INSTRUCTION MANUAL
FOR
TYPE MP-101-5 METER PANEL

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WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Table 1-1. Type MP-101-5 Meter Panel, Specifications

Input Center Frequency	21.4 MHz
Input Level Range	10 mV to 300 mV
IF Bandwidth	8 MHz
Input Impedance	50 ohms, nominal, type BNC connector
Video Output No. 1	2 volts peak into a 50-ohm load (Direct)
Video Output No. 2	2 volts peak into a 50-ohm load (Pulse Stretcher)
Front-Panel Meter	Two scales: 0 to 10 μV in 100 increments, and dB above 1 μV in 1 dB steps
Pulse Stretcher	0, 5, 10, 50, and 100 μsec.
Audio Outputs	3.2Ω and 600Ω (50 mW) Phone Jack
Front-Panel Controls	Meter Response - Peak/Average; Meter Zero; Slide Back Gate Adjust; Video Gain No. 1; Video Gain No. 2; Audio Gain; Pulse Stretcher; Power Switch and Indicator
Power Requirements	115/230 volts, 50-400 Hz, 6 watts
Size	3.5 inches high, 19 inches wide, and 12 inches deep
Weight	9 lbs., approximately

SECTION I

GENERAL DESCRIPTION

1.1 ELECTRICAL CHARACTERISTICS

The CEI Type MP-101-5 Meter Panel is an accessory device for use primarily with pulse receivers having a 21.4-MHz IF output. The unit is designed to provide a means of metering either peak or average signal level at the output of an AM detector; a front-panel switch selects the desired response. The MP-101-5 converts an appropriate receiver into a signal strength meter or a selective transfer voltmeter; the selectivity for the latter application being provided by the IF amplifiers in the associated receiver. Two video outputs are provided from the meter panel to allow observation of amplitude modulated signals on a wideband oscilloscope. In order that the signals may be displayed with a minimum of baseline noise, a variable slide-back-gate feature has been included in the video amplifier circuit. This additional feature allows the operator to eliminate the unwanted noise while retaining the information contained in the modulation. A front-panel control is provided for adjustment of the slide-back gate circuit. The meter used in the MP-101-5 incorporates two scales: one is calibrated in microvolts from 0 to 10 in 100 increments and the second indicates dB above 1 microvolt in 1-dB steps. The input impedance of the unit is 50 ohms; the input power required is 115 or 230 Vac, 50-400 Hz. This manual contains a functional block diagram, electrical parts list, printed circuit assembly drawings, and schematic diagrams for the MP-101-5.

1.2 MECHANICAL CHARACTERISTICS

A front view of the MP-101-5 is shown in Figure 1-1. Mounted on the front panel are METER RESPONSE and POWER switches, METER ZERO, two VIDEO GAIN controls, the SLIDE BACK ADJUST control, the AUDIO GAIN control, double-scale meter, and a power pilot lamp.

1.2.1 Figure 1-2 shows the rear apron of the meter panel. The IF INPUT jack and the VIDEO OUTPUT jacks are type-BNC connectors. Also mounted on the rear apron are the line fuses, F1 and F2, the 115/230 volt power switch, S2, terminal board TB1, and the permanently-connected power cord.

1.2.2 The front panel, main chassis, and top and bottom dust covers are constructed of aluminum. The front panel is finished with grey enamel and is overlaid with a black-anodized etched bezel. The MP-101-5 contains eight subassemblies. Seven of these, the meter amplifier, the two video amplifiers, the audio amplifier, the pulse stretcher, and the ±12-volt power supply regulators are constructed on etched circuit boards that plug into the main chassis. The IF amplifier is constructed on a silver-plated brass chassis which has been gold flashed to prevent tarnishing. The meter panel measures 3.5 inches high, 19 inches wide, and 16 inches deep; it weighs approximately 10 pounds.

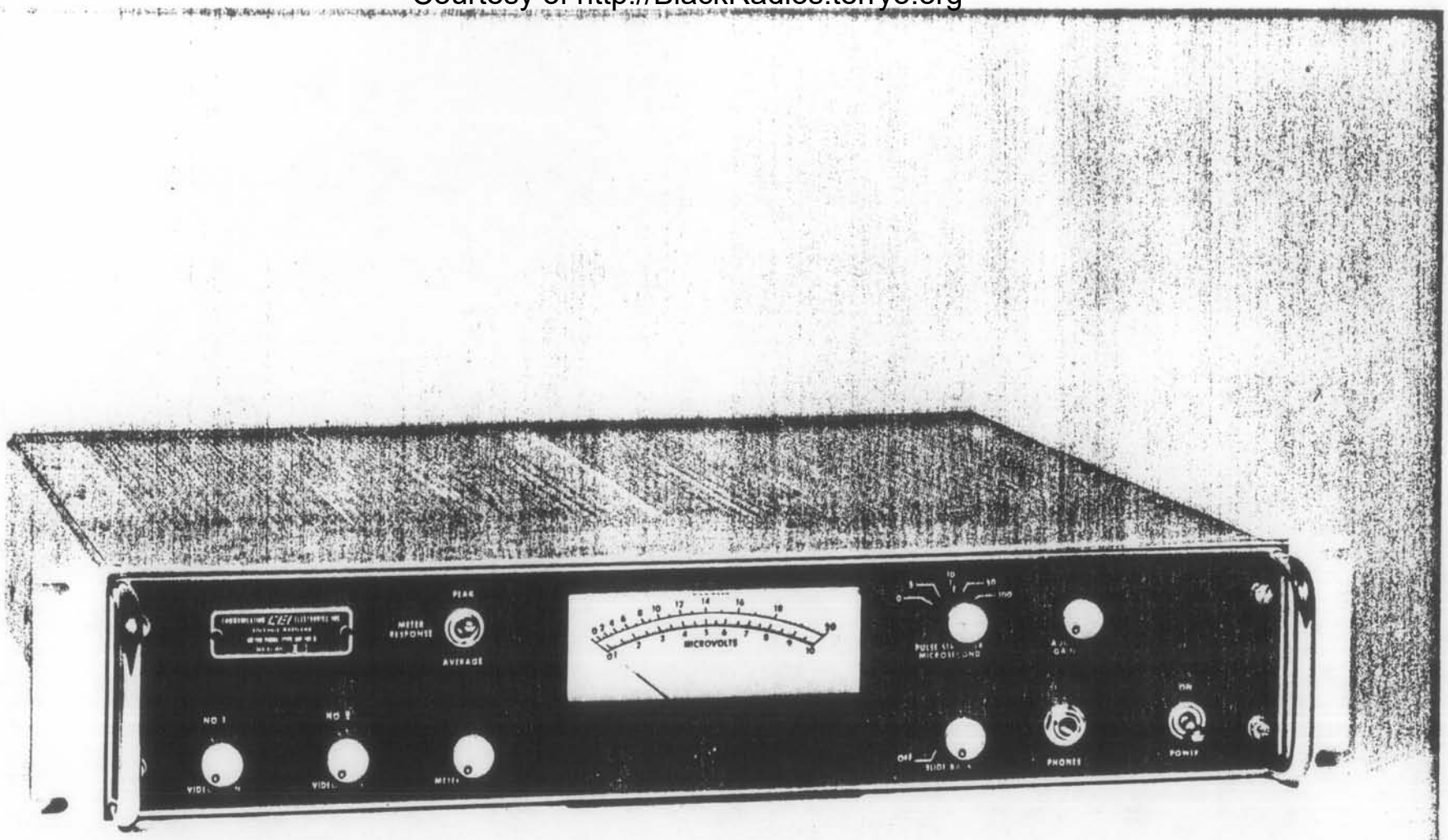


FIG. 1-1 TYPE MP-101-5 METER PANEL, FRONT VIEW

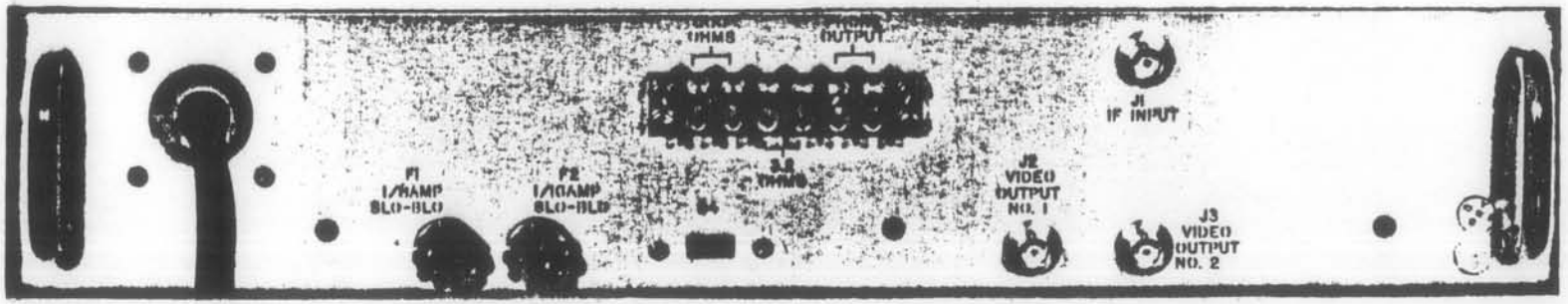


FIG. 1-2 TYPE MP-101-5 METER PANEL, REAR VIEW

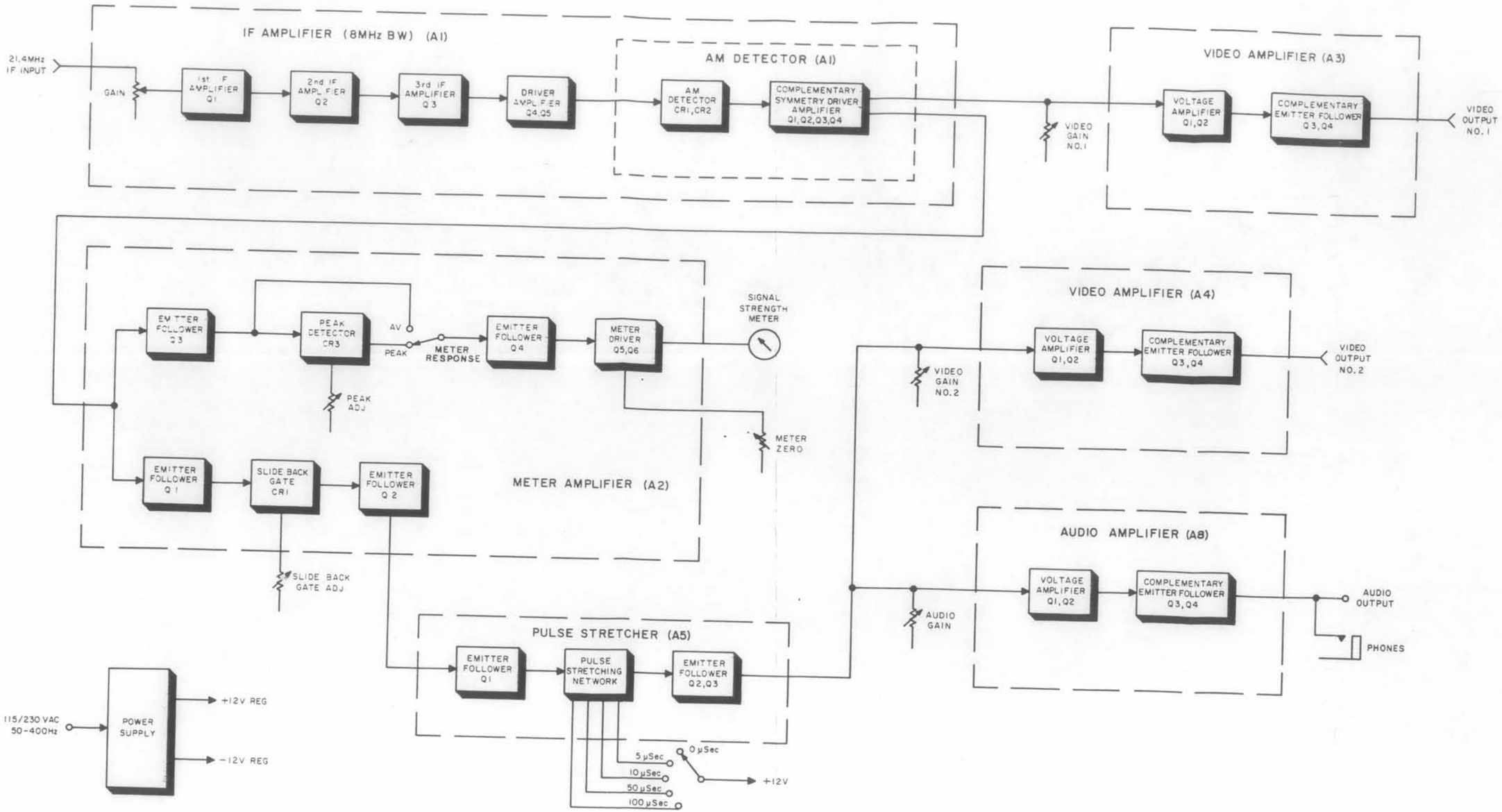


Figure 2-1. Type MP-101-5 Meter Panel, Functional Block Diagram

SECTION II

CIRCUIT DESCRIPTION

2.1 GENERAL

The operation of the various circuits in the MP-101-5 is discussed in the following paragraphs using the functional block diagram, Figure 2-1, and the schematic diagrams at the rear of this manual. Note that the unit numbering method is used for electrical components. This means that parts on subassemblies and modules carry a prefix before the usual class letter and number of the item (such as A1R1 and A3Q2). These subassembly prefixes are omitted on illustrations and in the text except in those cases where confusion may result from their omission.

2.2 FUNCTIONAL DESCRIPTION

The MP-101-5 Meter Panel, when connected to the 21.4-MHz IF output of a receiver and properly adjusted, provides metering of peak or average input carrier level, acts as a signal strength meter, or performs the function of a selective transfer voltmeter. The meter panel is also a wideband IF demodulator for AM signals, providing a 4-MHz wide video output. A pulse stretching network has been included for aural enhancement when receiving pulse transmissions.

2.2.1 Incoming signals from the associated receiver are connected to the MP-101-5 through IF INPUT jack, J1, and applied to the wideband IF amplifier, A1. The overall bandwidth of the IF amplifier is 8 MHz with a center frequency of 21.4 MHz. Transistors A1Q1, A1Q2, and A1Q3 are IF amplifiers which are stagger tuned to provide the necessary bandwidth. The output from A1Q3 is applied to a voltage amplifier, A1Q4, and then coupled to the detector driver, A1Q5. Transformer A1A1T1 inductively couples the output of A1Q5 to the detector, A1A1CR1 and A1A1CR2. The detected output is fed to complementary symmetry driver amplifier A1A1Q1, A1A1Q2, A1A1Q3, and A1A1Q4. This configuration is used to match the high impedance detector output and provide sufficient power gain to drive both the meter amplifier, A2, and the first video amplifier, A3.

2.2.2 The signal at the IF amplifier output jack, J3, is routed directly through VIDEO GAIN no. 1 control to the first video amplifier, A3. The first video amplifier consists of DC amplifier A3Q1, A3Q2, and complementary emitter followers A3Q3 and A3Q4. The video output signal is coupled to rear-apron mounted jack J2, VIDEO OUTPUT no. 1 to provide a means of monitoring the video signal before it has been distorted by the action of the pulse stretching network.

2.2.3 A second output from the IF amplifier is routed to the meter amplifier, A2, where the signal is split into two main paths. The first is through emitter follower A2Q3 and either dc-compensating diode, CR2, or peak detector diode, CR3, depending on the position of front panel RESPONSE switch S3. The peak/

average detector output at the wiper of S3 is coupled through emitter follower A2Q4 to a differential amplifier consisting of A2Q5 and A2Q6 which drives the signal strength meter, M1. The second signal path is through emitter follower A2Q1 and slide-back gate diode A2CR1 to a second emitter follower, A2Q2. A threshold voltage supplied by front-panel SLIDE BACK GATE ADJUST potentiometer, R5, may be utilized to reverse bias the gate diode as an aid in eliminating unwanted base line noise. To produce an output, the input signal level must exceed the reverse bias on the diode. The video signal on the emitter of A2Q2 is fed to the base of A5Q1, an emitter follower located in the pulse stretching module.

