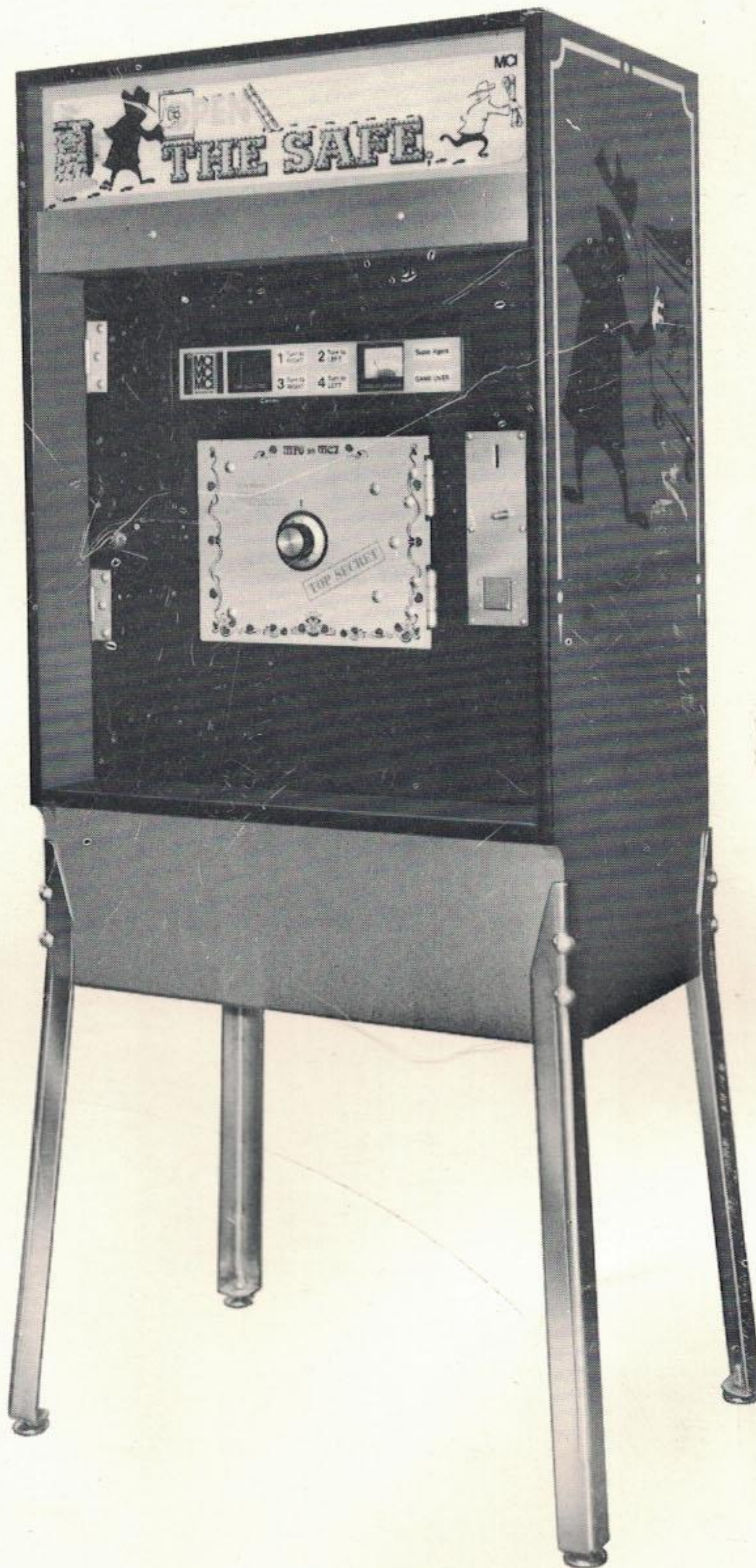


THE SAFE



MCI

3404 N. Holton Street, Milwaukee, Wisconsin 53212 414 962-0700

I. GAME SEQUENCE

A. STARTING THE GAME

The game is started by inserting a quarter into the coin acceptor. Inserting a quarter will cause:

1. The preset "Time Allotted" to appear on the display readout. (see game adjustment section to change "Time Allotted")
2. the "Turn To Right" lamp to light. "Game Over" and "Super Agent" (if lit) lights turn off.
3. the red LED lights to stop rotating (when game is over, rotation begins automatically).
4. the first number of the combination to be set into the game electronics.

B. PLAYING THE GAME

The "Time Allotted" will start to count toward zero as soon as the tumbler is turned in either direction. Game time is indicated by an audio 'ticking clock sound' and the numbers on the "Time Allotted" counter. Game time stops when the player wins the game or game time is zero. To successfully win a game the player should turn the tumbler in the direction indicated by the lamps on the display panel and stop when the meter turns on and the beep sound signal is heard.

First Direction: 1 TURN TO RIGHT - turn tumbler to right and stop when correct number beep and meter turn on.

Second Direction: 2 TURN TO LEFT - turn tumbler to left and stop when correct number beep and meter turn on.

Third Direction: 3 TURN TO RIGHT - turn tumbler to right and stop when correct number beep and meter turn on.

Fourth Direction: 4 TURN TO LEFT - turn tumbler to left and stop when correct number beep and meter turn on. The player has won the game.

C. WINNING A GAME

When the fourth number light turns on, the game is won.

Winning a game causes:

1. a Super Agent Token to be dispensed in to the Safe.
2. the small aluminum safe door to open.
3. the Win siren to turn on.
4. the "Time Allotted" counter to stop.
5. the "Super Agent" light and "Game Over" lights to turn on.

D. MISSING A CORRECT NUMBER

When a correct number is passed too quickly, the next direction lamp will turn on momentarily. The tumbler sensor meter and the correct number beep sound will be momentary. When an error in dialing a number is detected, a short raspberry tone is turned on to indicate the error and a new number is set in to the electronics. The player must start at the first number again. He may continue to start over again until his time runs out.

II. GAME ADJUSTMENTS

A. GAME TIME (ALLOTTED TIME)

There are five different time settings. These are located on the Logic PC Board. The settings are 30, 45, 60, 90 seconds and "Random Time". To change allotted time, plug in the "Timing Plug" to time desired.



B. GAME PLAY (HARDNESS)

There are three game play settings; easy, medium and hard. To change play, plug "Game Play Plug" in to hardness desired.

