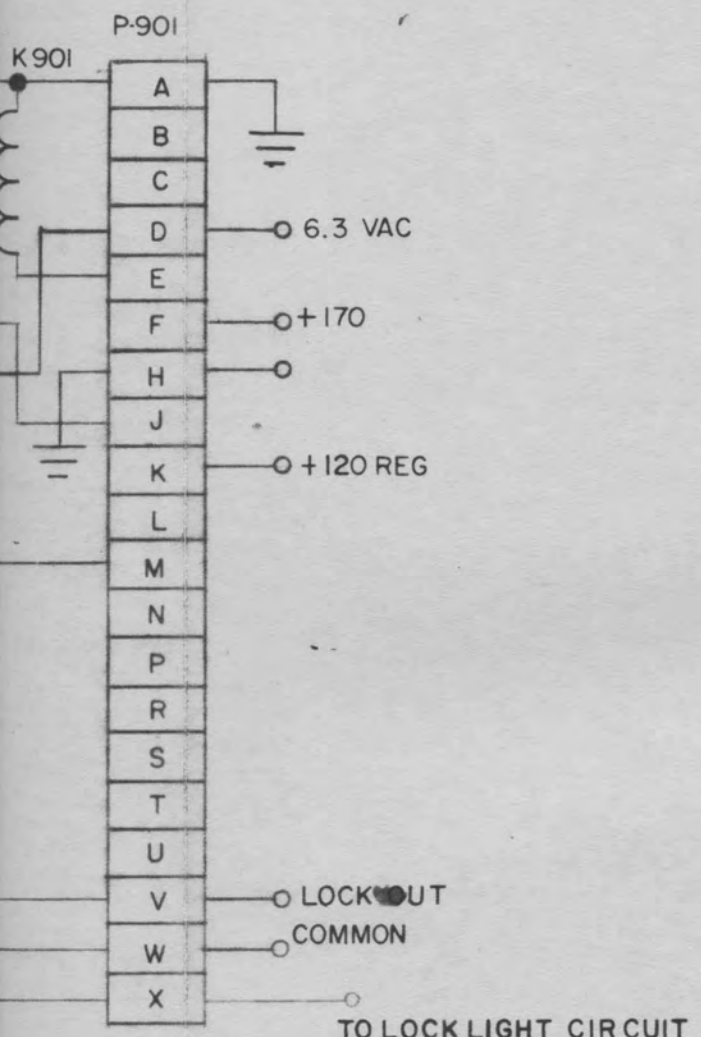

TO P901-K
+120 REG
R904 22K
V903 5702
T903
C902 33
INPUT BNC J901
C901 36
R901 1K
R902 47K
R903 91
C903 1500
C904 1500
C905 4700
R928 430
L903 3.2-8.3
C919 1500
R930 7.5K
C920 20
C925 1300
C924 110
V901 5702
C921 3-12
TO L901
C929 1500
R931 91K
R932 910
C923 1500
R933 56K
V903 5702
C935 1000
L905 .33
V904 5639
C936 1000
L906 .33


Ø LOCK OUTPUT
BNC J902
R904 22 K
R905 470
T904
CR903 IN695A
C907 22
R907 15K
R909 10K
C908 22
R908 15K
R910 10K
CR904 IN695A
C905 4700
C906 51
R906 1K
C904 500
C948 1500
C949 1500
5
2,4,8
C909 6 uf
L913 16
R91 1K
C946 56
C947 0.8-18
R937 470
C925 1300
C926 1500
R936 15K
C924 110
TO L901
V902 5636
TO L901
CR901 IN198
C930 1000
R939 24K
R940 300 K
CR902 IN198
R941 33K
+170
R942 10K
C931 1500
R933 56 K
R934 3K
V904 5639
C936 1000
L906 .33
V905 6021
C937 1000
L907 .33
C938 1000
L908 .33


OUTPUT
J902
+120 REG.
TO P-901-K
R911
100
C949
1500
C948
1500
5
7
1
2,4,8
V904
5639
C909
6 uf
L913
16
R913
1K
C947
0.8-18
K903
K902
K901
FL903
50 KC
FL902
100 KC
FL901
250 KC
FL904
WIDE BAND
R914
100
C943
1500
R944
24K
C932
1500
170
33K
V906
6021
V907
5639
V901
5702
V902
5636
C939
1000
C939
1000
C940
1000
C941
1000
L908
.33
L909
.33
L910
.33
L911
.33


+120 REG
TO P-901-K
TO V 901-2
V 902-7
C910
1500
R918
3.6K
2W
R921
3.6K
2W
C911
12
C912
12
V905
6021
R951
91
R952
91
R914
100
R915
100
R916
220
R917
500
R919
1.1K
R922
1.1K
R920
62
P901F
+170
K904
C943
1500
R945
20K
C916
1500
C944
1500
R946
150K
R950
10K
C934
110
V908
6111
R947
910
R949
51K
R926
3.3K
C918
150
R948
5.1K
V902
5636
V908
6111
C941
1000
L912
.33
C942
1000
P901-D


901-2
902-7
L 901
62
P-901-K
+120 REG
R921
3.6 K
2W
C912
12
V906
6021
C914
15
R952
91
R922
1.1 K
R920
62
C913
4700
R923
470
C916
1500
L902
3.2-8.3
C915
5.1
R924
2.4 K
R925
47 K
V907
5639
R926
3.3 K
C918
150
R927
100
C917
1500
C922
1500
P-901
K903
K902
K901
K904
A
B
C
D
E
F
H
J
K
L
M
N
P
R
S
T
U
V
W
X
6.3 VAC
+170
+120 REG
LOCK
COMMON
TO LOC




NOTES:

UNLESS OTHERWISE NOTED:

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICRO-FARADS.

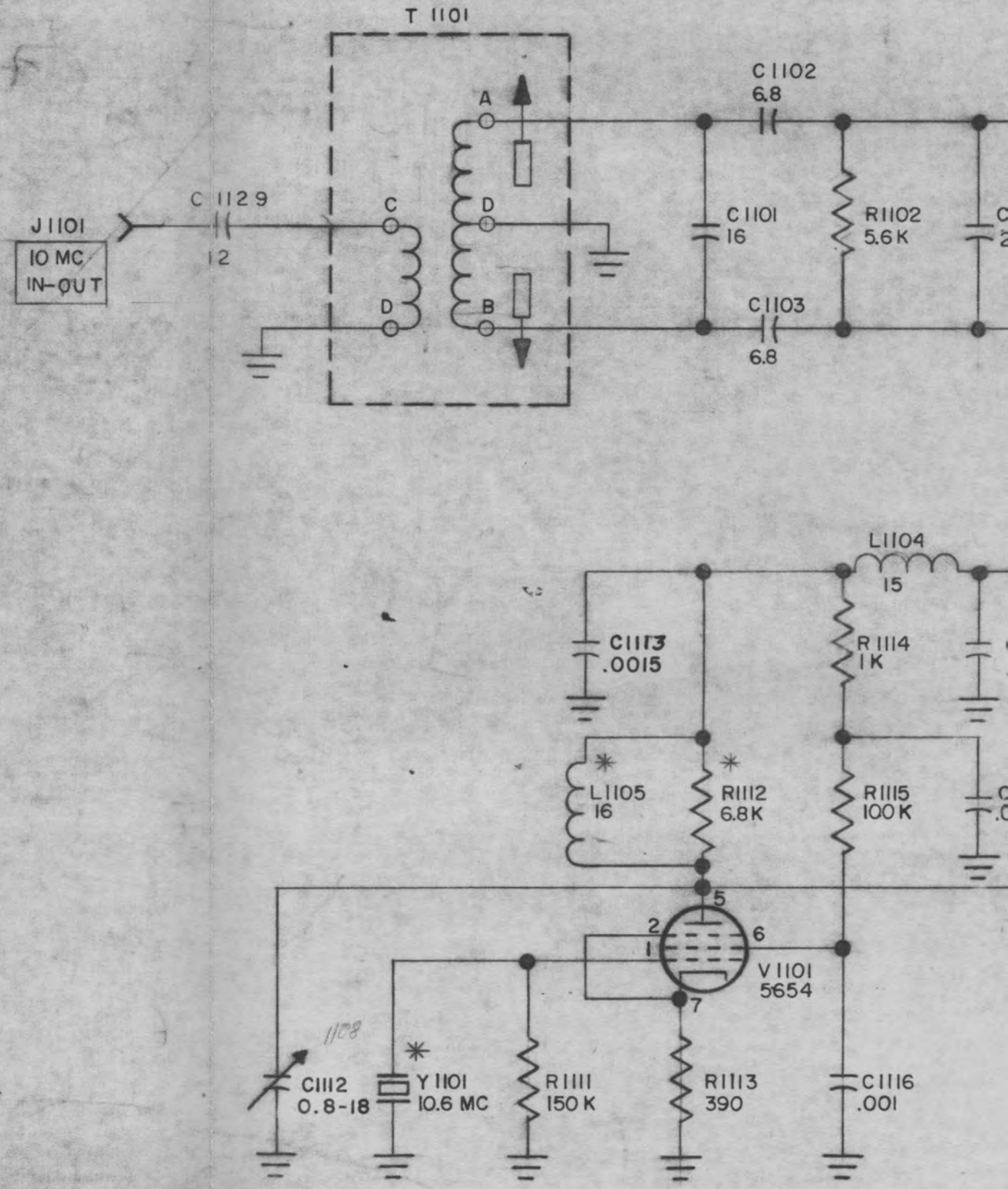
CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

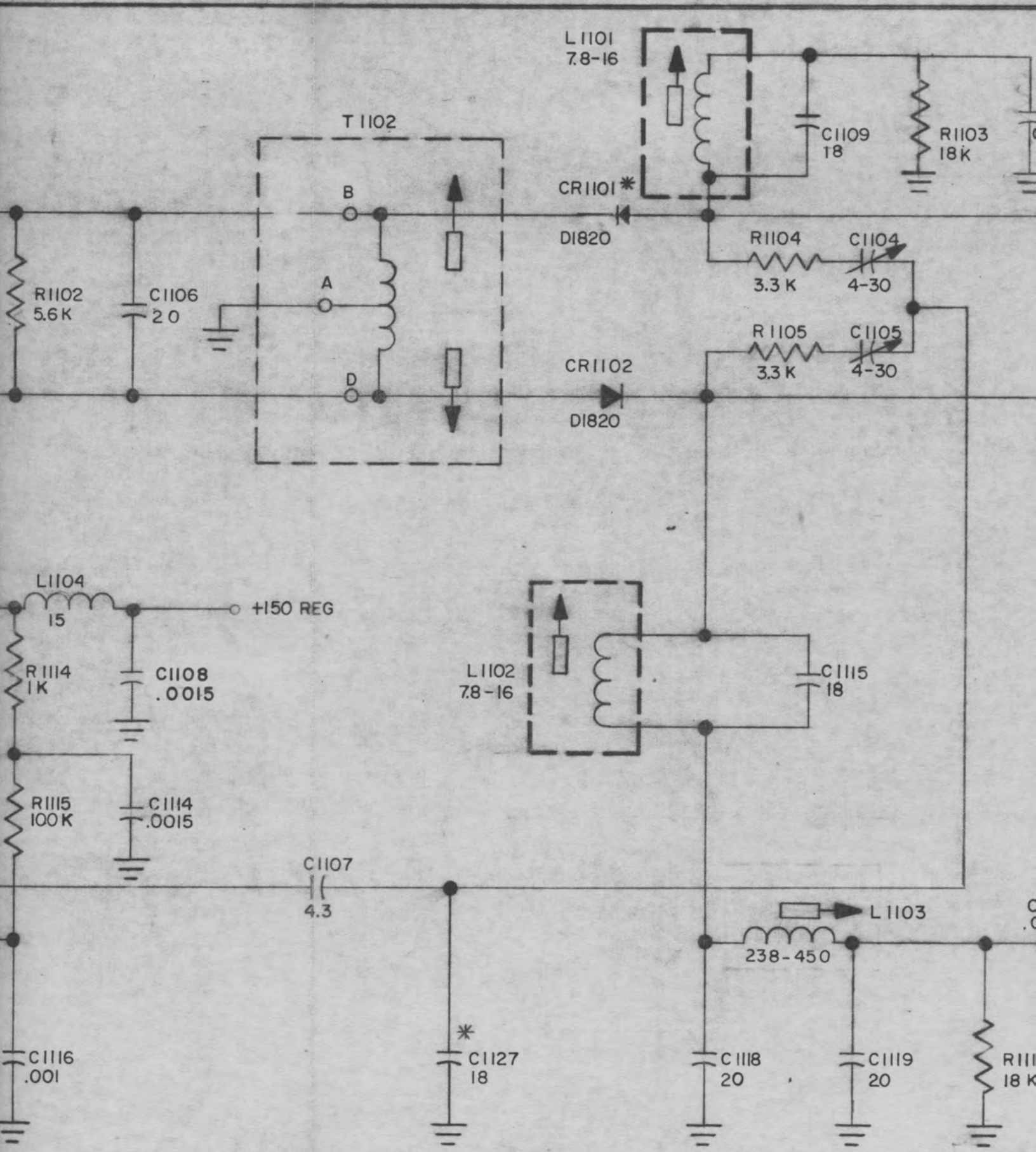
INDUCTANCE VALUES ARE IN MICROHENRYS.

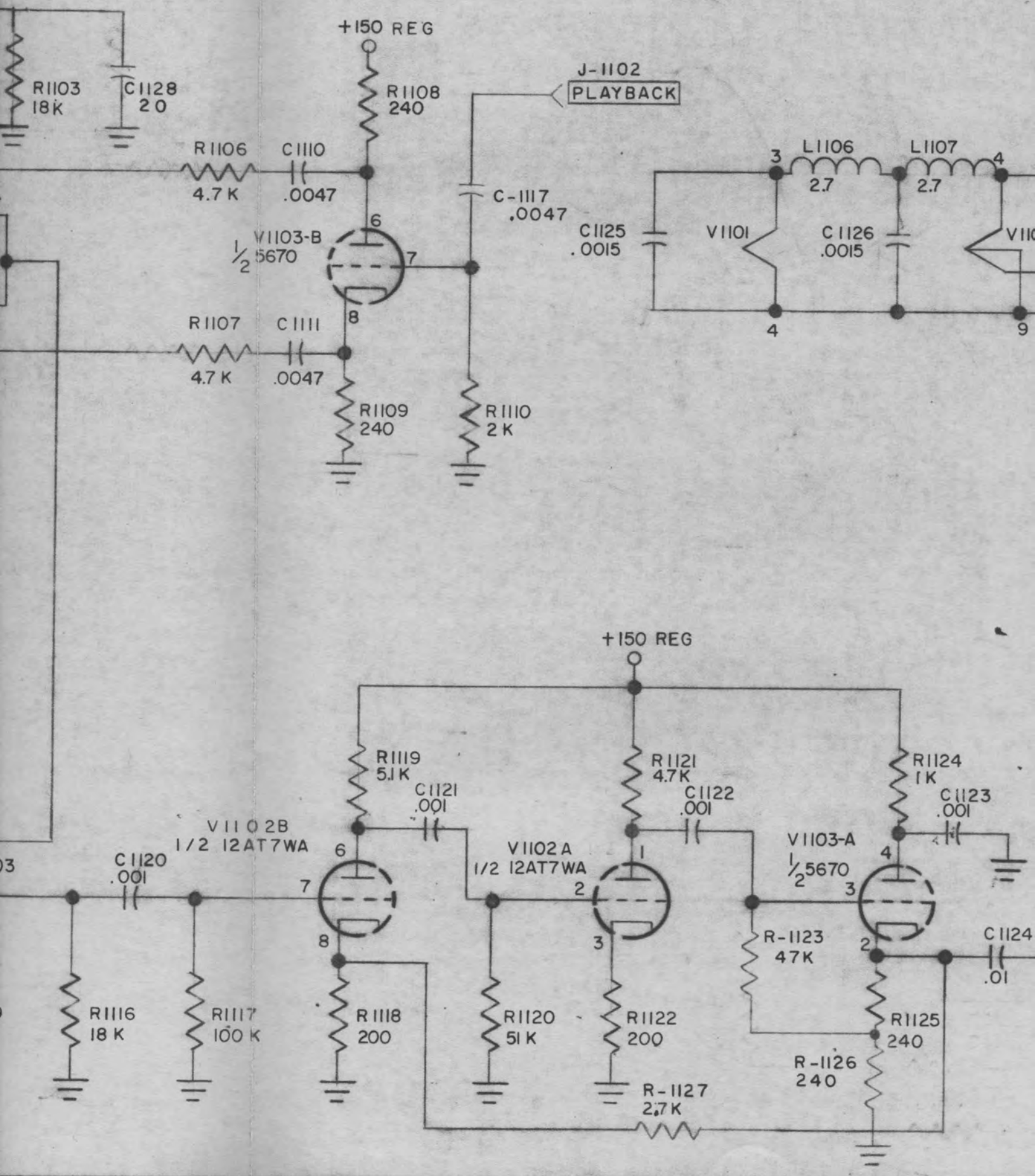
RESISTOR VALUES ARE IN OHMS - $\frac{1}{2}$ WATT.

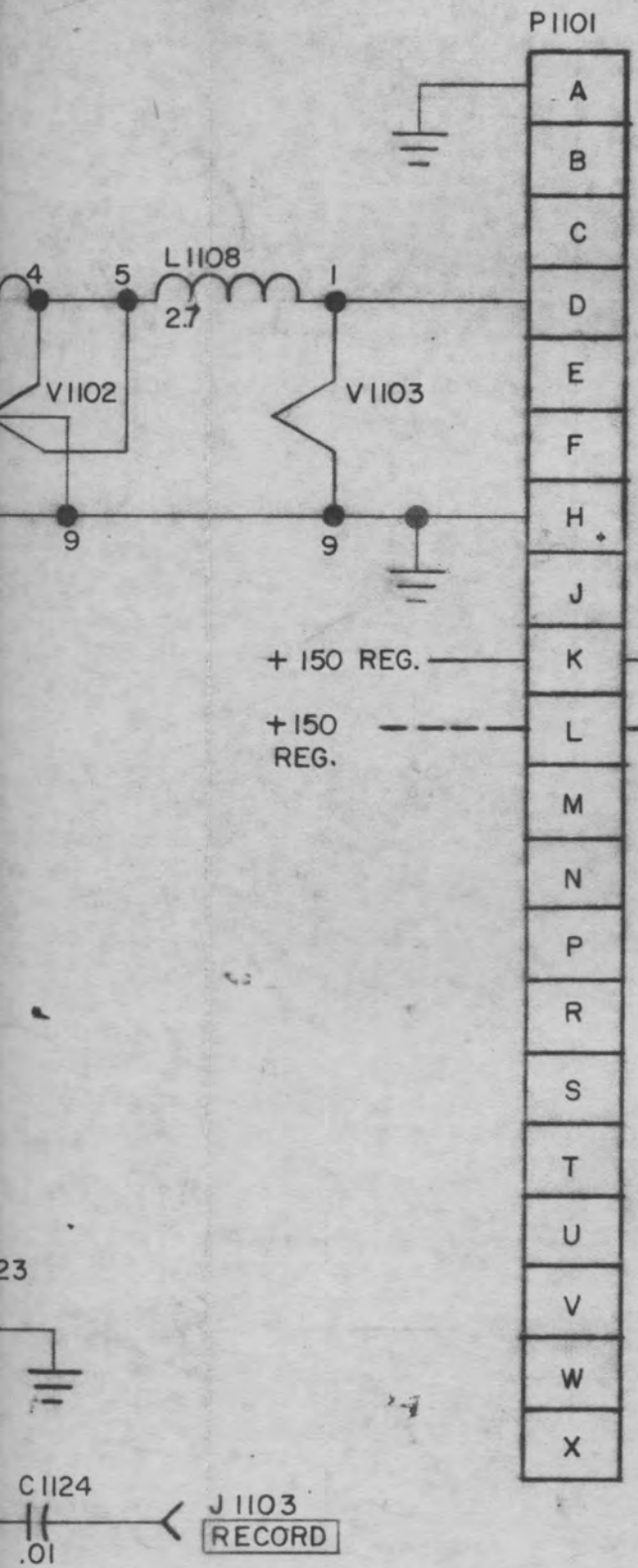
K= 1,000 M= 1,000,000

PHASE LOCK LOOP-INDICATOR
R-14-834


T 1101
A
B
C
D
D
J 1101
10 MC
IN-OUT
C 1129
12
C 1102
6.8
C 1101
16
C 1103
6.8
R 1102
5.6 K
L 1104
15
C 1113
.0015
R 1114
1K
L 1105
16
R 1112
6.8K
R 1115
100 K
5
2
1
6
7
V 1101
5654
C 1112
0.8-18
Y 1101
10.6 MC
R 1111
150 K
R 1113
390
C 1116
.001


L1101
7.8-16
T1102
B
A
D
CR1101 *
D1820
C1109
18
R1103
18K
R1104
3.3 K
C1104
4-30
R1105
3.3 K
C1105
4-30
CR1102
D1820
R1102
5.6K
C1106
20
L1104
15
+150 REG
R1114
1K
C1108
.0015
L1102
7.8-16
C1115
18
R1115
100K
C1114
.0015
C1107
4.3
L1103
238-450
C1116
.001
*
C1127
18
C1118
20
C1119
20


+150 REG
R1103
18K
C1128
20
R1108
240
J-1102
PLAYBACK
R1106
4.7 K
C1110
.0047
C-1117
.0047
V1103-B
1/2 5670
L1106
2.7
L1107
2.7
C1125
.0015
V1101
C1126
.0015
R1107
4.7 K
C1111
.0047
R1109
240
R1110
2 K
+150 REG
R1119
5.1 K
C1121
.001
R1121
4.7 K
C1122
.001
R1124
1 K
C1123
.001
V1102B
1/2 12AT7WA
C1120
.001
V1102A
1/2 12AT7WA
V1103-A
1/2 5670
R-1123
47K
C1124
.01
R1116
18 K
R1117
100 K
R1118
200
R1120
51 K
R1122
200
R1125
240
R-1126
240
R-1127
2.7K




CKT. VARIATION *

| SYM. | 600 KC | 5MC |
|---|---|---|
| Y1101 | 10.6 MC | 15 MC |
| R1112 | 6.8 K | OMIT |
| C1127 | 18 UUF | OMIT |
| L1105 | 16 UH | 6.8uh |
| CR1101 | as shown | reverse polarity |

NOTES

UNLESS OTHERWISE NOTES!

