

1. GENERAL

- signal measurements and Table 5 for d-c measurements.

- 1.04 If the photocell is deteriorating, there will be a brown discoloration on the lattice. With a VOM connected across the terminals of the photocell and the photocell lamp operated, there should be a reading of 100 to 300 ohms. With the photocell lamp off, the reading should be approximately one megohm. If the photocell is deteriorated, there will be a high resistance reading regardless of whether photocell lamp is on or off.

Table 1. Relay Adjustment - Relay K1.

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Table 2. Relay Adjustment - Relay K2.

ISSUE 1	TYP.	ENG. J. H. S.	O. K. H. A. A.	7-27-62	APE-1458-B12 OR G12
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1				1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
			28 24 G.A.	G.A. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
			.008	.008	
			RESID. .003 DISC.		
					11.2 V P.U.
COIL ϕ PP-70060-34A	TEST FOR	RESIST. AT 50 V	CURRENT	AMPERE TURNS	
1000 OHM		READJ. TEST	READJ. TEST	READJ. TEST	
12800 TURNS	NO. 1	0 3760 3460	.0105 .0112	135 144	
W-3001-38	NO	4200 4560	.0096 .009	123 115	
	NO. 2				
NOTES: MUST OP. ON 12 V.D.C.					
902773-M					
ELECTRONIC SEC.					
CONTACTS \approx 0-18					
EQA					

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Table 3. Relay Adjustment - Relay K3.

ISSUE 1	TYP.	ENG. J. H. S.	O. K. H. A. A.	7-27-62	APE-16154-B11 OR G11
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1				1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
			26 28 24 G.A.	G.A. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
			.008 .012	.012 .008	
			RESID. .003 DISC.		
					38.0V.
COIL ϕ PP-70060-23A	TEST FOR	RESIST. AT 50 V	CURRENT	AMPERE TURNS	
6500 OHMS		READJ. TEST	READJ. TEST	READJ. TEST	
31200 TURNS	NO. 1	0 2570 2070	.0058	172 182	
W-3001-42	NO	3440 4110		157 147	
	NO. 2				
NOTES: MUST OP. ON 40 VDC					
MUST REL. 15 VDC MIN.					
902773-M					
ELECT. SECRETARY					
CONTACTS # 0-18					

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Table 4. Signal Measurements (Serial No. 47501 & up).

115 volt 60 CPS supply. Ambient temperature 80° F. mechanism running. L1 & L2 terminated for and loaded with 600 OHMS. Mechanism running. Announcement level control maximum clockwise. All readings to frame ground unless noted. Measurements with vacuum tube voltmeter having 11 MEG OHM or higher input resistance. Ambient temperature 80° F. Voltages may vary $\pm 20\%$ according to transistor and power supply condition.

FUNCTION	AUTO	CHECK	DICTATE	DICTATE
Input Point Input Signal	PU-1 0.5 MV 1 KC	PU-1 0.5 MV 1 KC	J4 across Mic 2.0 MV 1 KC	None None
Q1 Base Coll.	0.42 MV 4.0 MV	0.42 MV 4.5 MV	1.4 MV 10.5 MV	- -
Q2 Base Coll.	4.0 MV 310 MV	4.5 MV 300 MV	10.5 MV 1.25 volt	- -
Q3 Base Coll.	60 MV 2.0 volts	- -	- -	- -
Q4 Base Coll.	- -	- -	- -	6.0V 5.8V
Q5 Base Coll.	- -	- -	- -	5.6V 6.0V
Q4B to Q5B Q4C to Q5C	- -	- -	- -	11.6V 11.8V
Q6 Base Coll.	.60 volt 4.0 volt	- -	- -	- -
Q7 Base Coll.	.60 volt 4.0 volt	- -	- -	- -
Q6B to Q7B Q6C to Q7C	1.20 volt 8.0 volt	- -	- -	- -
Output Point Output Level Output Load Conditions	L1 - L2 8.0V (+20 DBM) 600 OHM -	J4 135 MV Mic -	PU-1 135 MV PU-1 Note 1	PU-1 PU-2 30V 30V PU-1 PU-2 Note 3 Note 3
Output Point Output Level Output Load Conditions	- - - -	- - - -	Note 2 50 MV (50 MA) PU-1 Note 1	Note 2 Note 4 75MV (.75MA) 1.5V(15MA) PU-1 PU-2 Note 3 Note 3

- NOTES: 1. Q4 and Q5 removed.
2. Output across 100 OHM resistor in series with PU-1 ground lead.
3. Q4 and Q5 installed.
4. Output across 100 OHM resistor in series with PU-2 ground lead.