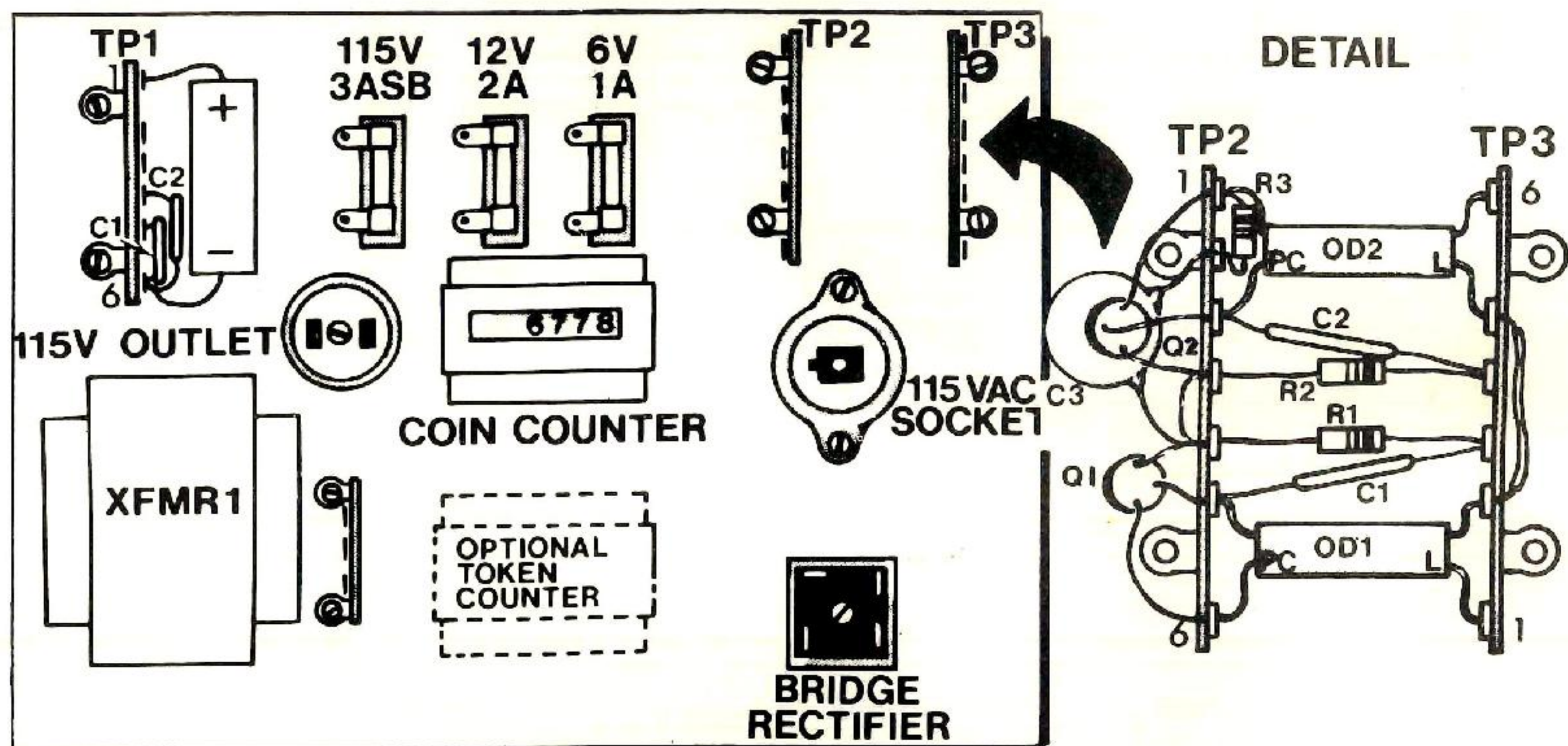


C. VOLUME CONTROL

All sounds are controlled by VR-1. To increase volume, turn VR-1 in direction indicated by arrow. For lower volume, turn in opposite direction.



III. TROUBLESHOOTING



A. POWER SUPPLY

A visual inspection of the action or lack of action of the power supply loading devices can quickly locate power supply or system problems. Listed below are the system voltages and measurement points and the loading of each voltage. Use these as a check list to determine the status of your power supply.

1. Voltage and Test Points

- a. 115VAC - XFMR 2 (Wh) to XFMR 6 (Blk)
- b. 12VAC - XFMR 9 (W/V) to XFMR 8 (W/R)
- c. 12VDC - Bridge negative (Gn) to Bridge positive (W/GY)
- d. 6VDC - Bridge negative (Gn) to Bridge AC (W/V)
- e. 15VDC (filtered) - Bridge negative (Gn) to Tie Strip TP1-1 (Yel) (must have (c) above)

- f. 5VDC (regulated) - Bridge negative (Gn) to Regulator Tie Strip (Blue) (must have (c) and (e) above)

2. Load Circuits

- a. 115VAC - Florescent lamp
 - Fuse 3 amp Slow Blow
 - Frosted 60w lamp
 - Door Solenoid
 - Token Solenoid
 - Transformer
- b. 12VAC - Bridge Rectifier
- c. 12VDC - Fuse 2 amp
 - Logic Clock ("Time Allotted" read out)
 - Coin Counter
- d. 6VDC - Fuse $\frac{1}{2}$ amp
- e. 15VDC - Audio Amplifier (no sound)
 - Optical Decoupler OD1, OD2 (Token dispenser and door solenoid)
 - Token Counter (optional)
 - Rotating Red LEDS (24 Leds on front)
- f. 5VDC - Time Allotted Read Out
 - Rotating Red LEDS
 - Increment Sensor

3. + 5VR Regulator Test (LM309K Heat Sink on Front Door)

- a. Check "input voltage" at regulator tie strip (green ground wire to violet wire). Voltage should be about $9\frac{1}{2}$ volts $\pm$ 1 volt DC under normal circuit loading of approximately 0.9 amps through regulator. The voltage at this point is dependent on regulator current. Excessive current will decrease this reading and no current out of the regulator will increase this voltage to about 17 volts. In either case, check regulator "output voltage" (Sec.3.b.)

b. After checking "input voltage" check "output voltage" at the regulator tie strip (green ground wire to blue wire). Voltage should be 5.0 volts $\pm$ $\frac{1}{2}$ volt DC on a fairly accurate meter.

1. If voltage is zero, disconnect blue wire at regulator tie strip. This will remove the output load from the regulator. Check "output voltage" again. If still zero, replace defective regulator. If output goes up to 5.0 volts DC the regulator is okay. Problem is in the logic assembly or increment sensor.

B. LOGIC ASSEMBLY 54A3019 PRINTED CIRCUIT

To determine if a problem is on the logic assembly or elsewhere, will require systematically testing the inputs and outputs of the circuit board. Be sure all power supply voltage have been checked in Sec.A.1. All voltages are referenced to ground (green wire on regulator tie strip).