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

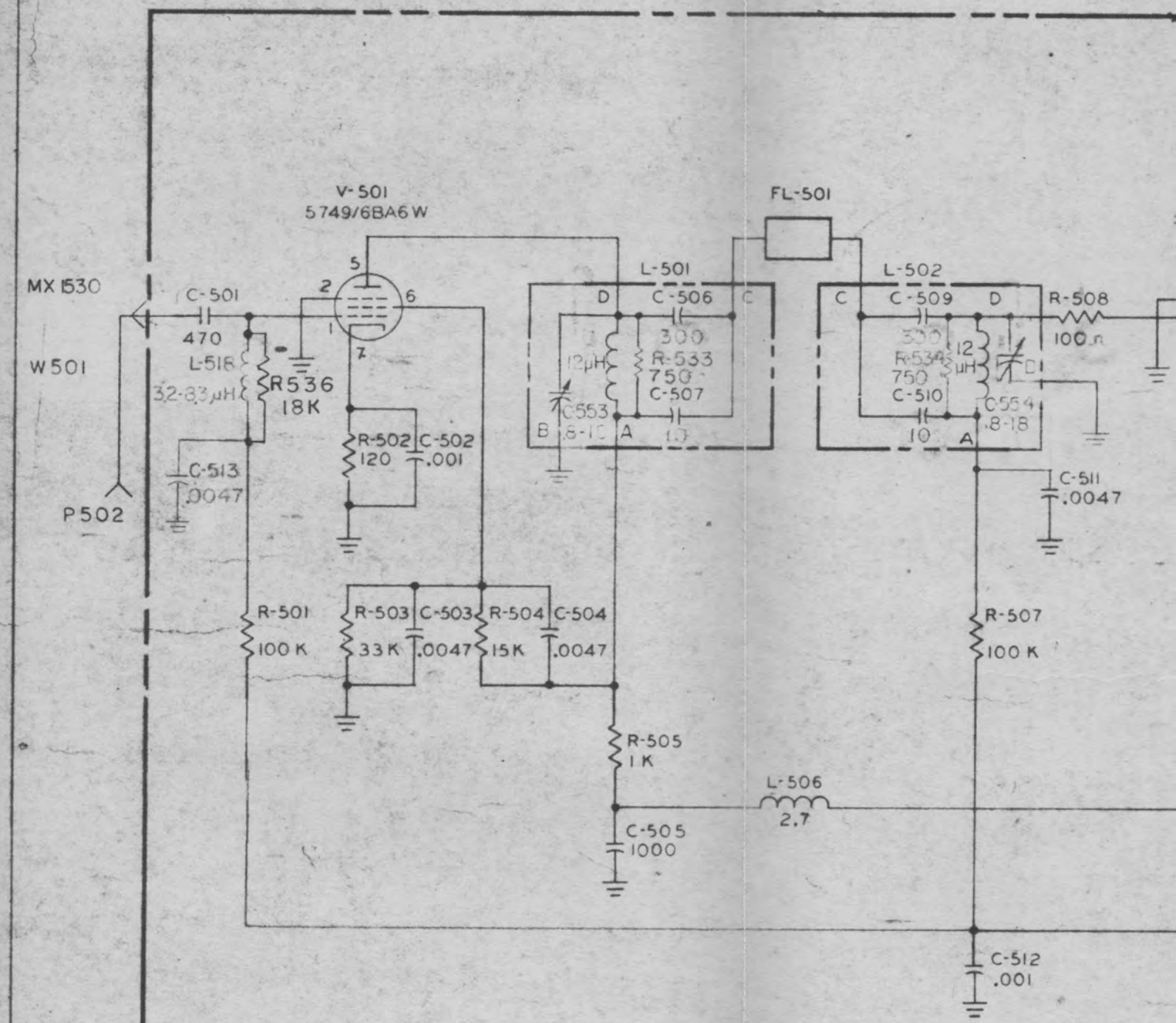
CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.

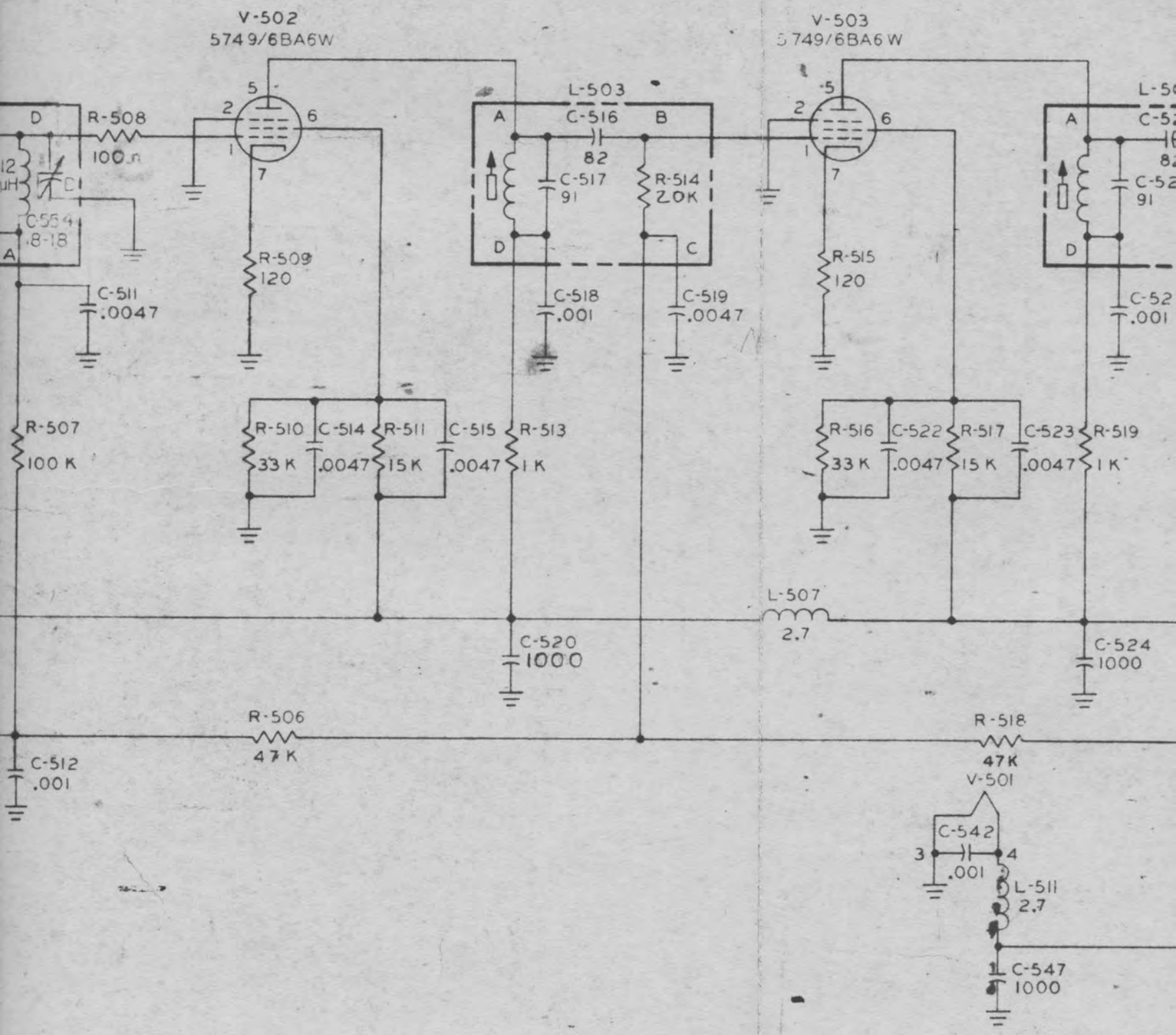
INDUCTANCE VALUES ARE IN MICRO-HENRYS.

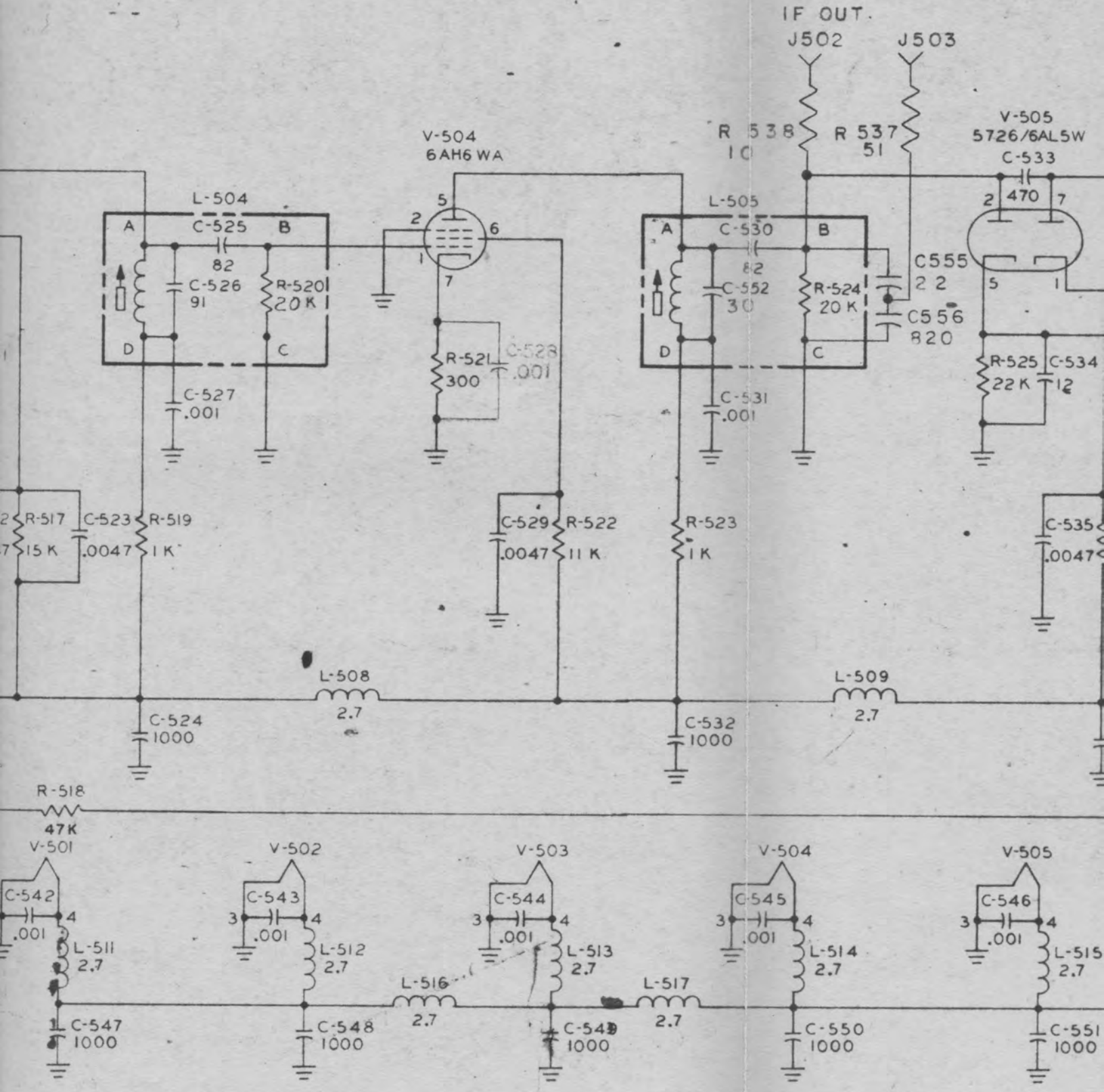
RESISTOR VALUES ARE IN OHMS - 1/2 WATT.

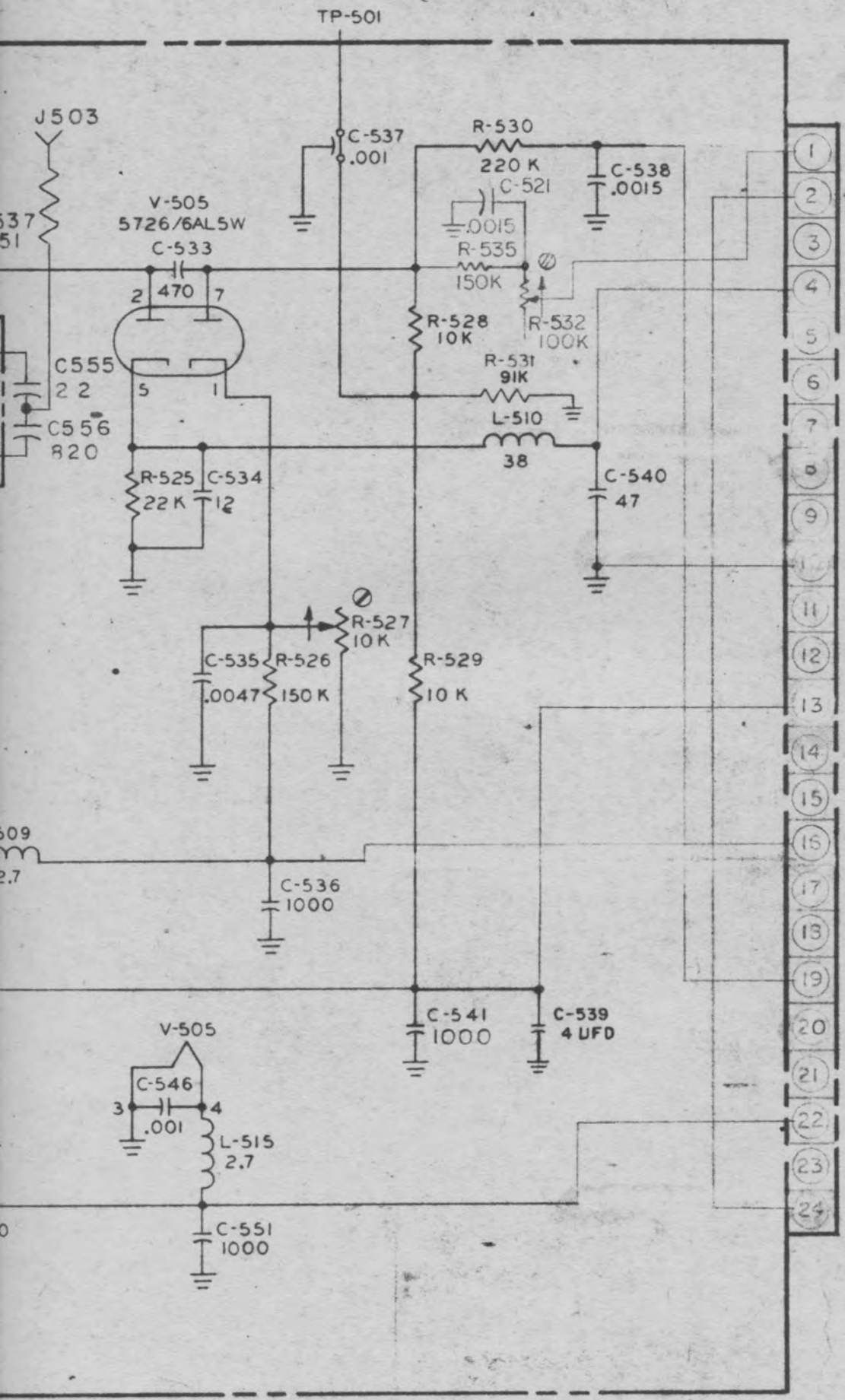
K=1,000 M=1,000,000

R-14-775
PREDECTION PLAYBACK


V-501
5749/6BA6W
FL-501
MX 1530
W 501
P 502
C-501
470
L-518
32-83 μH
R536
18K
C-513
.0047
R-502
120
C-502
.001
L-501
L-502
C-506
C-509
R-508
100 Ω
12 μH
C553
.8-10
C554
.8-18
R-533
750
C-507
R-534
750
C-510
C-511
.0047
R-501
100 K
R-503
33 K
C-503
.0047
R-504
15K
C-504
.0047
R-507
100 K
R-505
1K
L-506
2.7
C-505
1000
C-512
.001


V-502
5749/6BA6W
V-503
5749/6BA6W
L-503
R-508
100
C-554
.8-18
C-511
.0047
R-509
120
C-516
82
C-517
91
R-514
20K
C-518
.001
C-519
.0047
R-515
120
R-507
100 K
R-510
33 K
C-514
.0047
R-511
15 K
C-515
.0047
R-513
1 K
R-516
33 K
C-522
.0047
R-517
15 K
C-523
.0047
R-519
1 K
L-507
2.7
C-520
1000
C-524
1000
R-506
47 K
R-518
47K
C-512
.001
V-501
C-542
.001
L-511
2.7
C-547
1000


IF OUT.
J502
J503
R 538
1 C
R 537
51
V-505
5726/6AL5W
C-533
470
V-504
6AH6WA
L-504
A
C-525
B
82
C-526
91
R-520
20 K
D
C
C-527
.001
L-505
C-530
82
C-552
30
R-524
20 K
C-531
.001
C555
22
C556
820
R-521
300
C-528
.001
R-525
22 K
C-534
12
C-535
.0047
R-517
15 K
C-523
.0047
R-519
1 K
C-529
.0047
R-522
11 K
R-523
1 K
L-508
2.7
L-509
2.7
C-524
1000
C-532
1000
R-518
47K
V-501
V-502
V-503
V-504
V-505
C-542
.001
L-511
2.7
C-543
.001
L-512
2.7
C-544
.001
L-513
2.7
C-545
.001
L-514
2.7
C-546
.001
L-515
2.7
L-516
2.7
L-517
2.7
C-547
1000
C-548
1000
C-549
1000
C-550
1000
C-551
1000




NOTE:
UNLESS OT
CAPACITOR
ARE IN MI
CAPACITOR
ARE IN MI
INDUCTANC
RESISTOR
K=1,000, M
OPERAT
INTERNA
ARR

SCHE
10 KC BAN

P-501

1 TO SIGNAL LEVEL METER

2

3

4 A.M. OUT

5

6

7

8

9

10 GND

11

12

13 AGC TO FIRST IF

14

15

16 B+170V

17

18

19 AGC OUTPUT

20

21

22 6.3V A.C.

23

24 DIGITAL INDICATOR INPUT

NOTE:

UNLESS OTHERWISE INDICATED:

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.

INDUCTANCE VALUES ARE IN MICROHENRYS.

RESISTOR VALUES ARE IN OHMS, K=1,000, M=1,000,000.