Table 5. DC Measurements (Serial No. 47501 & up).

115 volt 60 CPS supply. Ambient temperature 80° F. mechanism running. L1 & L2 terminated for and loaded with 600 OHMS. Mechanism running. Announcement level control maximum clockwise. All readings to frame ground unless noted. Measurements with vacuum tube voltmeter having 11 MEG OHM or higher input resistance. Ambient temperature 80° F. Voltages may vary $\pm 20\%$ according to transistor and power supply condition.

AMPLIFIER	AUTO	AUTO	CHECK	DICTATE
Input Signal Input Point	None -	0.5 MV 1KC PU-1	None -	None -
Q1 Emitter	-.75 Volt	-.75 Volt	-.75 Volt	-.73 volt
Base	-.90	-.90	-.90	-.85
Collector	-5.0	-5.0	-5.0	-4.8
Q2 Emitter	-.75	-.75	-.75	-.75
Base	-.90	-.90	-.90	-.87
Collector	-4.6	-4.6	-4.6	-4.4
Q3 Emitter	-4.5	-4.5	-.40	-.40
Base	-4.7	-4.7	-.60	-.60
Collector	-10.7	-10.6	-.40	-.40
Q4 Emitter	-	-	-	-1.4
Base	-	-	-	+4.8
Collector	-	-	-	-10.8
Q5 Emitter	-	-	-	-1.2
Base	-	-	-	+4.8
Collector	-	-	-	-10.8
Q6 Emitter	-11.0	-10.8	-11.0	-10.8
Base	-10.4	-10.4	-10.4	-10.2
Collector	-.05	-.20	-.05	-.05
Q7 Emitter	-11.0	-10.8	-11.0	-10.8
Base	-10.4	-10.4	-10.4	-10.2
Collector	-.07	-.25	-.07	-.07
POWER SUPPLY				
F2-R37 Junct.	-24.5	-24.5	-24.5	-24.0
C21 Minus	-15.0	-15.0	-15.0	-14.8
C22 Minus	-11.0	-10.9	-11.0	-10.8
C23 Minus	-10.6	-10.5	-10.6	-10.3
PHOTOCELL VOLTAGES		STANDBY (LIGHT)	CYCLING (DARK)	
J5 Pin 8		-2.5 to -4.5	-22.5 to -24.5	
Relay K2 Coil Terms		-20.0 to -22.0	-.05 to -2.0	
Total DC Current (through F2)		190 - 220 MA	180 - 210 MA	

