

CHAPTER 5

SERVO AND HANDSET ATTENUATORS

5.1 INTRODUCTION

A fully expanded 580 Computer has a complement of 80 potentiometers. Of these, 70 are servo-driven, permitting rapid manual or automatic program setup. The computer is provided with a keyboard unit that permits pushbutton addressing and value entry for servo attenuators. Optional peripheral equipment may be supplied to permit pot setting from digital computers, punched paper tape, typewriter keyboards, etc. A manually operated lever on the analog control panel permits proportional control of any addressed servo pot.

The 10 handset pots may be used for any function requiring a manually set pot, or where the convenience of a servo pot is not needed.

All attenuators have a non-linear resistance in series with the wiper to avoid possible damage to the pot in the event of a patching error. This resistance has a negligible value for ordinary current levels, but increases rapidly as current through the wiper increases, preventing burn-out of the winding under excessive loading. The series resistance introduces no error into the circuit, since the pots are set under normal loading, thus taking the additional resistance into account.

5.2 TECHNICAL DATA

Resistance Value	5K
Setting Error*	±1.0 Millivolt, Maximum

5.3 THE SERVO ATTENUATOR SYSTEM

The servo attenuator system consists primarily of the motor-driven attenuators (Figure 5.1), a servo amplifier, and a digital-to-analog converter. The computer readout system energizes relays on the attenuator assemblies that connect the servo amplifier to an addressed attenuator motor; the mode control system energizes a relay permitting pots to be driven only when the computer is in the *pot set* mode**.

*This specification applies to the servo attenuator assemblies only.

**Manual control of an attenuator using the POT CONTROL lever can be performed in any mode.

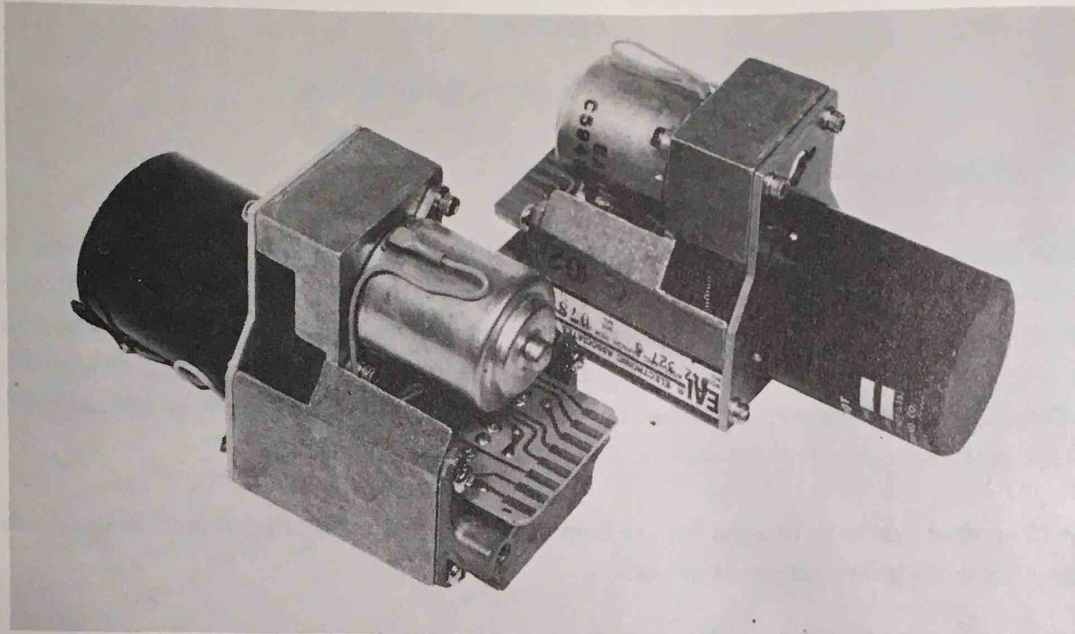


Figure 5.1. Servo Attenuators

5.3.1 Theory of Operation

The block diagram of Figure 5.2 illustrates the basic arrangement of the components included in the servo attenuator system. Enter the desired potentiometer coefficient on the DAC keyboard. The values of the resistors selected in the DAC provide a current into the amplifier that is proportional to the required analog voltage. The positive output from the DAC is connected through the digital I/O switch, located on the 0.51.0359 Address Select Card to an input of the servo amplifier.

The top of an addressed servo pot (when the computer is in the *SP* mode) is connected to positive reference. The wiper of the addressed pot is connected to the other input of the servo amplifier. The bottom of each pot (except for those in the -4 positions) is grounded. The bottom of any -4 position pot must be grounded prior to setting. (In an attempt to null, the servo drives an ungrounded pot to its highest resistance. The pot is held in this position until the CLR pushbutton is depressed and the pot is grounded.) The output of the servo amplifier is a voltage having a value and polarity dependent on the difference between DAC output (the desired pot coefficient) and the voltage selected by the wiper of the pot. The servo amplifier thus provides a signal to the pot motor that drives the pot wiper in a direction to reduce the error. When the error is reduced below a preset level, a null detector circuit disconnects the servo amplifier from the pot motor and allows entry of a new pot address and value selection. During the servo slewing period, the red flood indicator, in the units value display on the DVM, is lit.

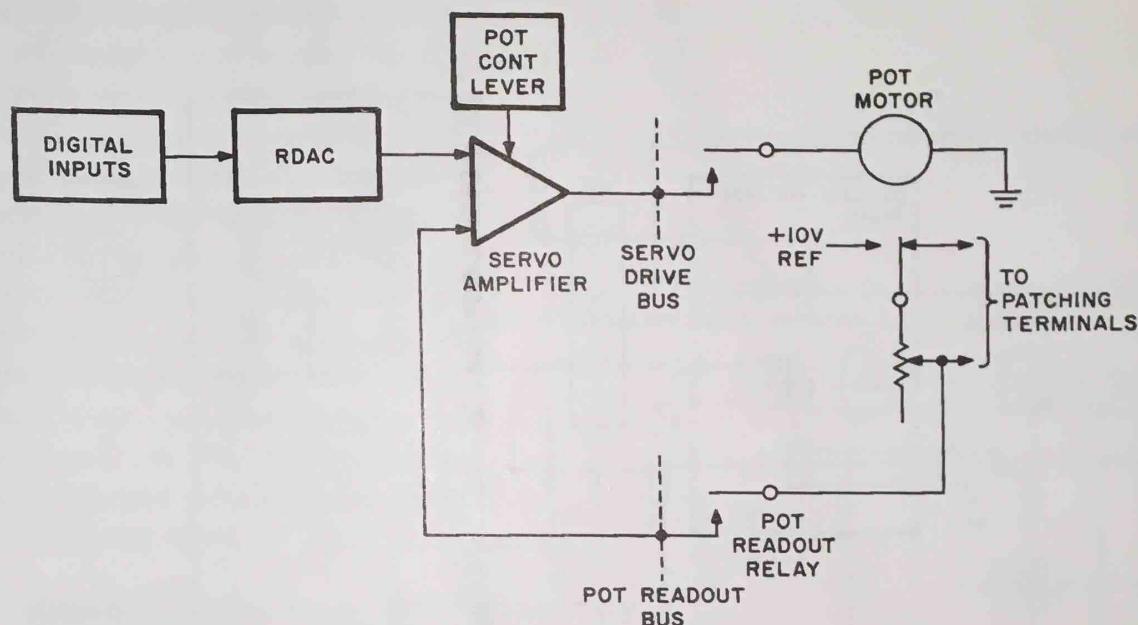


Figure 5.2. Servo Attenuator System, Basic Block Diagram

Figure 5.3 shows the circuit in more detail. To enter the desired pot coefficient it is necessary to activate the RDAC pushbutton switches. Each switch connects a precision resistor or a combination of resistors from negative reference to the input of the DAC amplifier. The value of each resistor or combination of resistors is inversely proportional to the "weight" of the activated switch. For example, the 1, 2, 4, and 8 switches connect resistors having ratios of 8000, 4000, 2000, 1000; the 10, 20, 40, and 80 switches connect resistors having ratios of 800, 400, 200, and 100, respectively, etc. Thus, the *current* provided by each resistor is directly proportional to the switch weight. The resultant output from the DAC amplifier is an analog voltage equal to the characters entered on the DAC keyboard. The output of the DAC is connected through the digital I/O switch, located on the 0.51.0359 Address Select Card to an input of the servo amplifier.

The 0.6.0677 Servo Amplifier (J1) receives an input from the DAC (pin 11), and an input from the wiper of an addressed pot (pin 12). The Servo Amplifier consists of a transformer-coupled differential input section and a direct-coupled driver section. When the SET pushbutton is depressed following the entry of data, relay K1 energizes. The contacts of this relay connect the servo amplifier input section to the driver section, and apply relay voltage to the coil of K2, the null detector circuit, the chopper oscillator, and relay K1 on the 0.51.0288 Servo Control. The Relay K2 connects the pot wiper to the input section. The chopper oscillator drives a two-pole chopper.