○ OPERATING CONTROL

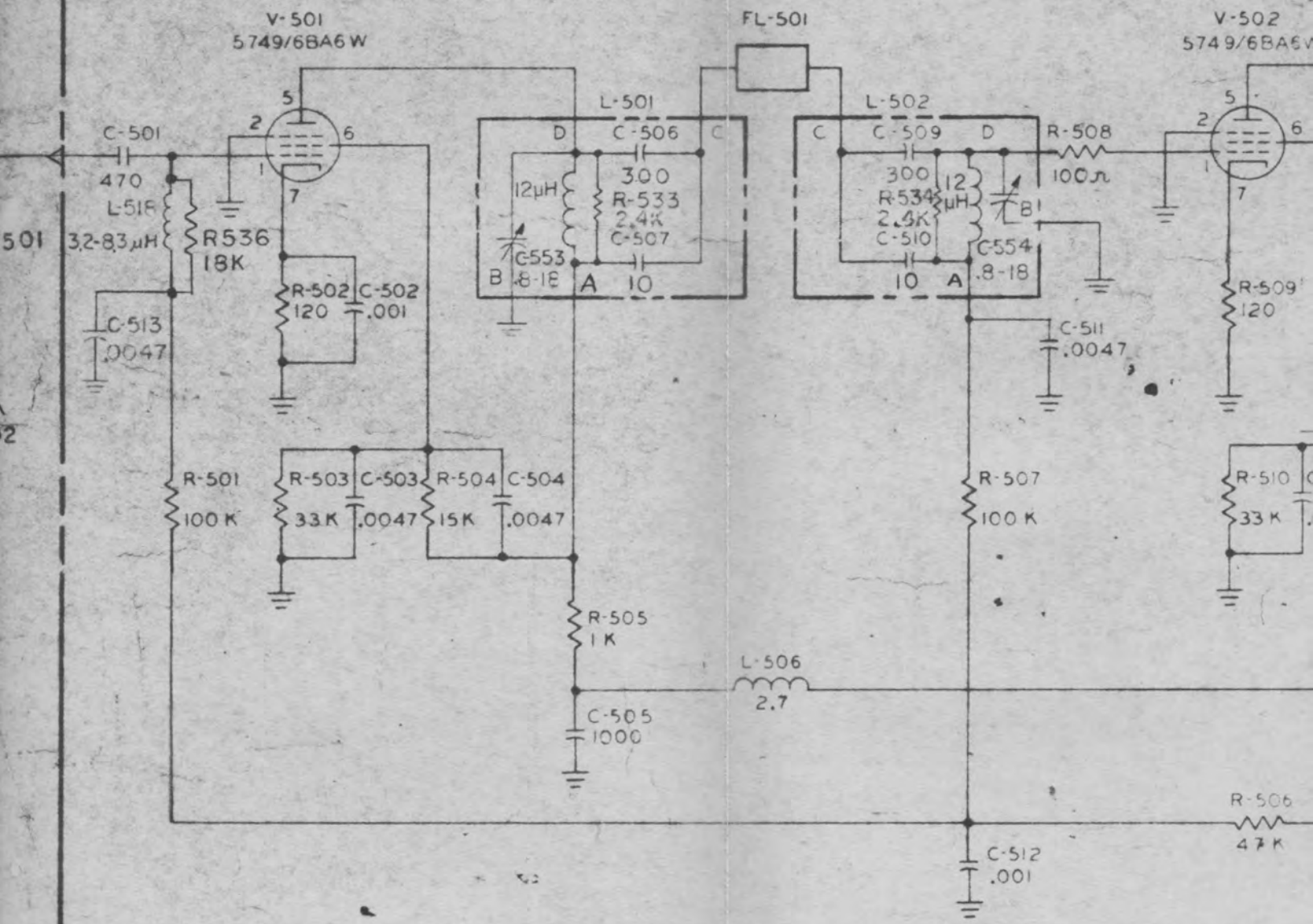
⊘ INTERNAL ADJUSTMENT

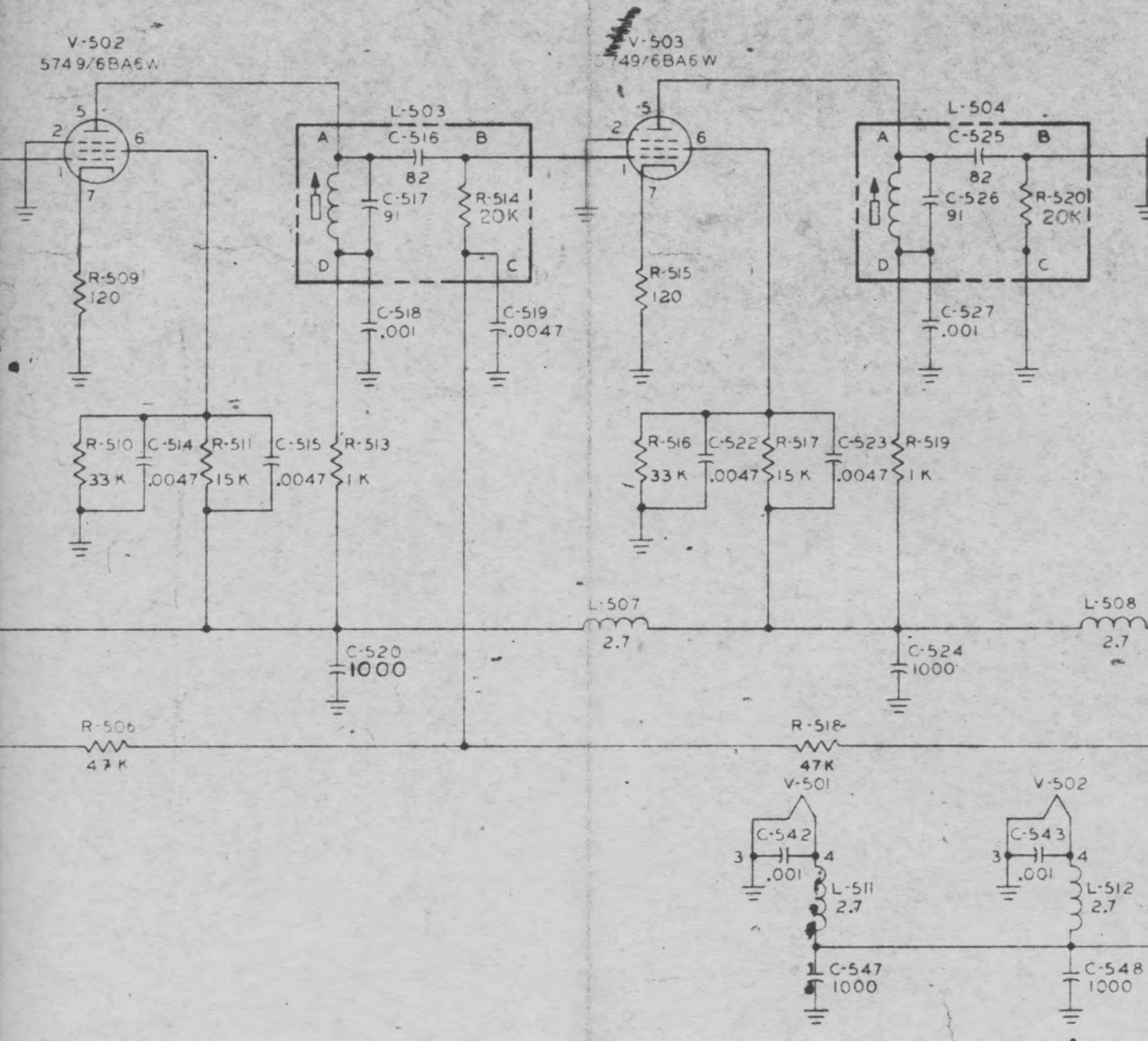
 ARROW DENOTES CLOCKWISE ROTATION

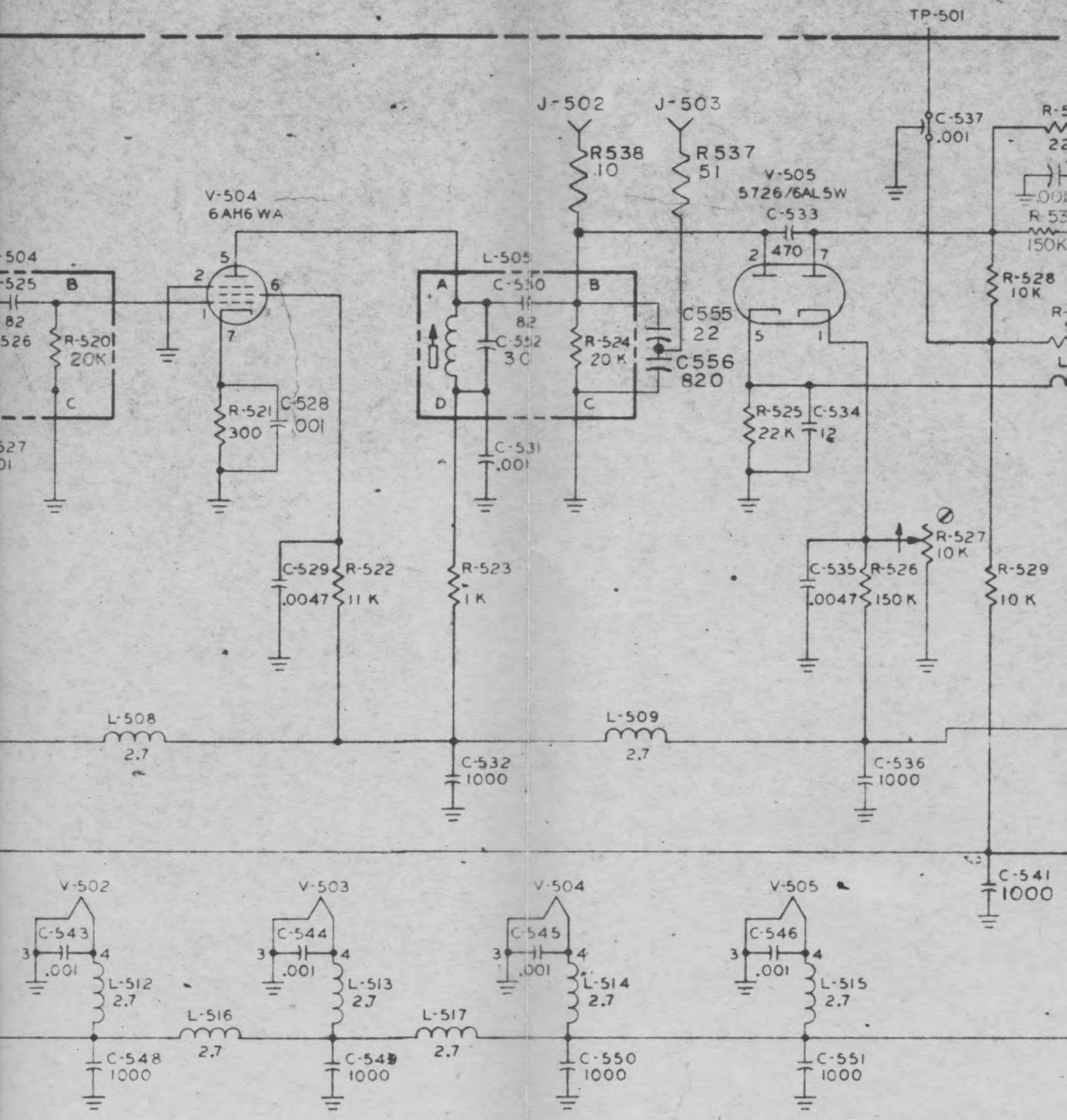
SCHEMATIC DIAGRAM

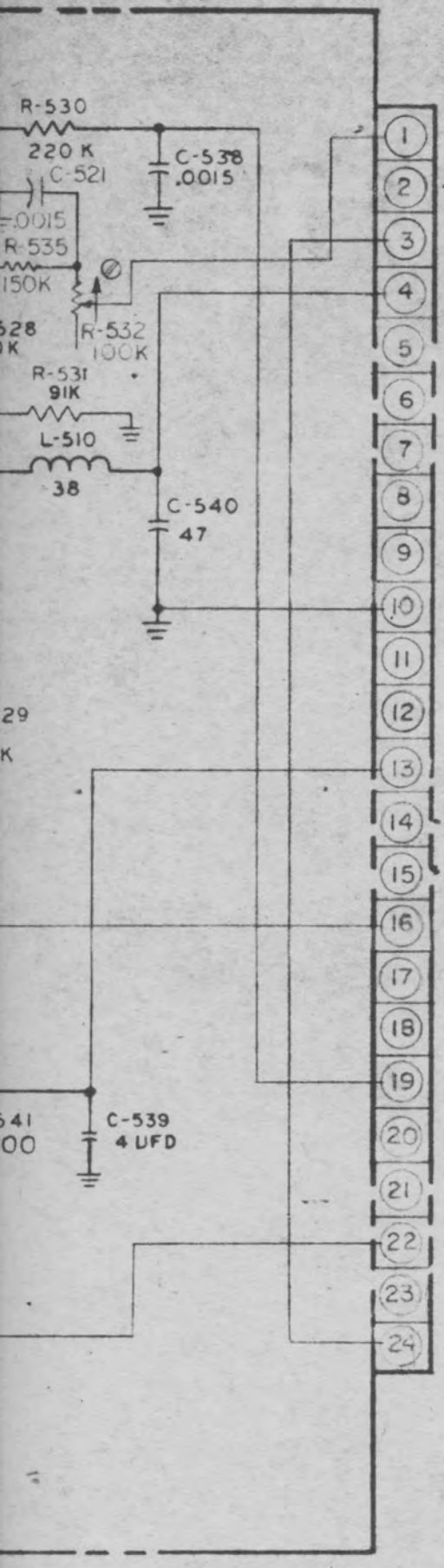
10 KC BANDWIDTH IF AMPLIFIER

| | |
|---|---|
| CENTER FREQUENCE | 10MC |
| BANDWIDTH | 10KC |


V-501
5749/6BA6W
FL-501
V-502
5749/6BA6W
L-501
L-502
C-501
470
L-518
3.2-8.3μH
R536
18K
C-513
.0047
R-502
120
C-502
.001
C-506
300
12μH
R-533
2.4K
C-507
C-553
.8-18
B
A
10
C-509
300
R-534
2.4K
C-510
12
μH
B1
C-554
.8-18
R-508
100Ω
C-511
.0047
R-509
120
R-501
100K
R-503
33K
C-503
.0047
R-504
15K
C-504
.0047
R-507
100K
R-510
33K
R-505
1K
L-506
2.7
C-505
1000
R-506
47K
C-512
.001


V-502
5749/6BA6W
V-503
5749/6BA6W
L-503
L-504
A
B
C
D
C-516
82
C-517
91
R-514
20K
C-518
.001
C-519
.0047
C-525
82
C-526
91
R-520
20K
C-527
.001
R-509
120
R-515
120
R-510
33K
C-514
.0047
R-511
15K
C-515
.0047
R-513
1K
R-516
33K
C-522
.0047
R-517
15K
C-523
.0047
R-519
1K
L-507
2.7
L-508
2.7
C-520
1000
C-524
1000
R-506
47K
R-518
47K
V-501
V-502
C-542
.001
C-543
.001
L-511
2.7
L-512
2.7
C-547
1000
C-548
1000


TP-501
J-502
J-503
R538
.10
R537
51
C-537
.001
V-505
5726/6AL5W
C-533
470
R-528
10K
V-504
6AH6WA
L-505
C-530
8.2
C-532
30
R-524
20K
C555
22
C556
820
R-525
22K
C-534
12
R-527
10K
R-529
10K
R-521
300
C-528
.001
C-531
.001
C-529
.0047
R-522
11K
R-523
1K
C-535
.0047
R-526
150K
L-508
2.7
L-509
2.7
C-532
1000
C-536
1000
C-541
1000
V-502
V-503
V-504
V-505
C-543
C-544
C-545
C-546
.001
L-512
2.7
L-513
2.7
L-514
2.7
L-515
2.7
L-516
2.7
L-517
2.7
C-548
1000
C-549
1000
C-550
1000
C-551
1000




NOTE:

UNLESS OTHERWISE INDICATED:

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.

INDUCTANCE VALUES ARE IN MICROHENRYS.

RESISTOR VALUES ARE IN OHMS, K=1,000, M=1,000,000.