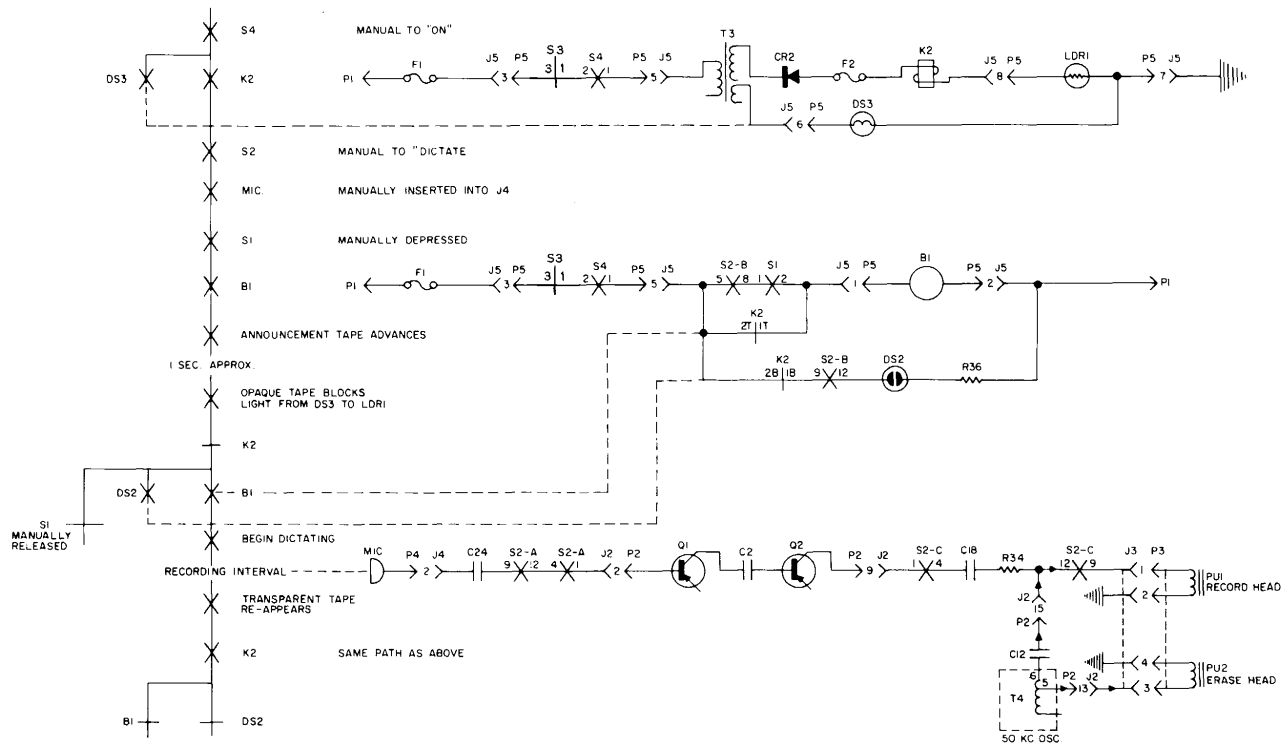


Figure 1. Dictate Announcement Sequence Chart.

2. DICTATE ANNOUNCEMENT (FIGURE 1)

2.01 Conditions:

- Power Switch S4 "ON"
- Lamp DS3 lit
- Relay K2 is operated
- Selector knob turned to "DICTATE"
- Microphone inserted into MICROPHONE jack.

2.02 Momentarily depress "START" button (S1). Motor B1 will be energized causing the announcement tape to advance moving the trans-

parent section of tape away from the photocell LDR-1.

2.03 When the opaque section of tape passes in front of the photocell, relay K2 releases forming a holding path for B1 and lighting the dictate lamp DS2.

2.04 The announcement message can now be dictated.

2.05 The announcement message recording interval ends when the transparent section of the tape reappears in front of the photocell.

2.06 Relay K2 now operates, breaking the holding path of B1 and extinguishing the dictate lamp, returning the machine to standby.