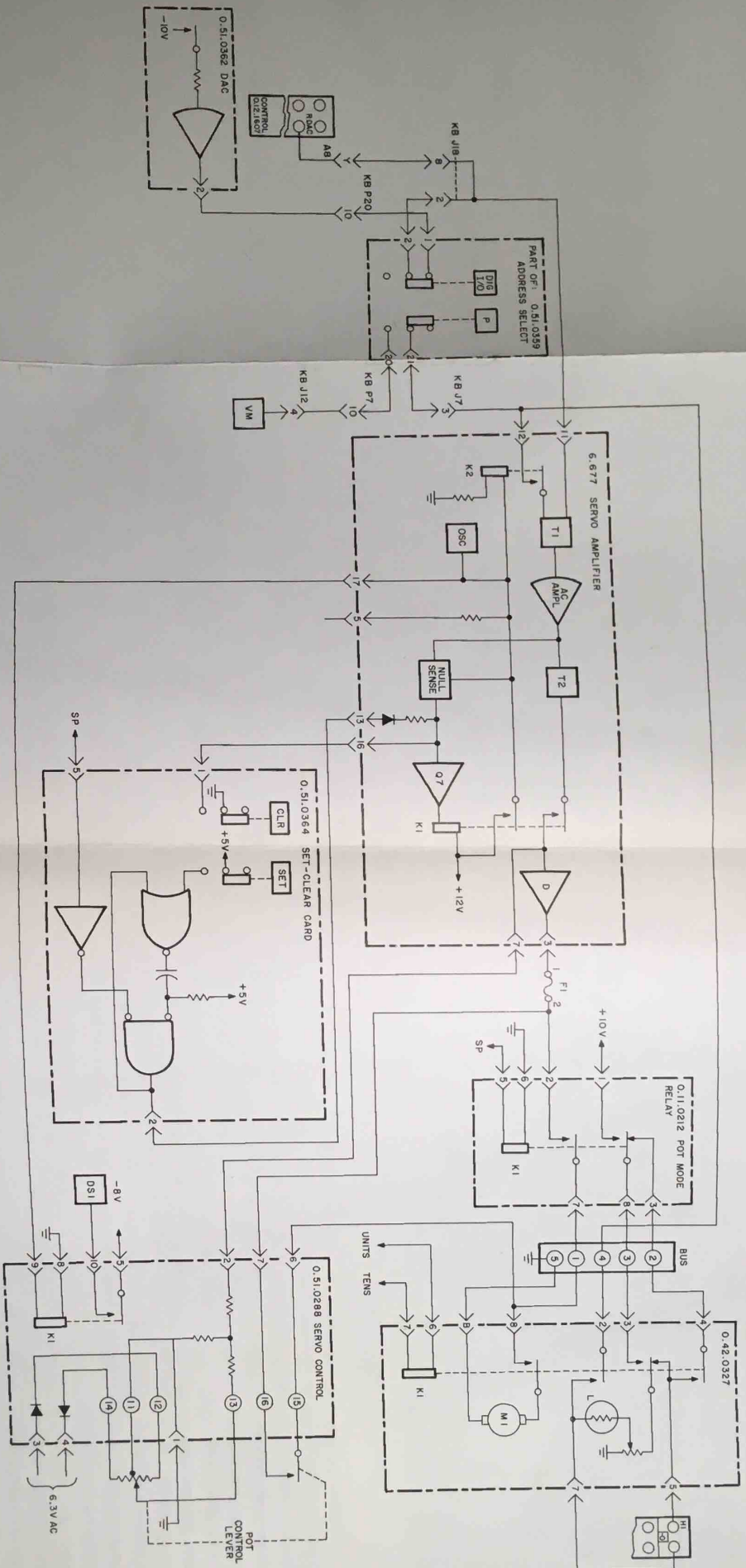


Figure 5.3.
Servo Attenuator System,
Consolidated Schematic

One pole of the chopper converts the difference voltage between the pot wiper and the DAC level from a dc signal to an ac signal. The ac signal is amplified by the input section, and the amplified ac signal at the output of this section is synchronously detected by the other pole of the chopper. The resulting pulsating dc signal is amplified further by the output section, and connected through relay K1 on the 0.11.0212 Pot Mode Relay Card (energized in the *SP* mode) to the pot motor drive bus (bus 20-1). Relay K1 on the addressed 0.42.0327 DAS Attenuator Assemblies is energized, coupling the servo amplifier output signal to the pot motor. As the motor drives the pot wiper, the difference signal into the servo amplifier becomes progressively smaller. When the voltage at the pot wiper is within about 1 millivolt of the level from the DAC output, the null sensing circuit causes K1 on the servo amplifier card to de-energize. When K1 de-energizes, the input to the servo amplifier driver section is removed. After the contacts of K1 open, K2 de-energizes, removing the pot wiper signal from the servo amplifier. Since the contacts of K1 open before K2 can de-energize, the transient signal that occurs when K2 de-energizes does not affect the pot motor.

5.4 HANDSET ATTENUATORS

The handset attenuators are similar to the servo set attenuators in that they are addressed and read out in the same manner. The two types of units differ in that setting the servo set pots is almost an automatic procedure where the handset pots are set-up using a manual method. Two methods of setting the handset pots are given below. To set the handset pots using a DVM for reading the pot coefficient, proceed as follows:

1. Place the computer in the *SP* mode.
2. Address the desired pot (P00 through P09).
3. Ground the low terminal.
4. Adjust the precision knob on the selected pot until the DVM reads out the desired pot coefficient.
5. Lock the knob to prevent accidental misadjustment.

This completes the pot setting using a DVM for readout purposes.

If a DVM is not available, the handset pots have to be set using a null voltage method. The procedure for this method is given below.

1. Place the computer in the *SP* mode.
2. Address the desired pot (P00 through P09).
3. Place the VM FUNCTION switch in the P SEL position.
4. Place the VM RANGE switch in the NULL position.

5. The desired pot and the VM are now connected in the configuration shown in Figure 5.4.
6. Set the RDAC pushbuttons for the desired pot coefficient.
7. Adjust the desired pot until the VM nulls (reaches zero).
8. Lock the pot knob to prevent accidental misadjustment.

This completes the null voltage method of setting pot coefficients.

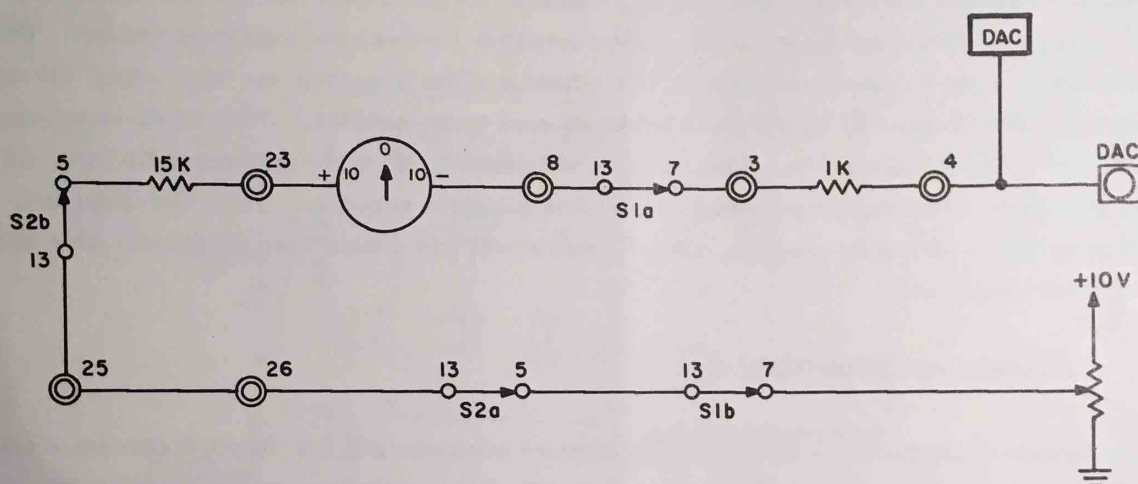


Figure 5.4. Handset Attenuator Null Voltage Circuit

5.5 CIRCUIT DESCRIPTION

5.5.1 0.6.0677 Servo Amplifier Card

Refer to Schematic D006 0677 0S for the following description. Transistors Q6 and Q7 from the servo start and null detection circuit. When the SET pushbutton is depressed following the entry of value data, a high Start pulse is provided to pin 13 of the card. This high forward biases Q7, energizing relay K1. When K1 energizes, contacts 3 and 4 of the relay connect the servo pre-amplifier (transistors Q3-Q5) to the servo output section (transistors Q8-Q13). Another set of contacts on K1 connects +12 volt relay power to: 1) the coil of relay K2; 2) the chopper oscillator; 3) to the Q6 stage of the null detector circuit; 4) acts as a null indicator to an external device in Hybrid operation; and 5) to Relay K1 on the 0.51.0288 Servo Control Card.