OPERATING CONTROL

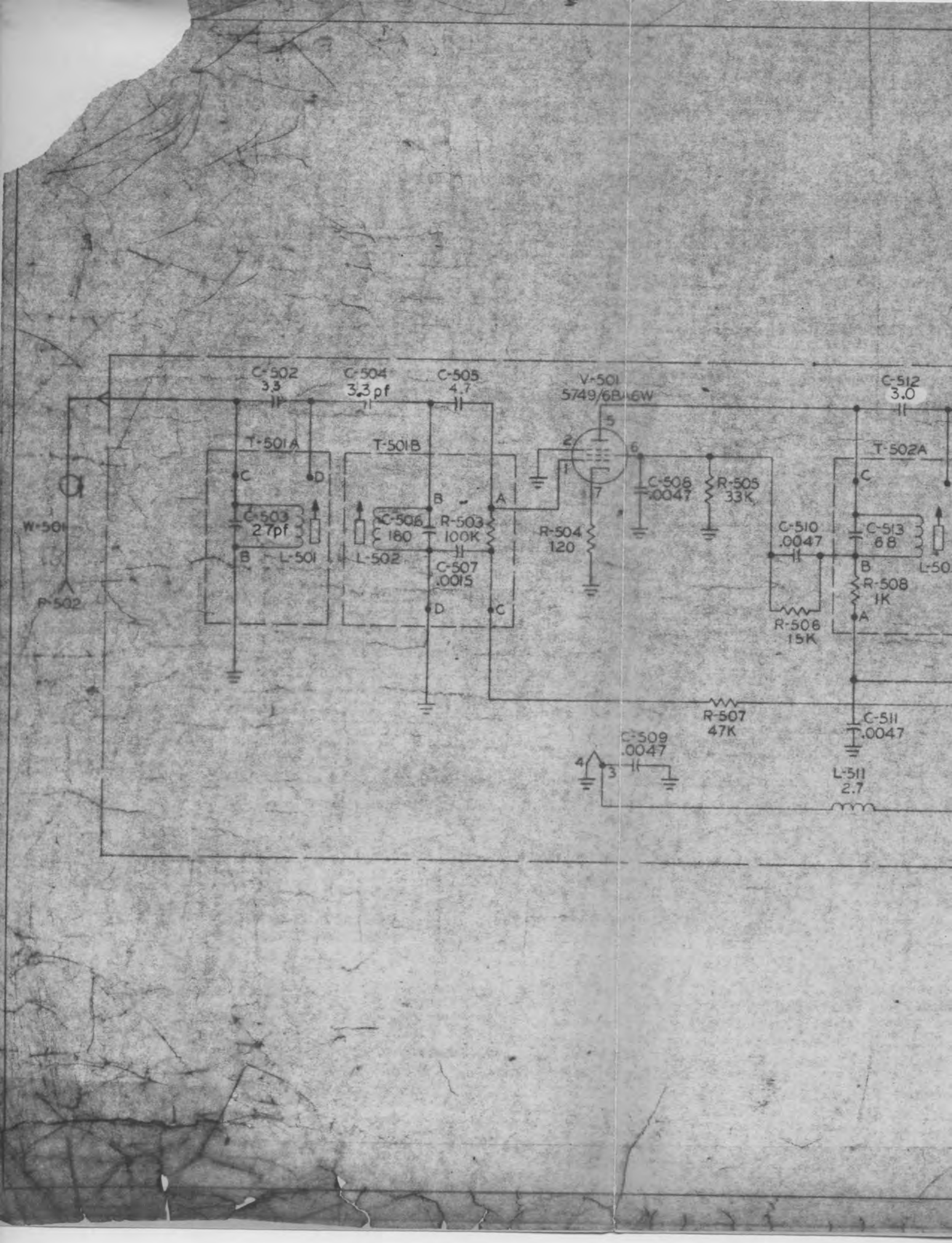
INTERNAL ADJUSTMENT

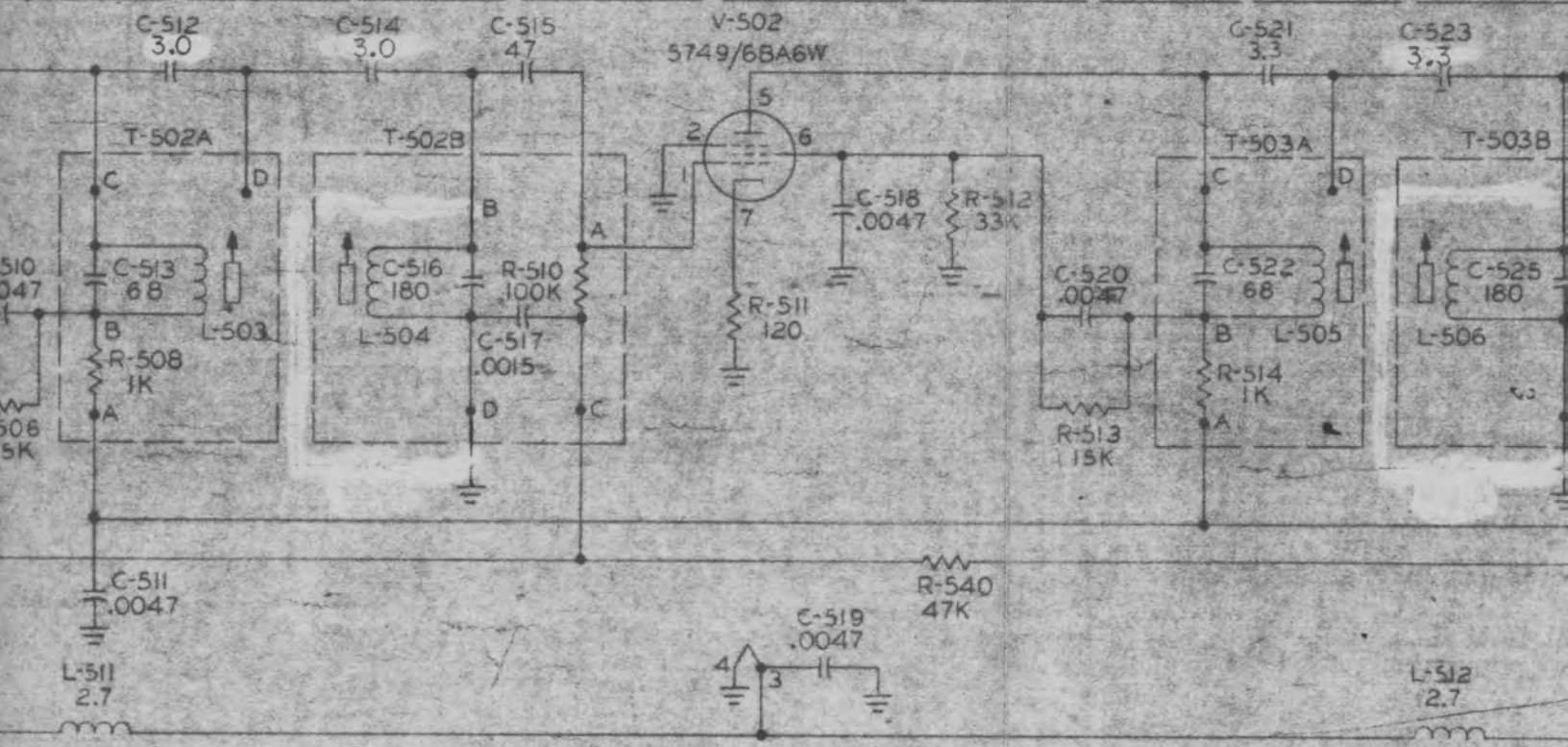
ARROW DENOTES CLOCKWISE ROTATION

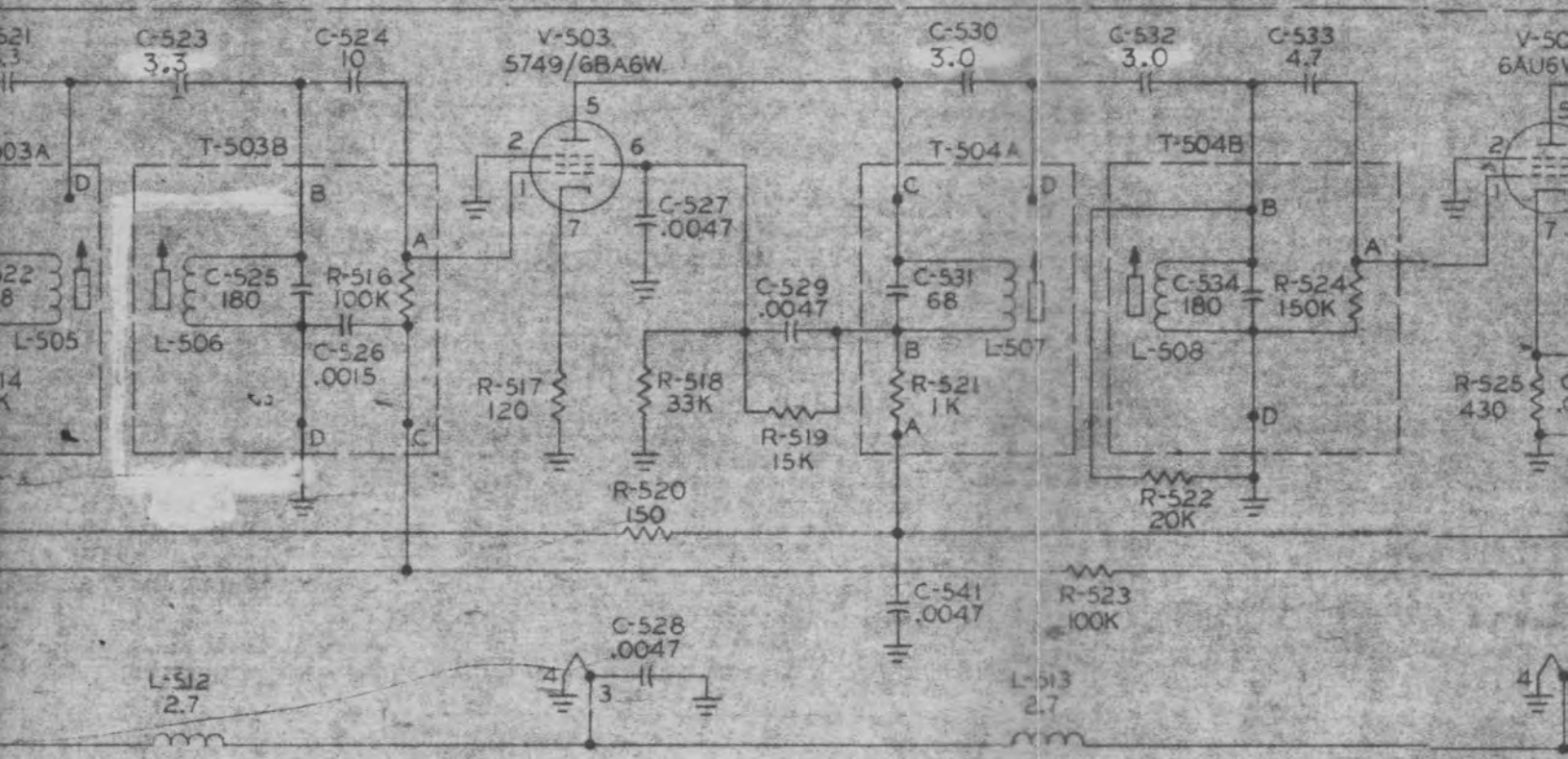
SCHEMATIC DIAGRAM

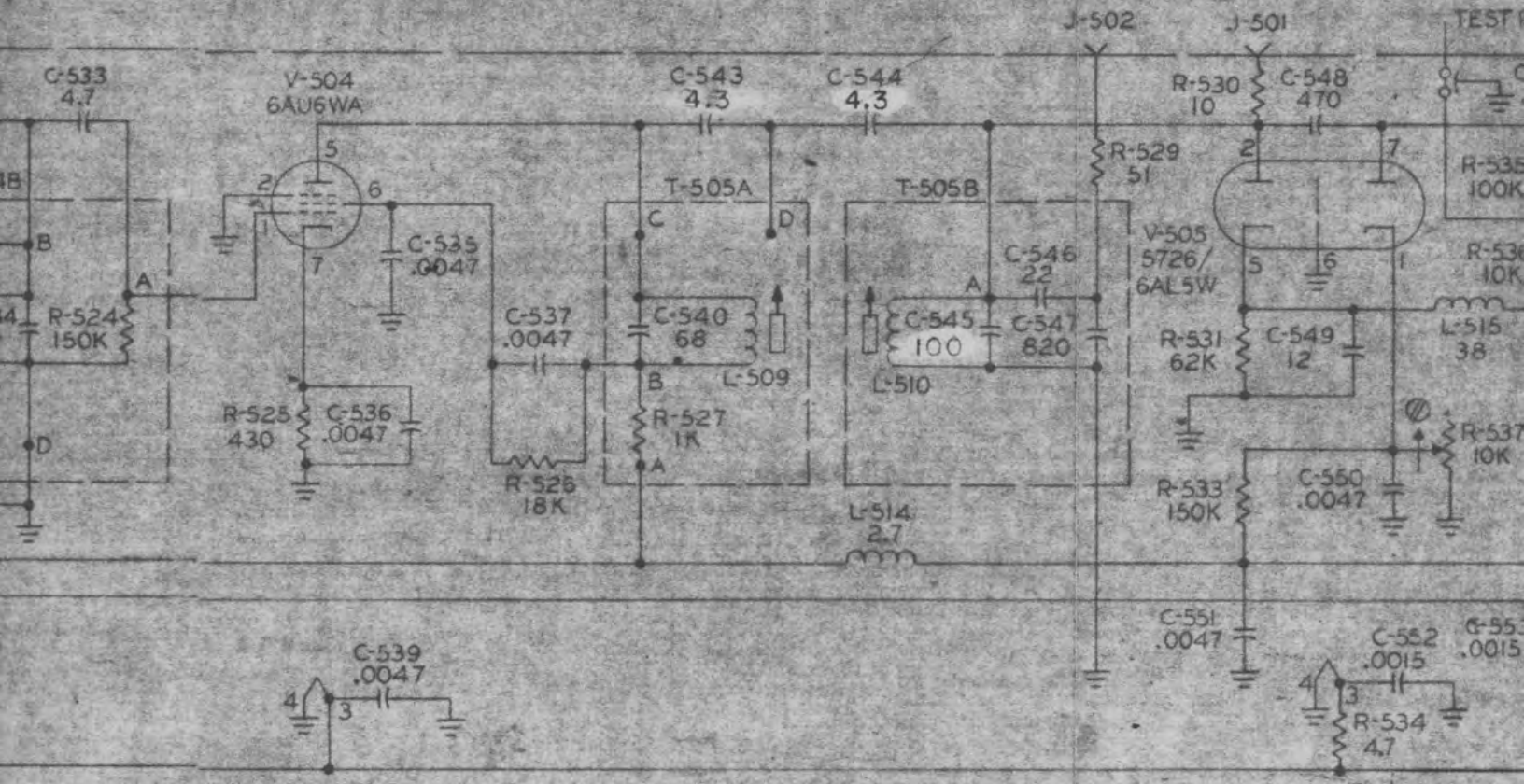
50 KC. BANDWIDTH IF AMPLIFIER

| | |
|---|---|
| CENTER | |
| BANDWID | |


C-502
3.3
C-504
3.3 pf
C-505
4.7
V-501
5749/6BA6W
C-512
3.0
T-501A
T-501B
T-502A
C
D
B
A
C-503
27pf
L-501
C-506
180
L-502
R-503
100K
C-507
.0015
R-504
120
C-508
.0047
R-505
33K
C-510
.0047
C-513
68
L-50
R-508
1K
R-506
15K
W-501
P-502
R-507
47K
C-509
.0047
C-511
.0047
L-511
2.7


C-512
3.0
C-514
3.0
C-515
47
V-502
5749/6BA6W
C-521
3.3
C-523
3.3
T-502A
T-502B
T-503A
T-503B
C-513
68
L-503
C-516
180
L-504
R-510
100K
C-517
.0015
C-518
.0047
R-512
33K
R-511
120
C-520
.0047
C-522
68
L-505
C-525
180
L-506
R-508
1K
R-513
15K
R-514
1K
C-511
.0047
R-540
47K
C-519
.0047
L-511
2.7
L-512
2.7


C-523
3.3
C-524
10
V-503
5749/6BA6W
C-530
3.0
C-532
3.0
C-533
4.7
T-503B
T-504A
T-504B
C-525
180
R-516
100K
C-526
.0015
L-506
C-527
.0047
C-529
.0047
R-517
120
R-518
33K
R-519
15K
R-520
150
C-531
68
L-507
R-521
1K
C-534
180
R-524
150K
L-508
R-522
20K
R-523
100K
C-541
.0047
C-528
.0047
L-512
2.7
L-513
2.7
R-525
430




NOTE:

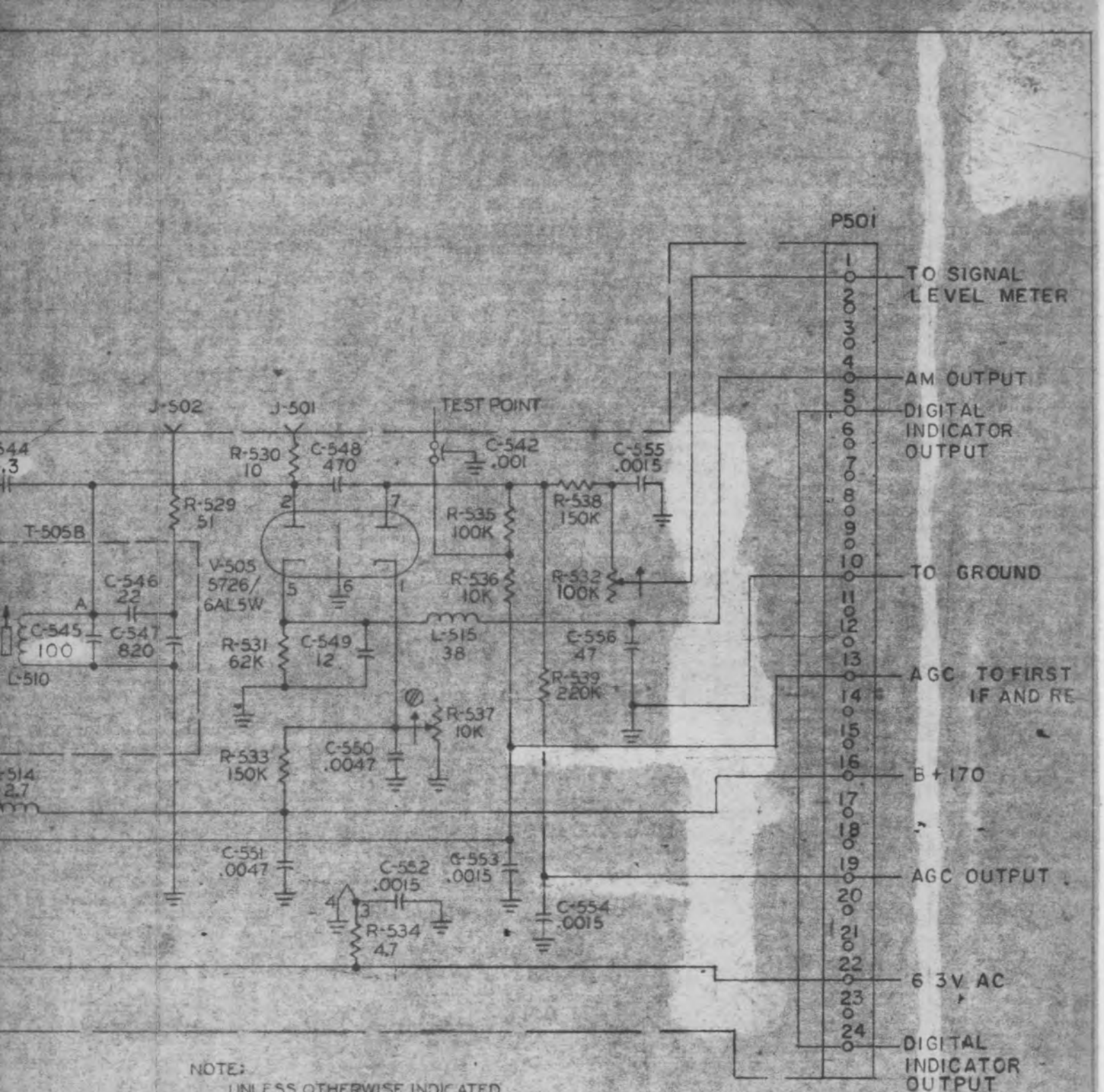
UNLESS OTHERWISE INDICATED
1. CAPACITOR VALUES LESS TH
VALUES GREATER THAN ONE
2. RESISTOR VALUES ARE IN OH
3. INDUCTANCE VALUES ARE IN

SCREW DRIVER ADJUST

ARROW DENOTES CLO

SCHEMATIC

50KC BANDWIDTH 2




NOTE:
UNLESS OTHERWISE INDICATED
1. CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS. VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.
2. RESISTOR VALUES ARE IN OHMS, K=1000, M=1,000,000
3. INDUCTANCE VALUES ARE IN MICROHENRIES.

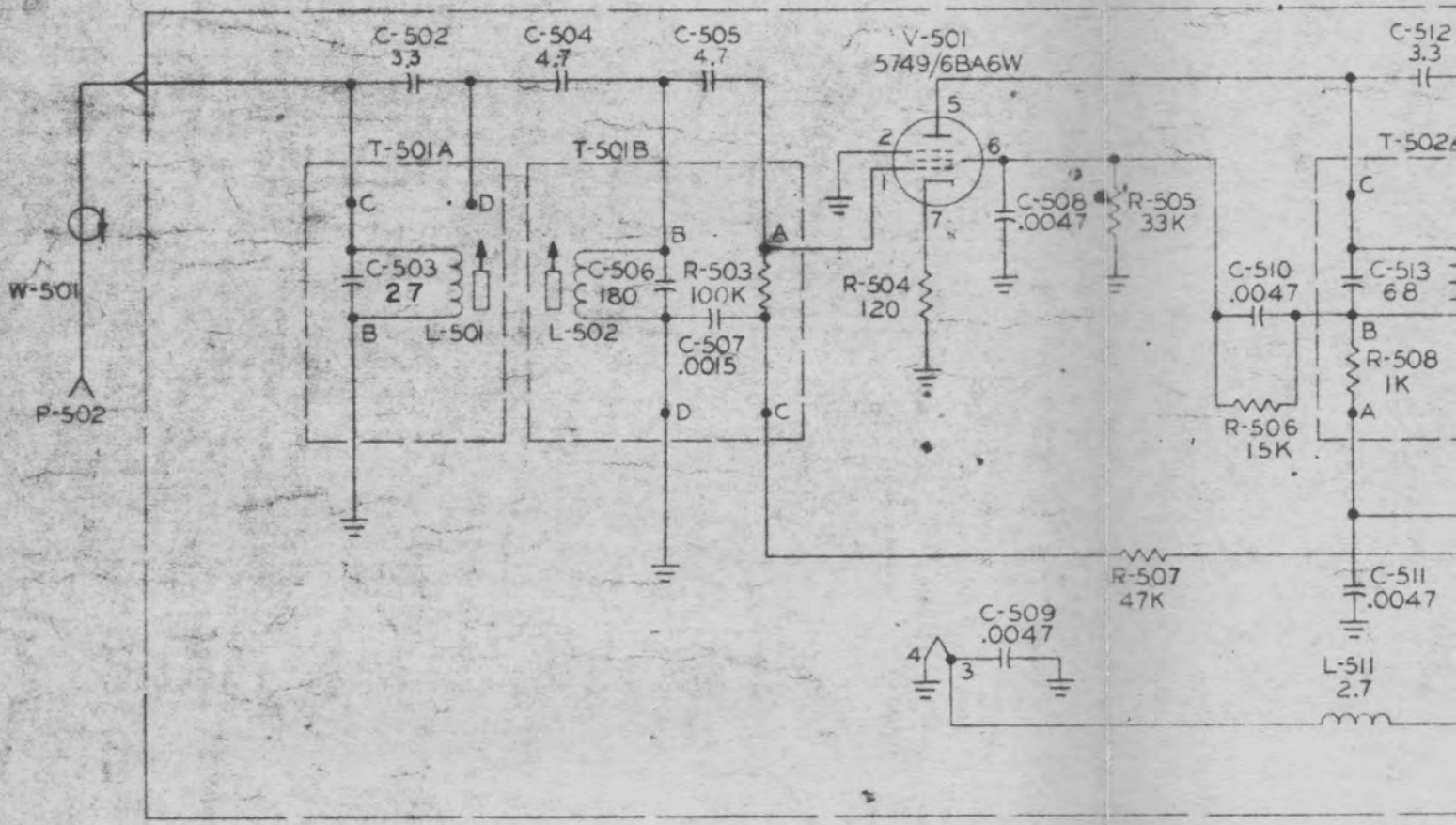
⌀ SCREW DRIVER ADJUSTMENT.

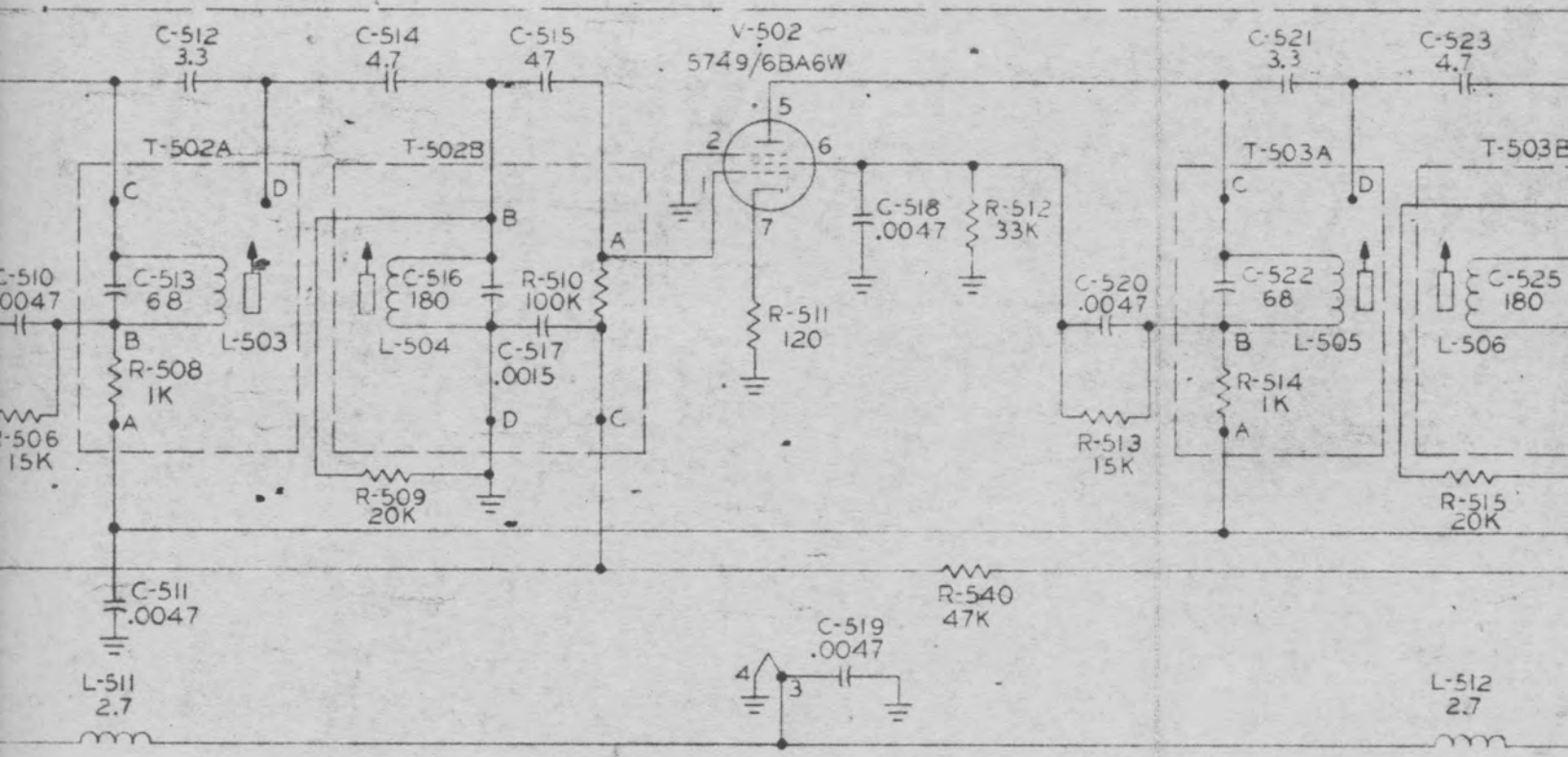
ARROW DENOTES CLOCKWISE ROTATION.

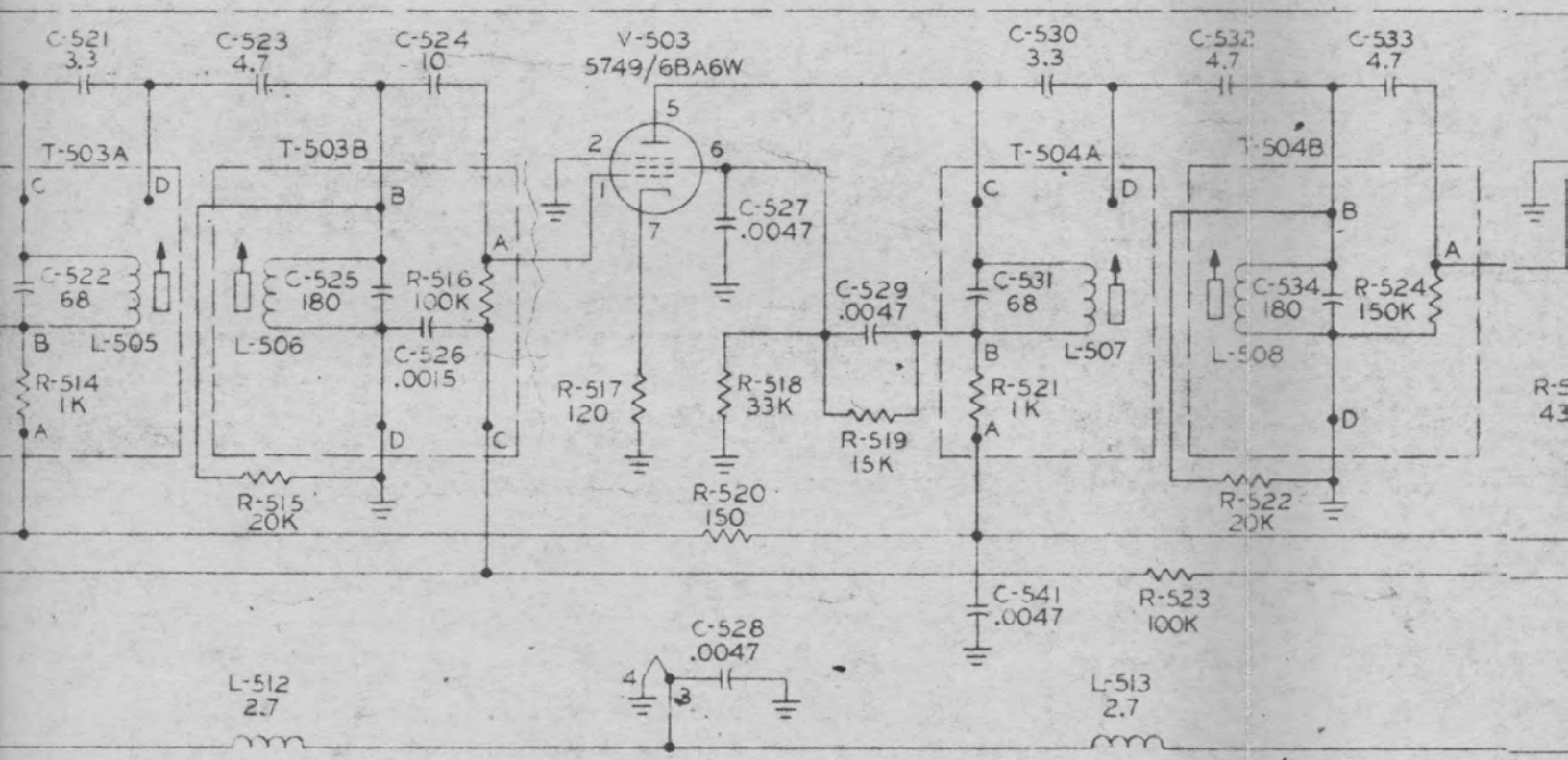
SCHEMATIC
50KC BANDWIDTH 2ND I.F. STRIP

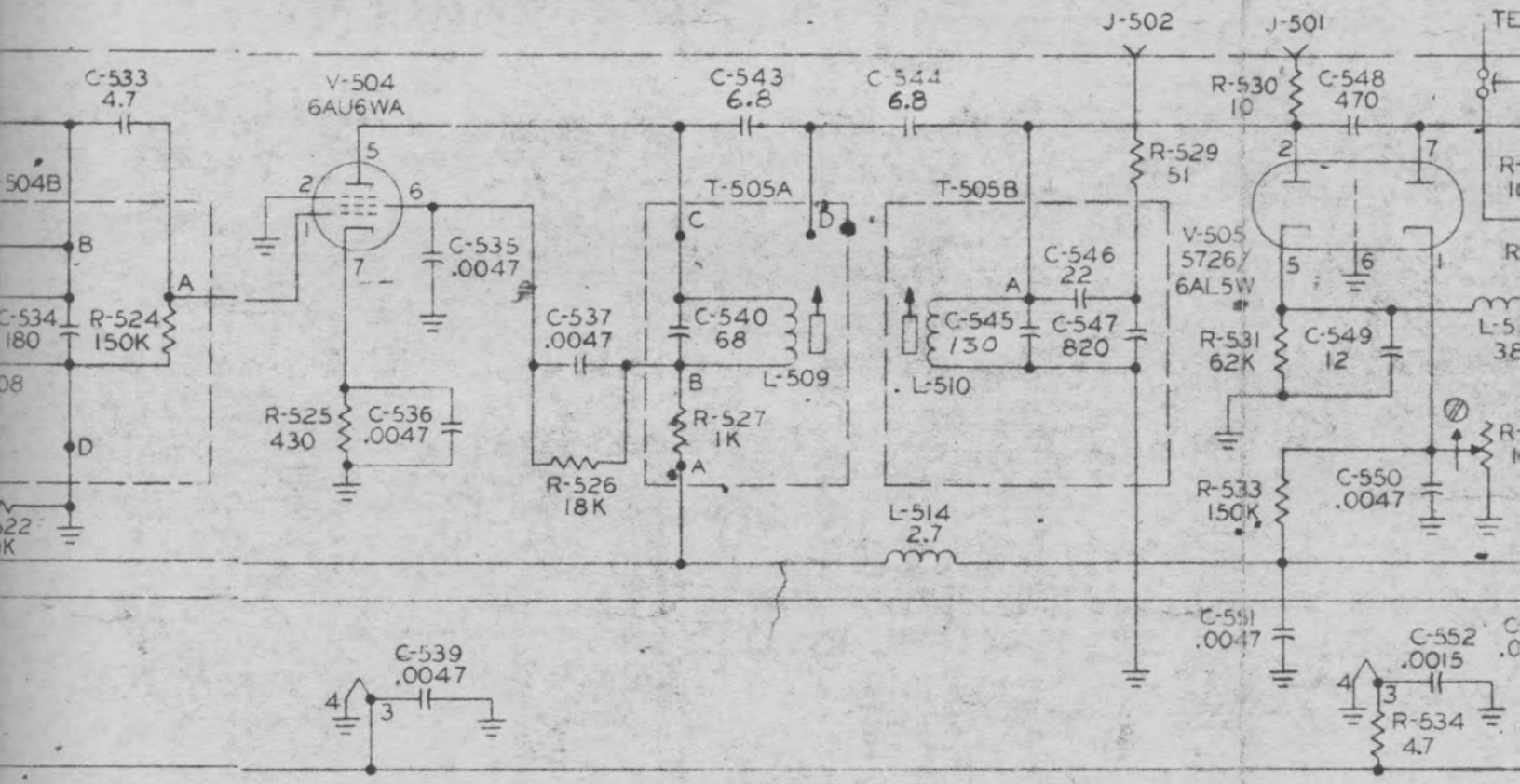
| | |
|---|---|
| CENTER FREQ | 10 MC |
| BANDWIDTH | 50 KC |