2.2.4 Front-panel PULSE STRETCHER switch, S5, enables the operator to select pulse stretching networks having decay times of 0, 5, 10, 50, or 100 μsec. The various decay times are used to conform with the pulse repetition rate of the received signal to improve audio characteristics for aural monitoring. Transistors A5Q2 and A5Q3 form a Darlington amplifier whose output is coupled to both the audio gain control and the second video gain control.

2.2.5 The audio amplifier, A8, contains a dc coupled voltage amplifier, A8Q1, A8Q2, and complimentary symmetry emitter followers A8Q3 and A8Q4. The secondary of output transformer A8T1 supplies both a 600 Ω and a 3.2 Ω output to rear apron terminal board TB1. A front panel PHONES jack, J4, is available, and is also coupled to TB1.

2.2.6 A second video amplifier, A4, which is identical to A3, provides a means of monitoring the pulse-stretched video signal at rear-apron VIDEO OUTPUT No. 2 jack, J3.

2.3 TYPE 72251 8-MHz BANDWIDTH IF AMPLIFIER

Figure 6-1 is the schematic diagram for the Type 72251 8-MHz bandwidth IF amplifier; its reference designation prefix is A1.

2.3.1 IF Amplifiers. - The incoming 21.4-MHz IF signal from the associated receiver is coupled through Gain Adjust potentiometer R36, and dc-blocking capacitor C1, to the base of the first IF amplifier, Q1. Resistor R1 terminates the input at 50 ohms. Potentiometer R36 sets the input signal amplitude and hence the overall gain of the IF amplifier. This control is set to match the gain of the MP-101-5 to the receiver IF output level (See Section III). The three IF amplifiers Q1, Q2, and Q3 are single-tuned by variable inductors L1, L2, and L3 in their respective collector circuits. Stagger tunning is used to obtain the desired 8-MHz bandwidth. Each coil is shunted by a resistor to lower its Q and thus increase its bandwidth. Inductor L3 resonates with its distributed capacity C18 and C19 at 21.4 MHz; L2 is tuned above the center frequency, and L1 is tuned below center. Resistors R4, R10, and R17 are parasitic suppressors. Capacitors C2, C8, and C13 provide feedback paths to neutralize Q1, Q2, and Q3, respectively. A sample of the IF signal is coupled through capacitor C20, detected by test point detector CR1 and applied to test point TP1 through resistor

R22 to provide a means of observing the video signal at the output of the IF amplifier stages. The IF signal is coupled through capacitor C18 to the base of voltage amplifier Q4. Resistor R25 is a parasitic suppressor in the collector circuit of Q4. Capacitor C21 couples the signal to the base of driver amplifier Q5. Resistor R33 prevents parasitic oscillations in the collector circuit of Q5. The primary of transformer A1T1 is the collector load for Q5. Capacitor C24 returns an out-of-phase voltage from the secondary of T1 to the base of Q5 to neutralize this stage. An overall phase-shift feedback loop to compensate for the inherent non-linearity of Q4 and Q5 at 21.4 MHz is accomplished by feeding a small signal from pin 4 on the secondary of A1T1 through resistor R30 and capacitor C22 to the emitter of Q4.

2.3.2 Detector and Output Amplifier. - Diodes A1CR1 and A1CR2 form a full-wave detector circuit the output of which is filtered by a pi network consisting of capacitors A1C1, A1C2, and inductor A1L1. A full-wave detector is used so that the ripple frequency will be twice the IF, making it easier to filter the wide-band, demodulated video signal. Use of this configuration also extends the units dynamic range since the signal handling capability is double that of a single diode detector. The low pass filter has little effect on the video signal, but presents a high impedance to RF components. The video signal is applied simultaneously through resistor A1R3 and A1R4 to the bases of A1Q1 and A1Q2. Transistors A1Q1, A1Q2, A1Q3, and A1Q4 form a compound complementary symmetry driver amplifier which is operated class B. Two video outputs are provided from the IF amplifier; OUTPUT No. 1 at jack, J3, and OUTPUT No. 2 at jack, J2.

2.4 TYPE 7360 VIDEO AMPLIFIER

The schematic diagram for this plug-in module is Figure 6-3; its reference designation prefixes are A3 and A4. The module consists of an NPN transistor, Q1, dc-coupled to Q2, a PNP transistor. These two stages provide the necessary voltage gain to drive complementary symmetry emitter followers Q3 and Q4. The latter two transistors are biased to operate Class B. Negative dc feedback to set the overall gain of the amplifier is taken at the junction of emitter resistors R12 and R13 and fed to the emitter of Q1 through R7. Silicon diodes CR1 and CR2 determine the idling currents of Q3 and Q4, and eliminate crossover distortion while preventing thermal runaway. Since the transistors and diodes are made of the same material they exhibit the same temperature coefficient of voltage characteristics. A rise in temperature lowers the base-emitter voltage drop of the transistors tending to make them conduct harder. However, the diode voltage drop decreases by the same amount so that the voltage applied to the bases also decreases, holding the collector current nearly constant. Resistors R12 and R13 are included in the emitter circuits of Q3 and Q4 to provide additional feedback with low-input signal levels. These resistors eliminate distortion introduced by the difference between the voltage drops of CR1 and CR2 and the base-emitter junctions of Q3 and Q4. With little or no input signal the drop across the resistors is a few tenths of a volt. Large input signals would cause the drop to become excessive except that CR3 and CR4 become forward biased and limit the drop to approximately 0.6 volt. The low-impedance output of the complementary symmetry emitter followers is matched to the higher impedance output terminals by means of

R14. This resistor has the additional effect of preventing amplifier damage if the output terminal is accidentally shorted to ground. Capacitor C3 provides additional drive for Q4 through R9 during the negative-going portion of the input signal. The bases of Q3 and Q4 are coupled through capacitor C6 to equalize the input signal level to the two stages.

2.5 TYPE 79499 METER AMPLIFIER

Figure 6-2 is the schematic diagram for the type 79499 meter amplifier; its reference designation prefix is A2. The amplifier contains four emitter followers, a slide-back gate diode, and a meter driver circuit. Incoming video signals are simultaneously fed to the slide-back gate circuit and the peak/average detector circuit.

2.5.1 Slide-Back Gate. - A slide-back gate circuit has been included in the MP-101-5 so that AM signals may be displayed on the oscilloscope with a minimum of baseline noise. This circuit allows the operator to remove the noise without affecting the information contained in the modulation. The circuit consists of emitter followers Q1 and Q2, diode CR1, and front-panel SLIDE BACK GATE ADJUST potentiometer R5. The operation of the circuit is most easily explained assuming the following conditions: an output level at A1J2, IF OUTPUT No. 2 of approximately 3.0 Vdc; the appearance of baseline noise on the oscilloscope; front-panel SLIDE BACK GATE ADJUST potentiometer R5 set fully counterclockwise to the OFF position. With R5 in this position, the base of Q2 is at zero volts and gate diode CR1 is forward biased. Rotation of R5 in the clockwise direction will close switch S4 and apply a positive bias through resistor R3 to the base of Q2. Diode CR1 will then be reverse biased and a portion of the baseline noise will be eliminated (depending on the setting of R5), since only input signal levels high enough to overcome the reverse bias will pass through CR1 to the base of Q2. If the positive bias applied to CR1 is increased even more, the resulting AM signal will appear abnormal in that negative-going half cycles will be clipped. Since the range of R5 is from 0 to 4.0 volts, it may be possible to completely eliminate the incoming signal. The proper setting for R5 is when the maximum signal-to-noise deflection is viewed on the oscilloscope.

2.5.2 Peak/Average Output. - A second path for the video input signal is through emitter follower Q3 to peak detector diode CR3. The rectified output from CR3 is stretched by capacitor C1 and applied to peak adjust potentiometer R8. This control is adjusted so that the meter reading, with a CW input signal, is the same for either PEAK or AVERAGE modes of operation. The signal from the arm of R8 is fed to the PEAK position on METER RESPONSE switch S3. Diode CR2 compensates for the 0.6 volt drop across peak detector CR3 so that there is no dc shift at the arm of S3 with the switch in the AVERAGE position. The meter will read the average dc through Q3 when this switch is placed in the AVERAGE position. The signal from the arm of S3 is fed through resistor R11 to the base of emitter follower Q4. The emitter signal from this stage is coupled through R12 to the base of Q5, one-half of a differential amplifier. Front-panel meter M1 is connected between the emitter of Q5 and the emitter of Q6, the second half of the differential amplifier. Capacitor C2 sets the proper time constant for the

meter movement while preventing possible damage when ac poser is applied or removed. Meter M1 may be set to zero, with no signal input to the MP-101-5, by means of front-panel METER ZERO potentiometer R1. This control applies a voltage to the base of Q6 to match that applied to Q5, thus balancing the circuit. The direction of current flow depends on the difference of potential between the bases of the two transistors. When the positive-going incoming signal is applied, Q5 will conduct harder resulting in a left-to-right deflection of the meter needle.

2.6 TYPE 79500 PULSE STRETCHER

Figure 6-4 is the schematic diagram for the pulse-stretcher module. The reference designation prefix is A5. The video output from emitter follower A2Q2 is applied through pin 3 on the pulse stretcher module to the base of emitter follower Q1. With main chassis PULSE STRETCHER switch, S5, in the 0 μsec position, diodes CR1 through CR4 are reverse biased and no stretching action occurs. Under this condition the pulses are coupled directly through current limiting resistor R4 to the base of Q2. If, however, S5 is in the 5 μsec position, and a positive pulse of sufficient amplitude appears at the input, diode CR1 will be forward biased by the +12 Vdc source on the wiper of S5 and will conduct, so that the pulse charges capacitor C2. The discharge path for C2 is through a 100k resistor, R3, to the -12V supply. The rate of decay is a function of the ratio of capacitance to resistance, in this case 5 μsec. Operation of the 10 μsec, 50 μsec, and 100 μsec pulse stretcher circuits are identical to the one described above with the exception that longer decay periods are provided by inserting progressively larger capacitors in the respective stretching circuits. The output of the pulse stretcher network is applied to a Darlington amplifier consisting of Q2 and Q3, which provides sufficient gain to drive both AUDIO GAIN control, R6, and VIDEO GAIN no. 2 control, R4.

2.7 TYPE 7436 AUDIO AMPLIFIER

Figure 6-5 is the schematic diagram for the audio amplifier; A8 is its reference designation prefix. The operation of this module is similar to the video module discussed in paragraph 2.4. Notable differences exist in that a transformer is used to supply 3.2- and 600-ohm audio outputs as well as some negative feedback which is produced by current flow through the primary and resistor R6. The two low-impedance outputs are fed to rear-apron terminal board TB1. The high impedance output is fed to the PHONES jack on the front panel, as well as TB1.

2.8 POWER SUPPLY

The power supply for the MP-101-5 Meter Panel consists of various main chassis components (See Figure 6-8) and plug-in modules A6 and A7. The ac input power from power input connector FL1P1 is fed through the line filter FL1, line fuse F1, and POWER switch S1, to the two primary windings of power transformer T1. Input power selector switch, S4, located on the rear apron, is used to connect the two primary windings in parallel for 115-volt operation or in series for 230-volt operation. Fuse F2 provides additional overload

protection when the latter input power is used. Secondary winding 8-9-10 supplies the ac input power to the +12-volt and -12-volt regulated power supply boards.

2.8.1 Type 76169 +12V Regulated Power Supply. - The schematic diagram for this module is Figure 6-6; its reference designation prefix is A6. Transistor Q1 functions as a series regulator whose conduction is controlled by Q2, an emitter follower. Transistors Q3 and Q4 are connected in a differential amplifier configuration. The base of Q3 is connected to the regulated output through a sampling network consisting of fixed resistors R6 and R8, and potentiometer R7. The signals at the bases of the two stages are summed in the common emitter circuit to produce a signal at the collector of Q3 that is the difference between the two inputs. Thus, any fluctuation in the output voltage is sensed by Q3, amplified and inverted and fed to the base of Q2. For example, if the output voltage rises (becomes more positive) Q3 will conduct harder, causing an increased voltage drop across R2 and R3. This lowers the forward bias voltage and the current flow through Q2. As a result, the current flow through Q1 is reduced, returning the output voltage to its nominal value. Resistor R4 connects the base of Q3 to the input side of the regulator so that voltage fluctuations at this point can be sensed and compensated for by Q1. A differential amplifier is used in the comparison circuit as variations in base-emitter voltage due to temperature changes in one transistor will tend to cancel similar changes in the other. This configuration also permits the reference diode, CR2, to be placed in the base circuit rather than the emitter, as is the case with a one-stage error amplifier. Less current flows through the diode, resulting in a more stable reference voltage. Capacitor C4 prevents any tendency for the power supply to oscillate due to heavy loading.

2.8.2 Type 76170 -12V Regulated Power Supply. - Figure 6-7 is the schematic diagram for this module; its reference designation prefix is A7. The operation of this module is identical to power supply board A6. The polarity of the capacitors, transistors, and diodes has been reversed to supply the negative output voltage.

SECTION III

INSTALLATION AND OPERATION

3.1 INSTALLATION

The MP-101-5 Meter Panel is designed to mount in a standard 19-inch rack. The unit will occupy 3.5 inches of vertical space and project 16 inches back into the rack. If a mobile installation is anticipated, some means should be devised to support the sides and/or rear of the equipment.

3.1.1 Power Connection. - Plug the power cord into a 115/230 Vac source. The third pin of the power cord grounds the unit. Before power is applied insure that the rear apron 115/230-volt switch S4 in the proper position.

3.1.2 IF Input Connection. - Connect the source of 21.4-MHz IF signals to IF INPUT jack J1 on the rear apron using mating plugs and 50-ohm coaxial cable.

3.1.3 Video Outputs. - Video signals from the video amplifiers, A3 and A4, are available at rear apron VIDEO OUTPUT no. 1 jack, J2, and VIDEO OUTPUT no. 2 jack, J3, respectively. VIDEO OUTPUT No. 1 is the wideband video signal output. VIDEO OUTPUT No. 2 is the pulse stretched video signal output.

NOTE

The MP-101-5 Meter Panel may be used as a selective transfer voltmeter in making EMI and field intensity measurements. For procedures refer to the applications note inserted into the rear of this manual.

3.2 OPERATION

The operating controls and indicators found on the front panel of the MP-101-5 are described in the following paragraphs. These controls and indicators are shown in Figure 1-1.

3.2.1 Power Switch. - Placing the POWER switch in the ON position applies power to the unit and lights the pilot lamp located above the switch.

3.2.2 Meter Zero Control. - The METER ZERO control is used to center the meter needle over the 0 mark on the μV (bottom) scale prior to the application of an IF signal.

3.2.3 Video Gain Controls. - The amplitude of the video signal present at J2 and J3 may be varied by VIDEO GAIN no. 1, and VIDEO GAIN no. 2 controls, respectively.

3.2.4 Slide-Back Gate Control and Switch. - The combination SLIDE BACK GATE ADJUST control and switch is used to remove baseline noise from the video output signal. Rotating this control clockwise from its extreme counterclockwise position closes switch S2. Continued clockwise movement of the control will result in elimination of the baseline noise.

3.2.5 Meter. - The front-panel meter is calibrated in two scales. The top scale is calibrated in μV from 0 to 10 in 100 increments; the bottom scale is calibrated in dB above 1 μV in 1 dB steps.

3.2.6 Meter Response Switch. - Placing the METER RESPONSE switch in the PEAK position results in a meter reading corresponding to the peak signal level; selection of the AVERAGE position results in an average signal level indication.

3.2.7 Audio Gain Control. - Adjust the AUDIO GAIN control for the desired audio level at the phones jack and TB1 on the rear apron.