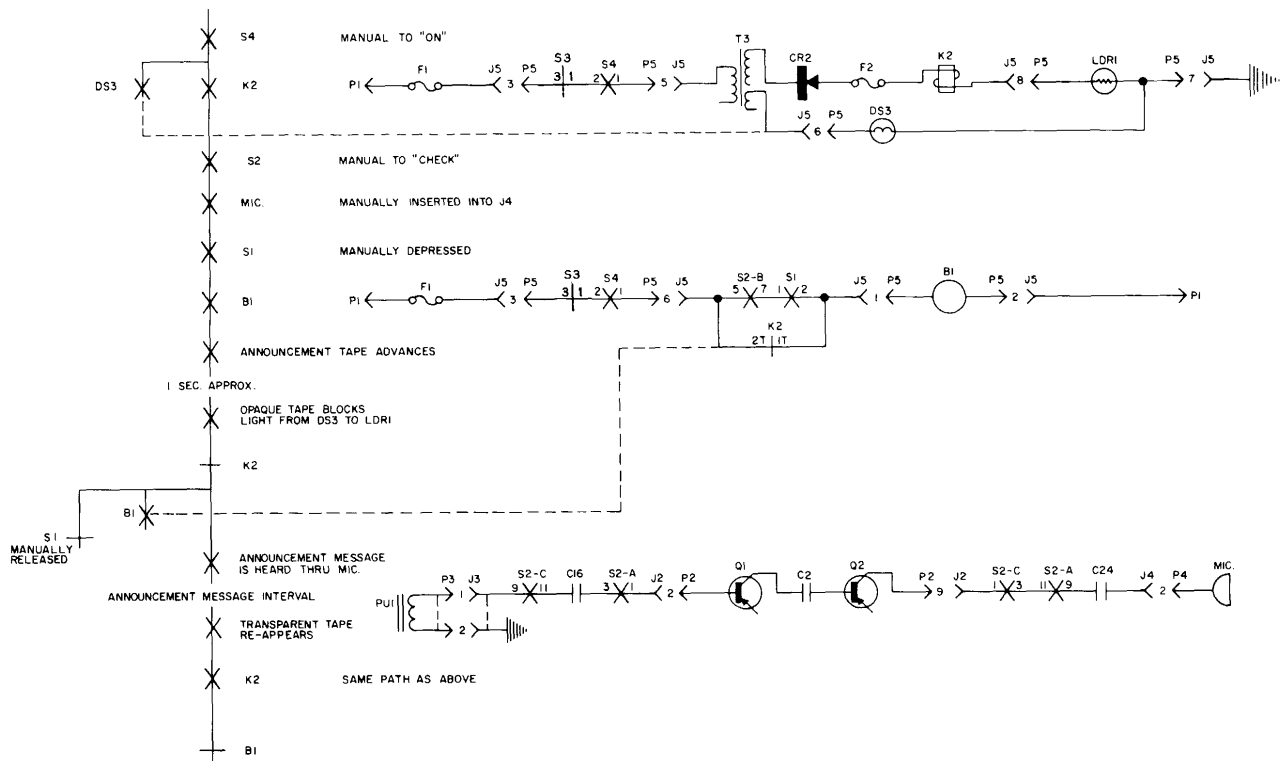


Figure 2. Check Announcements Sequence Chart.

3. CHECK ANNOUNCEMENTS (FIGURE 2)

3.01 Conditions:

- Power Switch S4 "ON"
- Lamp DS3 lit
- Relay K2 is operated
- Selector knob turned to "CHECK"
- Microphone inserted into MICROPHONE jack.

3.02 Momentarily depress "START" button (S1).

Motor B1 will be energized, causing the announcement tape to advance moving the transparent section of tape away from the photocell LDR-1.

3.03 When the opaque section of the tape passes in front of the photocell, relay K2 releases forming a holding path for B1.

3.04 The announcement amplifier is connected to the microphone which serves as an earphone speaker through which the recorded message is now heard.