R14-541


C-502
3.3
C-504
4.7
C-505
4.7
V-501
5749/6BA6W
C-512
3.3
T-501A
T-501B
T-502A
W-501
P-502
C-503
27
L-501
C-506
180
L-502
R-503
100K
C-507
.0015
R-504
120
C-508
.0047
R-505
33K
C-510
.0047
C-513
68
R-506
15K
R-508
1K
R-507
47K
C-511
.0047
C-509
.0047
L-511
2.7


C-512
3.3
C-514
4.7
C-515
47
V-502
5749/6BA6W
C-521
3.3
C-523
4.7
T-502A
T-502B
T-503A
T-503B
C-513
68
L-503
C-516
180
R-510
100K
L-504
C-517
.0015
R-508
1K
R-509
20K
R-511
120
C-518
.0047
R-512
33K
C-520
.0047
R-513
15K
C-522
68
L-505
R-514
1K
C-525
180
L-506
R-515
20K
C-511
.0047
R-540
47K
C-519
.0047
L-511
2.7
L-512
2.7


C-521
3.3
C-523
4.7
C-524
10
V-503
5749/6BA6W
C-530
3.3
C-532
4.7
C-533
4.7
T-503A
T-503B
T-504A
T-504B
C-522
68
L-505
C-525
180
L-506
R-516
100K
C-526
.0015
C-527
.0047
C-529
.0047
C-531
68
L-507
C-534
180
L-508
R-524
150K
R-514
1K
R-517
120
R-518
33K
R-519
15K
R-521
1K
R-515
20K
R-520
150
R-522
20K
C-541
.0047
R-523
100K
C-528
.0047
L-512
2.7
L-513
2.7




NOTE:

UNLESS OTHERWISE INDICA

1. CAPACITOR VALUES LESS
VALUES GREATER THAN

2. RESISTOR VALUES ARE I

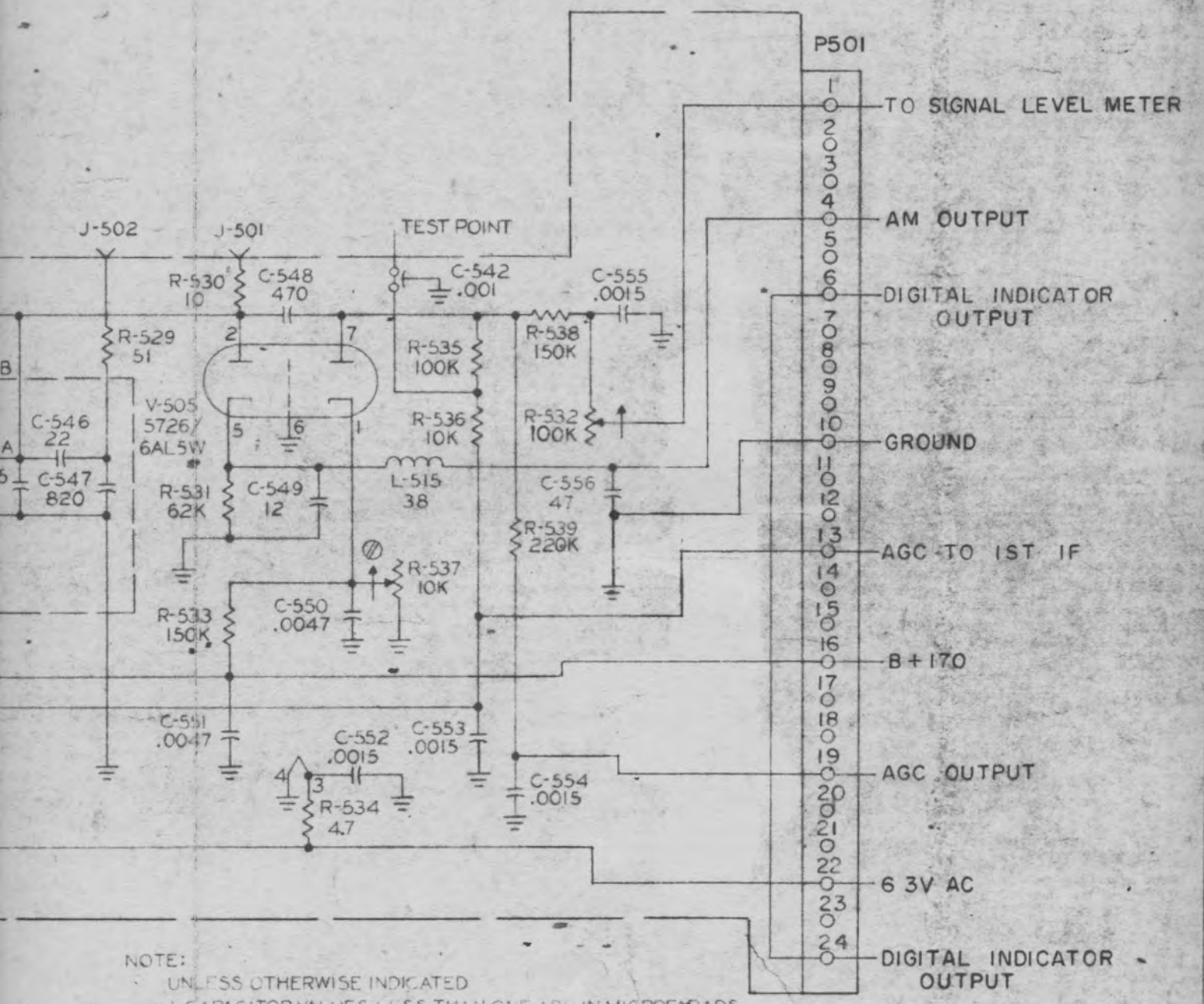
3. INDUCTANCE VALUES AR

Ø SCREW DRIVER ADJU

ARROW DENOTES

SCHEMA

100KC BANDWIDTH




NOTE:
UNLESS OTHERWISE INDICATED
1. CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS, VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.
2. RESISTOR VALUES ARE IN OHMS, K=1000, M=1,000,000
3. INDUCTANCE VALUES ARE IN MICROHENRIES.

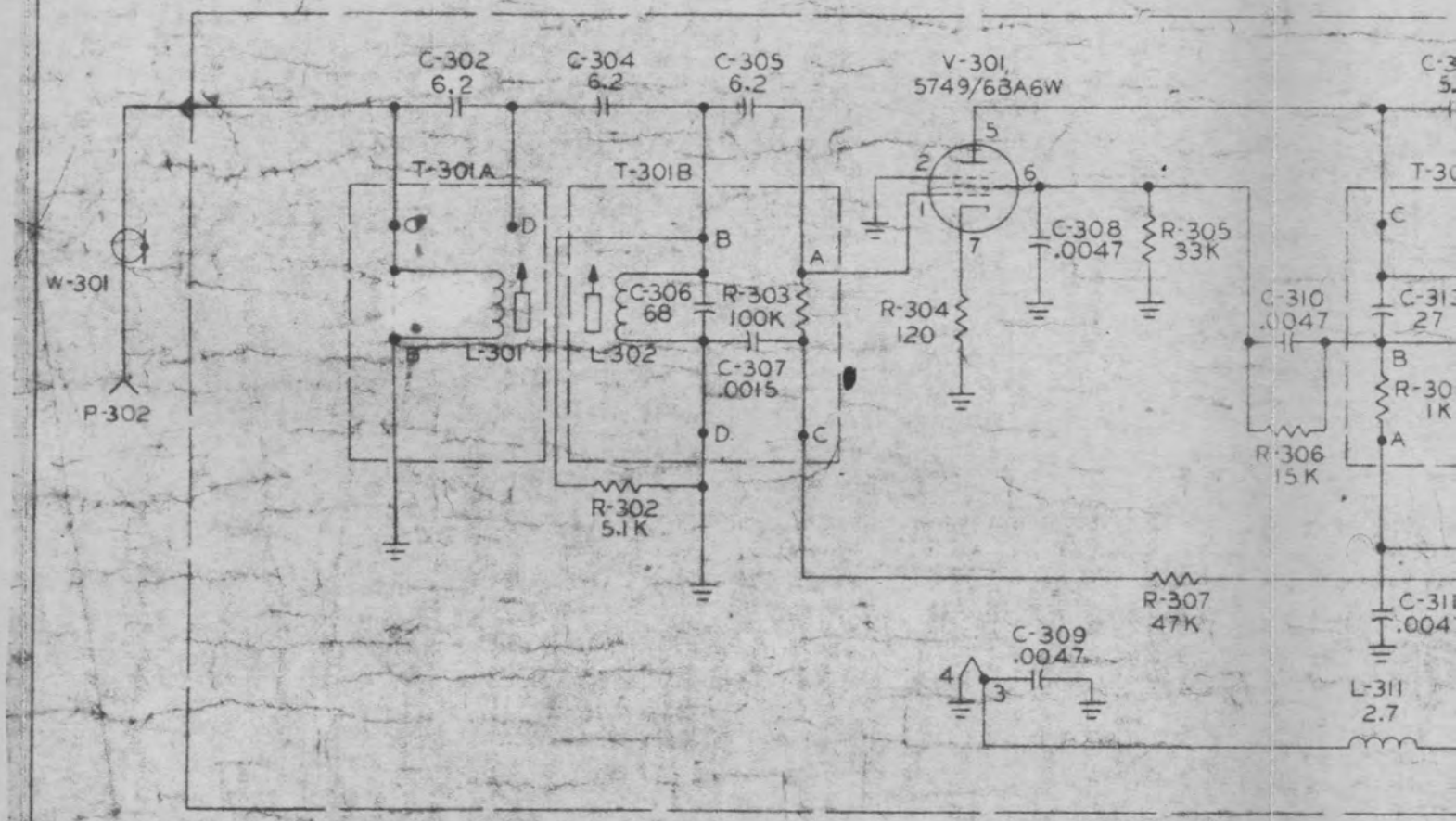
⊘ SCREW DRIVER ADJUSTMENT.

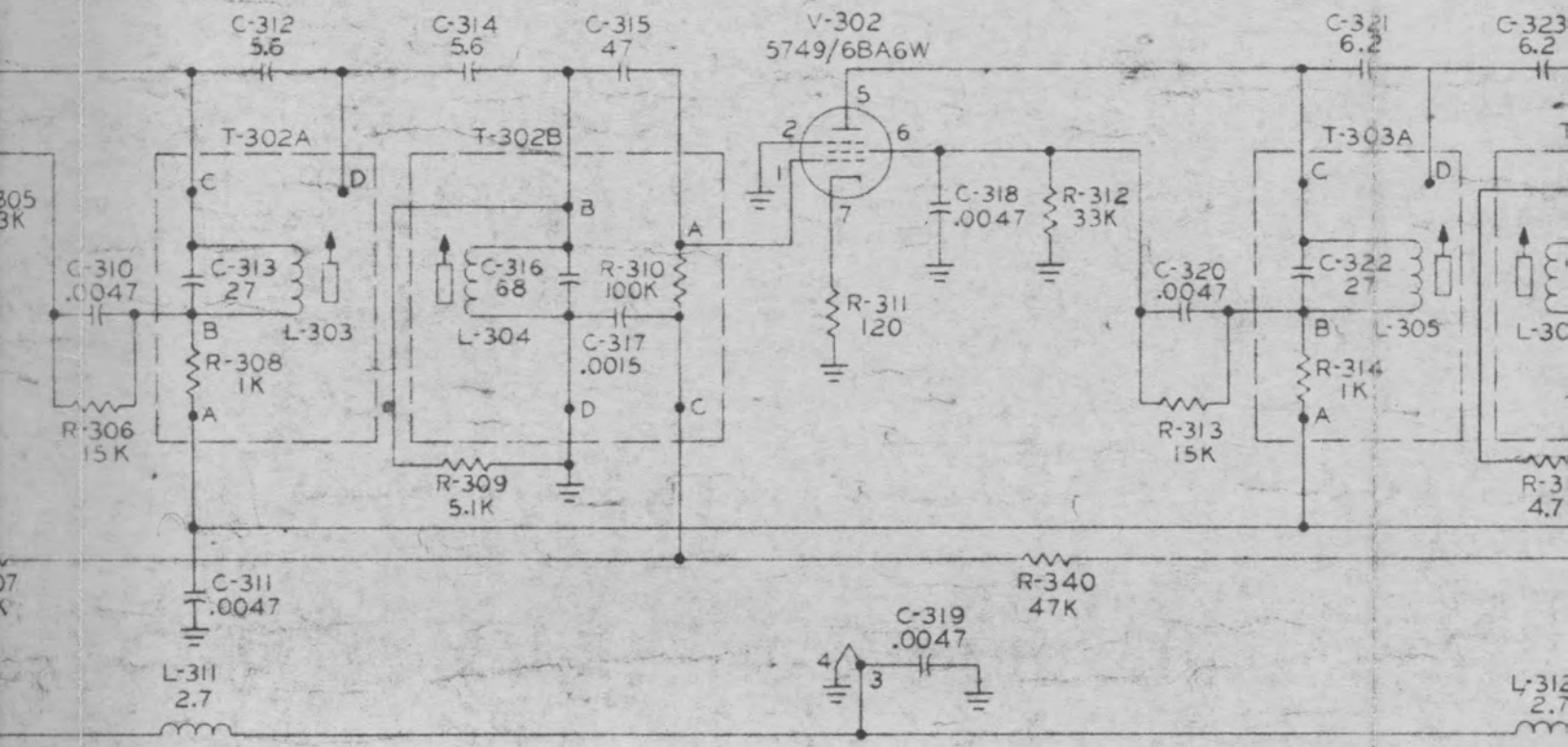
ARROW DENOTES CLOCKWISE ROTATION.

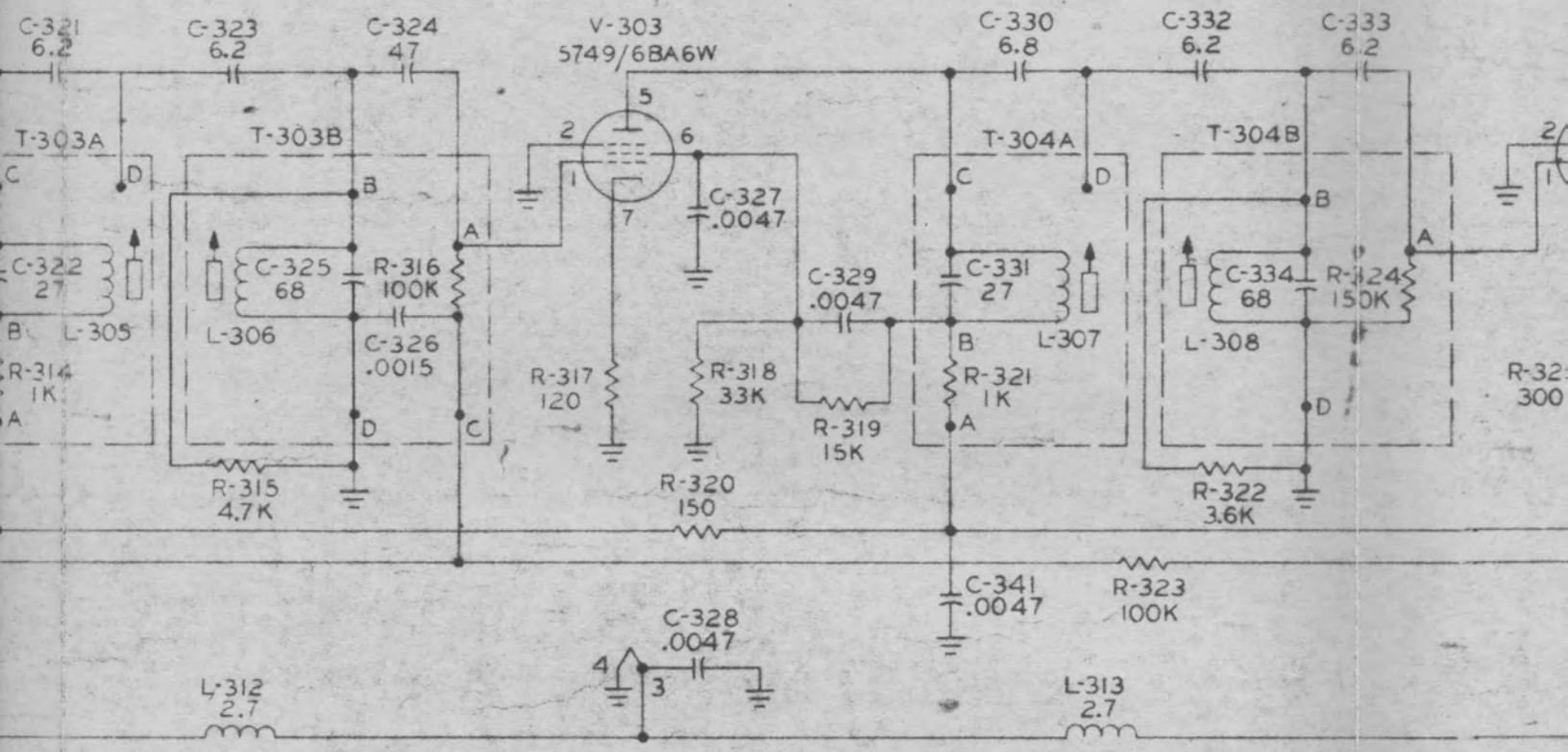
SCHEMATIC
100KC BANDWIDTH 2ND I.F. STRIP

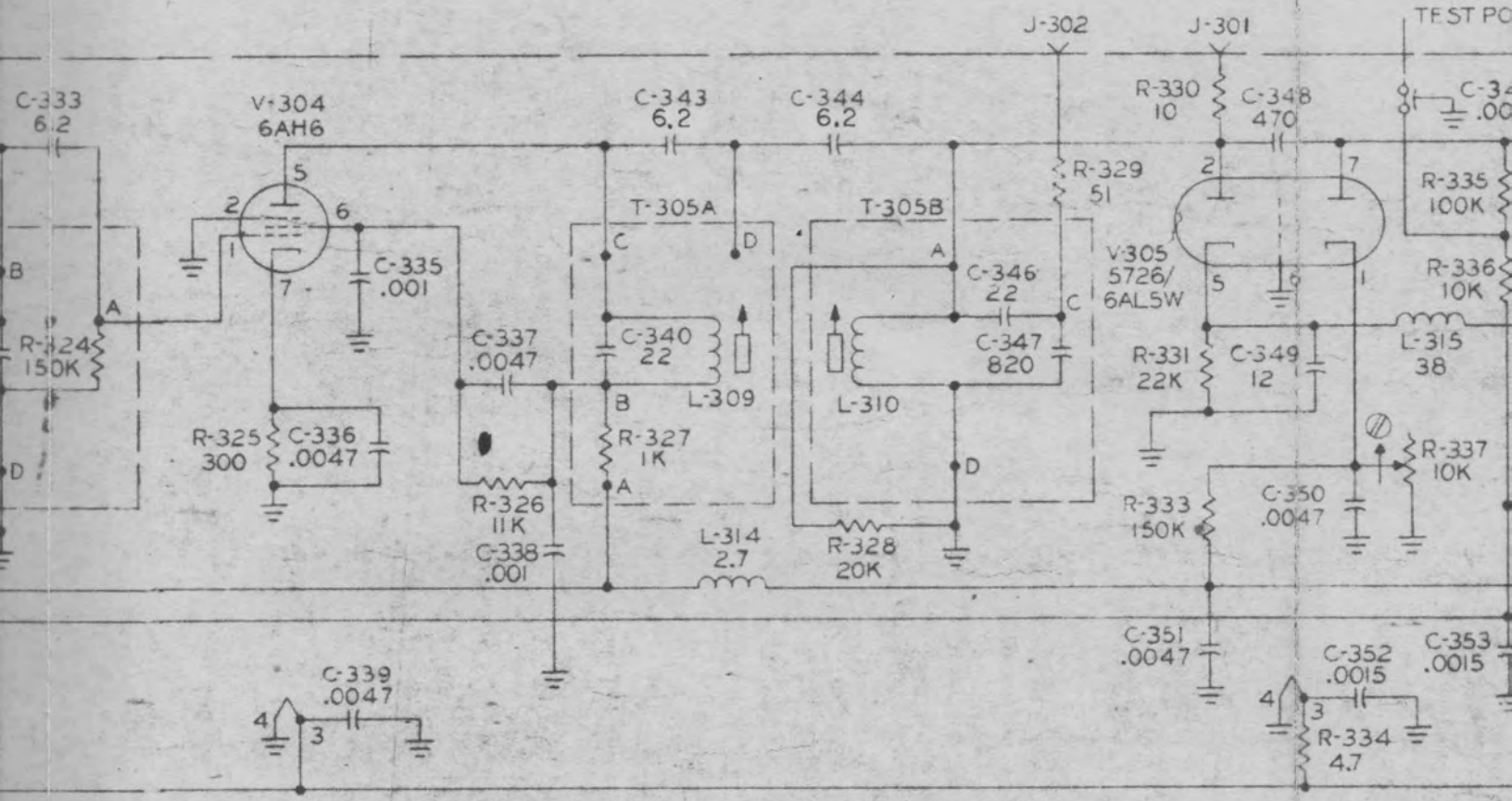
| | |
|---|---|
| CENTER FREQ | 10MC |
| BANDWIDTH | 100KC |