3.2.8 Pulse Stretcher Switch. - Selects desired pulse stretching delay network.

SECTION IV

MAINTENANCE

4.1 GENERAL

The MP-101-5 Meter Panel presents no special maintenance problems and normally requires no care beyond being kept clean. Should trouble occur, down time will be shortened if the technician is familiar with Section II in which the circuits are described. In addition, use should be made of Figures 5-1 and 5-2 in which the component locations are shown, and of the schematic diagrams, Figures 6-1 through 6-8, and the assembly drawings.

4.2 PLUG-IN MODULES

The seven plug-in modules (A2, A3, A4, A5, A6, A7, and A8) may be easily removed by loosening the hold-down clamps and pulling them upward from the receptacles into which they are fitted. The numbers on the module pins correspond to the numbers indicated on the main chassis schematic diagram at the points where the connecting leads pass through the lines outlining the module.

4.3 TROUBLESHOOTING

Most troubles in the unit will be caused by failure of the fuses or semiconductors. Initial troubleshooting should be directed toward localizing the problem to a particular subassembly. One method of locating the faulty subassembly is to feed in a signal of the proper frequency at the input and check each output with a wideband oscilloscope. If a plug-in module is suspected, a quick check can be made by replacing it with a spare known to be good. Once the faulty subassembly is known, further signal tracing will normally locate the bad stage. Voltage measurements of the faulty stage will usually pin point the malfunctioning component. Insure that the power supply is functioning properly before any further troubleshooting is carried out. The module and transistor pin socket voltages are listed in Table 4-1.

4.4 ALIGNMENT INSTRUCTIONS

The alignment procedures given for the IF amplifier are suitable for performance in the field when making periodic performance checks, or when making adjustments after replacing components. The alignment should be performed with suitable equipments and by technicians thoroughly familiar with their use.

4.4.1 Use of Marker During Alignment. - A post-detection type marker adder is recommended, and the alignment procedures in this book assume that one is used. However, if such a marker adder is not available, the marker generator output should be loosely coupled to the sweep generator output. This can be done by connecting the marker signal source to a turn or two if insulated wire wrapped around the sweep generator lead near the point of connection to the circuit under test, or by coupling to the sweep generator lead through a small capacitor. To insure that the addition of the marker is not affecting the response curve, disconnect the marker

generator and observe that no change in the curve's shape or symmetry occurs. A low-capacity shielded cable should be used to connect to the oscilloscope, and the shield should be grounded as closely as possible to the point to which the center conductor is connected.

4.4.2 Use of Oscilloscope During Alignment. - The vertical and horizontal amplifier inputs on the oscilloscope should be set in the dc-coupled mode. The dc component of the signal on the vertical input should be cancelled out by applying an equal voltage to the unused vertical differential scope input, since the dc component sometimes makes it impossible to center the signal vertically. Otherwise it will sometimes be necessary to use the ac coupled mode. A low-capacity shielded cable should be used to connect to the oscilloscope, and the shield should be grounded as closely as possible to the point to which the center conductor is connected.

4.4.3 Equipments Required. - The following equipments or their equivalents are required to perform the IF amplifier alignment and to check the overall operation of the MP-101-5.

(1) Sweep Generator, Telonic Type SM-2000

(2) Sweep Generator, Plug-In Head, Telonic Type LH-2

(3) Signal Generator, Hewlett Packard Type 606A

(4) Oscilloscope, Tektronix Type 503

(5) Resistor, Fixed, Composition, 51Ω

(6) Assorted cables, connectors, and alignment tools

4.5 TYPE 72251 8-MHz BANDWIDTH IF AMPLIFIER ALIGNMENT

The alignment procedure for the type 72251 IF amplifier is given in the following paragraphs. Refer to the schematic diagram, Figure 6-1.

4.5.1 IF Alignment. - Proceed as follows:

(1) Connect equipment as shown in Figure 4-1.

(2) On MP-101-5 set IF amplifier gain control, A1R36, fully clockwise.

(3) Set output frequency of signal generator and sweep generator to 21.4 MHz.

(4) Adjust sweep generator and oscilloscope controls to display a response curve.

(5) Adjust A1L3, A1L2, and A1L1 for a maximum amplitude, symmetrical response centered about the 21.4-MHz marker. Tune A1L3 to 21.4 MHz. Tune A1L2 and A1L1, respectively, above and below center frequency. Use the signal generator to check

for 3-dB response at 25.4 MHz and 17.4 MHz. A typical response is shown in Figure 4-2.

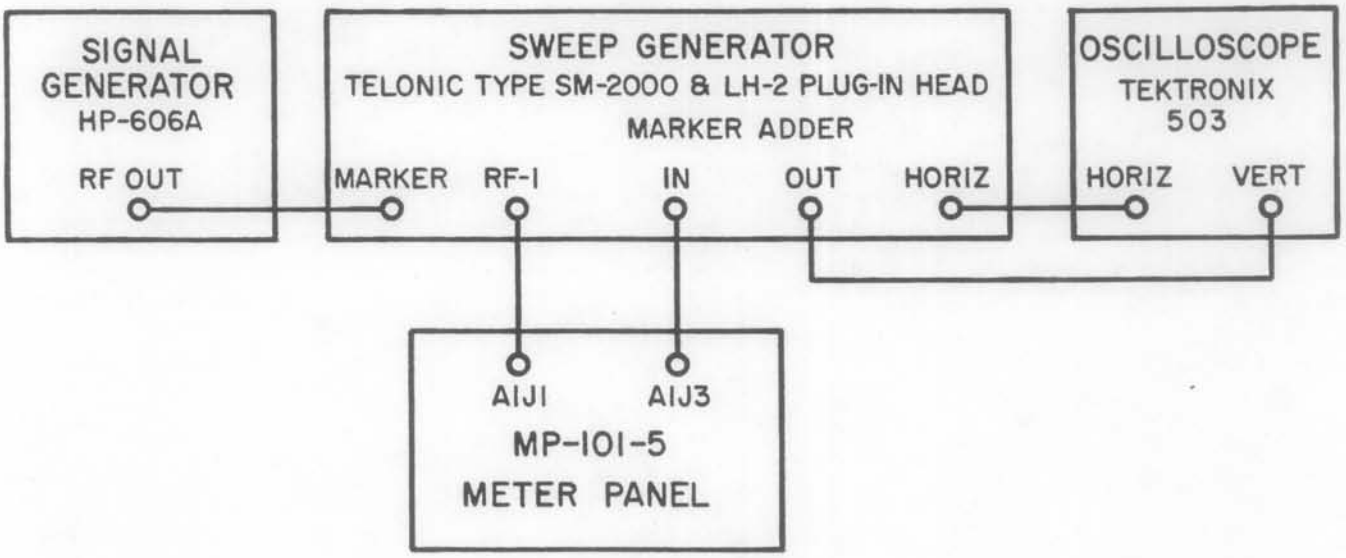


Figure 4-1. Equipment Setup, 8-MHz IF Amplifier Alignment

4.6 PRE-OPERATIONAL ADJUSTMENTS

The following adjustments should be made before the MP-101-5 is returned to service.

4.6.1 IF Gain Adjustment. - Proceed as follows:

(1) Zero the meter using the front-panel control.

(2) Connect the signal generator output to IF INPUT jack J1 on the rear apron.

(3) Set output frequency of signal generator to 21.4 MHz, CW mode; adjust output level to correspond to IF output level from associated receiver (with CW input signal, AGC operation).

(4) Place MP-101-5 METER RESPONSE switch in AVERAGE position.

(5) Adjust A1R36 on the IF amplifier chassis for a 5-μV reading on the front-panel meter.

(6) Place METER RESPONSE switch in PEAK and note meter reading. It should indicate 5 μV, ±1%. If not, adjust potentiometer A3R8 on meter amplifier board for correct reading.

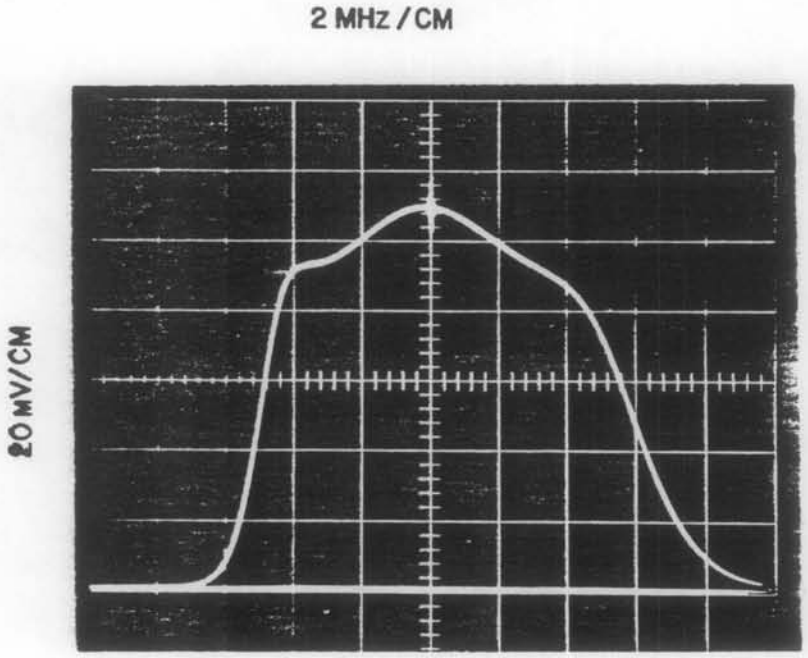


Figure 4-2. Typical Response 8-MHz IF Alignment

Table 4-1. Type MP-101-5 Meter Panel, Transistor and Module Pin Socket Voltages

IF Amplifier (A1)

Ref Desig	Element		
	Emitter	Base	Collector
A1Q1	-0.83	-0.14	7.3
A1Q2	-0.8	-0.09	7.3
A1Q3	-0.77	-0.07	9.6
A1Q4	-4.0	-3.3	6.7
A1Q5	-6.8	-6.1	9.6
A1A1Q1	-0.73	-0.08	12.0
A1A1Q2	0.56	-0.08	-12.0
A1A1Q3	0.07	-0.73	11.9
A1A1Q4	0.07	0.56	-11.9

Meter Amplifier (A2)

Pin Number	2	3	4	5	6	8	10	11	13	17	19	20	21
Voltage	-9.4	-2.0	-2.3	-9.4	-2.3	-1.3	-12.0	-1.25	-1.25	-2.0	-.07	-1.8	12.0

Video Amplifier (A3, A4)

Pin Number	2	4	9	21
Voltage	-.52	-12.0	12.0	-0.01

Pulse Stretcher (A5)

Pin Number	2	3	5	7	9	11	13
Voltage	12.0	-1.8	-12.0	-12.0	-12.0	-12.0	-12.0

Table 4-1. Type MP-101-5 Meter Panel, Transistor and Module Pin Socket Voltages, (Cont 'd)

+12V Regulated Power Supply (A6)

Pin Number	10	11
Voltage	12.0	12.0

-12V Regulated Power Supply (A7)

Pin Number	19	20
Voltage	-12.0	-12.0

Audio Amplifier (A8)

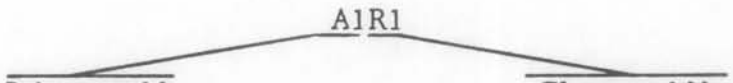
Pin Number	11	14
Voltage	-12.0	12.0

SECTION V

REPLACEMENT PARTS LIST

5.1 UNIT NUMBERING METHOD

The unit numbering method of assigning reference designations (electrical symbol numbers) has been used to identify assemblies, subassemblies (and modules), and parts. An example of the unit method follows:



Read from right to left as: First (1) resistor (R) of first (1) subassembly (A)

As shown on the main chassis schematic, components which are an integral part of the main chassis have no subassembly designation.

5.2 REFERENCE DESIGNATION PREFIX

Partial reference designations have been used on the equipment and on the illustrations in this manual. The partial reference designations consist of the class letter(s) and identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on drawings and illustrations following the notation "REF DESIG PREFIX."