3.05 The cycle ends when the transparent section of the tape reappears in front of the photocell.

3.06 Relay K2 now operates, breaking the holding path of B1, returning the machine to standby.

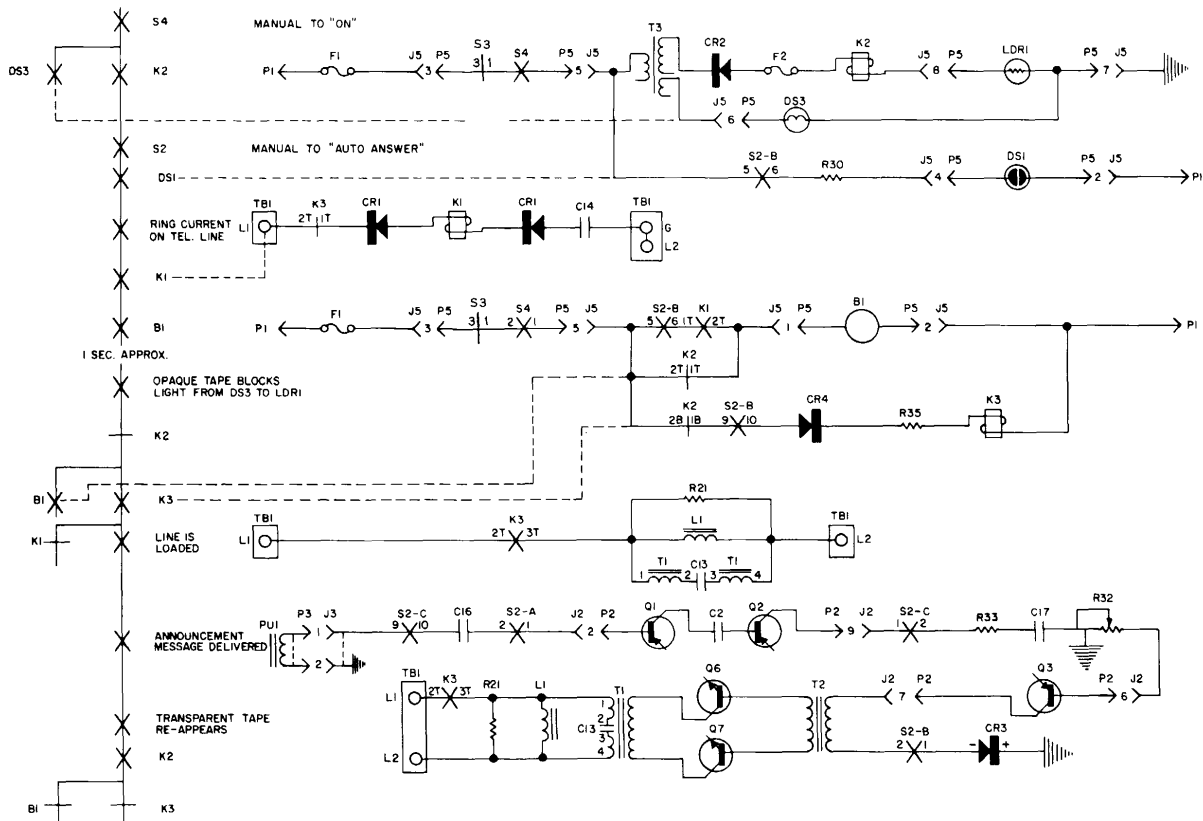


Figure 3. Automatic Answer Sequence Chart.

4. AUTOMATIC ANSWER (FIGURE 3)

4.01 Conditions:

- (a) Power Switch S4 "ON"; lamp lit.
- (b) Relay K2 operated.
- (c) Selector knob turned to "AUTOMATIC"; lamp DS1 lit.

4.02 When ringing current is applied to relay K1 it operates, energizing motor B1. The announcement tape advances moving the transparent section of tape away from the photocell LDR-1.

4.03 When the opaque section of the tape passes in front of the photocell, relay K2 releases

forming a holding path for B1 and relay K3 operates tripping the ring and loading the line.

4.04 The record-play head PU-1 is connected to the record-play back amp. whose output passes through the level control R32 to the driver and power amplifier Q3, Q6, and Q7.

4.05 The output of the power amplifier delivers the announcement message to L1 and L2 through contacts of relay K3.

4.06 The cycle ends when the transparent section reappears in front of the photocell.

4.07 Relay K2 now operates, breaking the holding path of B1, and releasing relay K3. The contacts of K3 open the line circuit restoring the machine to standby.

5. MODIFICATIONS

5.01 Early models of the Model AO-3 Electronic Secretary units (serial numbers 47000-47500) experience increased amplifier gain due to heat within the unit. To effect stabilization of the amplifier output, the amplifier circuit was modified. This modification is easily accomplished and is explained in paragraphs 5.03-5.04.

5.02 The first one hundred units of the Model AO-3 Electronic Secretary units (serial numbers 47000-47099) experienced friction drag and excessive wear of the tape due to the nickel plated tension and tape guide pillars that were used. This condition was remedied by replacing the nickel plated pillars with stainless steel pillars. This modification can be accomplished in the field and is explained in paragraph 5.05.