INPUT SIGNALS

1. No 6VDC at Plug P1-10 to Ground

Check - Power supply 6VDC fuse. If fuse is not blown, check Plug P1 wiring.

- If fuse is blown, unplug P1 and replace fuse. If fuse blows again, problem is in the P1 wiring.
- If fuse does not blow, 6VDC circuit on logic assembly, has a short circuit.

2. No 12VDC at Plug P1-3 to Ground

Check - Power supply 12VDC fuse. If fuse is not blown, check plug P1 wiring.

- If fuse is blown, unplug P1 and replace fuse. If fuse blows again, problem is in the P1 wiring.

- If fuse does not blow, 12VDC circuit on logic assembly or filter capacitor (C3) on power supply has a short circuit.

3. No +15VDC at Plug P1-1 to Ground

Check - For 12VDC at P1-3. If no 12VDC at P1-3, check Sec.B.2. If 12VDC at plug P1-3, check for open circuit on logic assembly.

4. No +5VDC at Plug P1-2 to Ground

Check - For about 9½VDC at plug P1-5. If no 9½VDC at P1-5, check P1 wiring or resistor R1 (5 ohm 5 watt) on logic assembly. If 9½VDC at P1-5 is okay, see Sec.A.3.b.

5. Increment Sensor Plug P2-1 to Ground and Plug P2-2 to Ground

Check - Changing voltage level at both P2-1 and P2-2 (.8 volts to 4.0 volts) when tumbler is rotated slowly.

Both Changing - Increment sensor board okay. Problem is in logic assembly.

One Changing - Unplug machine. Unplug P2. Check for short to ground on logic assembly P2-1 or P2-2, whichever is not changing. If shorted, logic assembly is bad. If not shorted, increment sensor is bad.

Neither Changing - Increment sensor bad or increment disc loose or worn.

6. Coin Switch Input at Plug P2-4 to Ground

Check - For +5VDC at coin switch (green wire to blue wire). If not +5VDC, do Sec.B.4. If okay, check input at plug P2-4 with volt meter. Should read +5VDC normally and drop to zero when coin switch is pressed down. If voltage readings are correct, the coin switch is good and the problem is on the logic assembly. If voltages are not okay, check the coin switch or P2 wiring.

OUTPUT SIGNALS

7. Speaker Output Plug P1-9 to Ground

Check - Speaker resistance with Plug P1 disconnected, should read about 8 ohms. If not, replace speaker. If reading is 8 ohm, problem is on logic assembly or in P1 wiring.

8. Coin Counter Output at Plug P1-11 to Ground

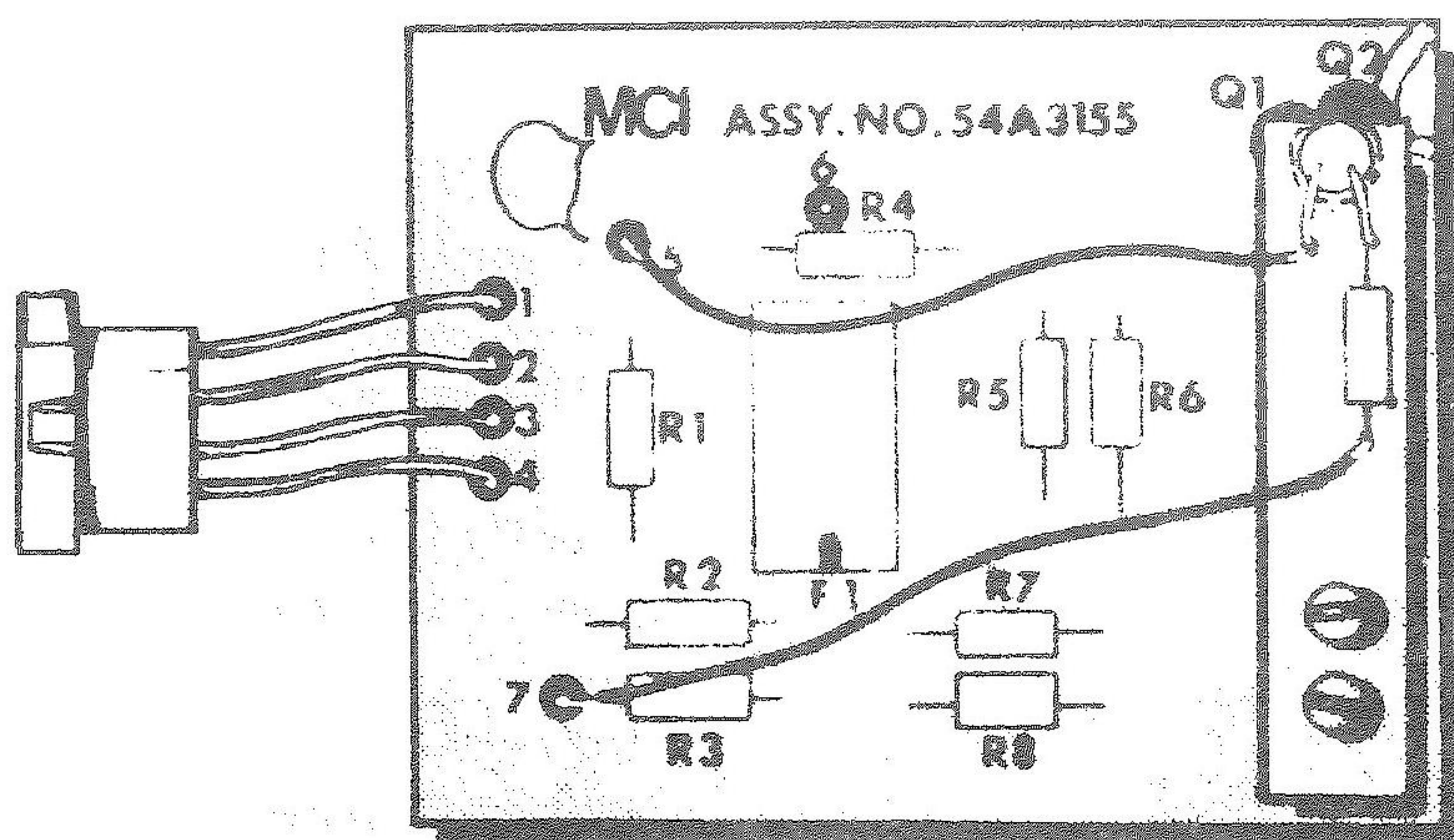
Coin counter will turn on when coin switch is energized and will not turn off until the tumbler is turned.