When relay K2 energizes, the signal at the wiper of the addressed pot is connected through R1 to the center-tap of transformer T1. The chopper oscillator (Q1-Q2) is a 400-cycle push-pull oscillator that drives the arms of chopper D1. The reference input from the DAC is connected, via the arm of the chopper, to alternate terminals of T1 (1, 3). The resulting signal at the secondary of T1 is an alternating voltage with an amplitude proportional to the difference between

the existing pot wiper voltage and the voltage from the DAC. The error signal is amplified by common-emitter stages Q3 and Q4. Resistor R9 together with resistor R11 provides feedback around the Q3-Q4 stages. Transistor Q5 is an emitter-follower, providing an output to the primary of T2, and through the wiper of R13 to the null detector circuit. Capacitor C6 and resistor R8 provide feedback around the Q4-Q5 stages.

The pulsating signal at the wiper of R13 is coupled through R14 and C10 to a rectifier-filter circuit consisting of CR5, CR6, and C11. The resulting negative bias at the base of Q6 keeps this stage cut off as long as the error exceeds a preset value. When Q6 is cut off, Q7 remains conducting after the end of the initial Start pulse, thus keeping K1 energized.

The pulsating signal at the secondary of T2 is coupled to the base of Q8a by the arm (pin 2) of chopper D1. The arms of chopper D1 are driven synchronously by the chopper coil. Thus, at the instant when pins 7 and 8 of the chopper are connected together, pins 1 and 2 of the chopper are also connected together. The pulsating voltage at pin 2 of the chopper has a polarity dependent on the difference between the DAC level and the level at the wiper of the pot. If the level from the DAC is more positive than the voltage from the pot, the voltage at pin 2 of the chopper is a positive pulsating voltage. Conversely, if the level from the DAC is less than the voltage from the wiper of the pot, the signal at pin 2 of the chopper is a negative pulsating voltage.

In either case, the signal is amplified by Q8a, and coupled to the base of Q9. The signal is further amplified by Q9, and coupled to the bases of Q10 and Q12. The R23-C13 network provides feedback for the Q9 stage. Diodes CR12 and CR13 establish the correct difference in bias levels for Q10 and Q12 without attenuating the signal. The Q10-Q11 stages are compound-connected and do not provide phase inversion, while the Q12-Q13 stages are both common-emitter stages, also effectively providing no phase inversion. The signal at the junction of Q11 and Q13 is thus a highly amplified pulsating dc signal that is connected to the motor of the addressed pot. Resistors R24 and R25 provide a feedback signal from the output of the servo amplifier to the base of Q8b. Since Q8a and Q8b are differentially coupled by common-emitter resistor R21, the amplitude of the feedback voltage at the wiper of R24 controls the overall gain of the servo amplifier.

The signal at the output of the servo amplifier drives the pot motor in the direction that reduces the error signal. As the pot wiper approaches the voltage set in the DAC, the error signal decreases until the reverse bias on Q6 is not sufficient to keep the transistor cut off. As Q6 begins to conduct, its collector goes toward ground, cutting off Q7. When Q7 cuts off, relay K1 de-energizes, disconnecting the pre-amplifier from the output section. The other contacts of K1 (5, 6) remove power from the null detector circuit, the chopper oscillator, relay K2, and the DVM red flood relay on the servo control card.

If for any reason the servo fails to null (for example, if no pot is installed in the address position), or if an ungrounded pot became hung up, the CL (clear) key should be depressed. When this pushbutton is depressed, pin 16 of the servo amplifier card is grounded. The ground at this point cuts off Q7, exactly as if a null has been reached.

When the POT CONTROL lever is used to set a pot manually, the input signal is connected to pin 7 of the card, bypassing the pre-amplifier section. The input signal at this point is derived from the 6.3 volt chopper supply, half-wave rectifier by CR1 or CR2 on the 0.51.0288 Servo Control Card. The polarity of the signal depends on the *direction* that the control lever is moved; the amplitude is determined by the *amount* that the lever is moved from the center (off) position. Figure 3.5 illustrates this circuit in more detail.

5.5.2 0.51.0364 Set-Clear Card

The 0.51.0364 SET-CLEAR card consists of a single-shot circuit that is activated by the SET pushbutton. The output of the single-shot is connected to one input of an AND gate. The second AND gate input is connected to the SP bus. In this manner, the output of the single-shot is inhibited in any mode other than SP.

When the SET pushbutton is depressed, pin 1 of OR gate 1a (located on the 0.51.0364 Set-Clear Card) goes high, forcing the output (pin 3) low. The low at the OR gate output essentially grounds the positive end of capacitor C1 and allows it to charge. When C1 starts to charge, pin 6 of AND gate 1a goes low and the gate output goes high. (The input to pin 7 of the AND gate is held low as long as the computer is in the SP mode.) The AND gate output pulse is connected to pin 13 of the 0.6.0677 Servo Amplifier energizing relay K1. The output of the gate is also connected to pin 2 of OR gate 1a to ensure that once the pushbutton is released the output of the OR gate remains low until the capacitor is fully charged. Once the capacitor is charged, pin 6 of AND gate 1a goes high and the output returns to a low level.

5.6 MAINTENANCE AND TROUBLESHOOTING

5.6.1 The Servo Amplifier

The servo amplifier is provided with controls for: 1) balance; 2) gain; and 3) null sensitivity. These controls are factory set and should not require adjustment for long periods of time. However, if the servo system seems sluggish or "hunts", adjustment is required.

To set the servo amplifier controls, perform the following steps in the order listed.

5.6.1.1 *Balance.* Balancing the servo amplifier is most easily accomplished by two people. Proceed as follows:

1. Place the computer in the *SP* mode. Depress the **SERVO** pushbutton on the amplifier balance select panel, located on the MDFG setup panel.
2. Adjust R20, the balance control on the servo amplifier card (see Figure 5.5), until the monitor meter indicates a null.

5.6.1.2 *Gain Adjustment.* To set the servo gain, proceed as follows:

1. Perform the steps in Paragraph 5.6.1.1. Leave the computer in the *SP* mode and the **AMPLIFIER BALANCE SELECT** switch in the **SERVO** position.
2. Set the null sensitivity control R13 (Figure 5.5) to mid-range.
3. Select any handset attenuator (P00 to P09) to ensure that the servo output has no load.
4. Remove the coax lead to terminal 2 of the 0.51.0200 Servo Control Card and reconnect to the RDAC output located on the 0.12.1607 Control Tray.

CAUTION

Care should be taken when removing or replacing the coax wire to prevent breaking the edge connector.

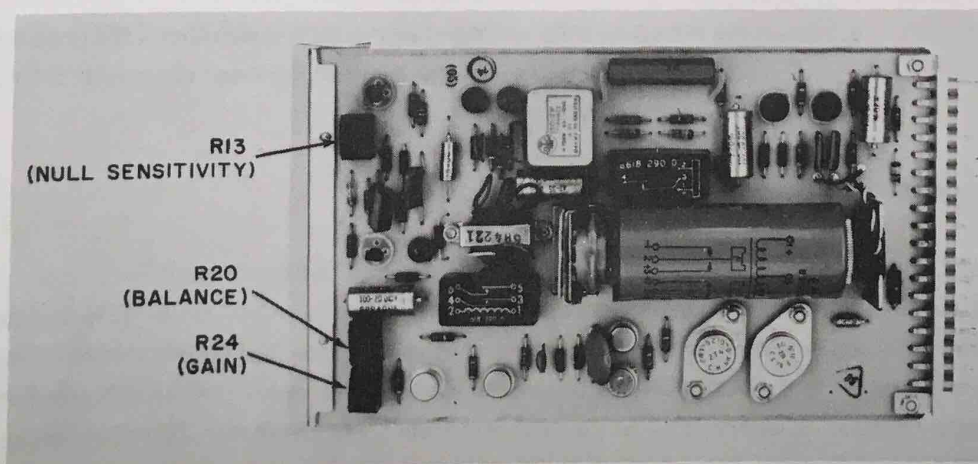


Figure 5.5. Servo Amplifier Card Control Locations

5. Set the RDAC to 2000.
6. Connect a meter to the servo output and adjust gain control R24 (Figure 5.5) for +9.0 volts.
7. Remove the coax lead from the RDAC output and connect it to ground.
8. Using a Hewlett-Packard 130C oscilloscope (or equal) check the servo output voltage. The output should read less than 1 millivolt pk-pk if the gain control has been properly set. (Note: When measuring the output disregard the TDVM clock pulses which appear on the scope.)
9. Remove the coax lead from ground and reconnect it to pin 2 of the servo control card.

This completes the gain adjustment.

5.6.1.3 Null Sensitivity Adjustment. The sensitivity of the null detection circuit must be adjusted after the servo gain is completed to assure that the attenuators are set correctly and that the servo system disconnects properly.