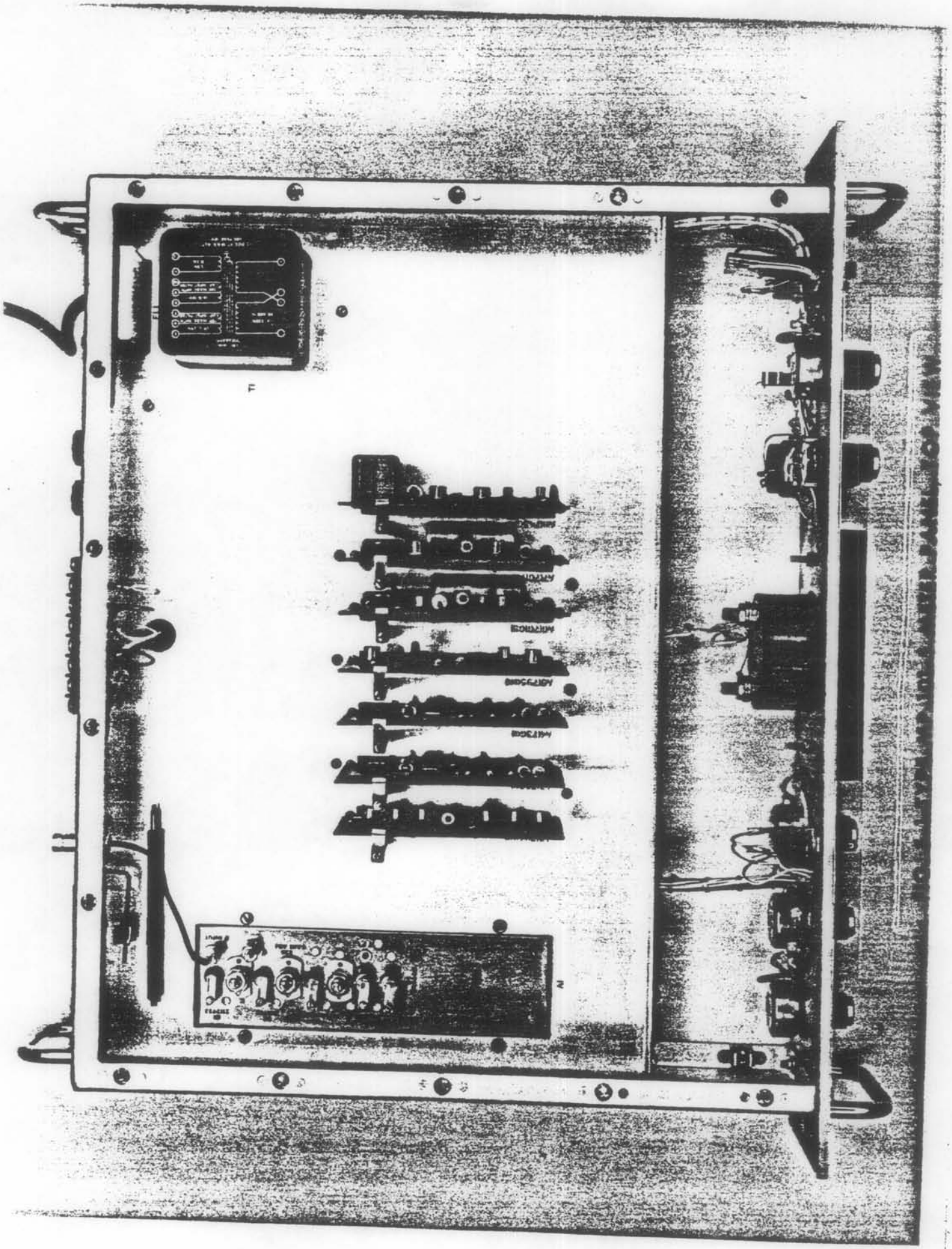
5.3 LIST OF MANUFACTURERS

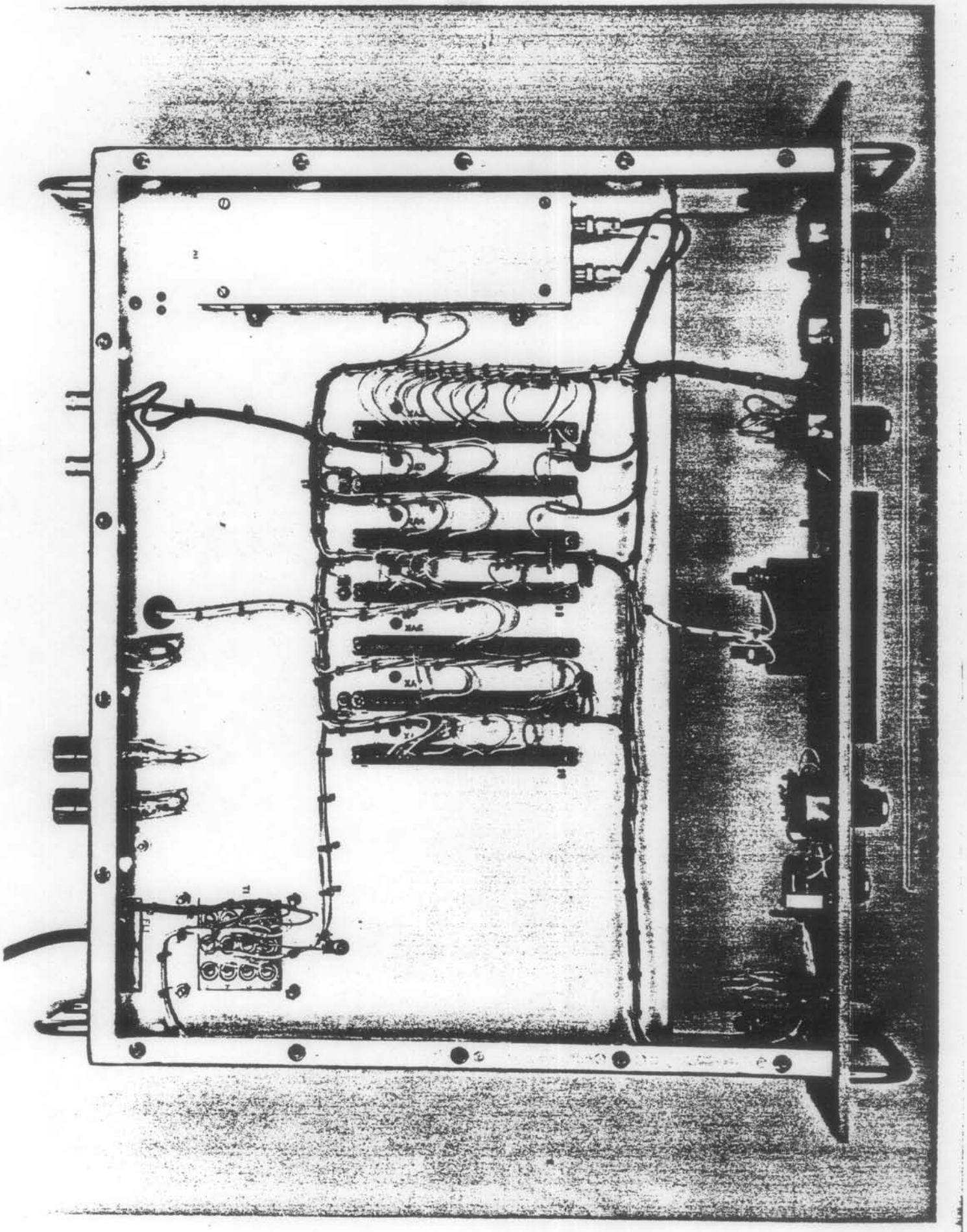
Vendor Code	Name and Address
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, Wisconson 53204
04013	Taurus Corporation 1 Academy Hill Lambertville, New Jersey 08530
04713	Motorola Semiconductor Prod., Inc. 5005 East McDowell Road Phoenix, Arizona 85008
06001	General Electric Company Capacitor Department P. O. Box 158 Irmo, South Carolina 29063
09023	Cornell-Dubilier Electric Corp. Electrolytics & Paper Tubular Div. 2562 Dalrymple Sanford, North Carolina 27330
14632	s, Inc. Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, Maryland 20760 ?

Vendor Code	Name and Address
27193	Cutler-Hammer, Inc. Special Products Div. 4201 N. 27th Street Milwaukee, Wisconsin 53216
28480	Hewlett-Packard Company 1501 Page Mill Road Palo Alto, California 94304
56289	Sprague Electric Company Marshall Street North Adams, Mass. 01247
71785	Cinch Manufacturing Company Howard B. Jones Division 1026 South Homan Avenue Chicago, Illinois 60624
72619	Dialight Corporation 60 Stewart Avenue Brooklyn, New York 11237
72982	Erie Technological Prod., Inc. 644 West 12th Street Erie, Pennsylvania 16512
73138	Beckman Instruments, Inc. Helipot Division 2500 Harbor Boulevard Fullerton, California 92634
73899	JFD Electronics Company Division of Stratford Retreat House 15th at 62nd Street Brooklyn, New York 11219
74868	Amphenol Corporation Amphenol RF Division 33 East Franklin Street Danbury, Connecticut 06810
80131	Electronic Industries Association 2001 Eye Street, N. W. Washington, D. C. 20006
81349	Military Specifications
82389	Switchcraft, Incorporated 5527 North Elston Avenue Chicago, Illinois 60630
91418	Radio Materials Company 4242 West Bryn Mawr Avenue Chicago, Illinois 60646
95121	Quality Components, Inc. P. O. Box 113 St. Mary's, Pennsylvania 15857
99687	Raytheon Company, Equipment Div. Surface Radar & Navigation Operatic Wayland, Massachusetts 01778
99800	Delevan Electronics Corporation 270 Quaker Road East Aurora, New York 14052

5.4 PARTS LIST

When ordering replacement parts from CEI, specify the type and serial number of the equipment, and the reference designation and description of each part ordered. The Vendors and Vendor Part Numbers listed are included as a guide to the user of the equipment in the field and do not necessarily agree with the parts installed in the equipment. Except in those cases specifically noted, the replacement part may be obtained from any vendor as long as the physical and electrical parameters of the part selected agree with the original part.





PARTS LIST
PAGE 1 OF 4

MP-101-5
TYPE NUMBER

METER PANEL
TITLE

.40903
SCHEMATIC

ORIGINAL JOB NO. 2503			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX

ENGINEER [signature] DATE Aug. 16, 1968
APPROVED FOR SAMPLE

ENGINEER [signature] DATE Aug 16, 1968
APPROVED FOR PRODUCTION

[signature] DATE 8/16/68
PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE
4586 4596	A	11/7/68						
5703 5778	B	2/24/70						

EQUIPMENT DESCRIPTION MP-101-5 METER PANEL DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
A1	IF AMPLIFIER		1	72251	14632
A2	METER AMPLIFIER		1	79499	14632
A3	VIDEO AMPLIFIER		2	7360	14632
A4	Same as A3				
A5	PULSE STRETCHER		1	79500	14632
A6	212V REGULATED POWER SUPPLY		1	76169	14632
A7	-12V REGULATED POWER SUPPLY		1	76170	14632
A8	AUDIO AMPLIFIER		1	7436	14632
C1	CAPACITOR, CERAMIC, DISC: 1000 pF, 20%, 1000V	140034	2	JF(1000pF, M)	91418
C2	Same as C1				
DS1	LAMP, NEON	240004	1	249-7866-1431-534	72619
F1	FUSE, 3AG, SLOW BLOW: 1/2A	130144	1	F02B250V1/2A	81349
F2	FUSE, 3AG, SLOW BLOW: 1/16A	130138	1	F02B250V1/16A	81349
FL1	FILTER, POWER	140033	1	JN33-694A	56289

EQUIPMENT DESCRIPTION MP-101-5 METER PANEL DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
J1	CONNECTOR, JACK, BNC SERIES, Part of W1	220086	3	17825	74868
J2	Same as J1				
J3	Same as J1				
J4	JACK, PHONE	140062	1	L-12A	82389
M1	METER, SIGNAL STRENGTH: 0-50DCUA		1	15114	14632
P1	CONNECTOR, PLUG, MB SERIES, Part of W1	260005	3	44950	74868
P2	Same as P1				
P3	Same as P1				
R1	RESISTOR, VARIABLE, COMPOSITION: 10 kΩ, 10%, 2W	170182	2	RV4NAYSD103A	81349
R2	RESISTOR, FIXED, COMPOSITION: 24 kΩ, 5%, 1/4W	160145	1	RC07GF243J	81349
R3	RESISTOR, VARIABLE, COMPOSITION: 100 Ω, 10%, 2W	170175	2	RV4NAYSD101A	81349
R4	Same as R3				
R5	RESISTOR, VARIABLE, COMPOSITION: 10 kΩ, 10%, 2W (with switch)	170181	1	RV4NBYSD103A	81349
R6	Same as R1				
R7	RESISTOR, FIXED, COMPOSITION: 20 kΩ, 5%, 1/4W	160143	1	RC07GF203J	81349
R8	RESISTOR, FIXED, COMPOSITION: 8.2 Ω, 5%, 1/4W	160005	1	RC07GF8R2J	81349

EQUIPMENT DESCRIPTION MP-101-5 METER PANEL

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
S1	SWITCH TOGGLE: SPST	300040	1	8280-K16	27193
S2	SWITCH, SNAP:SPST, Part of R5		--		
S3	SWITCH, TOGGLE: SPDT	300039	1	8282-K14	15605
S4	SWITCH, SLIDE: DPDT	200015	1	11A-1009	82389
S5	SWITCH, ROTARY, 1 Section, 2 Pole, 2-6 Position		1	1128-43	14632
T1	TRANSFORMER	200046	1	11616	14632
TB1	TERMINAL BOARD	250229	1	353-18-06-001	71785
W1	CABLE & CONNECTOR ASSEMBLY		1		14632

PARTS LIST

72251 — TYPE NUMBER

IF AMPLIFIER — TITLE

5477 — SCHEMATIC

ORIGINAL JOB NO. 2503			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
MP-101-5	A1		

ENGINEER [signature] DATE Aug. 16, 1968

APPROVED FOR SAMPLE

ENGINEER [signature] DATE Aug 16 1968

APPROVED FOR PRODUCTION

[signature] DATE 8/16/68

PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE
4573 4589	A	11/1/68						
5685	B	2/24/70						

EQUIPMENT DESCRIPTION 72251 IF AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
A1	DETECTOR		1	15047	14632
C1	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	120042	7	C023B101E502M	56289
C2	CERAMIC, COMPOSITION, TUBULAR: 2.2 pF, 10%, 500V	150126	3	QC(2.2pF, K)	95121
C3	Same as C1				
C4	CAPACITOR, MICA, DIPPED: 220 pF, 5%, 500V	120104	5	CM05FD221J03	81349
C5	CAPACITOR, MICA, DIPPED: 39 pF, 5%, 500V	120086	1	CM05ED390J03	81349
C6	Same as C4				
C7	CAPACITOR, CERAMIC, STANDOFF: 1000 pF, GMV, 500V	180029	3	SS5A-102W	01121
C8	Same as C2				
C9	Same as C1				
C10	Same as C4				
C11	CAPACITOR, MICA, DIPPED: 68 pF, 5%, 500V	120092	1	CM05ED680J03	81349
C12	Same as C4				
C13	CERAMIC, COMPOSITION, TUBULAR: 3.3 pF, 10%, 500V	150128	1	QC(3.3pF, K)	95121
C14	Same as C1				
C15	Same as C7				
C16	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	130135	2	FA5C-102W	01121
C17	Same as C4				
C18	CAPACITOR, MICA, DIPPED: 47 pF, GMV, 500V	120088	2	CM05ED470J03	81349
C19	Same as C4				
C20	CERAMIC, COMPOSITION, TUBULAR: 1.0 pF, 10%, 500V	150120	1	QC(1.0pF, K)	95121

EQUIPMENT DESCRIPTION 72251 IF AMPLIFIER DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C21	CAPACITOR, CERAMIC, DISC: 1000 pF, GMV, 500V	180028	1	SM(1000pF, GMV)	91418
C22	CAPACITOR, MICA, DIPPED: 20 pF, 5%, 500V	120079	1	CM05ED200J03	81349
C23	Same as C7				
C24	Same as C2				
C25	Same as C1				
C26	Same as C1				
C27	Same as C1				
C28	Same as C16				
CR1	DIODE	190085	1	1N198A	80131
J1	CONNECTOR, RECEPTACLE, MB SERIES	260008	3	46025	74868
J2	Same as J1				
J3	Same as J1				
L1	COIL, VARIABLE	210053	2	1472-2	14632
L2	COIL, VARIABLE	210054	1	1472-3	14632
L3	Same as L1				

EQUIPMENT DESCRIPTION 72251 IF AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
Q1	TRANSISTOR	220165	3	2N3933	80131
Q2	Same as Q1				
Q3	Same as Q1				
Q4	TRANSISTOR	230194	2	2N3866	80131
Q5	Same as Q4				
R1	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	160022	1	RC07GF510J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	160136	7	RC07GF103J	81349
R3	RESISTOR, FIXED, COMPOSITION: 1.5 kΩ, 5%, 1/4W	160116	1	RC07GF152J	81349
R4	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	7	RC07GF470J	81349
R5	Same as R2				
R6	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	160112	5	RC07GF102J	81349
R7	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	160006	4	RC07GF100J	81349
R8	Same as R2				
R9	RESISTOR, FIXED, COMPOSITION: 2.7 kΩ, 5%, 1/4W	160122	2	RC07GF272J	81349
R10	Same as R4				
R11	Same as R2				
R12	Same as R6				
R13	Same as R7				
R14	Same as R6				
R15	Same as R2				
R16	RESISTOR, FIXED, COMPOSITION: 820 Ω, 5%, 1/4W	160110	1	RC07GF821J	81349

EQUIPMENT DESCRIPTION 72251 IF AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R17	Same as R4				
R18	Same as R2				
R19	Same as R6				
R20	Same as R7				
R21	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	2	RC07GF101J	81349
R22	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	160083	1	RC07GF104J	81349
R23	Same as R2				
R24	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	160166	2	RC07GF471J	81349
R25	Same as R4				
R26	Same as R6				
R27	Same as R24				
R28	Same as R21				
R29	RESISTOR, FIXED, COMPOSITION: 18 Ω, 5%, 1/4W	160011	1	RC07GF180J	81349
R30	Same as R9				
R31	Same as R24				
R32	Same as R4				
R33	Same as R4				
R34	RESISTOR, FIXED, COMPOSITION: 220 Ω, 5%, 1/4W	160013 -	1	RC07GF221J	81349
R35	Same as R7				
R36	RESISTOR, VARIABLE, COMPOSITION: 500 Ω, 10%, 1/2W	170161	1	RV6LAYSA501A	81349
R37	RESISTOR, FIXED, COMPOSITION: 4.7 Ω, 5%, 1/4W	160073	1	RC07GF4R7J	81349
R38	RESISTOR, FIXED, COMPOSITION: 82 Ω, 5%, 1/4W	160027	1	RC07GF820J	81349
R39	RESISTOR, FIXED, COMPOSITION: 2.7 Ω, 5%, 1/4W	160067	1	RC07GF2R7J	81349

EQUIPMENT DESCRIPTION 72251 IF AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
TP1	TEST POINT	180102	1	TJ-6	04013

PARTS LIST

PAGE 1 OF 3

15047 — TYPE NUMBER

DETECTOR — TITLE

5477 — SCHEMATIC

ORIGINAL JOB NO. 2503			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
MP-101-5	A1A1		