Check - Resistance of counter coil with plug P1 disconnected, should read about 160 ohms. If not, replace counter. If reading is okay, problem is on logic assembly or in P1 wiring.

9. Optical Decoupler Output at Plug P1-9 to Ground

Check - The output at P1-4 to ground should be +15VDC. If not +15VDC, unplug machine from wall. Unplug P1 and check resistance of OD1 lamp (TP3-1 to TP3-2) and OD2 lamp (TP3-5 to TP3-6). Reading should be about 60 ohms on each. If readings are right, problem is on logic assembly or P1 wiring. If readings are not okay, replace the optical decoupler that does not read correctly.

C. INCREMENT SENSOR ASSEMBLY 54A3155

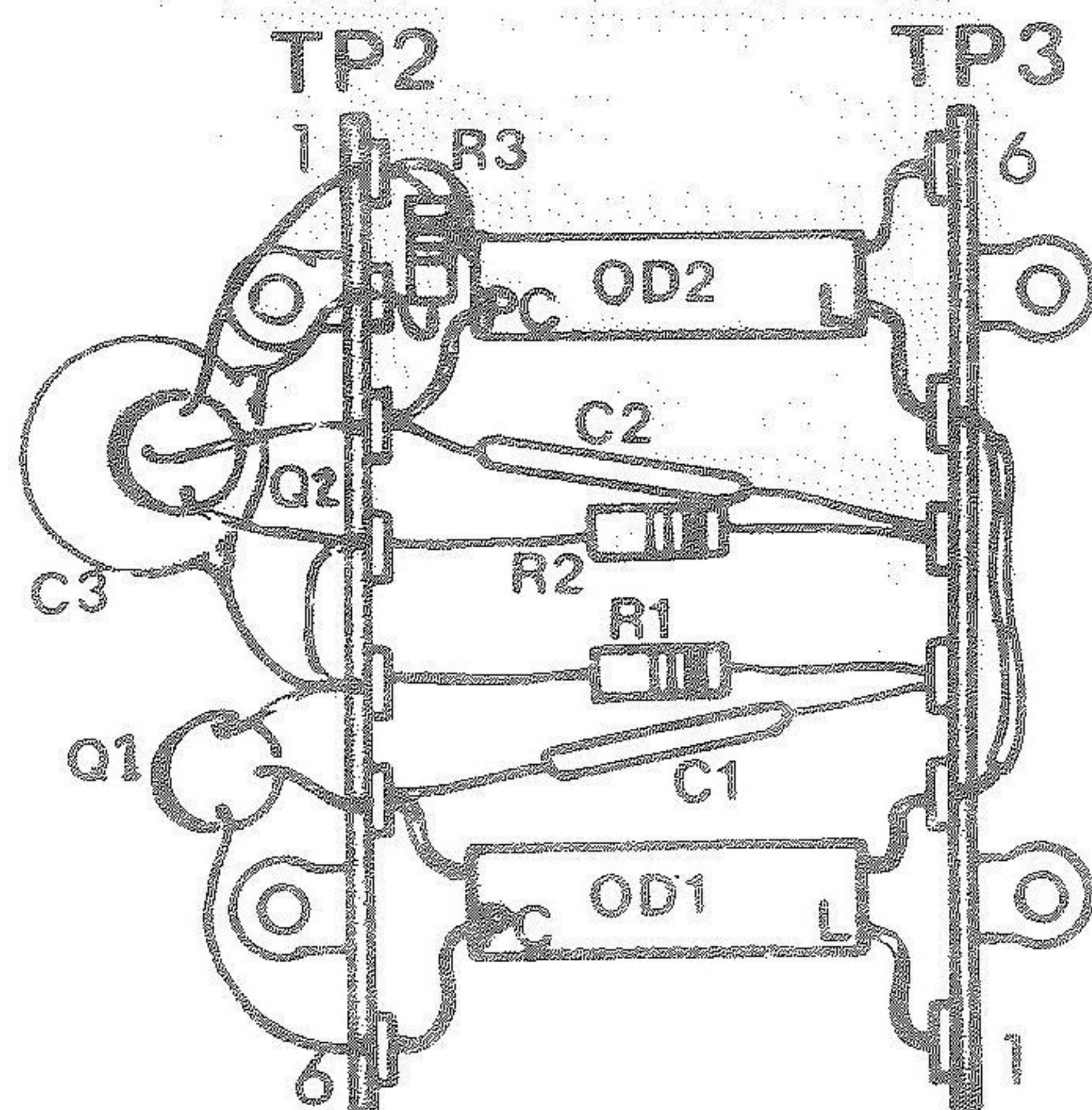


If rotating red LEDS sequence properly and change direction when tumbler direction is changed, increment sensor is okay, problem is on main logic assembly or P2 wiring. If not:

1. Remove metal cover on back of small safe door.
2. Check for +5VDC, see Sec. B.4., or check P2 wiring.
3. Check to see if LED on LED mounting strip (on increment sensor board) is glowing red. If +5VDC is okay and LED is not "on", check jumper wires to LED or replace LED.

4. If Sec.C2., and C.3. above are okay, see Sec.B.5.

D. AC SOLENOID ASSEMBLY 54A3077



The optical decouplers (OD1 and OD2) are used to interface the logic output to the 115VAC door opening solenoid and the token solenoid. The logic assembly output turns on the decoupler lamps when the player wins, which decreases the resistance of a photocell in the decoupler. This in turn energizes the triacs (Q1 and Q2) which turn on the two solenoids.

If a player wins and neither solenoid operated, disconnect plug P1 and check resistance of OD1 Lamp (TP3-1 to TP3-2) and OD2 lamp (TP3-5 to TP3-6). Readings should be about 60 ohm each. If not, replace the optical decoupler with the bad reading.

If door solenoid is not good, but token solenoid okay, try to open door with key switch. If door opens, replace OD2. If door does not open, check door solenoid, triac Q2, or wiring.

If token solenoid is not good, but door opens, check token solenoid. If okay, jumper a resistor, any value from 100 ohm to 1000 ohm, momentarily between TP2-5 and TP2-6. If solenoid turns "on" replace OD1. If solenoid does not turn on, triac Q1 is probably bad and should be replaced.