1. Select one of the handset attenuators (P00 to P09) and set to +5.000 volts.
2. Set RDAC to 5001, and depress the SET pushbutton.
3. Rotate the sensitivity control, R13 (Figure 5.5), until the red flood is visible on the DVM readout display.
4. Slowly adjust R13 until the red flood disappears.
5. Reset the RDAC to 5002 and depress the SET pushbutton. If the sensitivity adjustment is correct, the red flood should light and remain lit until the RDAC is Reset to 5001.

This completes the servo sensitivity adjustment.

5.6.1.4 Troubleshooting. If trouble is suspected in the servo amplifier, it can easily be isolated to the pre-amplifier section or the output section. If a pot can be slewed with the POT CONTROL lever but not with the normal pushbutton system, the output section is functioning correctly. If the POT CONTROL lever is inoperative, check the ± 14 volt levels with the monitor meter. If either level is significantly incorrect, check the ± 15 volt fuses on the 0.10.0354 Power Supply.

If the ± 14 volt levels are correct, install the 0.6.0677 Servo Amplifier Card on an extender and isolate the trouble with an oscilloscope. Apply an input from the POT CONTROL lever while checking the output section (this requires two people).

If the output section is functioning normally, but the servo fails to set pots with the pushbutton system, the trouble may be in either the null detection or the pre-amplifier circuit. Assure that a high Start command appears at pin 13 of the card when the SET pushbutton is depressed for the second time. Then make point-to-point signal checks to locate the trouble.

APPENDIX 1

REPLACEABLE PARTS LISTS

This appendix contains Replaceable Parts Lists for the equipment described in this chapter. In each case, a brief description of the part, the EAI part number and, where applicable, a reference symbol (schematic designation) is included. To enable a particular sheet to be readily located, an index precedes the individual replaceable parts lists.

The category column indicates the availability of each part so that a replacement can be obtained as quickly as possible.

Category "A" - The parts in category "A" are standard electronic items that are usually available from any commercial electronic supplier.

Category "B" - The parts in category "B" are proprietary items that are available only from EAI.

CAUTION

If proprietary items are replaced with items obtained from other sources, EAI cannot assume responsibility for a unit not operating within its published specifications.

ORDERING INFORMATION

To expedite your order for replacement parts the procedures below should be followed:

1. Specify the EAI part number and description of the part required. The model number and serial number of the next higher assembly should also be included.

NOTE

EAI is currently revising the part numbering system. All parts effected by this revision are identified using the new and the old number (the number in parenthesis). All parts should be ordered using the new number. The old number is provided to cross reference parts that may still be identified physically, or in other publications by that number.

2. When ordering complete assemblies (networks, printed circuit cards, etc.), specify the model and serial numbers of the equipment the assembly is to be used with. If possible, include the purchase order number or the EAI project number of the original equipment purchased.
3. When ordering expansion components, note if mounting hardware is required. If hardware is needed, add to the purchase order the statement "INCLUDING MOUNTING HARDWARE".

NOTE THAT EAI RESERVES THE RIGHT TO MAKE PART SUBSTITUTIONS WHEN REQUIRED. EAI GUARANTEES THAT THESE SUBSTITUTIONS ARE ELECTRICALLY AND PHYSICALLY COMPATIBLE WITH THE ORIGINAL COMPONENT.

PARTS LIST INDEX

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ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	C1,10	Capacitor, Fixed, Ceramic: 2.2 uf $\pm 20\%$, 25V (Sprague 5C15 or equal)	00 511.6225-4 (00 515.0240-0)	A
2	C2	Capacitor, Fixed, Plastic: 470 nf $\pm 10\%$, 80V (Sprague 192P4749R8 or equal)	00 521.1286-0	A
3	C3,4	Capacitor, Fixed, Ceramic: 470 nf $\pm 20\%$, 25V (Sprague 5C11 or equal)	00 515.0190-0	A
4	C5,8,12	Capacitor, Fixed, Electrolytic: 100 uf $\pm 20\%$, 20V (Sprague 150D or equal)	00 517.1107-3 (00 516.0270-0)	A
5	C6,13	Capacitor, Fixed, Electrolytic: 470 nf $\pm 10\%$, 600V (Cornell-Dubilier BYZ601ZU471K or equal)	00 516.0272-0	A
6	C7	Capacitor, Fixed, Electrolytic: 47 uf $\pm 20\%$, 35V (Sprague 150D or equal)	00 517.1476-4	A
7	C9	Capacitor, Fixed, Electrolytic: 10 uf $\pm 20\%$, 35V (Sprague 150D or equal)	00 517.1106-4 (00 516.0385-0)	A
8	C11,14	Capacitor	00 516.0264-0	B
9	C15,17,18	Capacitor, Fixed, Ceramic: 20 nf $+60\%$ -40% , 150V (Centralab DDM-203 or equal)	00 515.0180-0	A
9a	C16	Capacitor, Fixed, Ceramic: 120 pf $\pm 5\%$, 200V (Erie 835 or equal)	00 511.1121-2	A
10	CR1,2,9	Diode (ITT-G187 or equal)	00 614.0043-0	A
11	CR3,4,5,6,7 10,12,13	Diode	00 614.0007-0	B
12	CR8	Stabistor	00 648.0040-0	B
13	D1	Chopper	00 530.0072-0	B
14	K1	Relay	00 618.0299-0	B
15	K2	Relay	00 618.0209-0	B
16	L1	Coil	00 538.0036-0	B
17	P1	Connector	00 542.1371-0	B

*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

SERVO AMPLIFIER

MODEL NO.

0.6.0677

Sh. 1 of 4 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
18	Q1,2	Transistor: 2N3567	00 686.0236-0	A
19	Q3,4,6	Transistor	00 686.0257-0	B
20	Q5,7	Transistor	00 686.0229-0	B
21	Q8	Transistor: (GE 12A8 or equal)	00 686.0169-0	A
22	Q9,12	Transistor	00 686.0108-0	B
23	Q10	Transistor	00 686.0165-0	B
24	Q11	Transistor	00 686.0210-0	B
25	Q13	Transistor: 2N3740	00 686.0310-0	A
26	R1	Resistor, Fixed, Composition: 33K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0333-0	A
27	R2	Resistor, Fixed, Composition: 10K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0103-0	A
28	R3,4	Resistor, Fixed, Composition: 3K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0302-0	A
29	R5,11,25,30	Resistor, Fixed, Composition: 47 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0470-0	A
30	R6	Resistor, Fixed, Composition: 10 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0100-0	A
31	R7	Resistor, Fixed, Composition: 15K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0153-0	A
32	R8	Resistor, Fixed, Composition: 2K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0202-0	A
33	R9	Resistor, Fixed, Composition: 100K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0104-0	A
34	R10,17	Resistor, Fixed, Composition: 5.6K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0562-0	A

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UNIT TITLE

SERVO AMPLIFIER

MODEL NO.

0.6.0677

Sh. 2 of 4 Sh.

DATE 10 / 10 / 67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
35	R12	Resistor, Fixed, Composition: 910 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0911-0	A
36	R13	Resistor, Variable, Wirewound: 500 ohms, 1W (Int. Resistance Co. 106-2 or equal)	00 642.0685-0	A
37	R14	Resistor, Fixed, Composition: 270 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0271-0	A
38	R15	Resistor, Fixed, Composition: 470K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0474-0	A
39	R16	Resistor, Fixed, Composition: 4.7K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0472-0	A
40	R18	Resistor, Fixed, Composition: 18 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0180-0	A
41	R19	Resistor, Fixed, Composition: 330 ohms $\pm 5\%$, 1/2W (Allen-Bradley EB or equal)	00 626.0331-0	A
42	R20	Resistor, Variable, Wirewound: 200 ohms $\pm 5\%$, 1W (Int. Resistance Co. Type 106-2 or equal)	00 642.0733-0	A
43	R21	Resistor, Fixed, Composition: 3.3K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0332-0	A
44	R22,23	Resistor, Fixed, Composition: 470 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0471-0	A
45	R24	Resistor, Variable, Wirewound: 1K ohms $\pm 5\%$, 1W (Int. Resistance Co. Type 106-2 or equal)	00 642.0708-0	A
46	R26	Resistor, Fixed, Composition: 2.7K ohms $\pm 5\%$, 1/2W (Allen-Bradley EB or equal)	00 626.0272-0	A
47	R27,28	Resistor, Fixed, Composition: 2.7K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0272-0	A

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UNIT TITLE

SERVO AMPLIFIER

MODEL NO.

0.6.0677

Sh.3 of 4 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
48	R29	Resistor, Fixed, Composition: 10 ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0100-0	A
49	T1	Transformer	00 684.0220-0	B
50	T2	Transformer	00 684.0221-0	B
51	XD1	Socket, Tube: 9 Contacts (Elco Corp. 05-4008 or equal)	00 650.0075-0	A
52	XQ1,2,5,7, 9,10	Socket, Transistor: 3 Contacts (Augat 8069-1G1 or equal)	00 650.0121-0	A
53	XQ3,4,6	Socket	00 650.0162-0	B
54	XQ8	Socket, Transistor: 6 Contacts (Augat 8058-1G33 or equal)	00 650.0148-0	A

NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

SERVO AMPLIFIER

MODEL NO.