MODIFYING AMPLIFIER CIRCUIT

5.03 A modification kit (order number WW-5896-63) which contains the components required to modify the amplifier circuit is available. This modification kit may be ordered from Automatic Electric Company, Northlake, Illinois, and consists of the following components:

AMT.	PART NUMBER	DESCRIPTION
2	6-1853	Resistor, 15 ohms, 1/2 watt
1	6-1831	Resistor, 3,300 ohms, 1/2 watt
2	37-5776	Transistor, 2N697
1	37-5777	Diode 1N482
2 inches	30-1227	Sleeving No. 22
1	1E4517	Drawing (Revision A)
1	54D5109	Drawing (Revision A)

5.04 Use the following procedure to modify the amplifier assembly:

- (1) Remove tape, telephone line, and power connections from the unit.
- (2) Remove the tape mechanism from the chassis. (Refer to the appropriate section in the 997-400 series of General System Practices.)

- (3) Remove the 2N1377 transistors from sockets Q6 and Q7.
- (4) On the underside of the chassis, locate resistors R25 (15 ohms, 1/2 watt), R26 (4.7 ohms, 1/2 watt), R27 (4.7 ohms, 1/2 watt), and R28 (1,500 ohms, 1/2 watt) which are wired to the Q6 and Q7 sockets and adjacent terminal strip. Disconnect both ends of these resistors and remove them.
- (5) Viewing the set from the bottom rear, locate second lug from the left on the terminal strip adjacent to the Q6 and Q7 sockets. Remove the red lead (output transformer center tap) from this lug and connect this lead to the center lug (ground) of the same terminal strip.
- (6) Connect a 15-ohm, 1/2-watt resistor (R26) between the second terminal strip lug and the emitter socket terminal of Q6.
- (7) Connect a 15-ohm, 1/2-watt resistor (R27) between the second terminal strip lug and the emitter socket terminal of Q7. Use sleeving on the resistor leads.
- (8) Connect a 3,300-ohm, 1/2-watt resistor (R28) between the center (ground) lug and extreme right hand (fifth) lug of the terminal strip.
- (9) Connect a 1N482 diode (CR-5) between the second and the fifth terminal strip lugs. The cathode or banded end of the diode is connected to the second lug. Position this diode toward the underside of the Q6 socket.
- (10) Solder all connections and install 2N697 transistors at Q6 and Q7 socket.
- (11) Reassemble the unit, install tape, and reconnect the unit to the telephone line and the power source.

Installing Pillars

5.05 The parts required to make this modification are one stainless steel tape tension

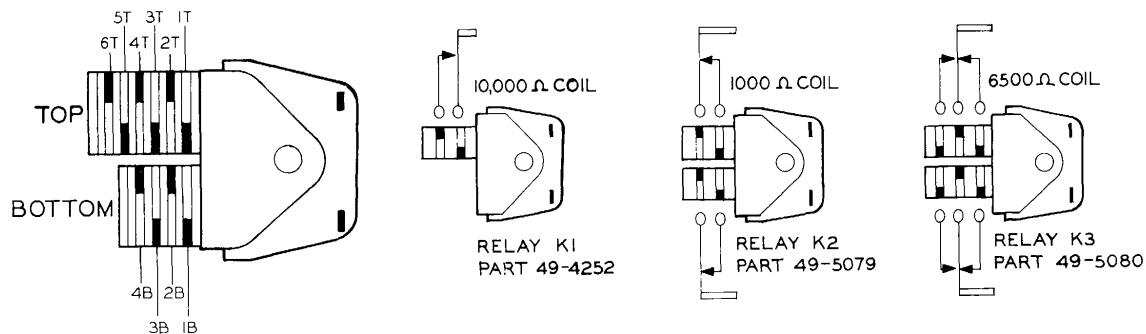
pillar (part number WW-5692-36) and two stainless steel tape guide pillars (part number WW-5703-36). Use the following procedure to replace the pillars:

- (1) Remove the tape, telephone line, and power connections.
- (2) Remove the tape mechanism from the chassis. (Refer to the appropriate section in the 997-400 series of Gener-

al System Practices.)