IV. PARTS

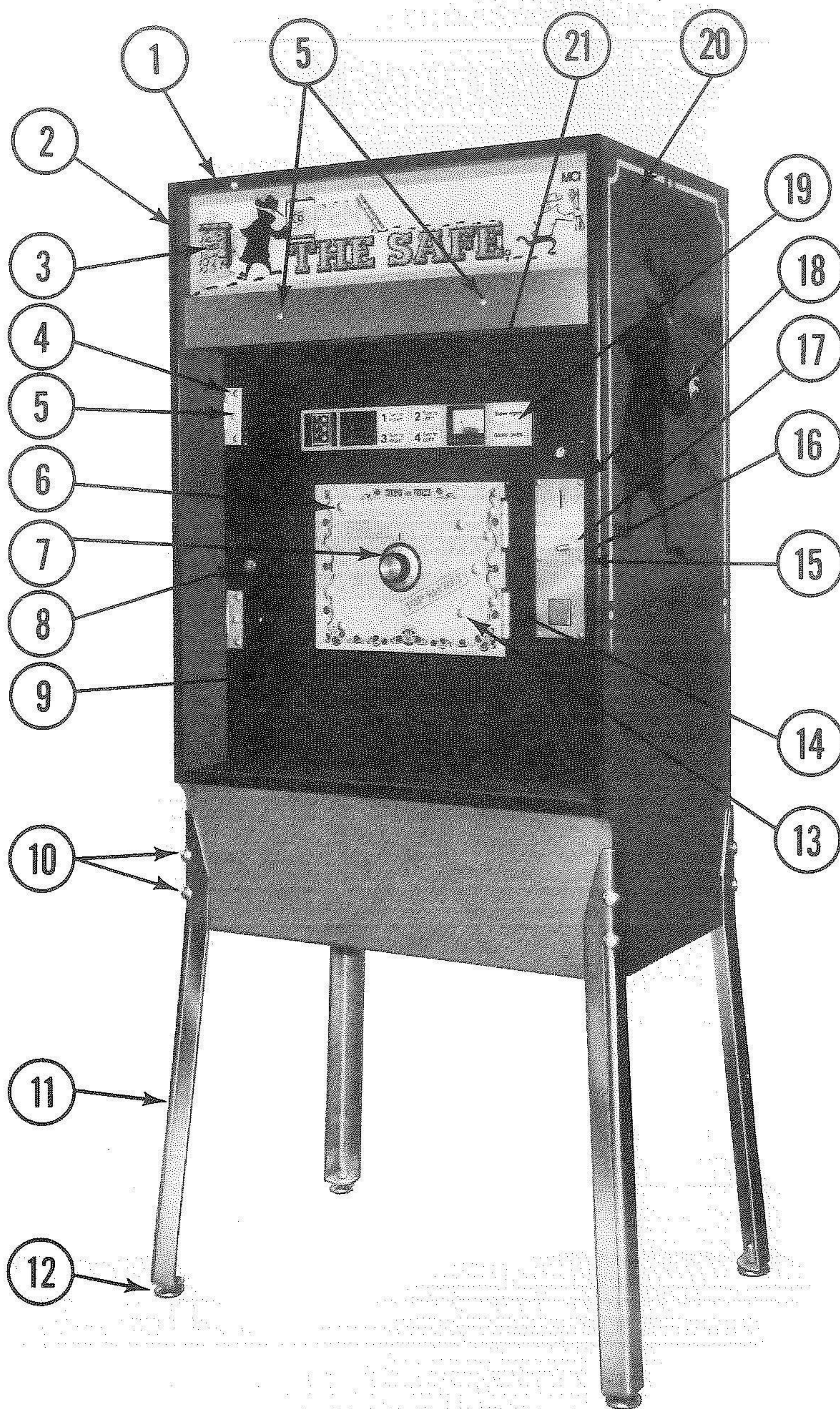


FIGURE NO. 1 CABINET EXTERIOR

FIGURE NO. 1 EXTERIOR

ITEM	PART NUMBER	DESCRIPTION
1	07S2842-002	26½" Black Vinyl Trim "T" Molding
2	07S2842-001	35½" Black Vinyl Trim "T" Molding
3	07S2990	Title Screen-Plexiglass
4	31R3023	Hinge, Main Door
5	32R3060-004	Carriage Bolt 10-32/1"
6	11M2985	Aluminum Door
7	34R2963-002	Dial
8	31R3048	Key Lock Switch, N.O.
9	57L2983	Main Door, Less Hardware
10	32R3060-084	Carriage Bolt 3/8"-16x3"
11	11R3015	Leg, Chrome
12	30R533	Leveler
13	32R3060-028	Carriage Bolt 1/4"-20x1"
14	31R3070	Hinge
15	67S527	Coin Acceptor (.25)
16	31R267	Lock #527 (including keys)
17	35R2307	Label 1 Play/Quarter
18	32R3060-100	Carriage Bolt 8-32x1"
19	07S2997-000	Display Panel Plexiglass
20	57R2982	Cabinet, Less Door and All Hardware
21	07S2988	Bottom Light Shield, Plexiglass