ENGINEER [signature] DATE Aug. 16 1968

APPROVED FOR SAMPLE

ENGINEER [signature] DATE Aug 16 1968

APPROVED FOR PRODUCTION

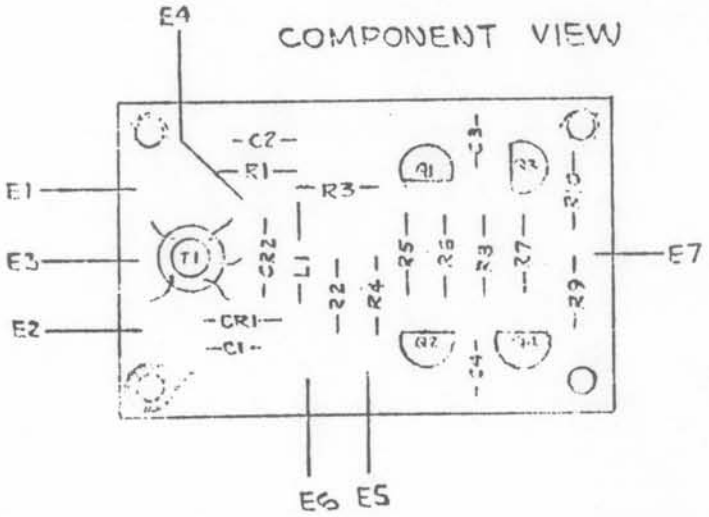
[signature] DATE 8/16/68

PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE
4595	A	11/1/68						

COMPONENT VIEW



NOTE:
1. SCHEMATIC REF 5477

	1	15046	PRINTED CIRCUIT	1

J. Shafer 8-5-65
4-14-65

DETECTOR
PRINTED CKT ASSY

15047

SEE 1/1

72251 MP101-5

FLOW SOLDER

1/1 Job 2503

EQUIPMENT DESCRIPTION 15047 DETECTOR

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, CERAMIC, TUBULAR: 3.0 pF, ±0.25 pF, 500V	250084	1	301-000-C0J0-309C	72982
C2	CAPACITOR, CERAMIC, TUBULAR: 1.0 pF, ±0.1 pF, 500V	250168	1	301-000-C0K0-109B	72982
C3	CAPACITOR, CERAMIC, DISC: 5000 pF, 20%, 100V	120042	2	C023B101E502M	56289
C4	Same as C3				
CR1	DIODE	270121 -	2	5082-2900	28480
CR2	Same as CR1				
L1	COIL, FIXED: 100 μH		1	1025-68	99800
Q1	TRANSISTOR	220163	2	2N3904	80131
Q2	TRANSISTOR	220164	2	2N3906	80131
Q3	Same as Q2				
Q4	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 4.7 kΩ, 5%, 1/4W	160128	1	RC07GF472J	81349
R2	RESISTOR, FIXED, COMPOSITION: 1 mΩ, 5%, 1/4W	160306	1	RC07GF105J	81349
R3	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	4	RC07GF101J	81349
R4	Same as R3				

EQUIPMENT DESCRIPTION 15047 DETECTOR

DATE August 13, 1968

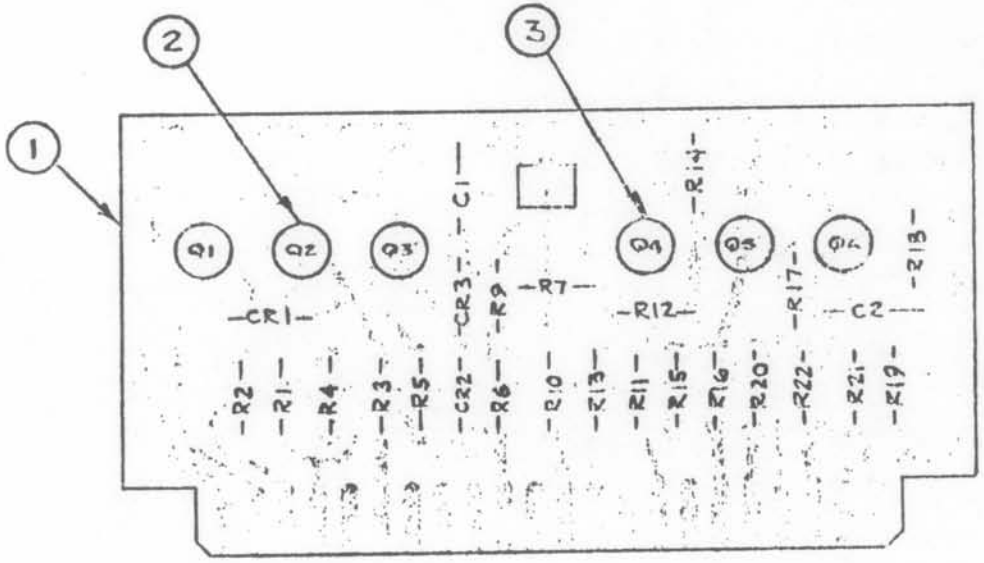
BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R5	RESISTOR, FIXED, COMPOSITION: 9.1 kΩ, 5%, 1/4W	160135	2	RC07GF912J	81349
R6	Same as R5				
R7	Same as R3				
R8	Same as R3				
R9	RESISTOR, FIXED, COMPOSITION: 4.7 Ω, 5%, 1/4W	160073	1	RC07GF4R7J	81349
R10	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	160136	1	RC07GF103J	81349
T1	TRANSFORMER		1	21427-3	14632

REVISIONS

	DESCRIPTION	DATE	APPROVED

COMPONENT VIEW



NOTE;
1. SCHEMATIC REF 31961
2. INSTALL ITEM 2 UNDER Q1 & Q2
3. INSTALL ITEM 3 UNDER Q3-Q6

QTY	VENDOR OR MFR	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	NOTE	ITEM NO.
4	THERMALLOY	7717-115 DAP	TRANSISTOR PAD		3
2	THERMALLOY	7717-22 DAP	TRANSISTOR PAD		2
1		15052	PRINTED CIRCUIT		1

PARTS LIST

COMMUNICATION ELECTRONICS INC.

METER AMPLIFIER

SIZE	DRAWING NO.	REV.
A	MP101-5	79499

8-12-68

SCALE 2503

PARTS LIST
PAGE 1 OF 3

79499 — TYPE NUMBER

METER AMPLIFIER — TITLE

31961 — SCHEMATIC

ORIGINAL JOB NO.			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
MP-101-5	A2		

ENGINEER [signature] DATE Aug. 16, 1968
APPROVED FOR SAMPLE

ENGINEER [signature] DATE Aug 16, 1968
APPROVED FOR PRODUCTION

[signature] DATE 8/16/68
PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE

EQUIPMENT DESCRIPTION 79499 METER AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, ELECTROL., TANTALUM: 0.1 μF, 10%, 75V	120294	1	CS13BH104K	81349
C2	CAPACITOR, ELECTROL., TANTALUM: 4.7 μF, 10%, 35V	120057	1	CS13BF475K	81349
CR1	DIODE	190114	3	1N914A	80131
CR2	Same as CR1				
CR3	Same as CR1				
Q1	TRANSISTOR	220183	6	2N929	80131
Q2	Same as Q1				
Q3	Same as Q1				
Q4	Same as Q1				
Q5	Same as Q1				
Q6	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	160112	2	RC07GF102J	81349
R2	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	160136	5	RC07GF103J	81349
R3	RESISTOR, FIXED, COMPOSITION: 47 kΩ, 5%, 1/4W	160152	1	RC07GF473J	81349
R4	RESISTOR, FIXED, COMPOSITION: 2.4 kΩ, 5%, 1/4W	160121	2	RC07GF242J	81349
R5	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	1	RC07GF101J	81349
R6	Same as R2				

EQUIPMENT DESCRIPTION 79499 METER AMPLIFIER

DATE August 13, 1968

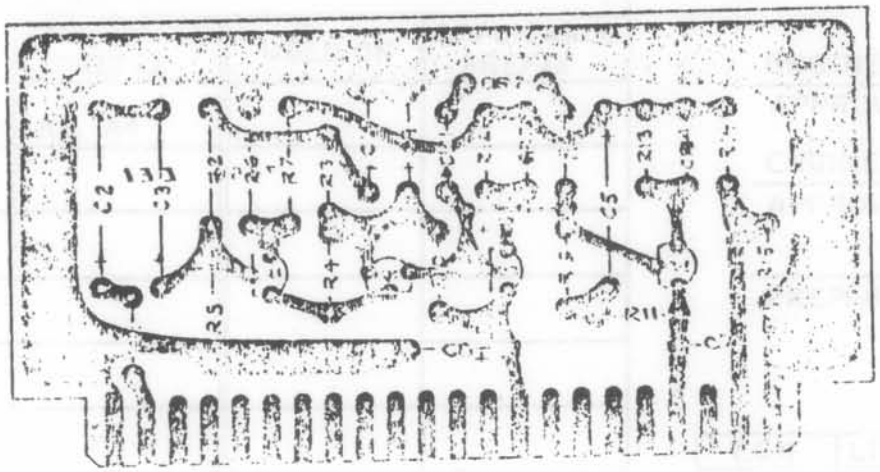
BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R7	RESISTOR, FIXED, COMPOSITION: 5.1 kΩ, 5%, 1/4W	160129	1	RC07GF512J	81349
R8	RESISTOR, VARIABLE, FILM: 10 kΩ, 30%, 1/2W	280053	1	62PAR10K	73138
R9	RESISTOR, FIXED, COMPOSITION: 620 kΩ, 5%, 1/4W	160102	1	RC07GF624J	81349
R10	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	160006	1	RC07GF100J	81349
R11	Same as R1				
R12	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	160083	3	RC07GF104J	81349
R13	Same as R12				
R14	Same as R12				
R15	Same as R2				
R16	RESISTOR, FIXED, COMPOSITION: 15 kΩ, 5%, 1/4W	160140	1	RC07GF153J	81349
R17	Same as R2				
R18	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	160120	1	RC07GF222J	81349
R19	Same as R2				
R20	Same as R4				
R21	RESISTOR, FIXED, COMPOSITION: 1.5 kΩ, 5%, 1/4W	160116	1	RC07GF152J	81349
R22	RESISTOR, FIXED, COMPOSITION: 7.5 kΩ, 5%, 1/4W	160133	1	RC07GF752J	81349

7360A

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	PER MCR R1 (DUPLICATION OF R7)	12/16	[illegible]

COMPONENT VIEW



NOTE:
1. SCHEMATIC REF 31944

-2 QTY	-1 QTY	PART NO.	DESCRIPTION	VENDOR NO.	ITEM
	1	15049	PRINTED CKT BOARD		1

LIST OF MATERIALS

SIGNATURE	DATE
DRAWN [illegible]	6/26/68
CHECKED [illegible]	7/4/68
MECH ENGR [illegible]	8/1/68
ELEC ENGR	
DESIGN APPD	
CUSTOMER APPD	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± 1/32
2 PLACE DECIMALS ±.010
3 PLACE DECIMALS ±.005
ANGLES ± 30'

MATERIAL
GLASS EPOXY

FINISH
FLOW SOLDER

NEXT ASSY	USED ON
	MF101-5
APPLICATION	

COMMUNICATION ELECTRONICS INC.
ROCKVILLE, MARYLAND

VIDEO AMPLIFIER
PRINTED CKT ASSY

CODE IDENT NO.	SIZE		REV
14632	A	7360	A
SCALE 1/1	JOB 2503	SHEET	

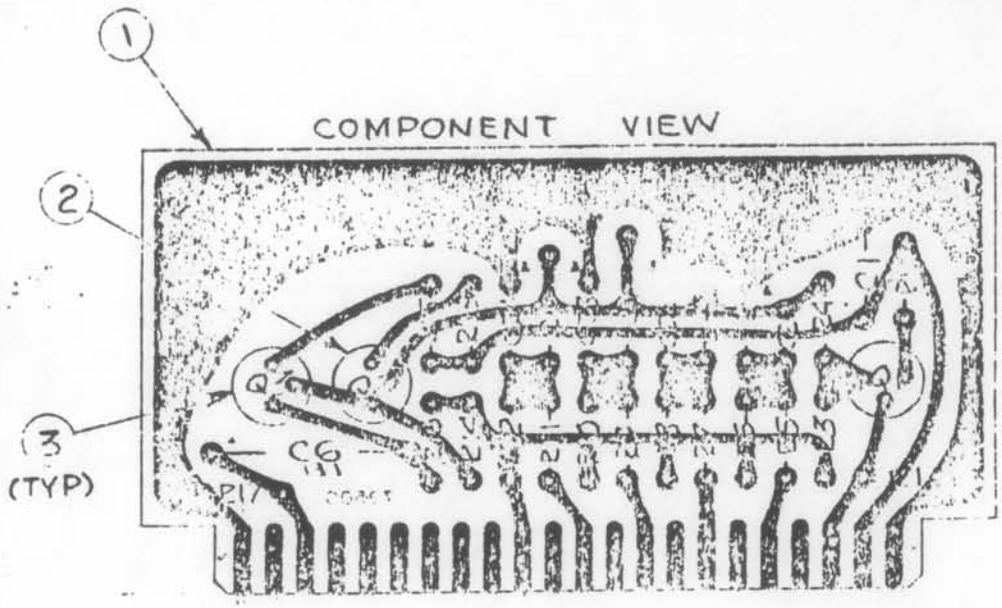
EQUIPMENT DESCRIPTION 7360 VIDEO AMPLIFIER DATE August 13, 1968

 BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	160045	1	RC07GF471J	81349
R2	RESISTOR, FIXED, FILM: 232 kΩ, 1%, 1/4W	170043	1	RN60D2323F	81349
R3	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4W	160136	2	RC07GF103J	81349
R4	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	160112	3	RC07GF102J	81349
R5	RESISTOR, FIXED, FILM: 24.3 kΩ, 1%, 1/4W	170091	1	RN60D2432F	81349
R6	RESISTOR, FIXED, FILM: 681 Ω, 1%, 1/4W	170134	1	RN60D6810F	81349
R7	RESISTOR, FIXED, FILM: 4.75 kΩ, 1%, 1/4W	170072	1	RN60D4751F	81349
R8	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	1	RC07GF101J	81349
R9	Same as R4				
R10	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	4	RC07GF470J	81349
R11	Same as R4				
R12	Same as R10				
R13	Same as R10				
R14	Same as R10				
R15	Same as R3				

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED



NOTES:
1. SCHEMATIC REF 31950
2. INSTALL ITEM 2 UNDER Q2
3. INSTALL ITEM 3 UNDER Q1, Q3

-2 QTY	-1 QTY	PART NO.	DESCRIPTION	VENDOR NO.	ITEM
	2	7717-22DAP	MOUNTING PAD	THERMALLOY	3
	1	7717-115DAP	MOUNTING PAD	THERMALLOY	2
	1	15041	PRINTED CIRCUIT		1

LIST OF MATERIALS

NEXT ASSY	USED ON
	MP-101-5

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/32
2 PLACE DECIMALS ±.010
3 PLACE DECIMALS ±.005
ANGLES ± 30'

MATERIAL: SEE L/M

FINISH: FLOW SOLDER

SIGNATURE		DATE
DRAWN	Hartley	26 Jun 67
CHECKED		
MECH. ENGR		
ELEC ENGR		
DESIGN APPD		
CUSTOMER APPD		

COMMUNICATION CEI ELECTRONICS INC.
ROCKVILLE, MARYLAND

PULSE STRETCHER
PRINTED CIRCUIT ASS'Y

CODE IDENT NO.	SIZE	
14632	A	79500
SCALE NONE	JOB 2503	SHEET

PARTS LIST

TYPE NUMBER	TITLE	SCHEMATIC
79500	PULSE STRETCHER	31950

ORIGINAL JOB NO. 2503

USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
MP-101-5	A5		

ENGINEER Alex, Ralph E. Slipp DATE Aug. 16, 1968
APPROVED FOR SAMPLE

ENGINEER Ralph E. Slipp DATE Aug. 16, 1968
APPROVED FOR PRODUCTION

[illegible] DATE 8/16/68
PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE

EQUIPMENT DESCRIPTION 79500 PULSE STRETCHER DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, ELECTROL, TANTALUM: 1.0 μF, 10%, 35V	120050	1	CS13BF105K	81349
C2	CAPACITOR, MICA, DIPPED: 270 pF, 5%, 500V	120107	1	CM05FD271J03	81349
C3	CAPACITOR, MICA, DIPPED: 750 pF, 5%, 500V	120118	1	CM06FD751J03	81349
C4	CAPACITOR, MYLAR, TUBULAR: 4700 pF, 10%, 100V	180177	1	WMF1D47	09023
C5	CAPACITOR, MYLAR, TUBULAR: 6800 pF, 10%, 100V	280032	1	61F10AA682	06001
C6	CAPACITOR, ELECTROL., TANTALUM: 15 μF, 10%, 20V	120063	1	CS13BF156K	81349
CR1	DIODE	190114	4	1N914A	80131
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
Q1	TRANSISTOR	220197	2	2N2270	80131
Q2	TRANSISTOR	220183	1	2N929	80131
Q3	Same as Q1				
R1	RESISTOR, FIXED, COMPOSITION: 10 kΩ, 5%, 1/4A	160136	6	RC07GF103J	81349
R2	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	3	RC07GF470J	81349
R3	RESISTOR, FIXED, COMPOSITION: 100 kΩ, 5%, 1/4W	160083	5	RC07GF104J	81349
R4	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	160006	1	RC07GF100J	81349