0.6.0677

Sh. 4 of 4 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	B1	Motor	00 594.0085-0	B
2	R2	Potentiometer	00 642.0687-0	B
<p style="text-align: center;"><u>NOTE</u></p> <p>If replacement of either the Servo Motor (B1) or the Potentiometer (R2) is necessary, the entire unit must be returned to EAI.</p>				
<p style="text-align: center;"><u>0.42.0326 DAS ATTENUATOR CARD</u></p>				
1	C1	Capacitor, Fixed, Ceramic: 10 nf +60% -40%, 150V (Centralab DDM-103 or equal)	00 515.0151-0	A
2	CR1,2	Diode	00 614.0007-0	B
3	K1	Relay	00 618.0289-0	B
4	R1	Resistor, Non-Linear	00 646.0062-0	B
<p>*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.</p>			UNIT TITLE	
			DAS ATTENUATOR	
			MODEL NO.	
			0.42.0327 Sh. 1 of 1 Sh.	

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	R1	Potentiometer	00 642.0687-0	B

NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.		UNIT TITLE
		HAND SET ATTENUATOR
		MODEL NO.
1	DATE 10/ 10 / 67	0.42.0338 Sh. 1 of 1 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1		Connector Block: Lettered (DUAL SIN/COS 0.16.0336)	00 542.1551-2	B
<u>0.51.0356 READOUT TRAY</u>				
1	CR1,2	Diode	00 614.0199-0	B
2	J1	Connector Block: Yellow	00 542.1545-1	B
3	R1,2	Resistor, Precision	00 638.1050-2	B
4	R3	Resistor, Precision	00 638.1050-0	B
NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.			UNIT TITLE	
1-2			POT READOUT TRAY	
DATE 10 / 10 /67			MODEL NO.	
			0.42.0343 Sh. 1 of 1 Sh.	

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	F1	Fuse, Cartridge, Medium Acting: 1 Amp, 250V (Littelfuse 314001 or equal)	00 570.0116-0	A
2	J1	Connector	00 542.1489-0	B
3	KBJ	Connector, Receptacle: 12 Contacts; Female (Amp 480087-1 or equal)	00 542.1058-0	A
4	P80	Connector, Housing: 16 Cavity (Amp 582140-2 or equal)	00 542.1430-0	A
<u>0.11.0212 POT MODE RELAY CARD</u>				
1	CR1	Diode (ITT-G187 or equal)	00 614.0043-0	A
2	K1	Relay	00 618.0304-0	B
<u>0.12.1642 SERVO POWER SUPPLY NETWORK CARD</u>				
1	C1,2	Capacitor	00 516.0415-0	B
2	R1,2	Resistor, Fixed, Wirewound: 1 ohm $\pm 5\%$, 5W (Ward Leonard 5XM1 or equal)	00 636.0054-0	A
*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.			UNIT TITLE	
			ATTENUATOR HOUSING	
			MODEL NO.	
1-1-0	DATE 10 / 10 / 67		0.42.348	Sh. 1 of 1 Sh.

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1		Resistor, Variable, Composition: 5.2K ohms $\pm 2\%$	00 642.0747-0	B
2		Switch, Sensitive: SPDT	00 662.0046-0	B
<u>0.51.0281 SERVO CONTROL CARD</u>				
1	C1	Capacitor, Fixed, Ceramic: 10 nf $\pm 20\%$, 200V (Vitramon VK33BW103M or equal)	00 515.0333-0	A
2	CR1,2,3	Diode	00 614.0007-0	B
3	K1	Relay	00 618.0290-0	B
4	R1,2,3	Resistor, Fixed, Composition: 1.2K ohms $\pm 5\%$, 1/2W (Allen-Bradley EB or equal)	00 626.0122-0	A
NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.				
			UNIT TITLE	
			SERVO CONTROL	
			MODEL NO.	
			0.51.0288 Sh.1 of 1 Sh.	

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	R1	Resistor, Fixed, Film: 400K ohms $\pm 0.1\%$, 1/2W (Dale MFF1/4-T1 or equal)	00 634.0729-0	A
2	S1	Switch	00 656.0177-0	B
<p>*NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.</p>				
<p>0</p> <p>DATE 10 , 10 , 67</p>			<p>UNIT TITLE</p> <p>DAC CONTROL CARD</p>	
			<p>MODEL NO.</p> <p>0.51.0361 Sh.1 of 1 Sh.</p>	

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	R1	Resistor, Fixed, Film: 4 megohms $\pm 1.0\%$, 1/2W (Dale DCS-1/2 or equal)	00 634.0733-0	A
2	R2	Resistor, Fixed, Film: 2 megohms $\pm 0.5\%$, 1/2W (Dale DCS-1/2 or equal)	00 634.0732-0	A
3	R3	Resistor, Fixed, Film: 1 megohm $\pm 0.2\%$, 1/2W (Dale MFF 1/4-T1 or equal)	00 634.0731-0	A
4	R4	Resistor, Fixed, Film: 500K ohms $\pm 0.1\%$, 1/2W (Dale MFF 1/4-T1 or equal)	00 634.0730-0	A
5	S1	Switch	00 656.0177-0	B

NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
 A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
 B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

DAC CONTROL CARD

MODEL NO.

0.51.0361-1 Sh. 1 of 1 Sh.

DATE 10 / 10 /67

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	AR1	Amplifier	00 006.0681-2	B
2	C1	Capacitor, Fixed, Ceramic: 150 pf $\pm 5\%$, 500V (Erie 831-000-X5R0-151J or equal)	00 515.0404-0	A
3	C2,3	Capacitor, Fixed, Electrolytic: 100 uf $\pm 20\%$, 20V (Sprague 150D107X0020-S2 or equal)	00 516.0270-0	A
4	S1	Switch	00 656.0177-0	B
<p>NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS. A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY. B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.</p>				
0			UNIT TITLE	
			DAC W/AMPLIFIER	
			MODEL NO.	
			0.51.0362 Sh. 1 of 1 Sh.	
DATE 10 /10 /67				

ITEM	REF. DESIG.	DESCRIPTION	EAI NO.	*CAT.
1	1a	Integrated Circuitry: Quad 2 Input Gate	00 592.0096-0	B
2	C1	Capacitor, Fixed, Electrolytic: 2.2 uf $\pm 20\%$, 15V (Kemet K2RC15 or equal)	00 516.0425-0	A
3	C2	Capacitor, Fixed, Ceramic: 0.01 uf $+60\%$ -40% , 150V (Sprague 19C385 or equal)	00 515.0151-0	A
4	R1	Resistor, Fixed, Composition: 1K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0102-0	A
5	R2	Resistor, Fixed, Composition: 5.1K ohms $\pm 5\%$, 1/4W (Allen-Bradley CB or equal)	00 625.0512-0	A
6	S1	Switch	00 656.0180-0	B

NOTE: THE CATEGORY COLUMN IS DESIGNED TO INDICATE AVAILABILITY OF PARTS.
 A - INDICATES PARTS THAT SHOULD BE PURCHASED LOCALLY.
 B - INDICATES PARTS THAT SHOULD BE PURCHASED FROM EAI.

UNIT TITLE

SET-CLEAR CARD

MODEL NO.

0.51.0364

Sh. 1 of 1 Sh.