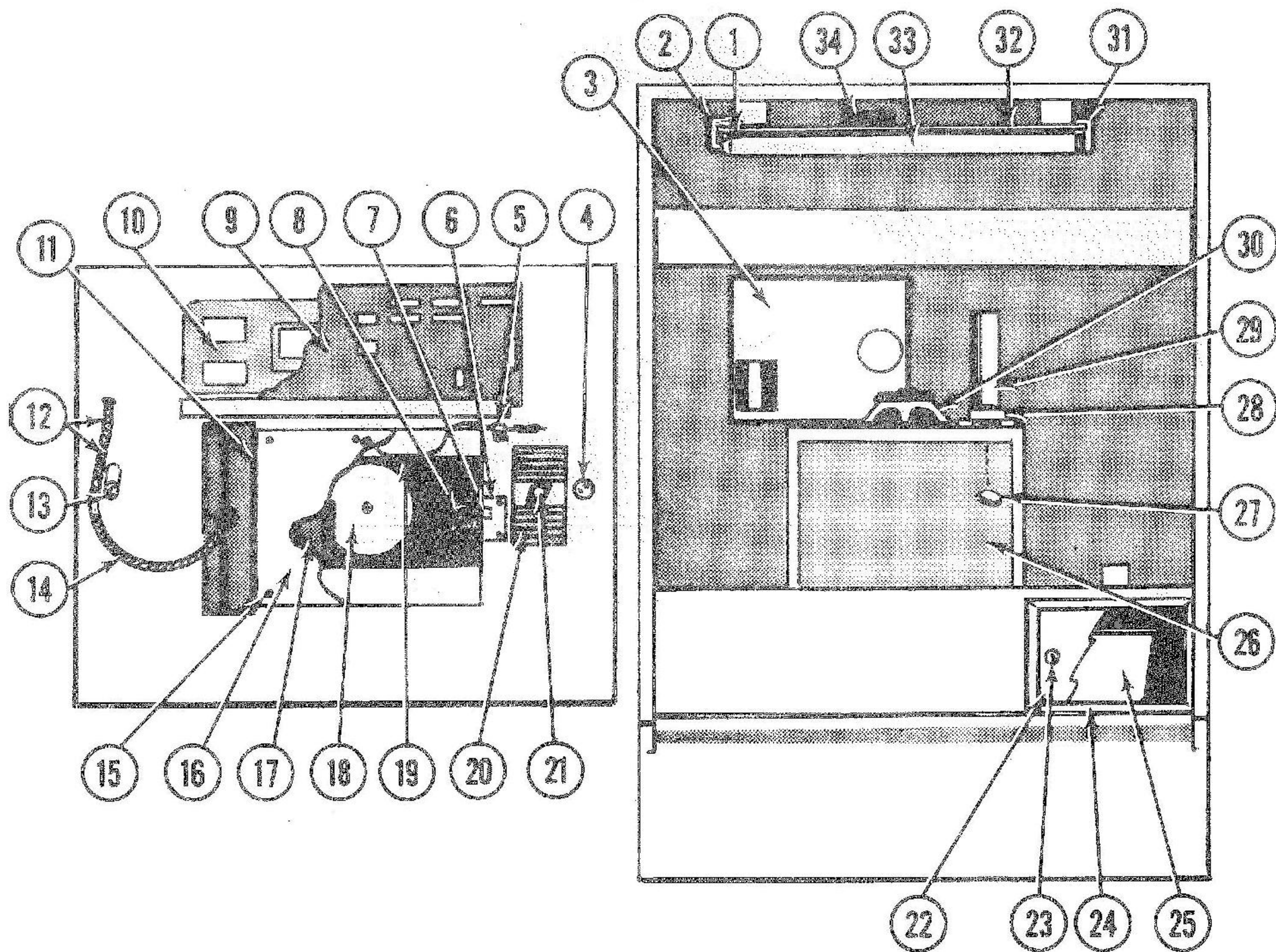
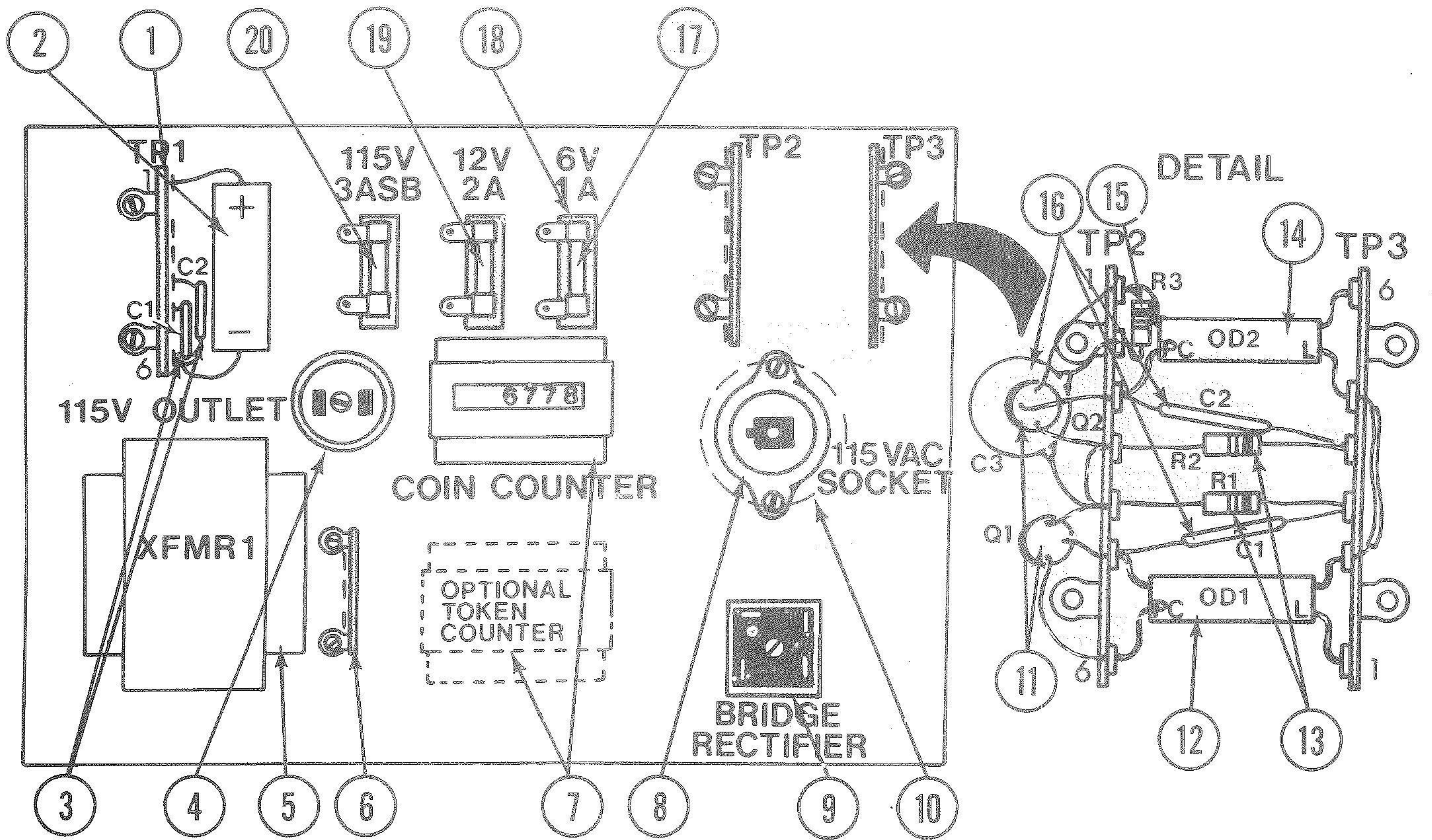