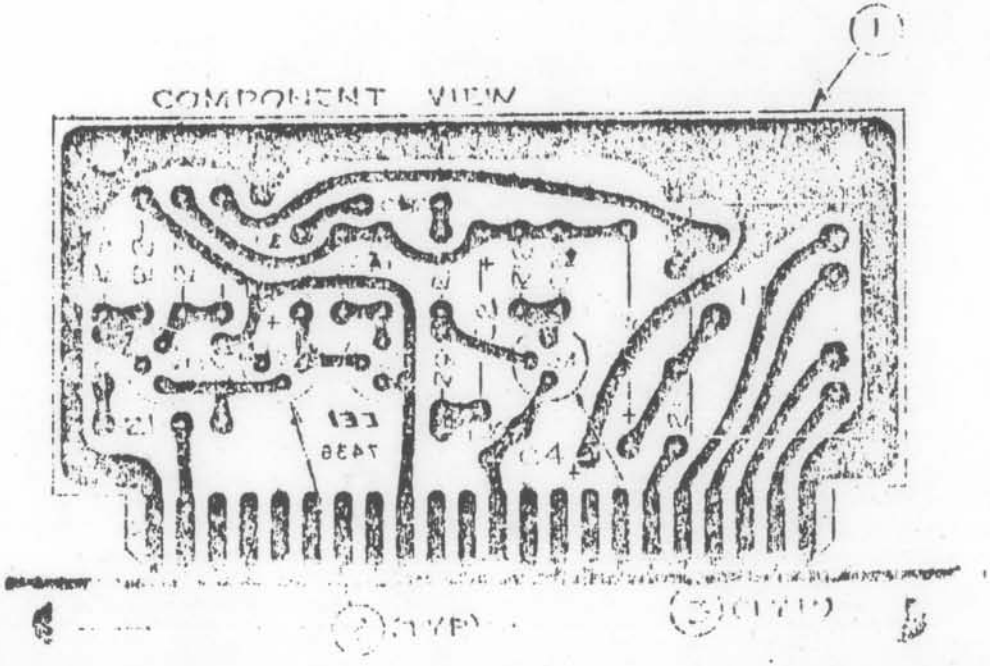
EQUIPMENT DESCRIPTION 79500 PULSE STRETCHER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R5	Same as R1				
R6	Same as R3				
R7	Same as R1				
R8	Same as R3				
R9	Same as R1				
R10	Same as R3				
R11	Same as R1				
R12	Same as R3				
R13	Same as R2				
R14	RESISTOR, FIXED, COMPOSITION: 12 kΩ, 5%, 1/4W	160138	1	RC07GF123J	81349
R15	Same as R2				
R16	RESISTOR, FIXED, COMPOSITION: 1.2 kΩ, 5%, 1/4W	160114	1	RC07GF122J	81349
R17	Same as R1				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



NOTE:
1. SCHEMATIC REF 31992
2. INSTALL ITEM 2 UNDER Q1 & Q2
3. INSTALL ITEM 3 UNDER Q3 & Q4

-2 QTY	-1 QTY	PART NO.	DESCRIPTION	VENDOR NO.	ITEM
	2	7717-2 [illegible]	MOUNTING PAD	THERMALLOY	3
	2	7717-1 [illegible]	MOUNTING PAD	THERMALLOY	2
	1	15[illegible]	PRINTED CIRCUIT		1

LIST OF MATERIALS

SIGNATURE	DATE
DRAWN	[illegible]
CHECKED	[illegible]
MECH ENGR	[illegible]
ELEC ENGR	
DESIGN APPD	
CUSTOMER APPD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± 1/32
2 PLACE DECIMALS ± .010
3 PLACE DECIMALS ± .005
ANGLES ± 30'

MATERIAL:
[illegible]
(1 SIDE) .062

FINISH:
[illegible]

NEXT ASSY	USED ON
	[illegible]

APPLICATION

COMMUNICATION ELECTRONICS INC.
ROCKVILLE, MARYLAND

AUDIO AMPLIFIER
PRINTED CIRCUIT ASS'Y

CODE IDENT NO.	SIZE	
14632	A	7436

SCALE [illegible] SHEET

PARTS LIST
PAGE 1 OF 3

7436 — TYPE NUMBER

AUDIO AMPLIFIER — TITLE

31992 — SCHEMATIC

ORIGINAL JOB NO. 2503			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
MP-101-5	A8		

ENGINEER Robert E. Stopp DATE May 13, 1968
APPROVED FOR SAMPLE

ENGINEER Robert E. Stopp DATE May 16, 1968
APPROVED FOR PRODUCTION

R. Tg DATE 8/16/68
PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE

EQUIPMENT DESCRIPTION 7436 AUDIO AMPLIFIER DATE August 13, 1968

 BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
C1	CAPACITOR, CERAMIC, DISC: 0.1 μF, -20+80%, 25V	130019	1	DFJ-3	73899
C2	CAPACITOR, ELECTROL., TANTALUM: 22 μF, 10%, 15V	120066	1	CS13BD226K	81349
C3	CAPACITOR, ELECTROL., TANTALUM: 100 μF, 10%, 20V	120073	1	CS13BE107K	81349
C4	CAPACITOR, ELECTROL., TANTALUM: 1.0 μF, 10%, 35V	120050	2	CS13BF105K	81349
C5	Same as C4				
CR1	DIODE	190099	4	1N462A	80131
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
Q1	TRANSISTOR	220183	1	2N929	80131
Q2	TRANSISTOR	220153	1	2N3251	80131
Q3	TRANSISTOR	220197	1	2N2270	80131
Q4	TRANSISTOR	220166	1	2N4037	80131
R1	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	160047	2	RC07GF561J	81349
R2	RESISTOR, FIXED, FILM: 316 kΩ, 1%, 1/4W	170046	1	RN60D3163F	81349
R3	RESISTOR, FIXED, FILM: 24.3 kΩ, 1%, 1/4W	170091	1	RN60D2432F	81349
R4	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	160120	1	RC07GF222J	81349

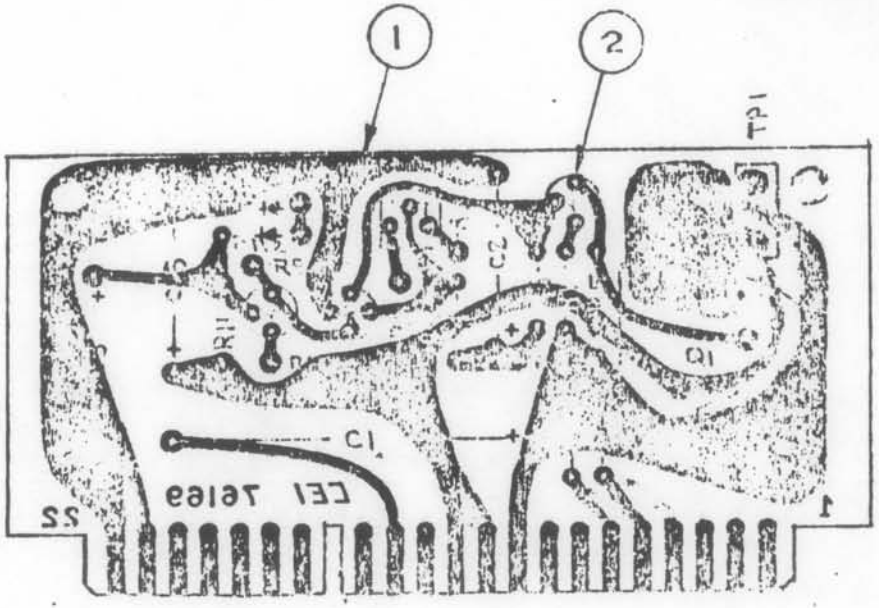
EQUIPMENT DESCRIPTION 7436 AUDIO AMPLIFIER

DATE August 13, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME/CODE
R5	RESISTOR, FIXED, FILM: 681 Ω, 1%, 1/4W	170134	1	RN60D6810F	81349
R6	RESISTOR, FIXED, COMPOSITION: 2.7 Ω, 5%, 1/4W	160067	1	RC07GF2R7J	81349
R7	RESISTOR, FIXED, FILM: 10 kΩ, 1%, 1/4W	170081	1	RN60D1002F	81349
R8	RESISTOR, FIXED, COMPOSITION: 100 Ω, 5%, 1/4W	160029	1	RC07GF101J	81349
R9	RESISTOR, FIXED, COMPOSITION: 1.5 kΩ, 5%, 1/4w	160116	2	RC07GF152J	81349
R10	Same as R9				
R11	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	2	RC07GF470J	81349
R12	Same as R11				
R13	Same as R1				
T1	TRANSFORMER		1	14006	14632

REVISION			
LTR	DESCRIPTION	DATE	APP'D
A	ITEM 2 WAS 10042 DAP M.ROSS, ADDED ITEM 3	6-9-65	



NOTES:

1. SCHEMATIC REF. 30731
2. INSTALL ITEM 2 UNDER Q2, Q4
3. INSTALL ITEM 3 UNDER Q3

ITEM	PART NO.	DESCRIPTION	QTY
3	7717-44 DAP	TRANSIPAD THERMALLOY	1
2	7717-115 DAP	TRANSIPAD THERMALLOY	2
1	14827	PRINTED CKT BOARD	1

ORIGINAL JOB NO. 2137

UNIT	NEXT ASS'Y NO.
DEO-310	

APPROVED FOR SAMPLES

APPROVED FOR PRODUCTION

COMMUNICATION CEI ELECTRONICS, INC.
ROCKVILLE, MARYLAND
MANUFACTURER'S CODE NO. 14632

+12V REGULATED POWER SUPPLY (0-250 MA)
PRINTED CKT ASS'Y

MATERIAL: ———

FINISH: FLOW SOLDER

DWG. LIST	SCALE: FULL	REV
D2-20-65, C	76[illegible]D	A

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED.
FRACTIONS ±.015
2 PLACE DECIMALS ±.010
3 PLACE DECIMALS ±.005
4 PLACE DECIMALS ±.0005
ANGLES ±30'

PARTS LIST
PAGE 1 OF

76169	+12V REGULATED POWER SUPPLY (0-250 MA)	30731
TYPE NUMBER	TITLE	SCHEMATIC

ORIGINAL JOB NO.			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
DRO-310	A7		
FE-26	A6		
MP-101-5	A6		
DRX-1000	A2		
DRX-1000-1	A2		
DRO-312	A3		
DRO-310-1	A7		
DRX-1000-2	A2		
VM-101	A2		
DRX-308	A4		

ENGINEER DATE

APPROVED FOR SAMPLE

ENGINEER [signature] DATE 2 Dec 68

APPROVED FOR PRODUCTION

[signature] DATE 3/21/69

PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE
Updated & Re-Released		11/17/70						

EQUIPMENT DESCRIPTION 76169 +12V REGULATED POWER SUPPLY (0-250 MA)

DATE March 19, 196[illegible]

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME./ CODE
C1	CAPACITOR, ELECTROL., ALUMINUM: 450 μF, -10+75%, 25V	250051	1	39D457G025FJ4	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 25 μF, -10+75%, 25V	250037	1	30D256G025CB2	56289
C3	CAPACITOR, ELECTROL., ALUMINUM: 10 μF, -10+75%, 25V	250032	1	30D106G025BB2	56289
C4	CAPACITOR, DIPPED MICA: 180 pF, 5%, 500V	120102	1	CM05FD181J03	81349
C5	CAPACITOR, ELECTROL., TANTALUM: 22 μF, 10%, 15V	120066	1	CS13BD226K	81349
CR1	DIODE	140121	1	MDA940A-3	04713
CR2	DIODE	190108	1	1N754A	80131
CR3	DIODE	190099	1	1N462A	80131
Q1	TRANSISTOR	220152	1	2N3055	80131
Q2	TRANSISTOR	220167	2	2N4074	80131
Q3	TRANSISTOR	220156	1	2N3478	80131
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	160021	1	RC07GF470J	81349
R2	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	160132	2	RC07GF682J	81349
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	160087	1	RC07GF154J	81349
R5	RESISTOR, FIXED, COMPOSITION: 1 kΩ, 5%, 1/4W	160112	1	RC07GF102J	81349
R6	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	160120	3	RC07GF222J	81349

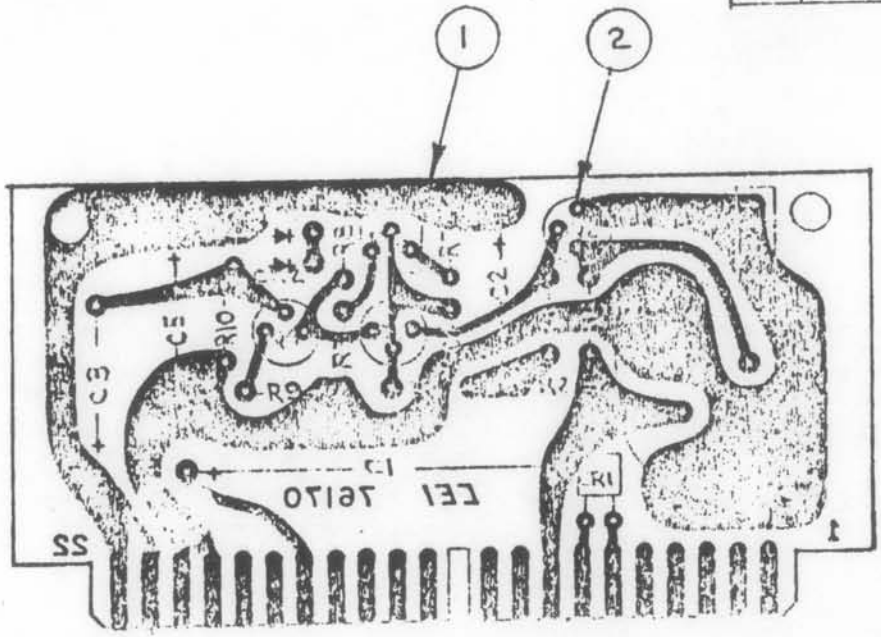
EQUIPMENT DESCRIPTION 76169 +12V REGULATED POWER SUPPLY (0-250ma)

DATE March 1?, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME / CODE
R7	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	280052	1	62PAR1K	73138
R8	RESISTOR, FIXED, COMPOSITION: 3.9 kΩ, 5%, 1/4W	160126	1	RC07GF392J	81349
R9	Same as R6				
R10	RESISTOR, FIXED, COMPOSITION: 220 Ω, 5%, 1/4W	160037	1	RC07GF221J	81349
R11	Same as R6				
TP1	TEST POINT	180104	1	TJ-203R	99687

REVISION			
LTR	DESCRIPTION	DATE	APP'D
A	ITEM 2 WAS 10028 DAP MILTON ROSS	6-7-65	[illegible]



NOTES:

1. SCHEMATIC REF 30732
2. INSTALL ITEM 2 UNDER Q2, Q3, & Q4.

ITEM	PART NO.	DESCRIPTION	QTY
2	7717-22 DAP	TRANSIPAD THERMALLOY	3
1	14828	PRINTED CKT BOARD	1

ORIGINAL JOB NO. 2137

UNIT	NEXT ASS'Y NO.
DRO-310	

APPROVED FOR SAMPLES

APPROVED FOR PRODUCTION

COMMUNICATION CEI ELECTRONICS, INC.
ROCKVILLE, MARYLAND
MANUFACTURER'S CODE NO. 14632

-12V REGULATED POWER SUPPLY (0-250 MA.)
PRINTED CKT ASS'Y

MATERIAL: ----------

FINISH: FLOW SOLDER

D 2-23-68	C	SCALE: FULL	REV.
DWG. LIST		14828	A

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED.
FRACTIONS ±.015
2 PLACE DECIMALS ±.010
3 PLACE DECIMALS ±.005
4 PLACE DECIMALS ±.0005
ANGLES ±30'

PARTS LIST
PAGE 1 OF 3

76170 — TYPE NUMBER

-12V REGULATED POWER SUPPLY — TITLE

30732 — SCHEMATIC

ORIGINAL JOB NO.			
USED ON	APPLICABLE PREFIX	USED ON	APPLICABLE PREFIX
DRO-310	A6		
FE-26	A5		
MP-101-5	A7		
DRX-1000	A3		
DRX-1000-1	A3		
DRO-312	A4		
DRO-310	A6		
SD-104	A7		
DRX-1000-2	A3		
VM-101	A3		
DRX-308	A5		
FE-26-1	A5		

ENGINEER — DATE

APPROVED FOR SAMPLE

ENGINEER [signature] DATE 28 Nov. 68

APPROVED FOR PRODUCTION

[signature] DATE 3/28/69

PREPARED BY

REVISIONS

ECN	LTR	DATE	ECN	LTR	DATE	ECN	LTR	DATE
Updated & Re-Released		11/17/70						
7047	A	1-8-71						

EQUIPMENT DESCRIPTION 76170 -12V REGULATED POWER SUPPLY

DATE March 17, 1968

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME / CODE
C1	CAPACITOR, ELECTROL., ALUMINUM: 200 μF, -10+75%, 50V	250049	1	39D207G050FJ4	56289
C2	CAPACITOR, ELECTROL., ALUMINUM: 10 μF, -10+75%, 50V	250033	1	30D106G050CB2	56289
C3	CAPACITOR, ELECTROL., ALUMINUM: 10 μF, -10+75%, 25V	250032	1	30D106G025BB2	56289
C4	CAPACITOR, DIPPED MICA: 200 pF, 5%, 500V	120103	1	CM05FD201J03	81349
C5	CAPACITOR, ELECTROL., TANTALUM: 47 μF, 10%, 20V	120070	1	CS13BE476K	81349
CR1	DIODE	140122	1	MDA950A-3	04713
CR2	DIODE	190108	1	1N754A	80131
CR3	DIODE	190099	1	1N462A	80131
Q1	TRANSISTOR	220152	1	2N3055	80131
Q2	TRANSISTOR	220166	3	2N4037	80131
Q3	Same as Q2				
Q4	Same as Q2				
R1	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	160045	1	RC07GF471J	81349
R2	RESISTOR, FIXED, COMPOSITION: 6.8 kΩ, 5%, 1/4W	160132	2	RC07GF682J	81349
R3	Same as R2				
R4	RESISTOR, FIXED, COMPOSITION: 150 kΩ, 5%, 1/4W	160087	1	RC07GF154J	81349
R5	RESISTOR, FIXED, COMPOSITION: 2.2 kΩ, 5%, 1/4W	160120	3	RC07GF222J	81349
R6	RESISTOR, VARIABLE, FILM: 1 kΩ, 30%, 1/2W	280152	1	62PAR1K	73138

EQUIPMENT DESCRIPTION 7617U -12V REGULATED POWER SUPPLY DATE M[illegible]ch 1[illegible], [illegible]068

BY R. Teg

SYM. NO.	DESCRIPTION	CEI Control	UNITS PER ASS'Y	VENDOR PART NO.	VENDOR NAME / CODE
R7	RESISTOR, FIXED, COMPOSITION: 3.6 kΩ, 5%, 1/4W	160125	1	RCR07G362JS	81349
R8	Same as R5				
R9	RESISTOR, FIXED, COMPOSITION: 220 Ω, 5%, 1/4W	160037	1	RC07GF221J	81349
R10	Same as R5				
TP1/	TEST POINT	180106	1	TJ-210V	99687

SECTION VI

SCHEMATIC DIAGRAMS

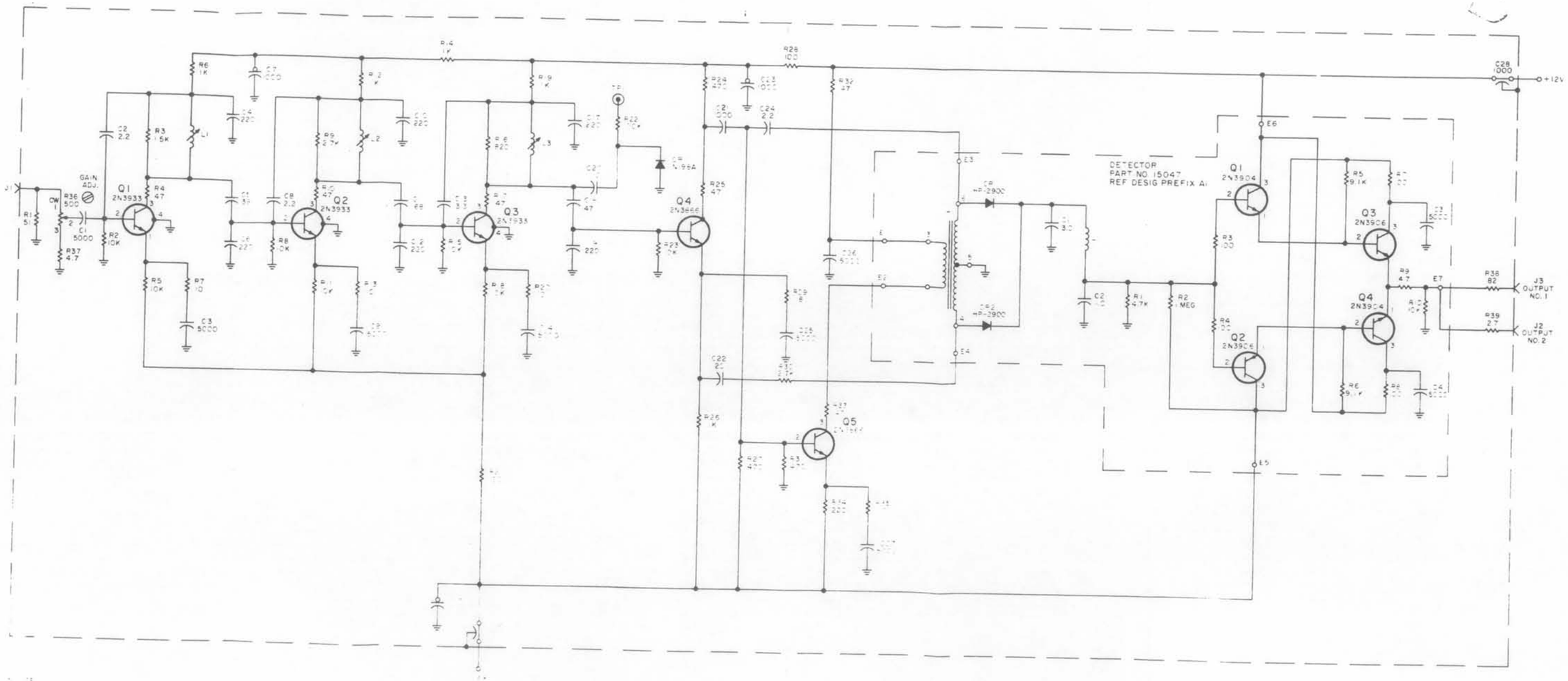
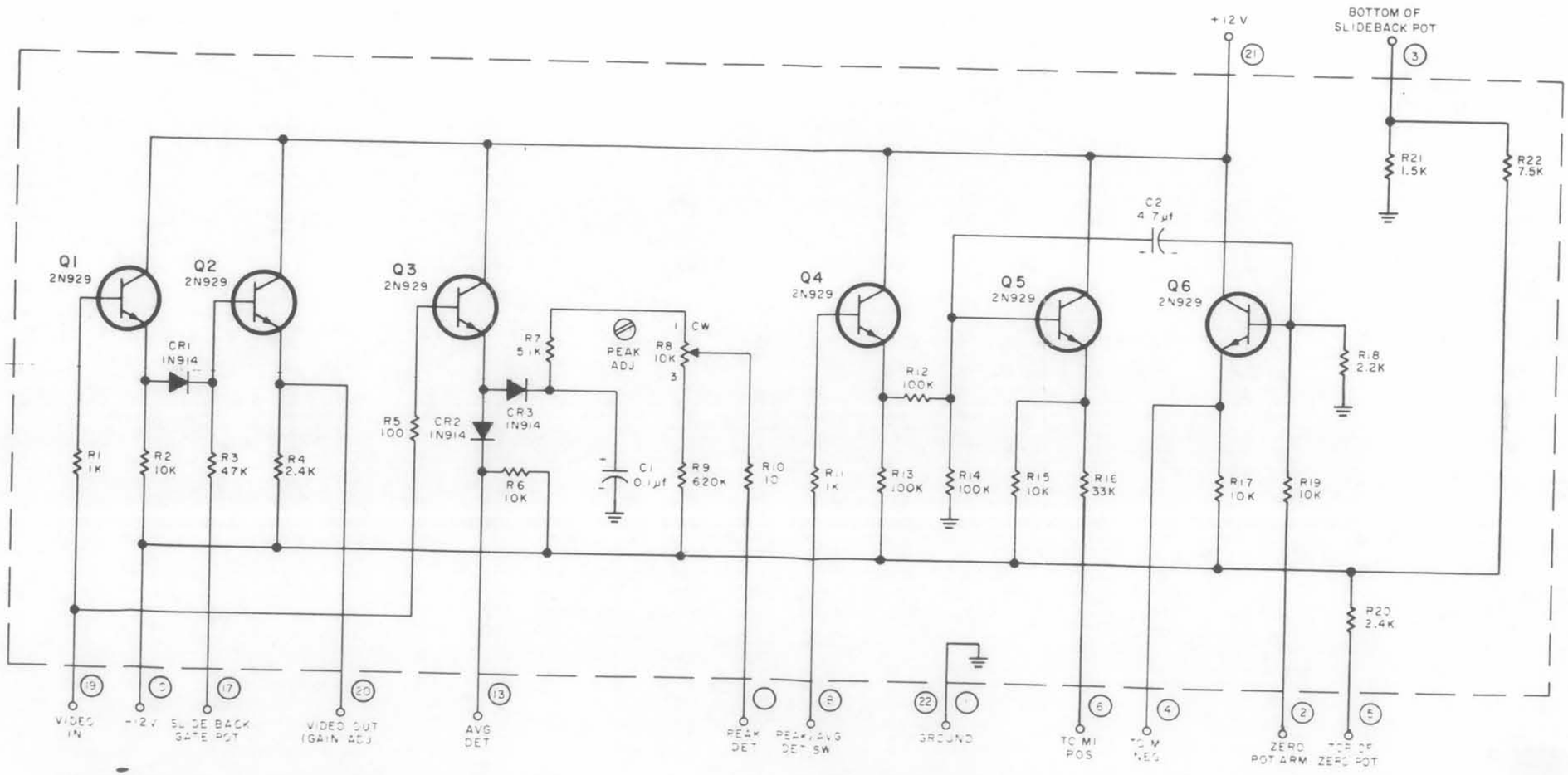
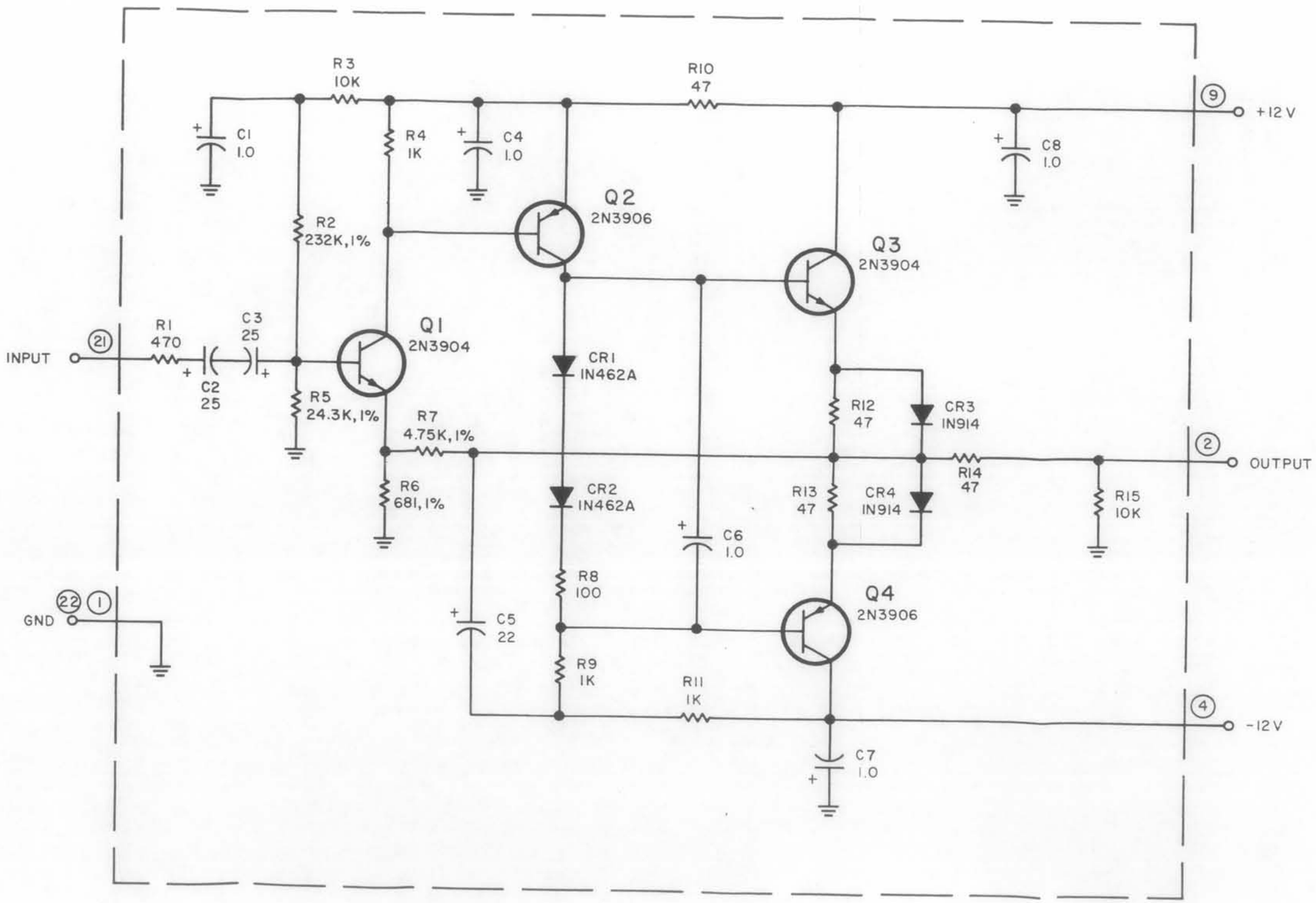