DATE 4 / 25 / 68

5-27/5-28

M446

APPENDIX 2

DRAWINGS

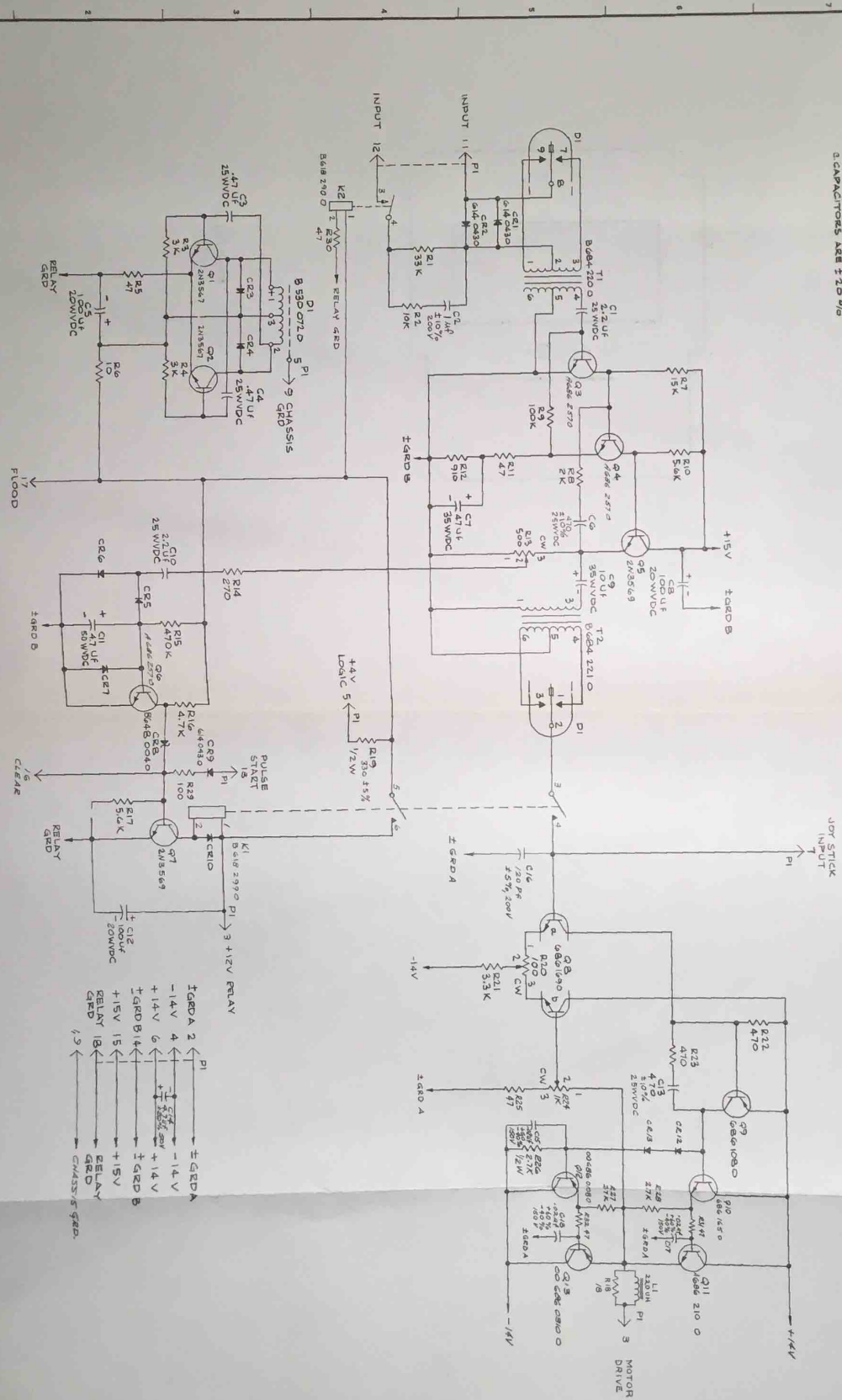
This appendix contains necessary schematics and wiring diagrams of equipment described in this manual. To facilitate locating a particular sheet, an index is provided that lists the model number of each unit or component, the type of drawings, and the associated drawing number. The drawings are bound into the manual in the order listed under the index Drawing Number column.

EAI drawings are prepared in accordance with standard drafting practices for electro-mechanical and electronic equipment. All symbols are in accordance with current government standards.

INDEX

<u>Unit or Component</u>	<u>Type of Drawing</u>	<u>Drawing Number</u>
6.677 Servo Amplifier	Schematic	D006 677 0S
0.11.0212 Pot Mode Relay	Schematic	B00 011 0212 0S
0.12.1642 Servo Power Supply Network	Schematic	A00 012 1642 0S
42.327 DAS Attenuator (Switching)	Schematic	C042 327 0S
0.42.0338 Handset Attenuator	Assembly	B00 042 0338 0A
0.51.0288 Servo Control	Schematic	B00 051 0288 0S
0.51.0361 DAC Control	Schematic	C00 051 0361 0S
0.51.0362 DAC W/Amplifier	Schematic	C00 051 0362 0S
0.51.0364 Set-Clear Card	Schematic	B00 051 0364 0S

NOTE:
 1. UNLESS OTHERWISE SPECIFIED
 ALL RESISTORS ARE $\pm 5\%$ $1/4W$
 CAPACITORS ARE $\pm 5\%$ $10\mu F$
 UNLESS OTHERWISE NOTED



MATERIALS	
Q1	2N3567
Q2	2N3567
Q3	2N3567
Q4	2N3567
Q5	2N3567
Q6	2N3567
Q7	2N3567
Q8	2N3567
Q9	2N3567
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Q48	2N3567
Q49	2N3567
Q50	2N3567

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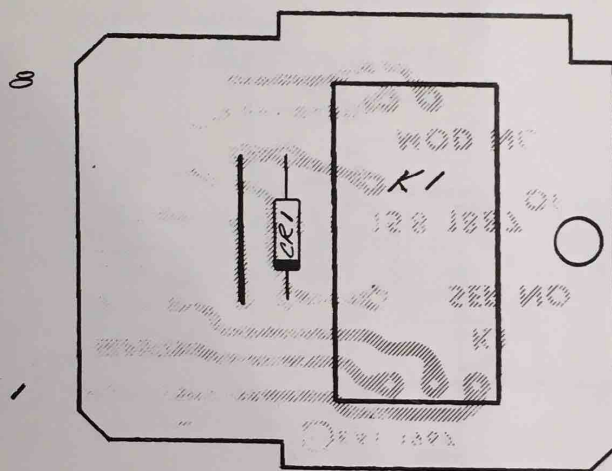
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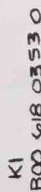
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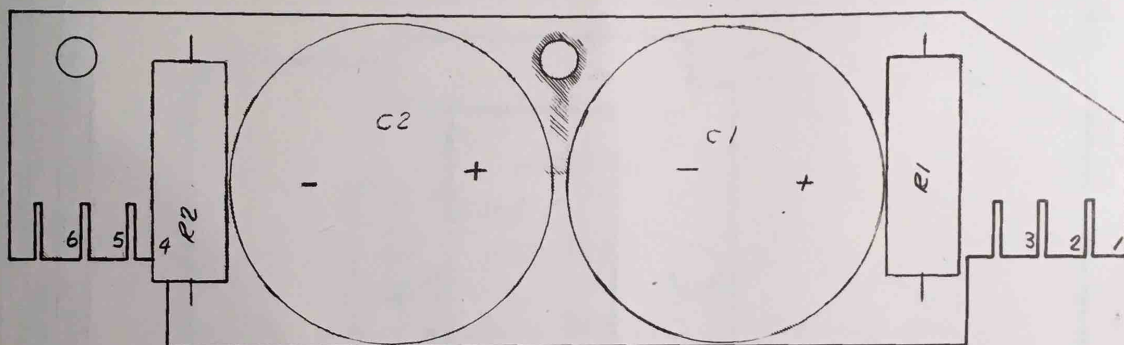


0.11.0212 Pot Mode Relay



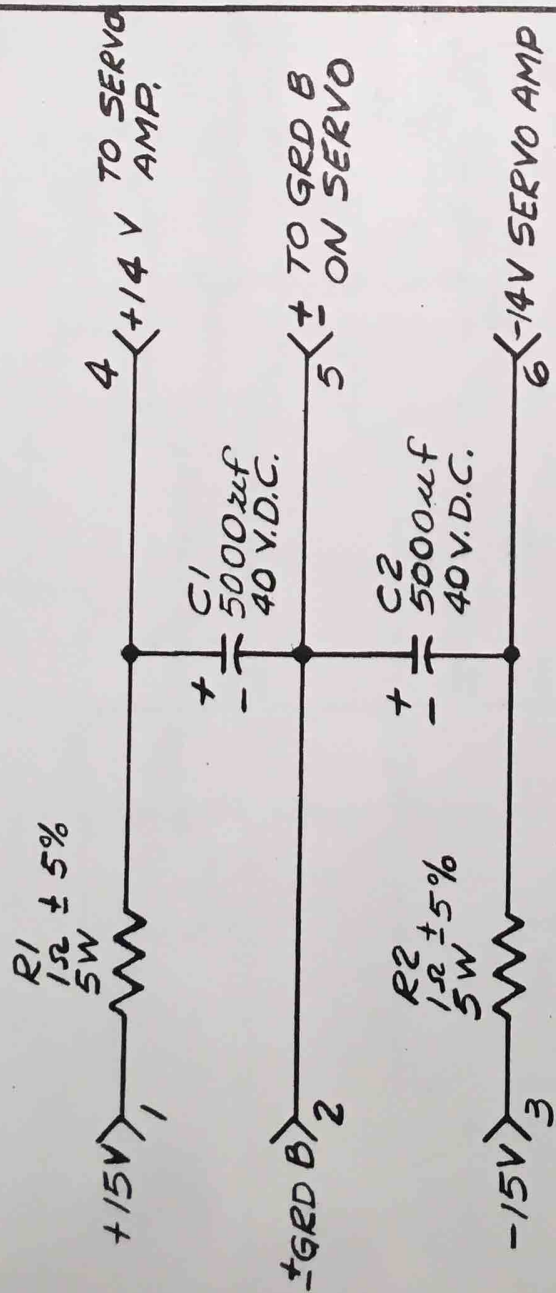
EAI
ELECTRONIC ASSOCIATES, INC. West Long Beach, R.C.