FIGURE NO. 2 CABINET INTERIOR

FIGURE NO. 2 INTERIOR

ITEM	PART NUMBER	DESCRIPTION
1	36R218	Starter
2	18R204	Starter-Tube Holder
3	54A3022	Power Supply Assembly
4	31R3048	Key Lock Switch N.O.
5	11S3099	Cable Hold Down Plate
6	11S2987	Striker Plate
7	54A3220	Door Latch Replacement Kit
8	11S2991	Latch Plate
9	54A3019	Logic Assembly Complete
10	07R3127-000	Plastic Vacuum Formed Light Shield
11	08R3213	Rubber Bumper
12	31R3068	Nylon Tie Wrap
13	31R267	Lock #527 Complete Assembly
14	30R3146	22" BX Armored Cable, Less Wires
15	32S2794	8-32x $\frac{1}{2}$ " Allen Head Cap Screw
16	11M2984	Back Panel, Black Anodized
17	54A3155	Increment Sensor Assembly
18	07S3158	Disc - 60 Increment, Plastic
19	15R3102	23" Cable, Insulated Steel
20	11R2875-002	Heat Sink Only
21	22R2708	Voltage Regulator Circuit LM309K
22	11R312	Coin Door
23	31R268	Coin Door Lock (all keyed differently)
24	11R314	Coin Door Frame
25	11R262	Coin Pan
26	02R3166	Panel, Cardboard
27	11R3001	Token, 1 $\frac{1}{8}$ "
28	67S2796	Token Dispenser
29	02R3073	Token Filler Tube
30	29S2447	Speaker 8 OHM 4W
31	18R205	Tube Holder-Florescent
32	11S2613	Light Plate-Manonite
33	36R2855	Florescent Black Lamp (alt. 20W white flores.)
34	16R191	Ballast

POWER SUPPLY



INCREMENT SENSOR ASSEMBLY

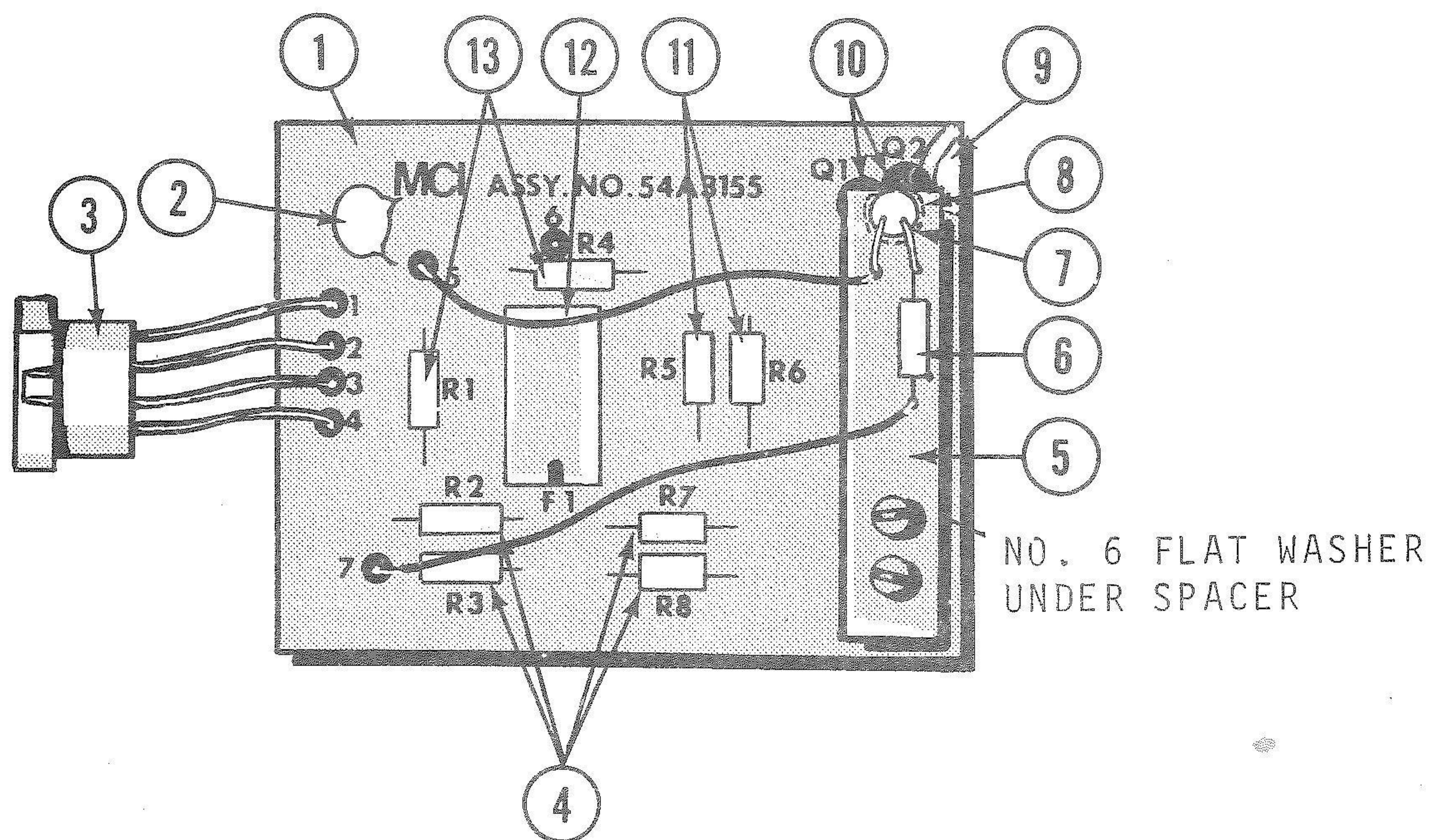


FIGURE NO. 3

FIGURE NO. 3

POWER SUPPLY

<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	30R231	Terminal Strip 6 Pin
2	25S515-105	Cap. 3000 MFD 15W VDC
3	25S2733	Cap. .01 MFD 150VAC Disc
4	18R2278	Surface Outlet 115 VAC
5	16R2884	Transformer
6	30R2594	Terminal Strip 3 Pin
7	27R237	Counter 24 VDC
8	18S2267	Lamp Socket
9	19R194	Bridge Rectifier
10	36R3106	Lamp 115 VAC 60W-Frosted
11	21R3081	Triac .3A 400V
12	22R2798	Opto-Isolator
13	23S300-312	Resistor 10 OHM. $\frac{1}{2}$ W
14	22R2798	Opto-Isolator
15	23S300-324	Resistor 100 OHM. $\frac{1}{2}$ W
16	25S2733	Cap. .01 MFD 150 VAC Disc
17	30S196	Fuse Block
18	26S626-003	Fuse 1 AMP
19	26S626-006	Fuse 2 AMP
20	26S195-001	Fuse 3 AMP Slo-Blo

INCREMENT SENSOR ASSEMBLY

<u>ITEM</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	54A3155	Increment Sensor Assembly, Complete
2	25S3176-129	Capacitor .01 MFD 50V Disc
3	54A3155-001	Plug 4 Pin Female Assembly
4	23S300-350	Resistor 15K OHM. $\frac{1}{2}$ W 10%
5	11S3150	Led Mount
6	23S300-322	Resistor 68 OHM. $\frac{1}{2}$ W 10%
7	36R3041-002	Led Indicator-Clear
8	31R3169-001	Led Retaining Ring
9	07R3221	Bumper
10	21R3161	Phototransistor FPT 230
11	23S300-362	Resistor 150K OHM. $\frac{1}{2}$ W 10%
12	22R3160	Quad Op-Amplifier
13	23S300-356	Resistor 47K OHM. $\frac{1}{2}$ W 10%