Figure 6-1. Part 15047 Detector (A1), Schematic Diagram



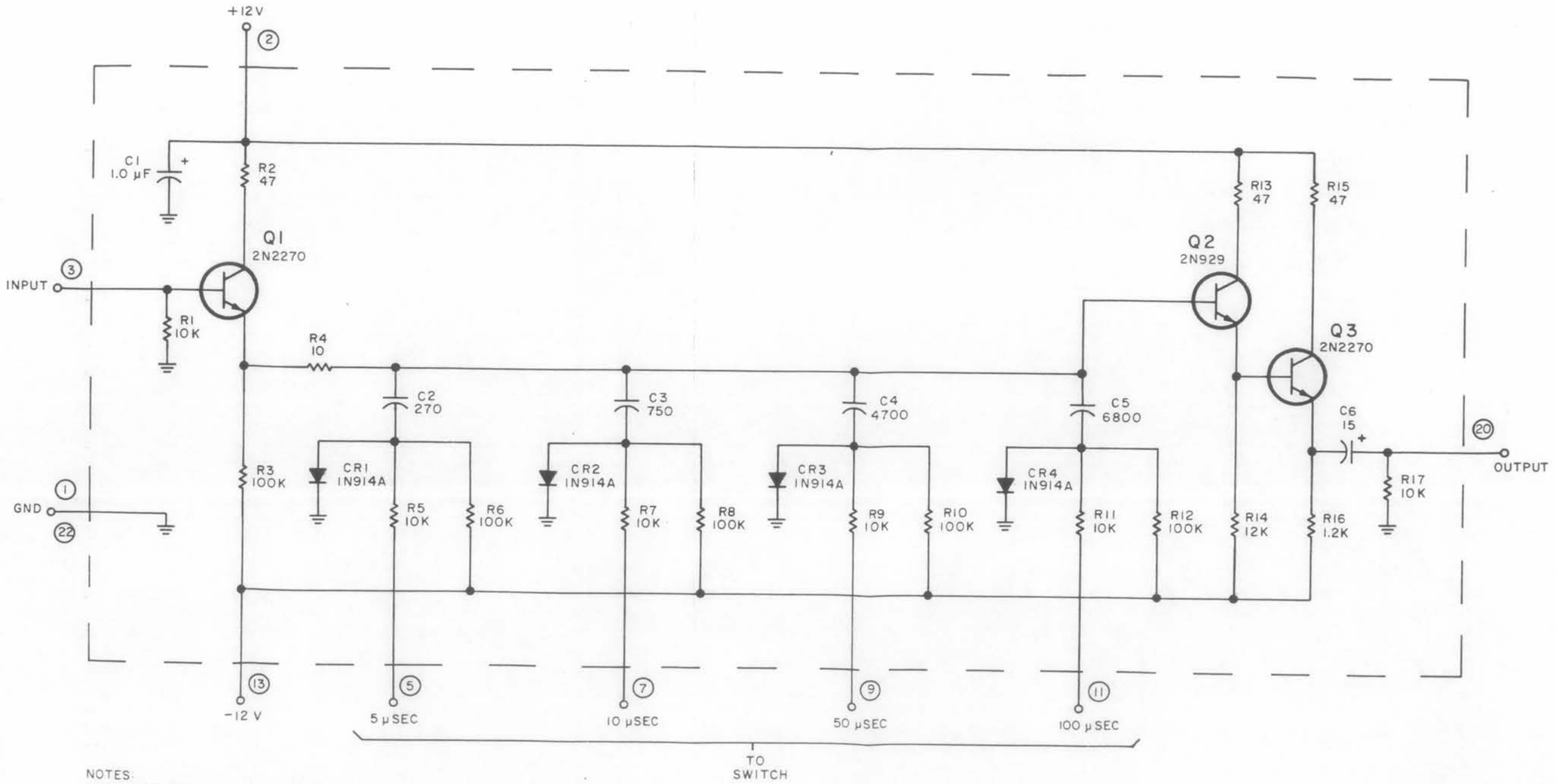
NOTES
1. UNLESS OTHERWISE SPECIFIED
   RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
2. PARENTHESIZED NUMBERS ARE MODULE P/N NUMBERS
3. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETER
   CW INDICATES CLOCKWISE ROTATION OF CONTROL KNOB
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-2. Type 79499 Meter Amplifier (A2), Schematic Diagram



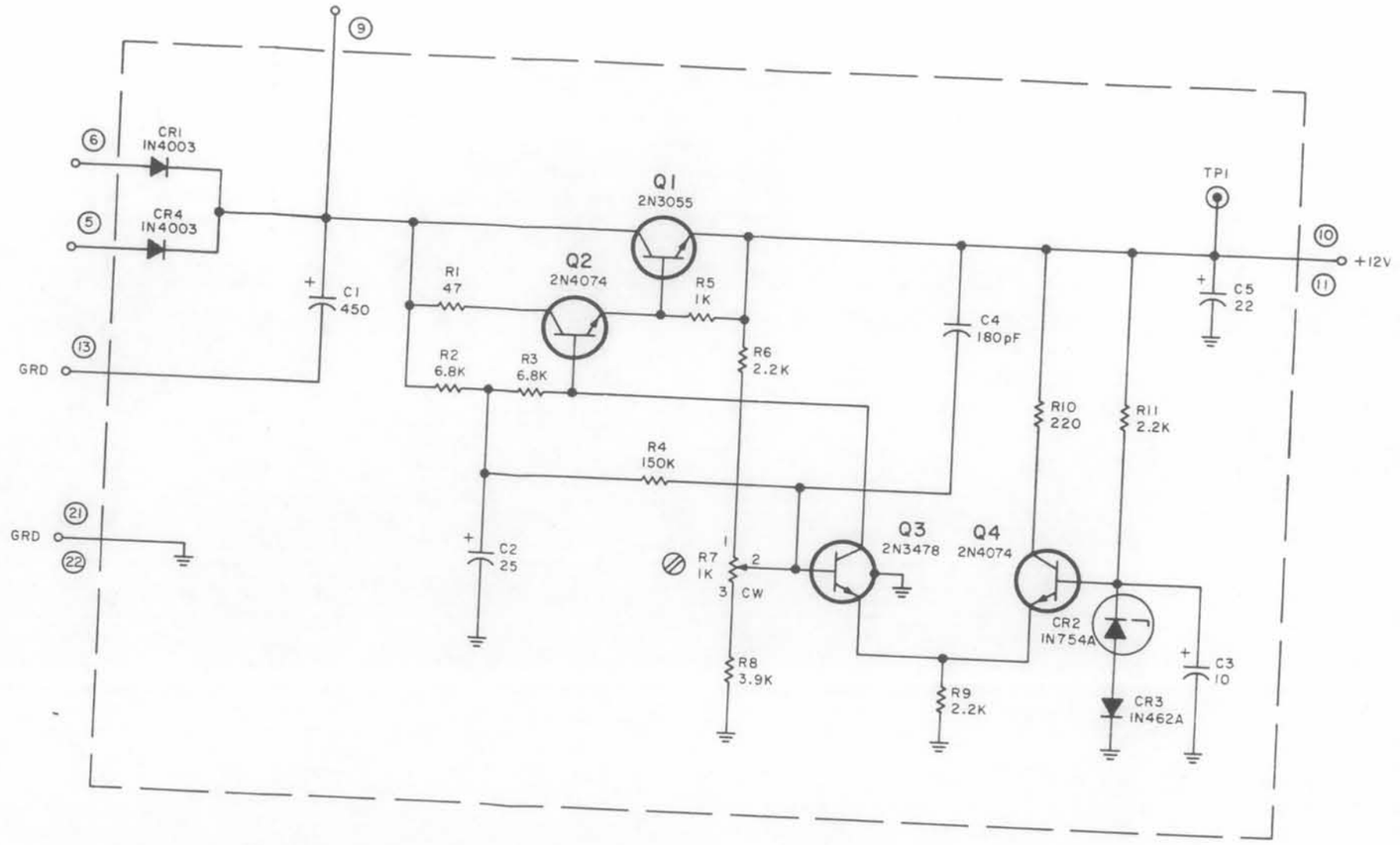
NOTES:
UNLESS OTHERWISE SPECIFIED
1. CAPACITANCE IS IN μF.
RESISTANCE IS IN OHMS ± 5%, 1/4 W.
2. ENCIRCLED NUMBERS ARE MODULE PIN NOS.

Figure 6-3. Type 7360 Video Amplifier (A3, A4), Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a. RESISTANCE IS MEASURED IN OHMS, ± 5%, 1/4 W.
   b. CAPACITANCE IS MEASURED IN µF

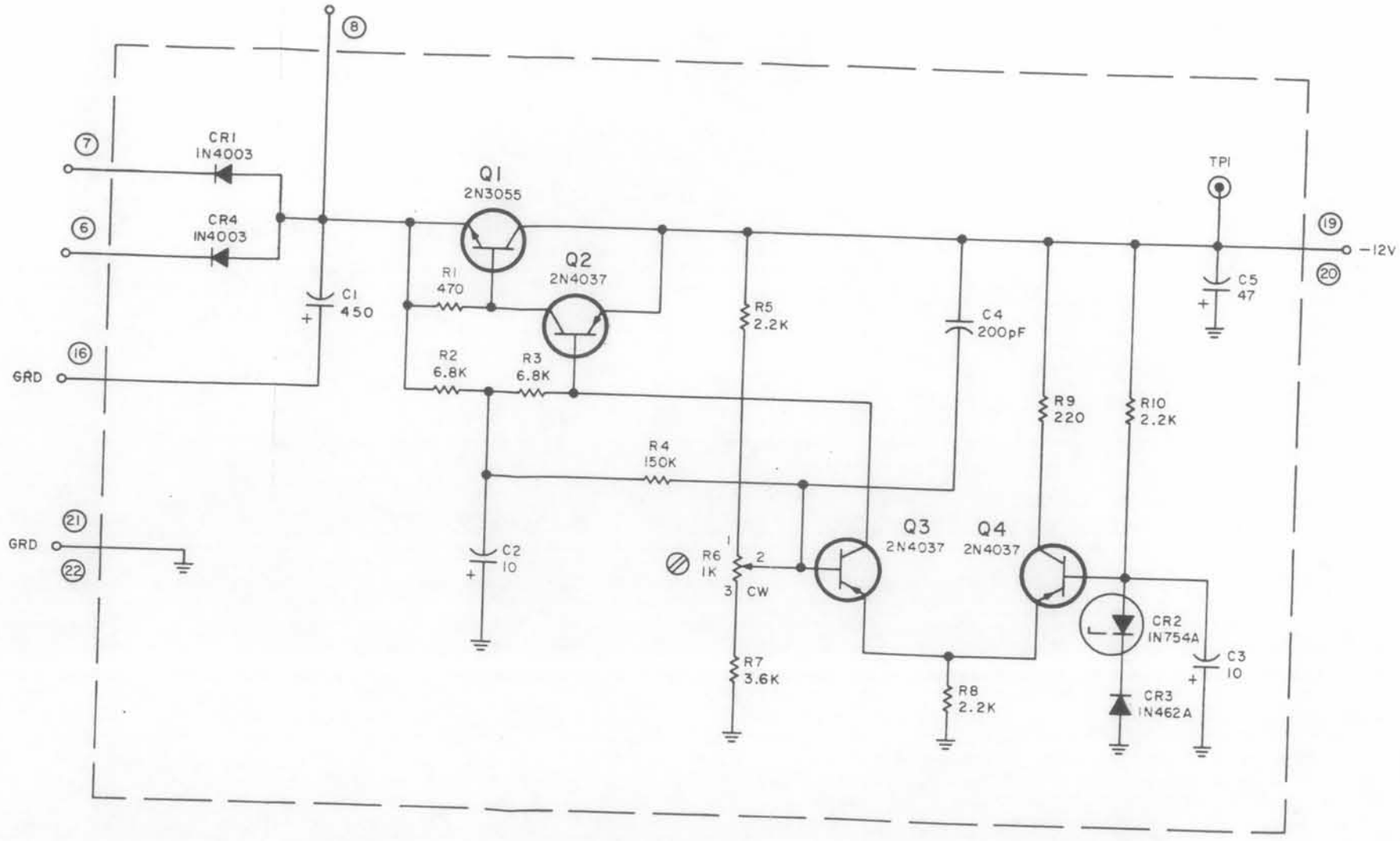
Figure 6-4. Type 79500 Pulse Stretcher (A5), Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS MEASURED IN OHMS, ± 5%, 1/4 W
   b) CAPACITANCE IS MEASURED IN μF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

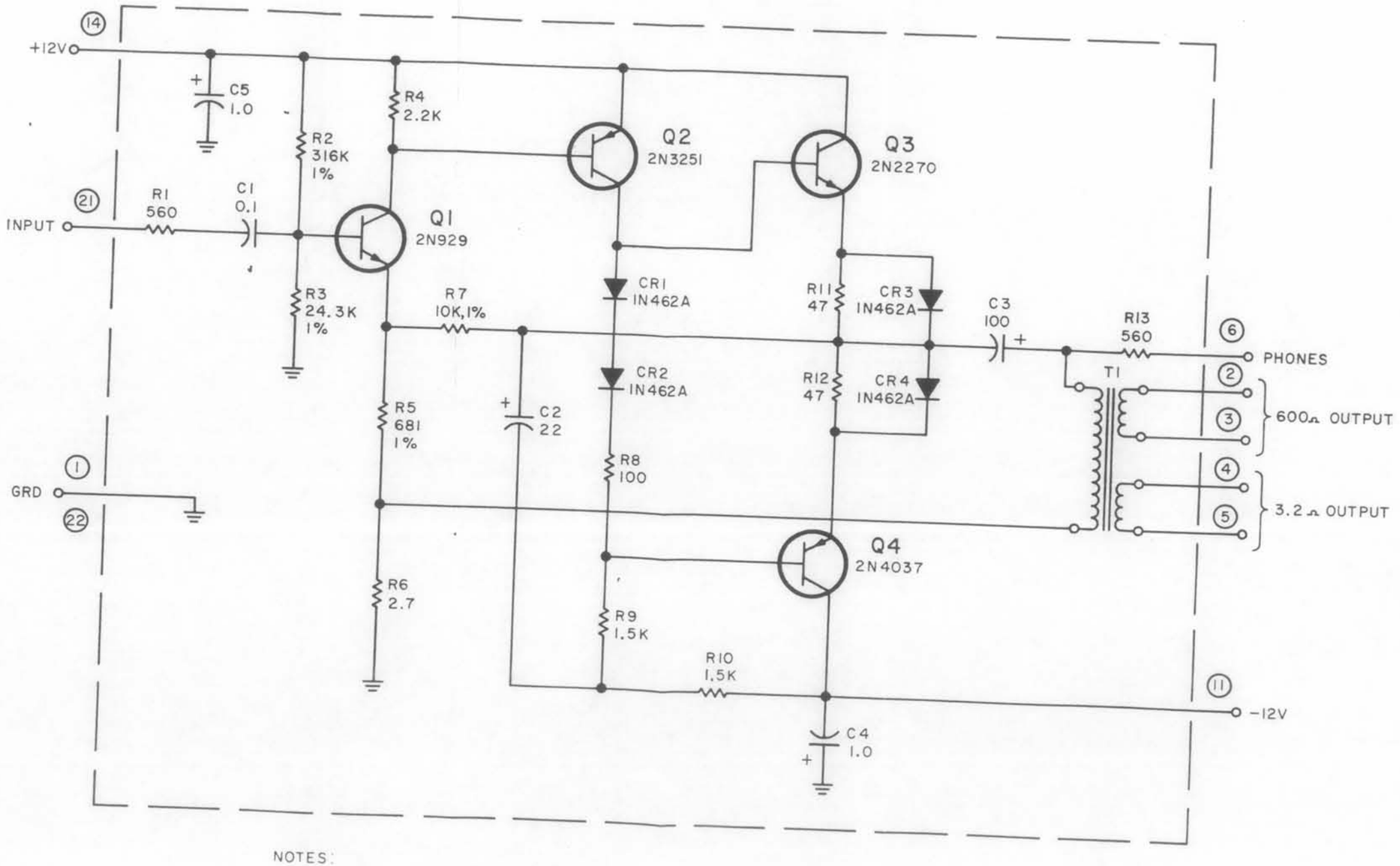
Figure 6-5. Type 76169 -12V Regulated Power Supply (A6), Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN μF
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.
3. FOLLOWING NOTATIONS ARE USED ON POTENTIOMETERS:
   CW INDICATES CLOCKWISE ROTATION
   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-6. Type 76170 -12V Regulated Power Supply (A7), Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN μF.
2. ENCIRCLED NUMBERS ARE MODULE PINS.

Figure 6-7. Type 7436 Audio Amplifier (A8), Schematic Diagram