- (3) Remove the tape pillar screws and washers from the underside of the tape mechanism and the pillars from the top.
- (4) Place the pillars on the top of the tape mechanism in their respective positions and fasten with the screws and washers previously removed.
- (5) Reassemble and reconnect the unit.

4a. Relay Contact Numbering System.



4b. Switch Contact Numbering System.

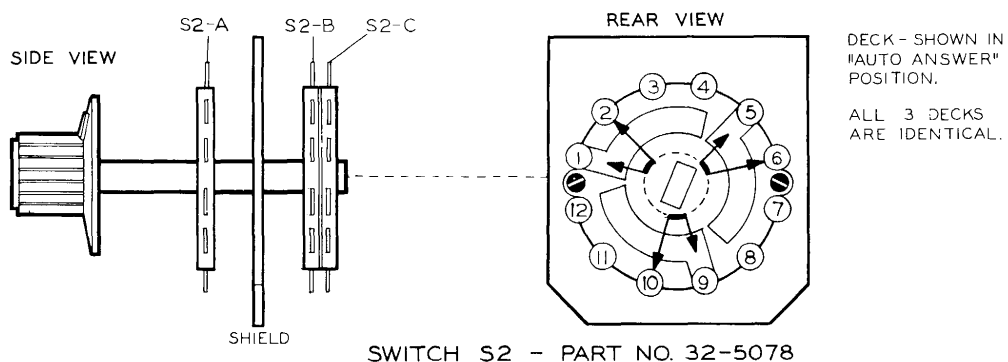
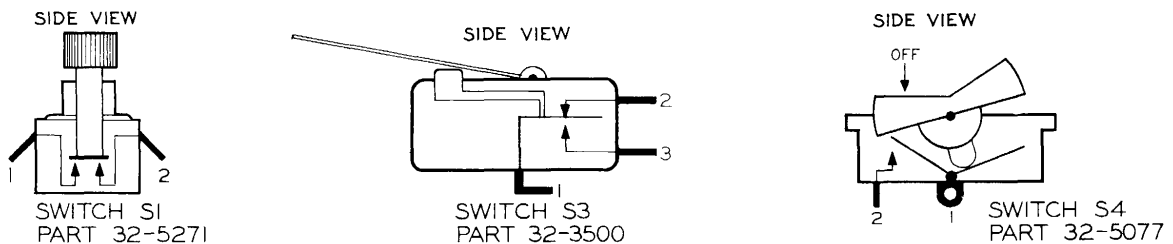


Figure 4. Contact Numbering Systems.