SCHMATIC
POT MODE RELAY
(TR-Y)



0.12.1642 Servo Power Supply Network

RELEASED FOR PRODUCTION:	DATE
NO.	3-31-67
REVISIONS	PC
APPROVED	



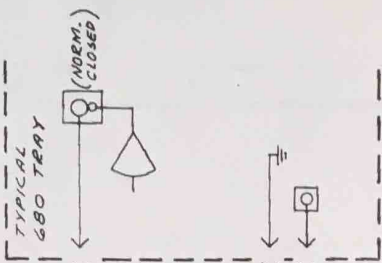
EAI
ELECTRONIC ASSOCIATES, INC., West Long Branch, N.J.

**SCHEMATIC
SERVO POWER SUPPLY
NETWORK (TR-Y)**

PROJ.	A	
SHEET	OF	SHEET
MATERIAL: SEE PARTS LIST A00 012 1642 OP		
FINISH:	DWG. NO. WAS: _____	
UNLESS OTHERWISE SPECIFIED	USED ON: A00 012 1642 OP	
DIMENSIONS ARE IN INCHES	DATE	BY
CAPACITANCE IS IN pf	20 MAR 67	THOMAS
RESISTANCE IS IN OHMS	DATE	DATE
TOLERANCE OF: .X = ± .03 .XX = ± .02	30 MAR 67	4-9-67
.XXX = ± .015 .XXX = ± .005 L = ± 1°	DATE	DATE
• REL. OF MATERIAL SUPPLIED	31 MAR 67	3-31-67

PROJECT
19390
A00 012 164205

1. UNLESS OTHERWISE SPECIFIED,
DIODES ARE 614 043 D.

[illegible]

SCHEMATIC
DAS ATTEN (SMITHING)

(480)

[illegible]

RELEASED FOR PRODUCTION:		SHR	DATE
NO.		REVISED	
APPROVED			
UNIT IN PRODUCTION 20 APR 68			
TABLE 1 - 1 VAR F ASSOC'D INFO			
1 WIRE NOT SPEC'D. A			
2 ENDYCC			
3 ECU 10.73			
4 EVAL WASN'T SPEC'D.			
5 1 9 APR 68			
6 EPN 11.87			
7 131 2 3 MAY 68			

- 1 VAR ONLY
SEE TABLE

NWI	YEL 22	POT HI	1	101-1
2				
1	GRN 22	POT ARM	2	
3	BLK 22	POT LD	3	102-1
				101-2
				102-2

WIRING INFO

6.25

6 - DIAL TO BE TEMPORARILY AFFIXED TO POT. PERMANENT MOUNTING AT FINAL ASSEMBLY

9 - SEE TABLE

PIN A THIS END

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
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0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
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0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
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0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	

UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	

UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
1:1		1:1		1:1		1:1		1:1		1:1		1:1	
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	
DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	

UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	

UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

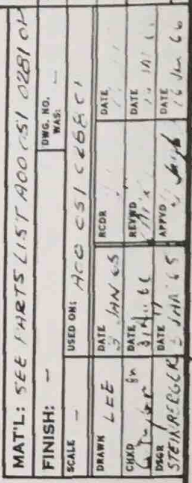
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DATE:		DATE:		DATE:		DATE:		DATE:		DATE:		DATE:	

UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:		USED ON:		DATE:		DATE:		DATE:		DATE:	
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UNIT NUMBER		ASSY NUMBER		PARTS LIST & NEXT ASSY.		DESCRIPTION	
0.042.0338		00 0420338 2A		00 042 0338 2A		AS SHOWN	
0.042.0338		00 0420338 1A		00 042 0338 1A		AS SHOWN	
0.042.0338		00 0420338 0A		00 042 0338 0A		LESS C101 & 1/2 (HAVE TABS AT B)	

FINISH:		SCALE:	
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RELEASED FOR PRODUCTION	ENG	DATE	APPROV
	2	5/14/66	V
NO.	REVISIONS		
		11/16/66	
1	IN AREA D-2 CAPAC- ITOE "CI" WAS NOT SPEC. PENNANT TO ELIMINATE "W" AND SPIKES 9 SEPT 66 R ERN 14130		
2	IN A1 - 1 DELETED PART NO 056 0150 6 FROM 51 11 FEB 67 ERN 10521		

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES

CAPACITANCE IS IN pF

RESISTANCE IS IN OHMS

TOLERANCE OF: $X = \pm .03$ $XX = \pm .02$
 $XXX = \pm .015$ $XXX = \pm .005$ $L = \pm 10$

*TOL. OF MATERIAL SUPPLIED

EAI

ELECTRONIC ASSOCIATES, INC. Real Good People, U.S.A.

SCHEMATIC

SILVCO CONTROL

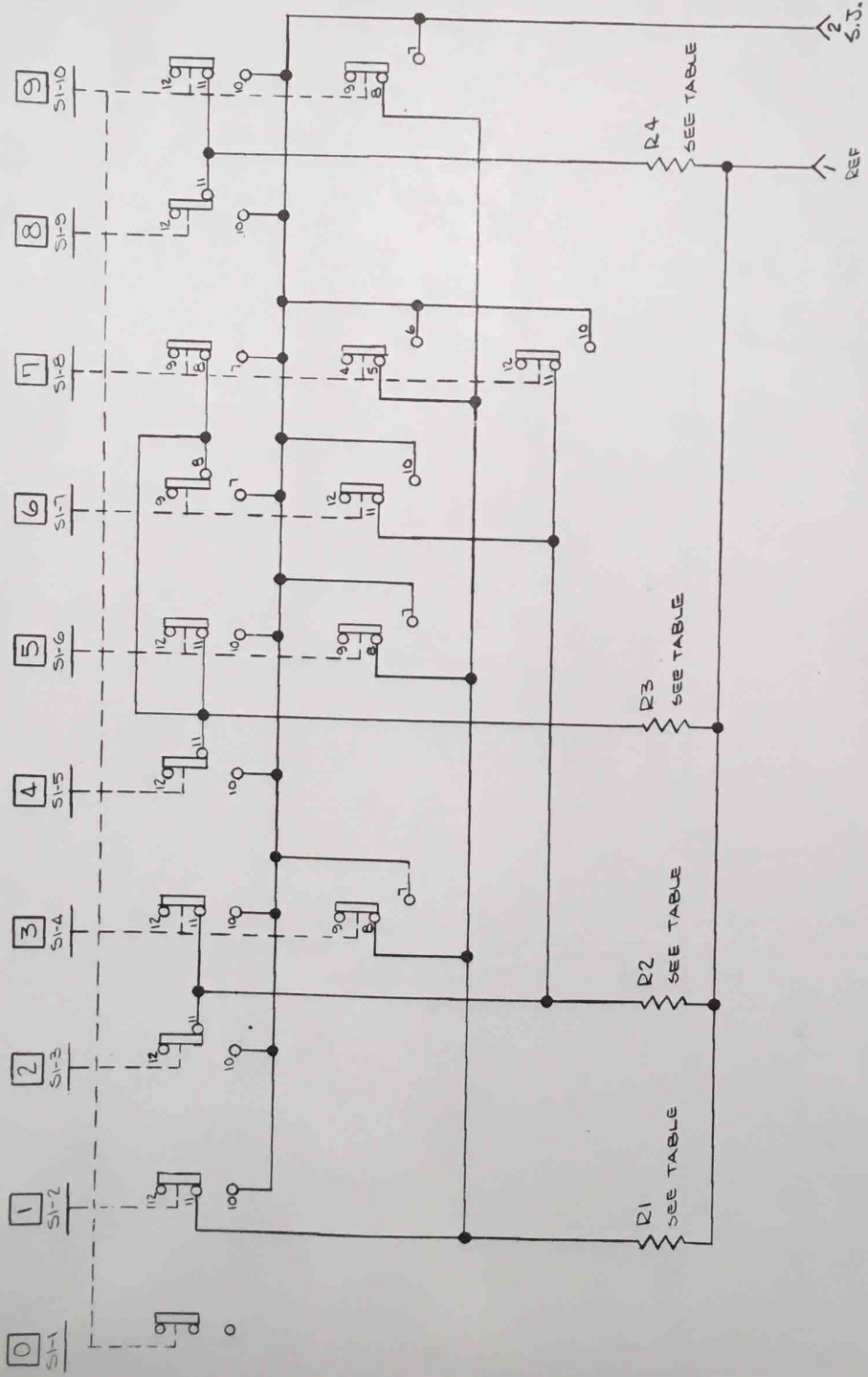
SHT. NO.			
SIZE			
REV. NO.			
PROJECT			

1-1A

B 00 051 0288 05

SHEET 1 OF 1 SHEETS

NOTES:
 1. ALL SWITCH SECTIONS ARE INTERLOCKING.
 2. VALUES ARE SHOWN FOR CLARITY. ACTUAL RESISTORS ARE INSTALLED AT NEXT ASSEMBLY LEVEL (0.00050)