R14-525


C-302
6.2
C-304
6.2
C-305
6.2
V-301,
5749/6BA6W
T-301A
T-301B
W-301
P-302
L-301
L-302
C-306
68
R-303
100K
C-307
.0015
R-302
5.1K
R-304
120
C-308
.0047
R-305
33K
C-310
.0047
R-306
15K
R-307
47K
C-309
.0047
L-311
2.7
T-30
C-31
27
R-30
1K
C-31
.004


C-312
5.6
C-314
5.6
C-315
47
V-302
5749/6BA6W
C-321
6.2
C-323
6.2
T-302A
T-302B
T-303A
C-310
.0047
C-313
27
L-303
R-308
1K
R-306
15K
C-316
68
L-304
R-310
100K
C-317
.0015
R-309
5.1K
C-318
.0047
R-312
33K
R-311
120
C-320
.0047
R-313
15K
C-322
27
L-305
R-314
1K
C-311
.0047
L-311
2.7
R-340
47K
C-319
.0047


C-321
6.2
C-323
6.2
C-324
47
V-303
5749/6BA6W
C-330
6.8
C-332
6.2
C-333
6.2
T-303A
T-303B
T-304A
T-304B
C-322
27
L-305
R-314
1K
C-325
68
L-306
R-316
100K
C-326
.0015
R-315
4.7K
C-327
.0047
R-317
120
R-318
33K
C-329
.0047
R-319
15K
R-320
150
C-331
27
L-307
R-321
1K
C-334
68
L-308
R-324
150K
R-322
3.6K
C-341
.0047
R-323
100K
C-328
.0047
L-312
2.7
L-313
2.7

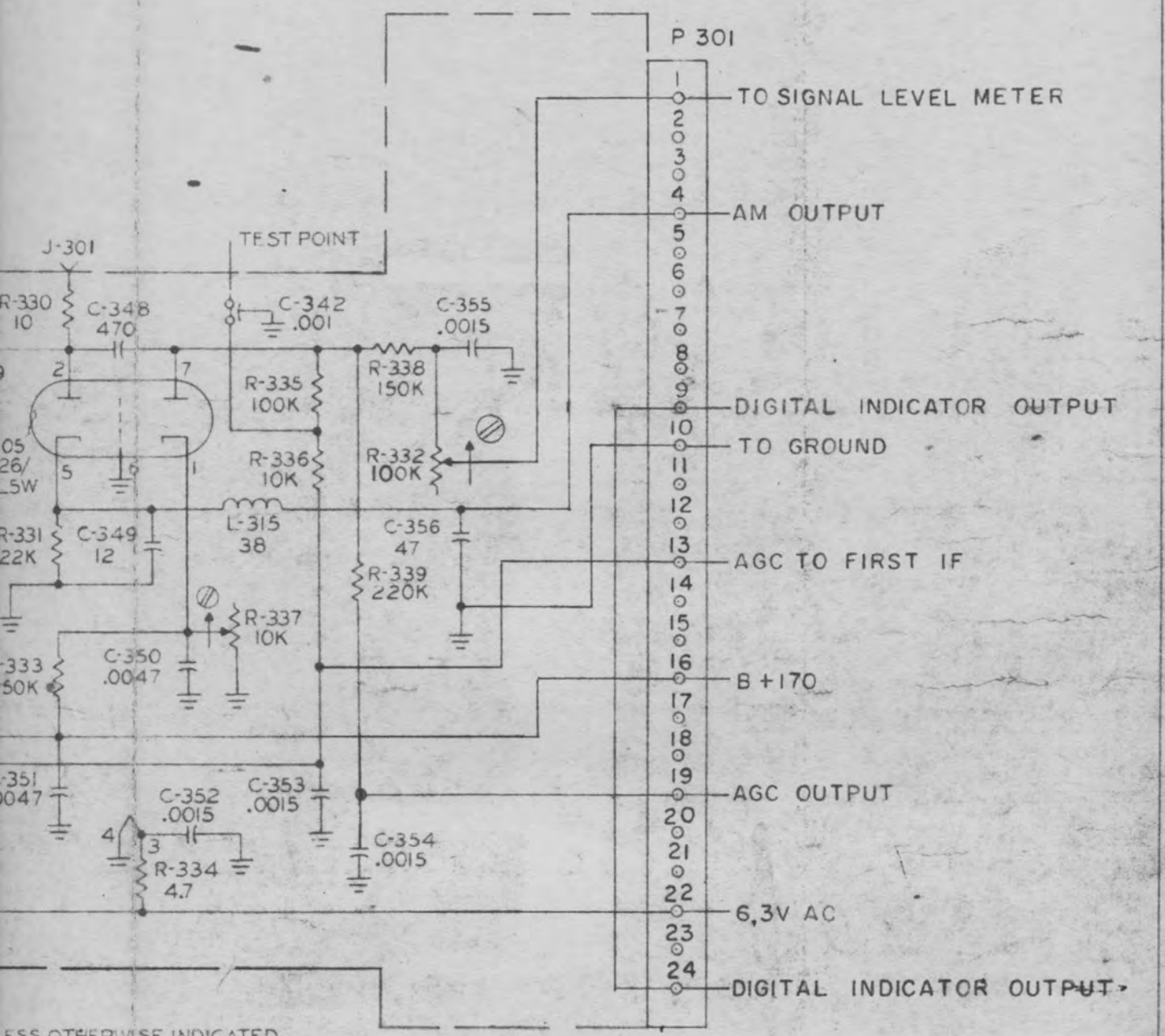



NOTE:
UNLESS OTHERWISE INDICATED
1. CAPACITOR VALUES LESS THAN O
VALUES GREATER THAN ONE ARE
2. RESISTOR VALUES ARE IN OHMS,
3. INDUCTANCE VALUES ARE IN MICR

⊘ SCREW DRIVER ADJUSTMEN

ARROW DENOTES CLOCKWI

SCHEMATIC.
300 KC BANDWIDTH 2ND I.




LESS OTHERWISE INDICATED
APACITOR VALUES LESS THAN ONE ARE IN MICROFARADS,
ALUES GREATER THAN ONE ARE IN MICROMICROFARADS.
ESISTOR VALUES ARE IN OHMS, K=1000, M=1,000,000
NDUCTANCE VALUES ARE IN MICROHENRIES.

) SCREW DRIVER ADJUSTMENT.

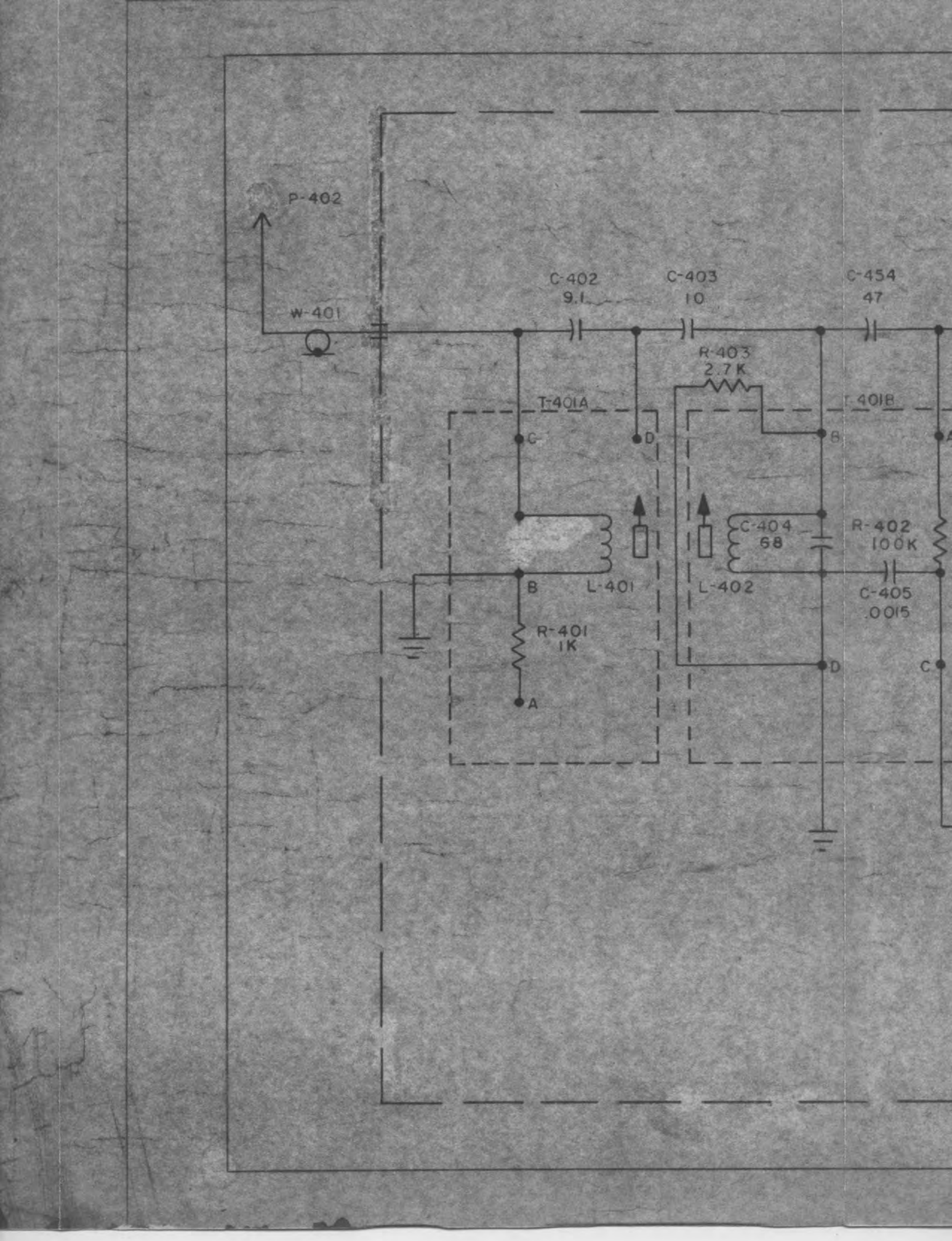
ARROW DENOTES CLOCKWISE ROTATION.

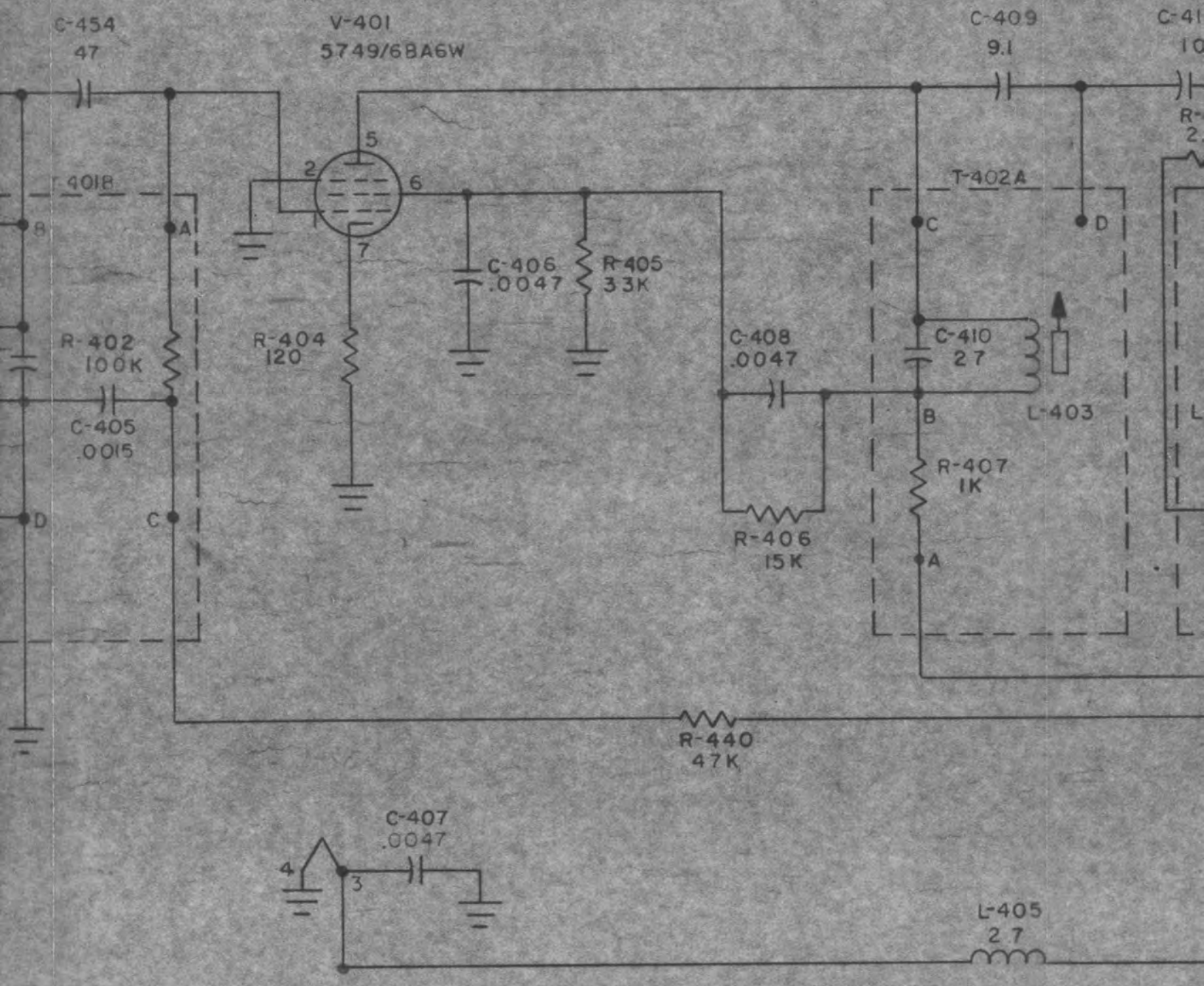
R14-537

SCHEMATIC.

300 KC BANDWIDTH 2ND I.F. STRIP

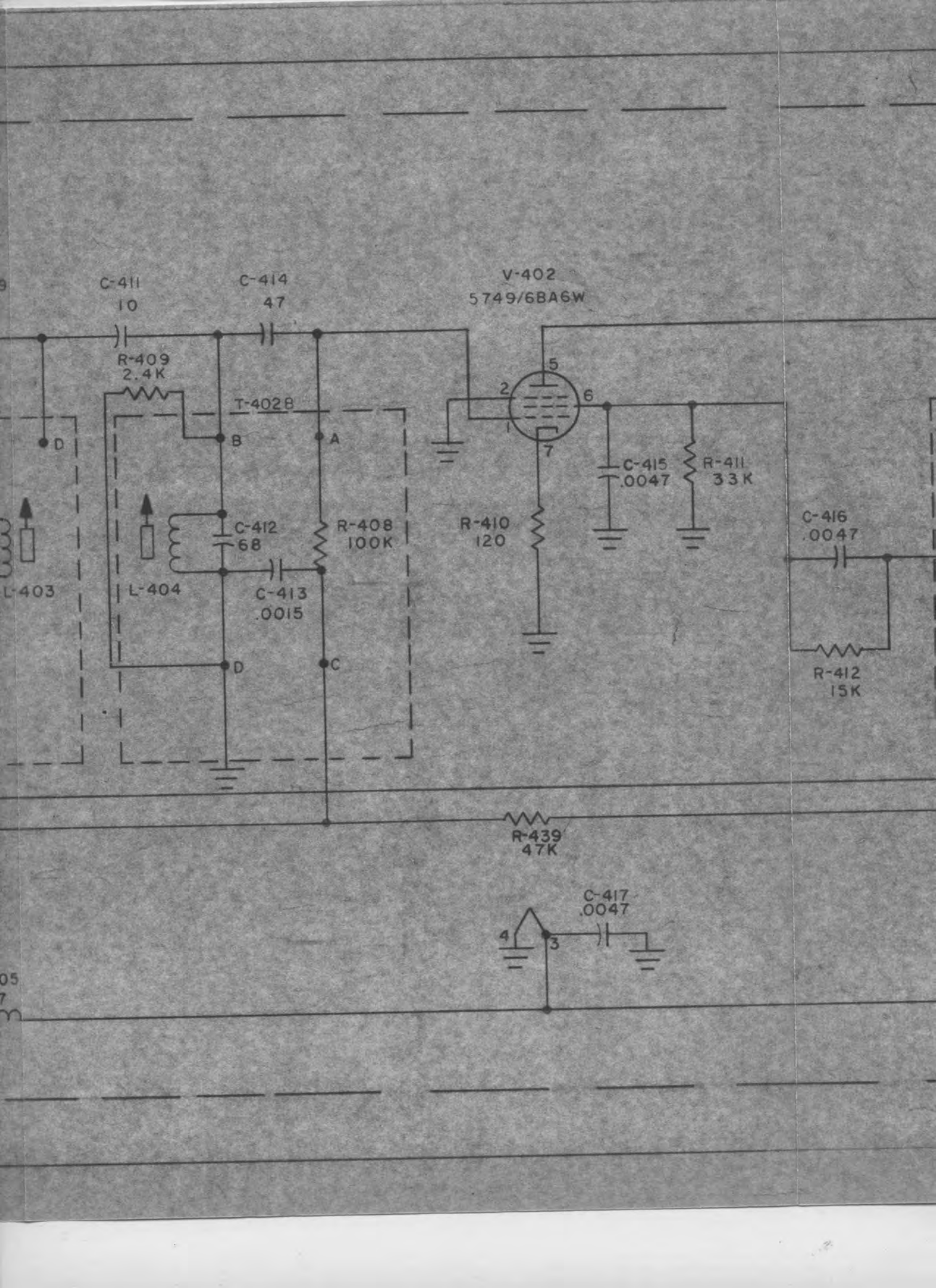
| | |
|---|---|
| CENTER FREQ | 10MC |
| BANDWIDTH | 300 KC |


P-402
W-401
C-402
9.1
C-403
10
C-454
47
R-403
2.7K
T-401A
4018
C
D
B
A
C-404
68
R-402
100K
L-401
L-402
C-405
.0015
R-401
1K


C-454
47
V-401
5749/6BA6W
C-409
9.1
T-402A
C
D
A
B
C-406
.0047
R-405
33K
R-404
120
R-402
100K
C-405
.0015
C-408
.0047
C-410
27
L-403
R-407
1K
R-406
15K
R-440
47K