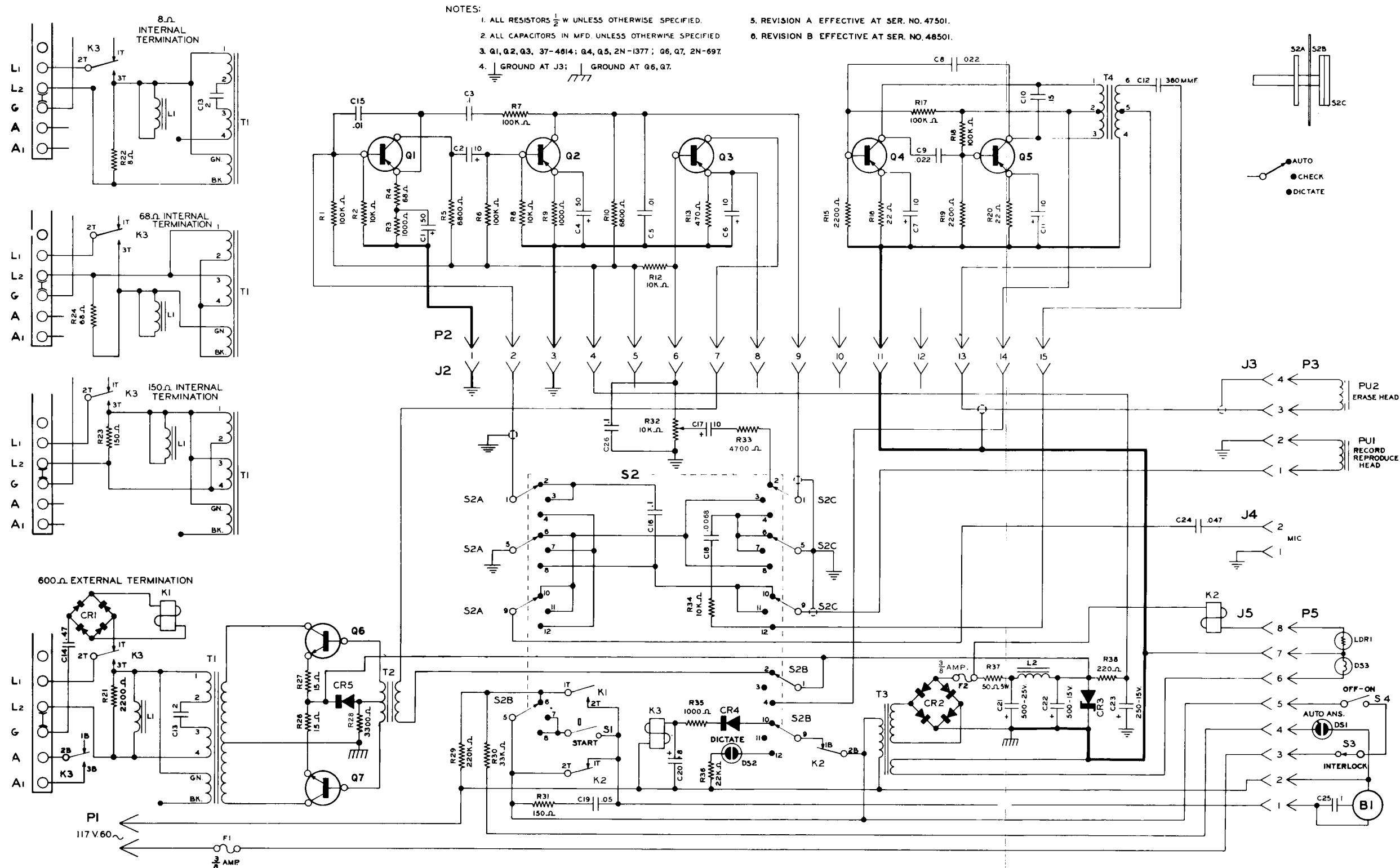


Figure 5. AO-3 Schematic.

ELECTRONIC SECRETARY® MODEL AO-3
ELECTRICAL TESTS

1. GENERAL

1.01 This Addendum is issued to revise Section 997-400-501, Issue 2. In ink or red pencil make the changes outlined in Part 2. When the changes have been made, file this addendum ahead of Section 997-400-501, Issue 2.

2. CHANGES

2.01 In Paragraph 1.04 delete everything after the first sentence, and replace with: "For a photocell voltage check refer to Table 5."

2.02 On pages 3 and 4, delete the information between the table captions and the tables. Under these captions write: "See Paragraph 2.03 of Addendum 997-400-501, Issue 1."

2.03 The conditions under which Tables 4 and 5 were compiled are: Mechanism running

on 115-volt 60-cps power supply; ambient temperature 80° F; L1 and L2 terminated for and loaded with 600 ohms; and announcement level control in maximum clockwise position. All readings are frame grounded unless otherwise noted. Measurements are made with a vacuum tube voltmeter having a 1-megohm or higher input resistance. Voltages may vary $\pm 20\%$ according to the transistor and power supply conditions.

2.04 In the first dictate column of Table 4, under note 2, change "50MV (50MA)" to read "5.0 MV (.05MA)."

2.05 In Table 5, lower section, draw a line the width of the Table between "Relay K2 Coil Terms" and "Total DC Current (through F2)."

2.06 In Paragraph 5.02 change "one hundred" to read "two hundred" and serial numbers "47000-47099" to "47000-47199."