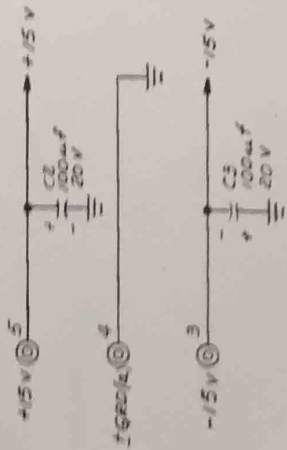
UNIT NUMBER	SCHEMATIC C	TABLE OF UNIT NUMBERS	DESCRIPTION	PARTS LIST USED ON	PROJECT NUMBER	
0.51.0361-2	00 051 0361 26	00 051 0361 26 40 ME G	20 ME G	5 ME G	00 009 0050 0P	19330
0.51.0361-1	00 051 0361 15	00 051 0361 15 4 ME G	2 ME G	1 ME G	00 009 0050 0P	19330
0.51.0361-0	00 051 0361 05	00 051 0361 05 4 ME G	2 ME G	1 ME G	00 009 0050 0P	19330

EAI
 SCHEMATIC
 DAC CONTROL
 (REV)

SHT NO	SIZE	REV NO	PROJECT
			19330

C00051036105
 SHEET 1 OF 1

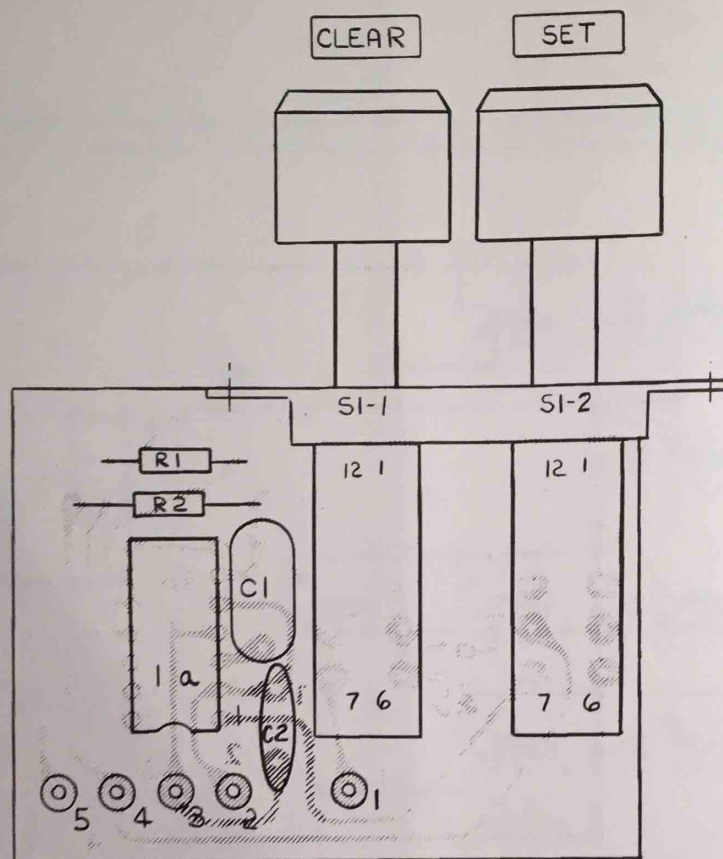
1. ALL SOUTH AFRICAN CITIZENS, AND ALL OTHERS WHO
WISH TO ENTER THE REPUBLIC OF SOUTH AFRICA, MUST
OBTAIN A PASSPORT, AND A VISA, FROM THE
CONSUL GENERAL, JOHANNESBURG, SOUTH AFRICA.
AT ABOUT US\$15.00 PER VISA.



SCOTT'S
ONE AND ONLY
(1914-15)

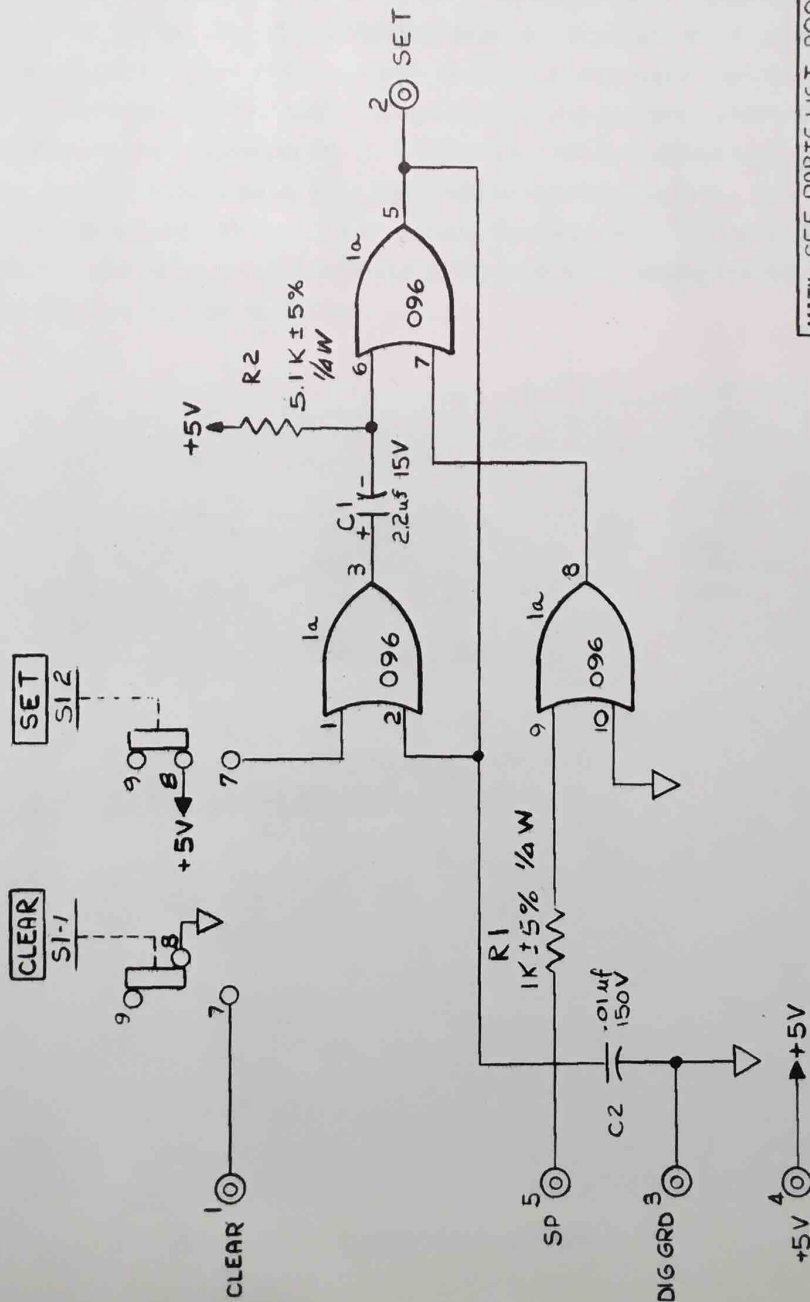
FINISH		DATE		TIME		TEMP		HUMID		WIND		CLOUD		MOON		STAR		PLANET		SIGN		HOUSE		CHART		PAGE	
MATERIAL: SEE CHARTS		DATE: 10/10/10		TIME: 10:00		TEMP: 60		HUMID: 50		WIND: 10		CLOUD: 10		MOON: 10		STAR: 10		PLANET: 10		SIGN: 10		HOUSE: 10		CHART: 10		PAGE: 10	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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0.51.0364 Set-Clear Card

NOTES:
 1. SWITCH SECTIONS ARE
 MOMENTARY.
 2. PIN 4 ON IC P G0ES
 TO DIG GRD
 3. PIN 11 ON IC P G0ES
 TO +5V



FINISH: —		DWG. NO. —	
SCALE —	USED ON: A00 051 0364 0P	DATE: 4-27-67	DATE: 4-27-67
DRAWN: A KANE	DATE: 4-14-67	REVISED: 4-27-67	DATE: 4-27-67
CHKD: J. KANE	DATE: 4-14-67	APPROVED: 4-27-67	DATE: 4-27-67
DESIGNED: J. KANE	DATE: 4-14-67	DATE: 4-27-67	DATE: 4-27-67

SHT. NO.		SIZE	
REV. NO.		PROJECT	
19330		B00 051 0364 05	
SHEET 1 OF 1 SHEETS			

SCHEMATIC
 SET-CLEAR CARD
 (TR-Y)

EAI

UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN INCHES
 CAPACITANCE IS IN μ F
 RESISTANCE IS IN OHMS
 TOLERANCE OF: .X = $\pm .03$.XX = $\pm .02$
 .XXX = $\pm .015$.XXX = $\pm .005$ L = $\pm 1^\circ$
 *TOL. OF MATERIAL SUPPLIED

AREA B2 C2 WAS
 NOT SPEC'D REASON:
 TO PREVENT POTS
 SETTING TO RDAC
 VALUE WHEN STEP-
 PING THROUGH
 COMPONENT ADDRESS
 19 OCT 67 ERN 11, 416

Bowling 4/26/67

RELEASED FOR PRODUCTION:	ENGR	DATE
NO.	REVISIONS	APPROV