C-407
.0047
4
3


L-405
27


C-411
10
C-414
47
V-402
5749/6BA6W
R-409
2.4K
T-4028
B
A
D
C-412
68
R-408
100K
L-403
L-404
C-413
.0015
D
C
R-410
120
C-415
.0047
R-411
33K
C-416
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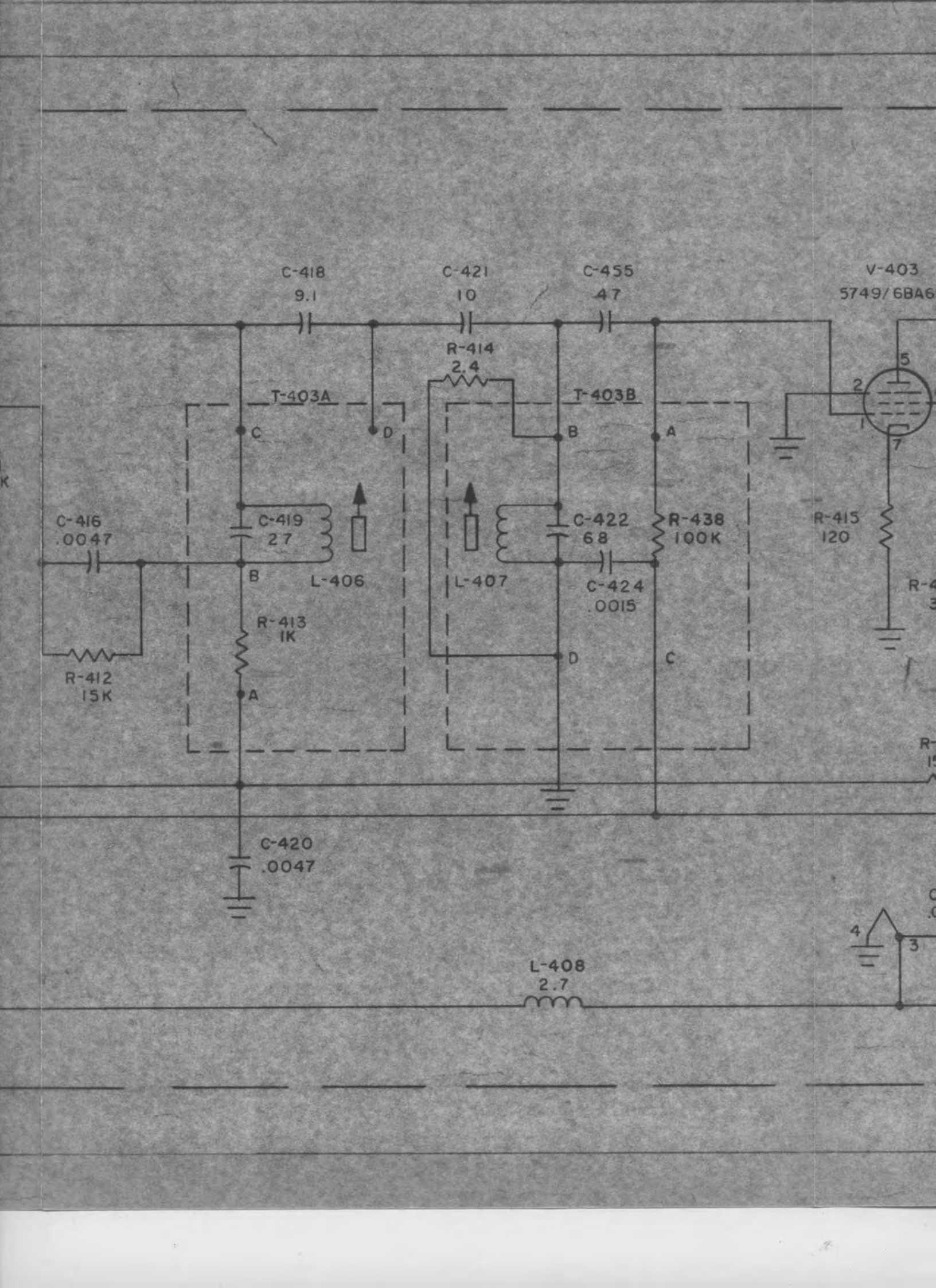
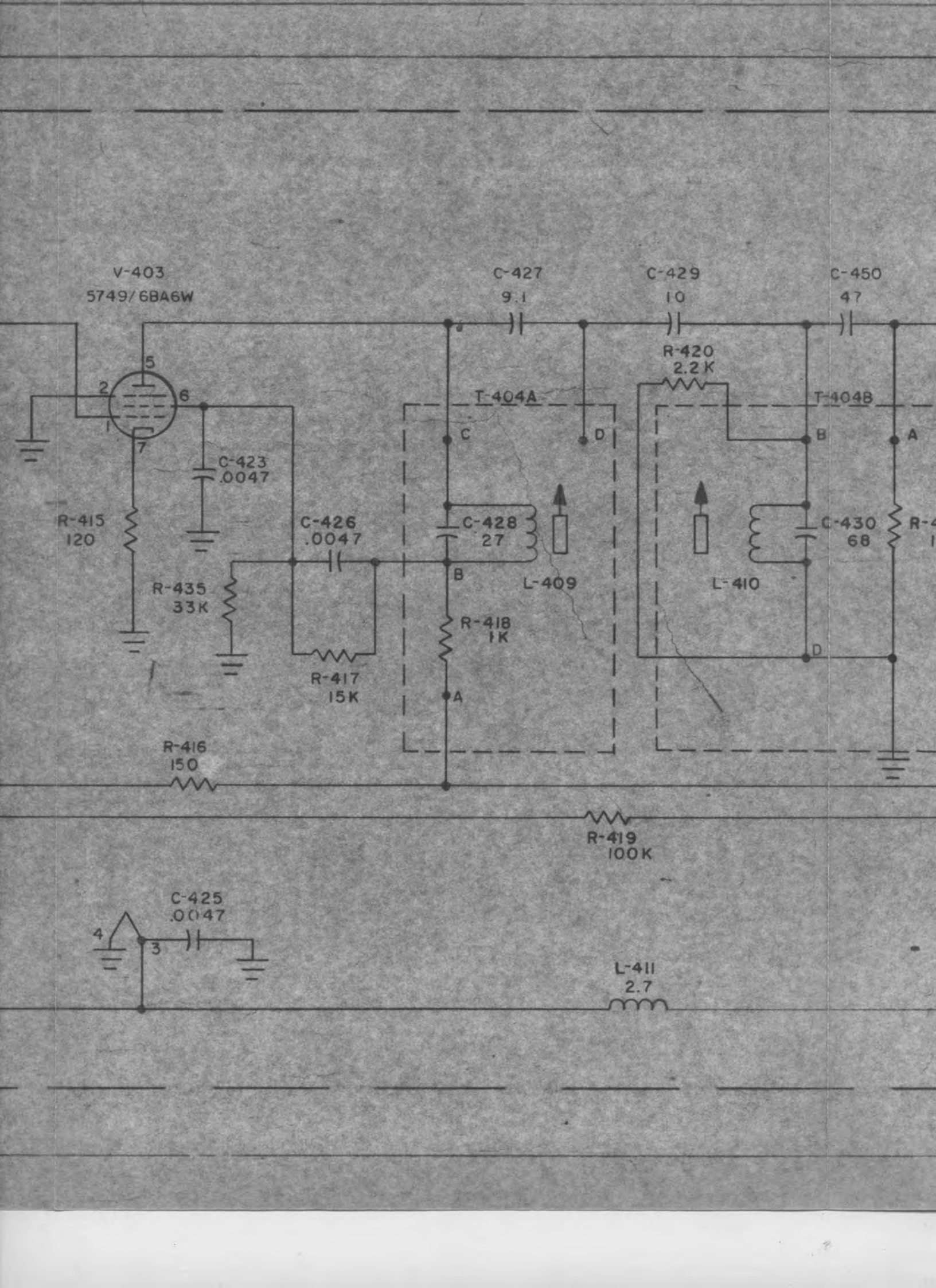
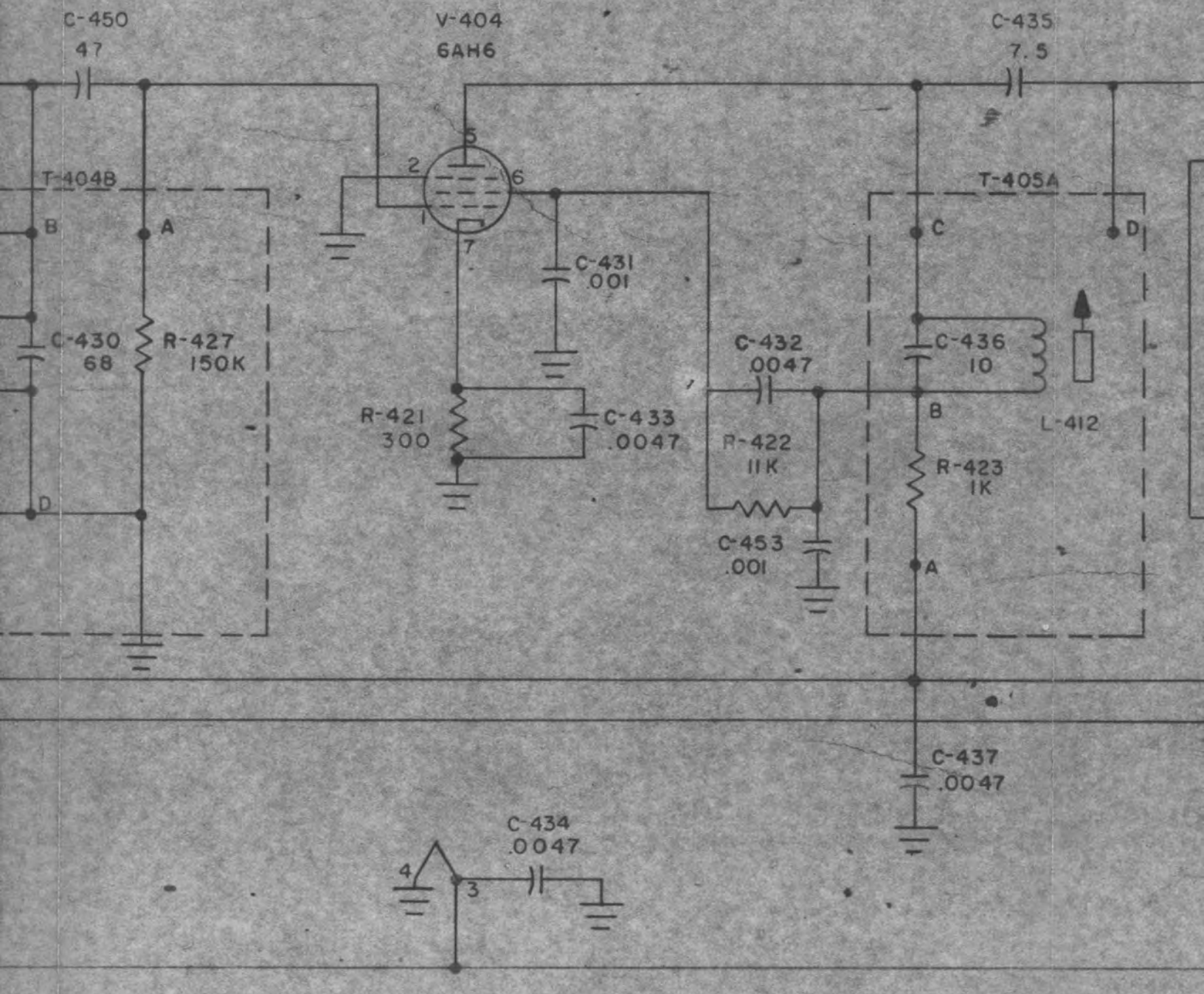
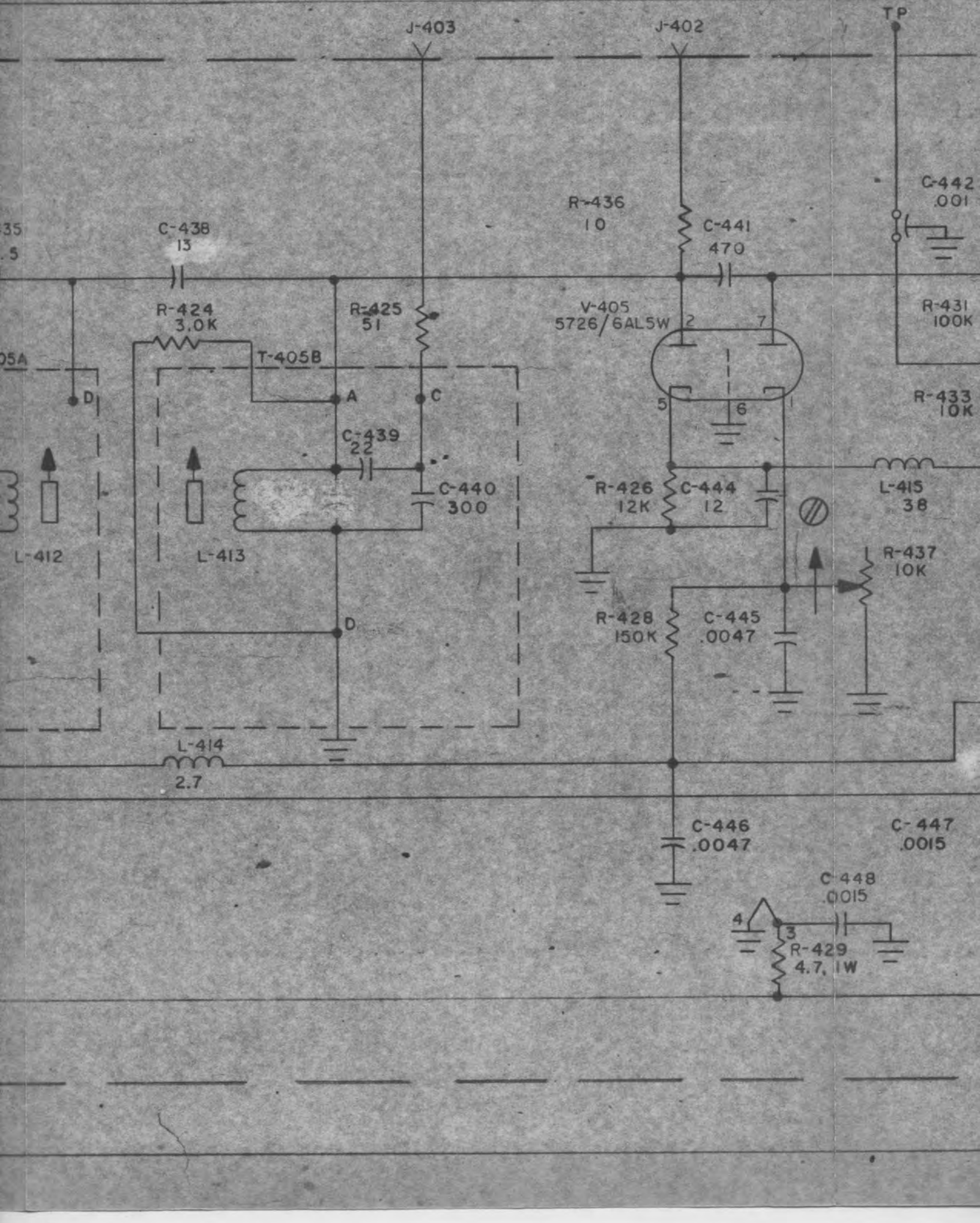
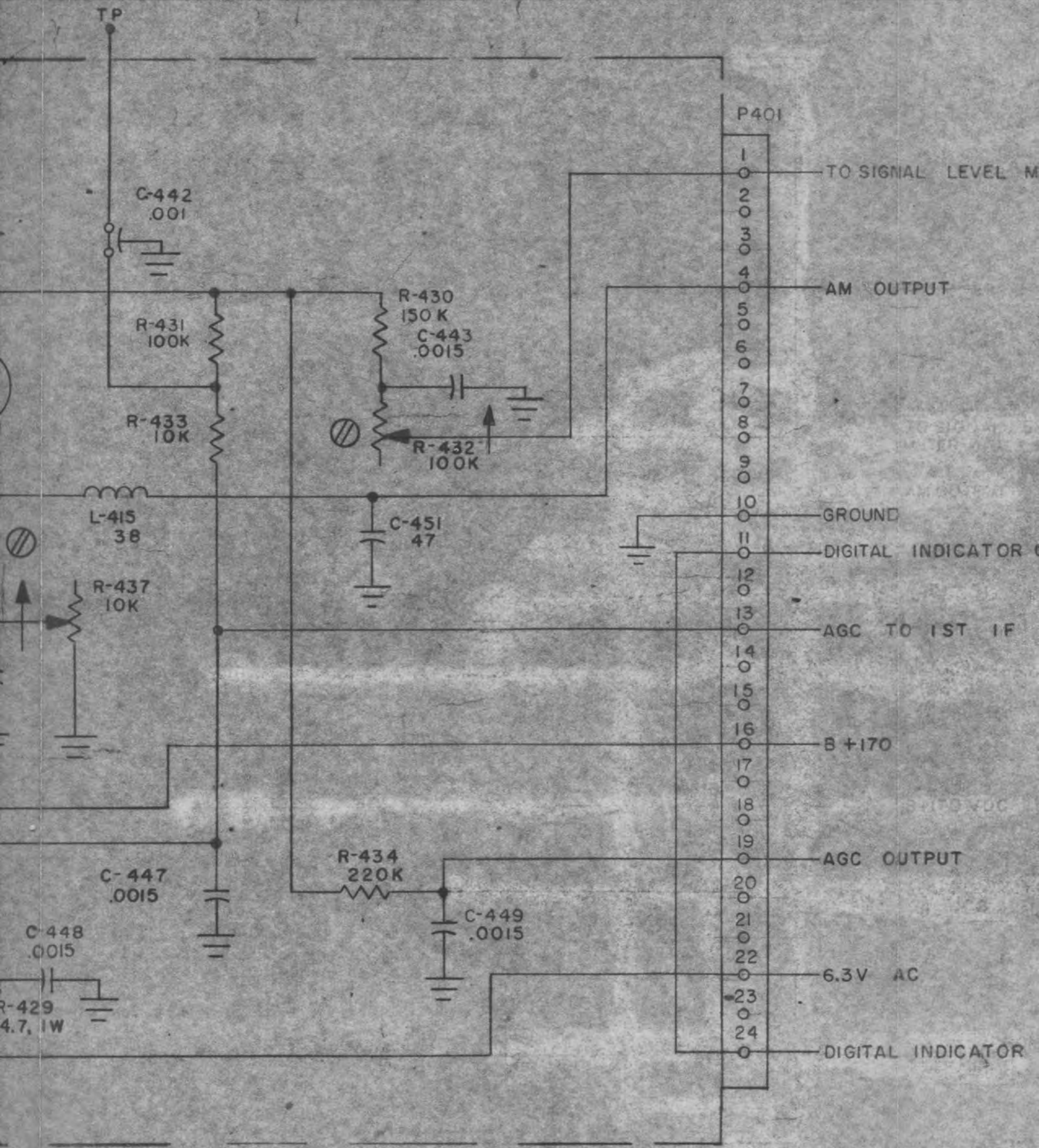
R-412
15K
R-439
47K
C-417
.0047
5
2
6
1
7
4
3


C-418
9.1
C-421
10
C-455
47
V-403
5749/6BA6
R-414
2.4
T-403A
T-403B
C
D
B
A
C-416
.0047
C-419
27
C-422
68
R-438
100K
R-415
120
L-406
L-407
C-424
.0015
R-413
1K
R-412
15K
C-420
.0047
L-408
2.7


V-403
5749/6BA6W
C-427
9.1
C-429
10
C-450
47
R-420
2.2K
T-404A
T-404B
C-423
.0047
R-415
120
C-426
.0047
C-428
27
C-430
68
R-435
33K
L-409
L-410
R-418
1K
R-417
15K
R-416
150
R-419
100K
C-425
.0047
L-411
2.7


C-450
47
V-404
6AH6
C-435
7.5
T-404B
T-405A
B
A
C
D
C-430
68
R-427
150K
C-431
001
C-432
.0047
C-436
10
L-412
R-421
300
C-433
.0047
R-422
11K
R-423
1K
C-453
.001
C-437
.0047
C-434
.0047
1
2
3
4
5
6
7


J-403
J-402
TP
C-442
.001
R-436
10
C-441
470
C-438
13
R-424
3.0K
R-425
51
V-405
5726/6AL5W
2
7
5
6
1
R-431
100K
R-433
10K
T-405B
A
C
D
C-439
22
C-440
300
L-412
L-413
L-415
38
R-426
12K
C-444
12
R-437
10K
R-428
150K
C-445
.0047
D
L-414
2.7
C-446
.0047
C-447
.0015
C-448
.0015
4
3
R-429
4.7, 1W


TP
C-442
.001
R-431
100K
R-433
10K
R-430
150K
C-443
.0015
R-432
100K
L-415
38
C-451
47
R-437
10K
C-447
.0015
C 448
.0015
R-429
4.7, 1W
R-434
220K
C-449
.0015
P401
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
TO SIGNAL LEVEL M
AM OUTPUT
GROUND
DIGITAL INDICATOR
AGC TO 1ST IF
B+170
AGC OUTPUT
6.3V AC
DIGITAL INDICATOR

TO SIGNAL LEVEL METER

AM OUTPUT

GROUND

DIGITAL INDICATOR OUTPUT

AGC TO 1ST IF

B +170

AGC OUTPUT

6.3V AC

DIGITAL INDICATOR OUTPUT

NOTE

UNLESS OTHERWISE NOTED:

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS

INDUCTANCE VALUES ARE IN MICROHENRYS

RESISTOR VALUES ARE IN OHMS
K=1000 M=1,000,000

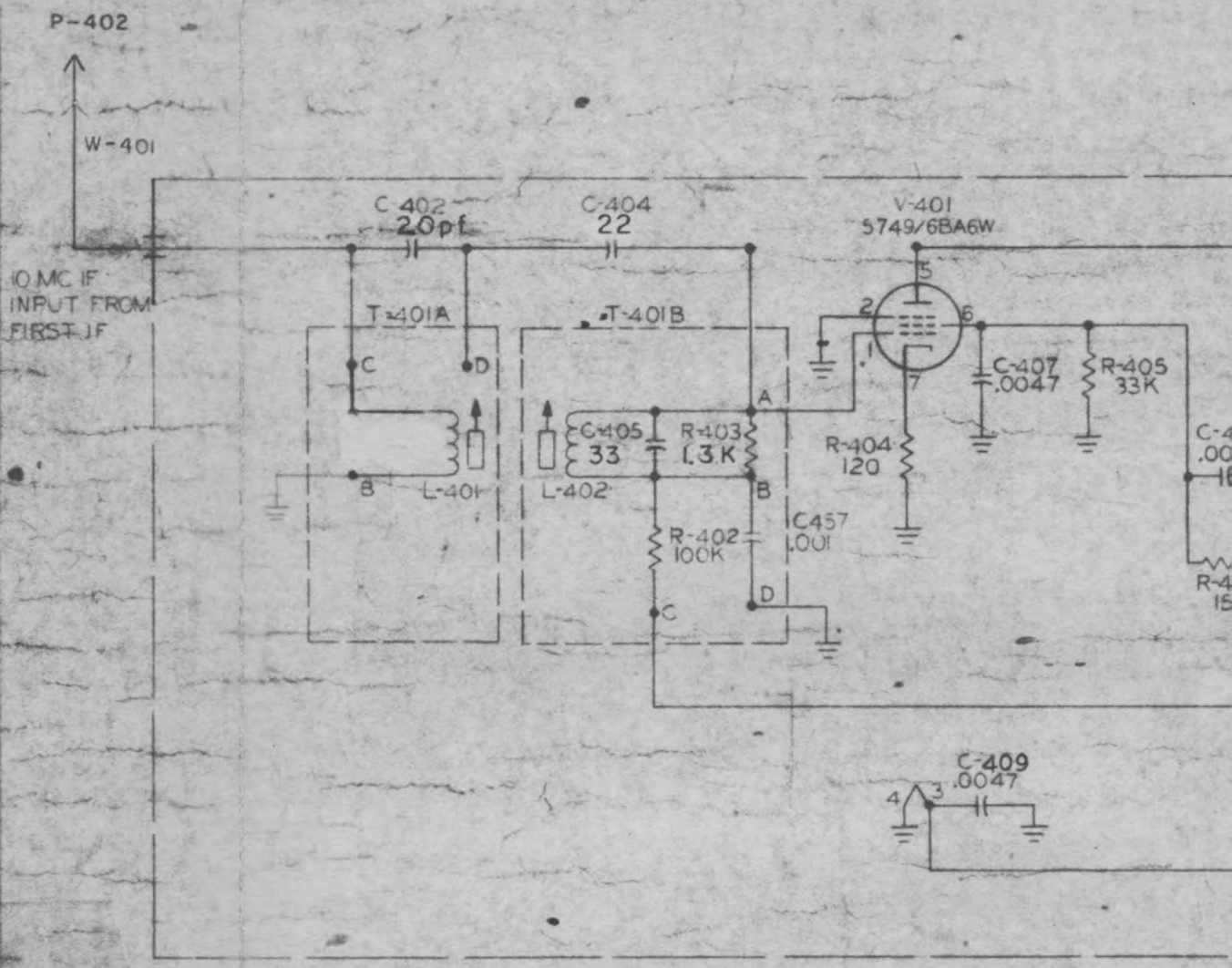
OPERATING CONTROL

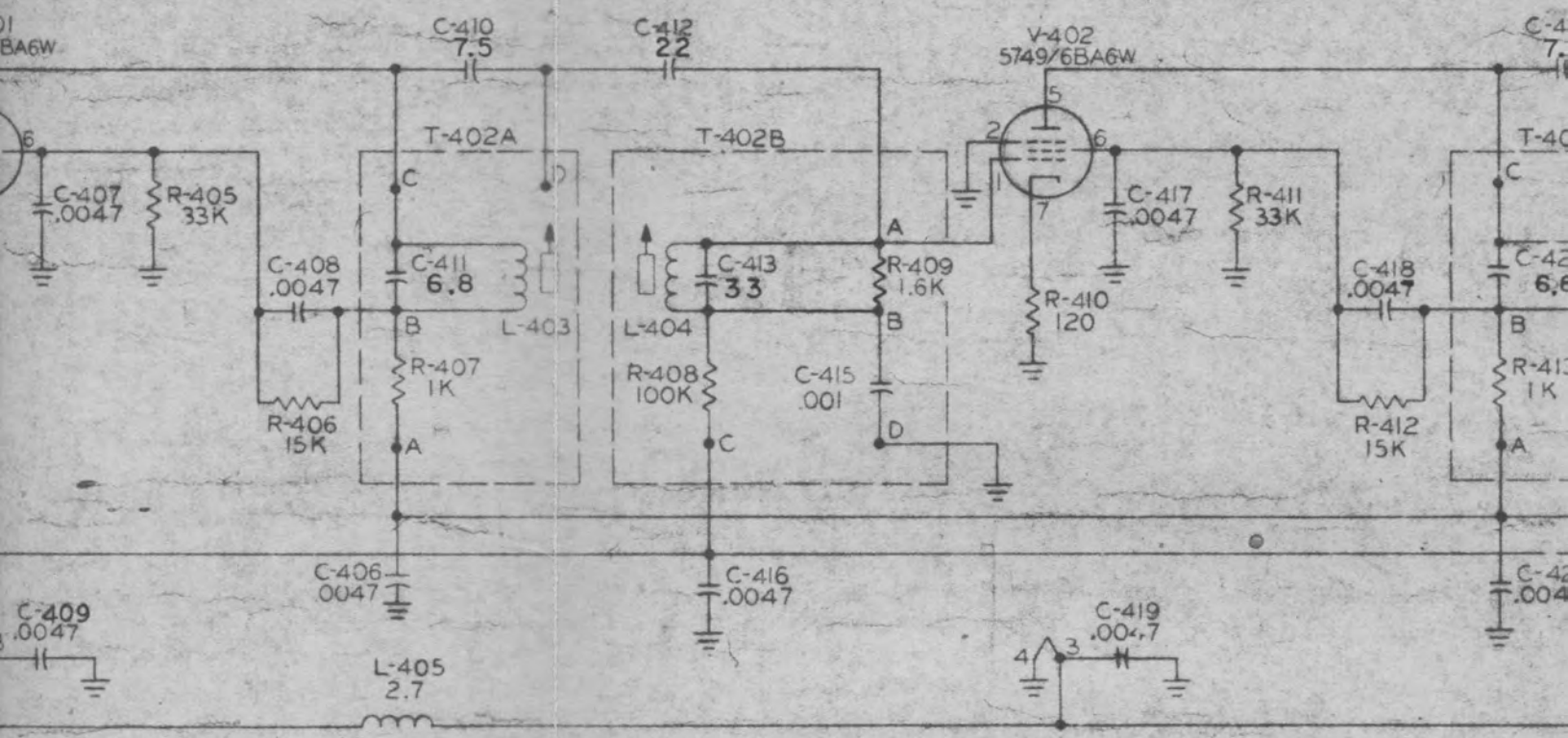
INTERNAL ADJUSTMENT

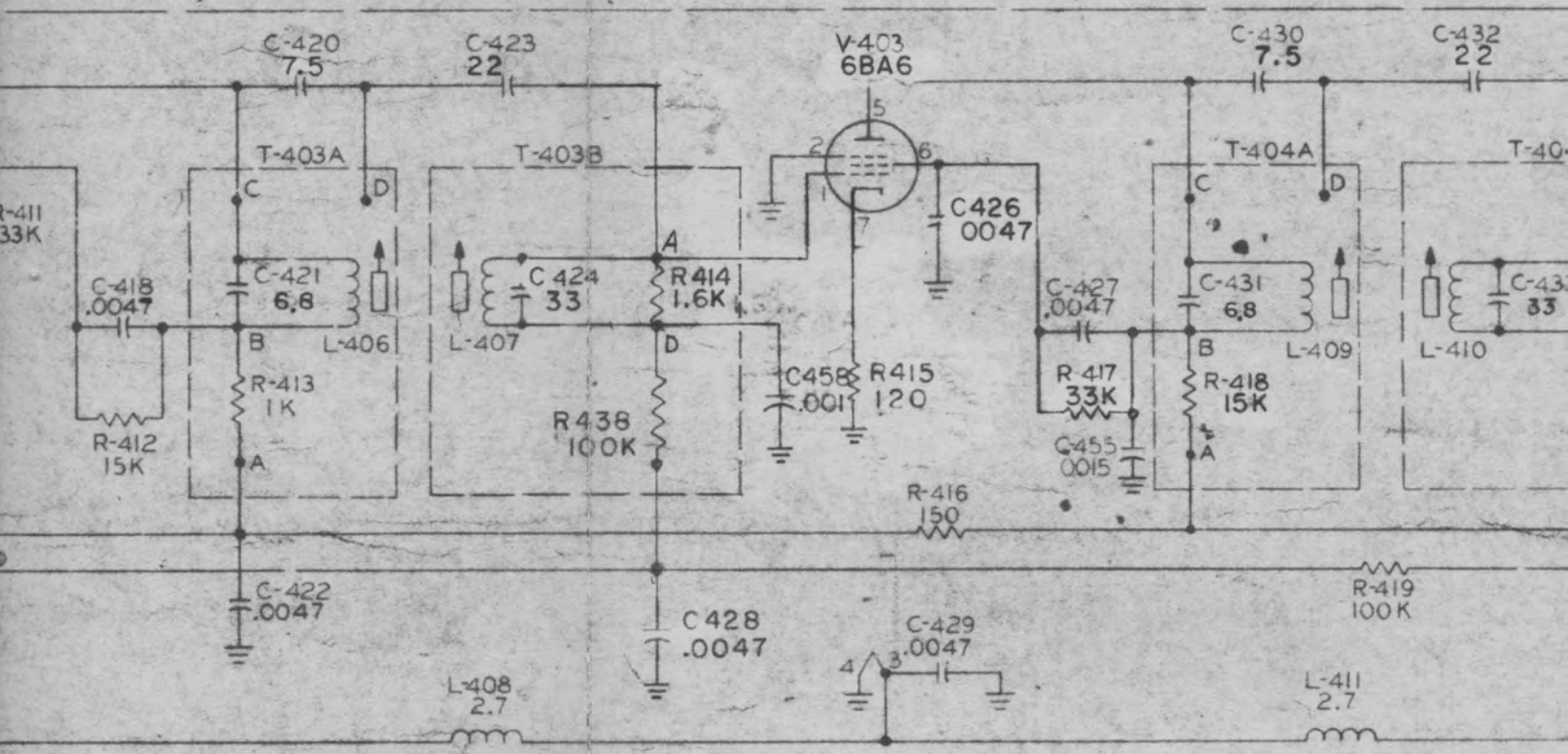
ARROW DENOTES CLOCKWISE ROTATION

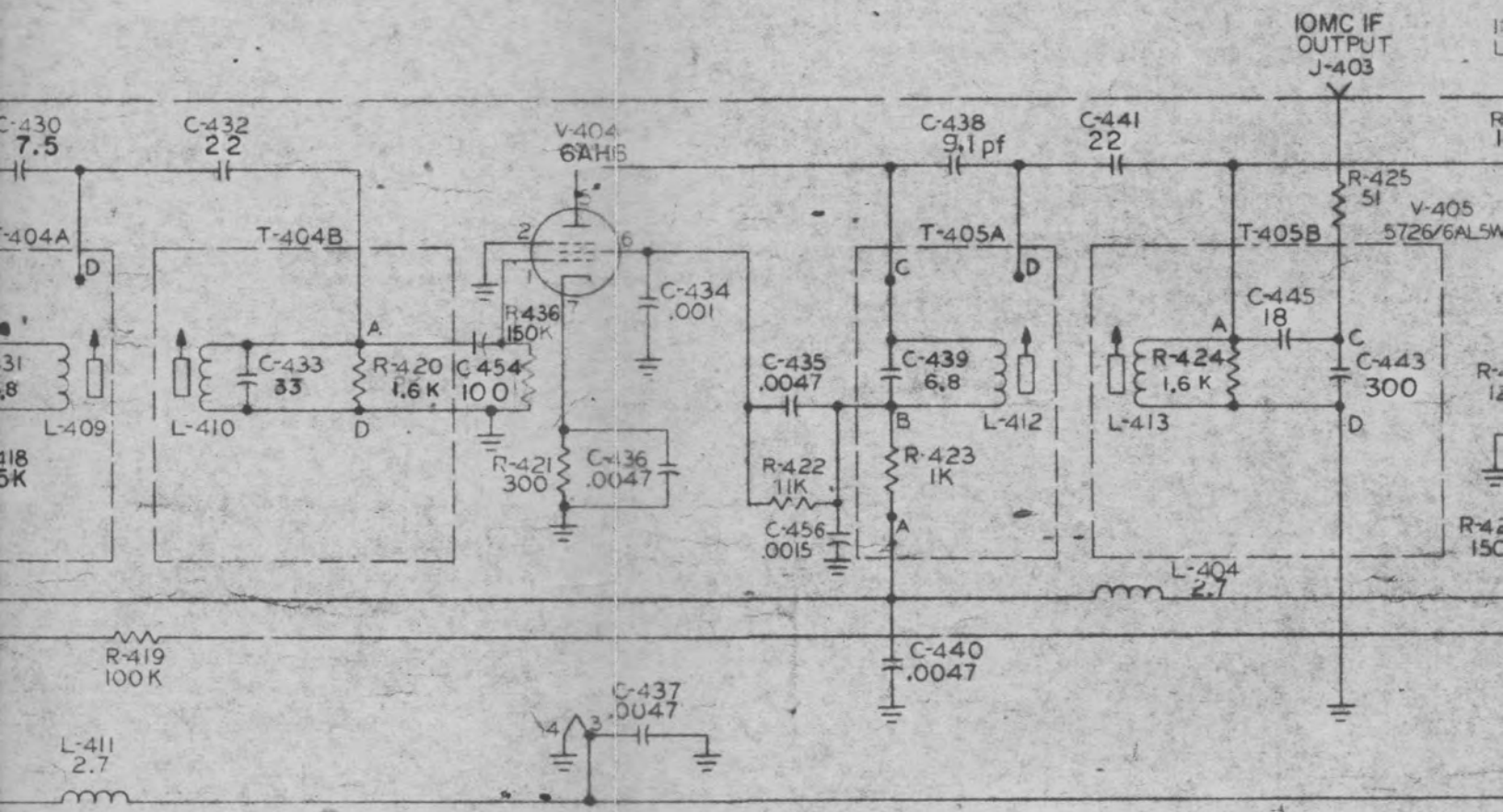
SCHEMATIC DIAGRAM
IF AMPLIFIER, R14-531

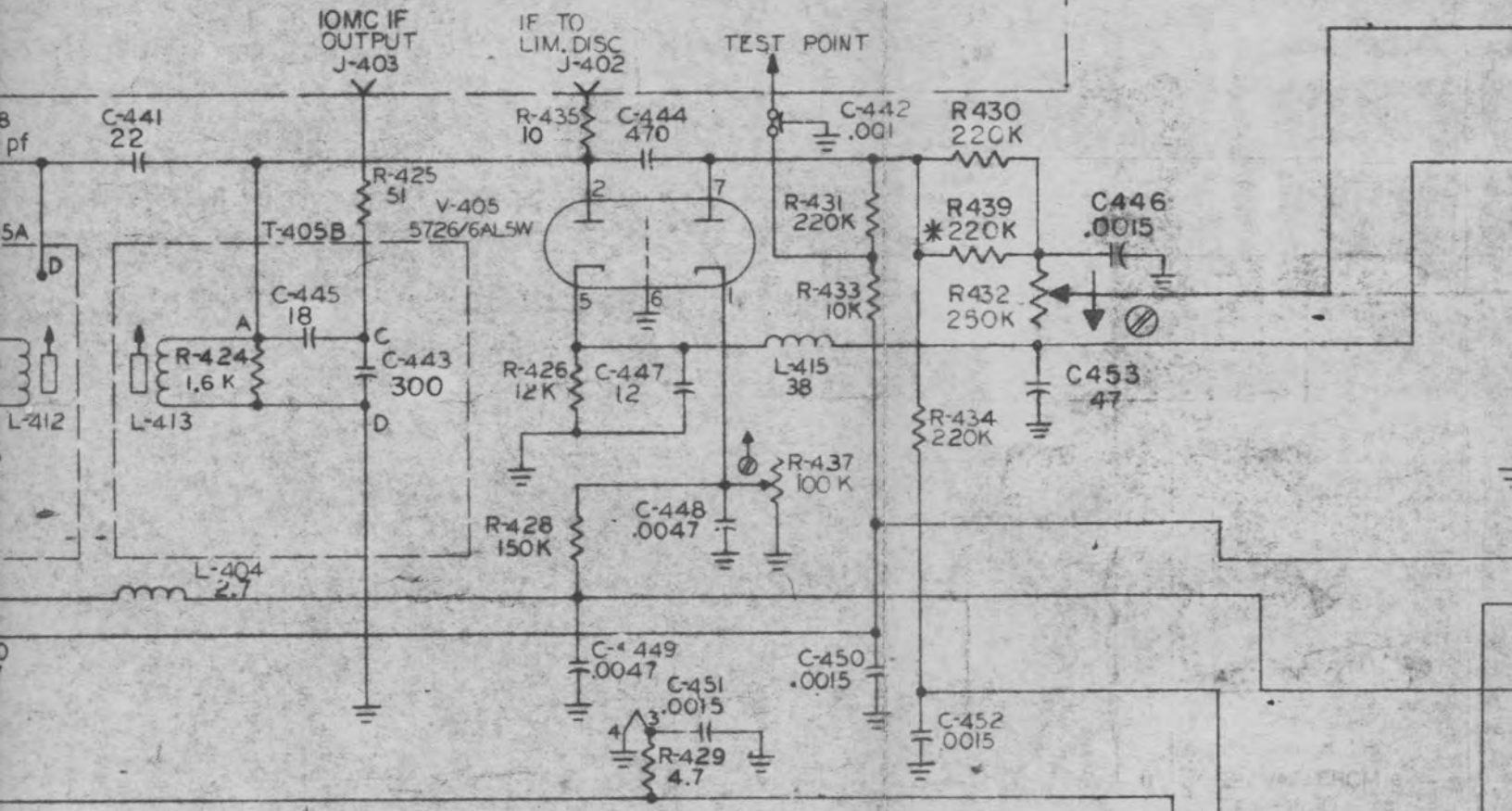
| | |
|---|---|
| CENTER FREQ | 10 MC |
| BANDWIDTH | 500 KC |


P-402
W-401
10 MC IF
INPUT FROM
FIRST IF
C-402
20pf
C-404
22
V-401
5749/6BA6W
T-401A
T-401B
C
D
A
B
L-401
L-402
C-405
33
R-403
1.3K
R-402
100K
C457
.001
R-404
120
C-407
.0047
R-405
33K
C-409
.0047
1
2
3
4
5
6
7


C-410
7.5
C-412
22
V-402
5749/6BA6W
T-402A
T-402B
C-407
.0047
R-405
33K
C-408
.0047
C-411
6.8
L-403
C-413
33
R-409
1.6K
L-404
R-408
100K
C-415
.001
R-410
120
C-417
.0047
R-411
33K
C-418
.0047
R-406
15K
R-407
1K
R-412
15K
C-406
0047
C-416
.0047
C-419
.004.7
C-409
.0047
L-405
2.7


C-420
7.5
C-423
22
V-403
6BA6
C-430
7.5
C-432
22
T-403A
T-403B
T-404A
T-40
C
D
A
B
C426
0047
C-421
6.8
C424
33
R414
1.6K
C-427
.0047
C-431
6.8
C-43
33
C-418
.0047
L-406
L-407
L-409
L-410
R-413
1K
R-412
15K
R438
100K
C458
.001
R415
120
R-417
33K
R-418
15K
C455
0015
R-416
150
R-419
100K
C-422
.0047
C 428
.0047
C-429
.0047
L-408
2.7
L-411
2.7


10MC IF
OUTPUT
J-403
C-430
7.5
C-432
22
V-404
6AH8
C-438
9.1 pf
C-441
22
R-425
51
V-405
5726/6AL5W
T-404A
T-404B
T-405A
T-405B
C-434
.001
R-436
150K
C-445
18
C-433
33
R-420
1.6 K
C-454
100
C-435
.0047
C-439
6.8
R-424
1.6 K
C-443
300
L-409
L-410
L-412
L-413
R-421
300
C-436
.0047
R-422
11K
R-423
1K
C-456
.0015
L-404
2.7
R-419
100 K
C-440
.0047
C-437
.0047
L-411
2.7




NOTE:

UNLESS OTHERWISE NOTED:

CAPACITOR VALUES LESS THAN ONE ARE IN MICROFARADS.

CAPACITOR VALUES GREATER THAN ONE ARE IN MICROMICROFARADS.

INDUCTANCE VALUES ARE IN MICROHENRYS.

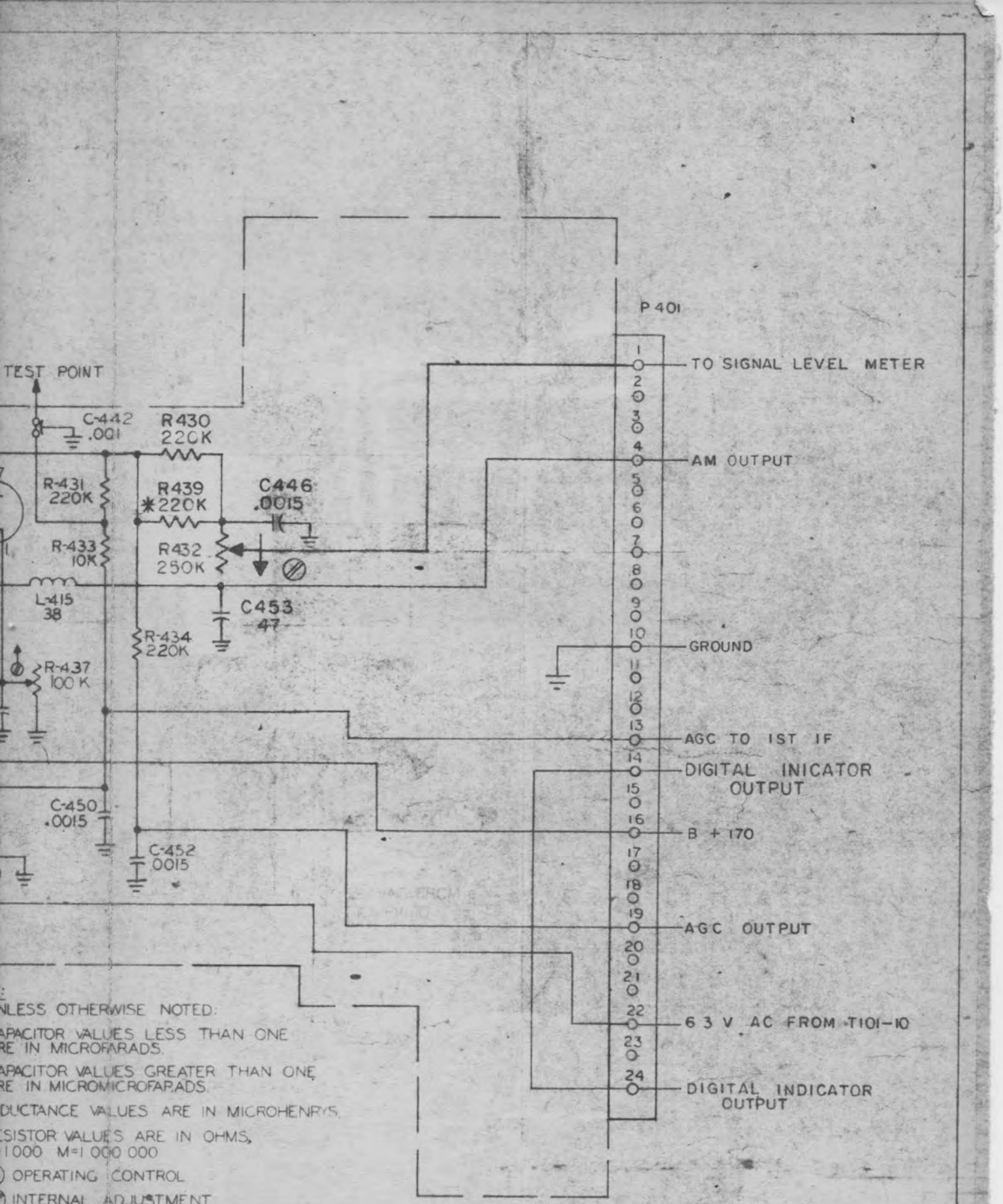
RESISTOR VALUES ARE IN OHMS, K=1 000 M=1 000 000

○ OPERATING CONTROL

⊘ INTERNAL ADJUSTMENT

ARROW DENOTES CLOCKWISE ROTATION

* MAY OR MAY NOT BE REQUIRED RESISTOR VALUE TO BE CORRECTED OR DELETED AS IS REQUIRED IN TEST




NLESS OTHERWISE NOTED:
APACITOR VALUES LESS THAN ONE RE IN MICROFARADS.
APACITOR VALUES GREATER THAN ONE RE IN MICROMICROFARADS.
DUCTANCE VALUES ARE IN MICROHENRYS.
ESISTOR VALUES ARE IN OHMS, 1000 M=1 000 000
) OPERATING CONTROL
) INTERNAL ADJUSTMENT
ARROW DENOTES CLOCKWISE ROTATION

MAY OR MAY NOT BE REQUIRED
RESISTOR VALUE TO BE CORRECTED OR DELETED AS IS REQUIRED IN TEST

SCHEMATIC DIAGRAM

I.F. AMPLIFIER

| | |
|---|---|
| CENTER FREQ | 10MC |
| BANDWIDTH | 1.0MC |

R14 518