PC LOGIC ASSEMBLY

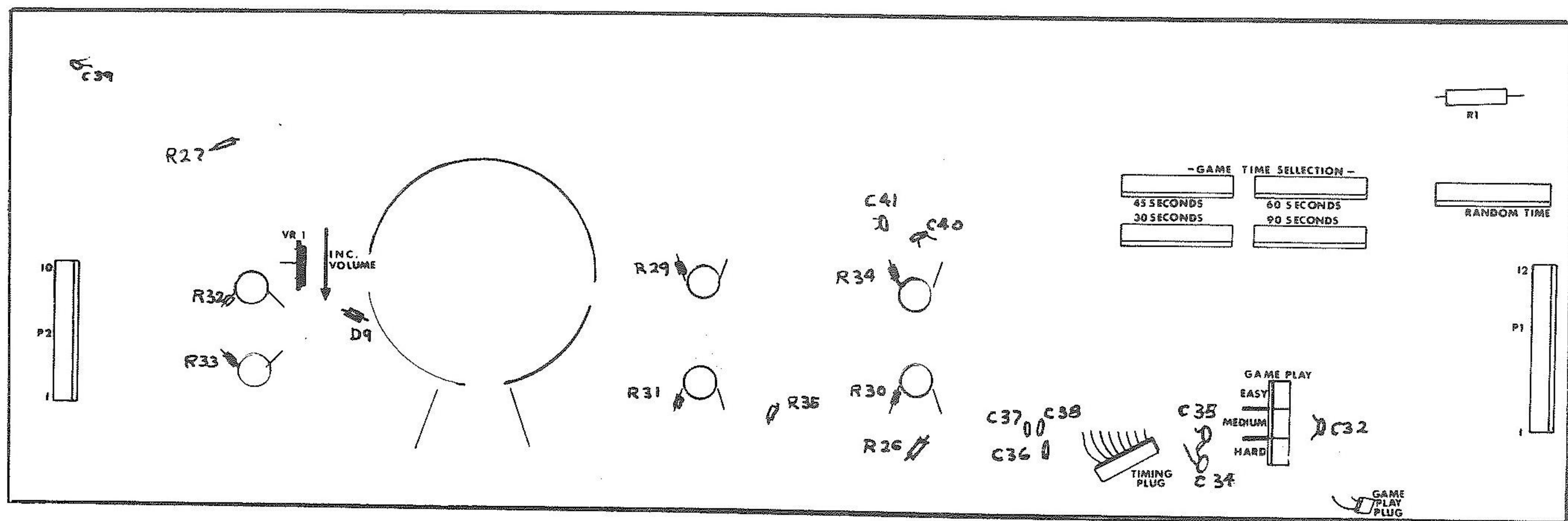
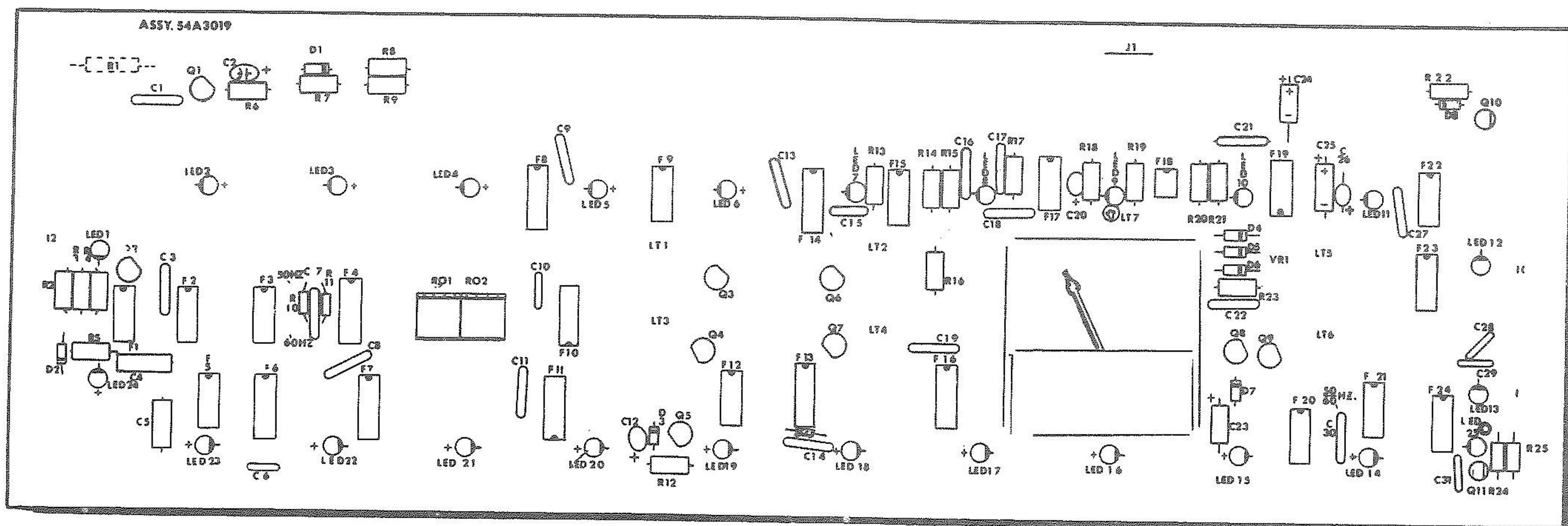


FIGURE NO. 4

FIGURE NO. 4
PC LOGIC ASSEMBLY

ITEM	PART NUMBER	DESCRIPTION
R29,34	23R300-314	Resistor 55 OHM, $\frac{1}{2}W$
R1	23R723-006	Resistor 5 OHM, 5W
R27	23S300-332	Resistor 470 OHM, $\frac{1}{2}W$ 10%
R26	23S300-340	Resistor 2.2K OHM, $\frac{1}{2}W$ 10%
C32,33,35,37	25S3176-129	Capacitor .01 MFD 50V Disc
C34,36,38	25S3176-136	Capacitor .1 MFD 50V Disc
D9	19R2016	Diode 1N4148
F20,22	22R2940	I.C. 7400
F5,24	22R2943	I.C. 7408
F21	22R3011	I.C. 7410
F12	22R2944	I.C. 7416
F23	22R3032	I.C. 7432
F9	22R2948	I.C. 7486
F1,2	22R3033	I.C. 7490
F3	22R3034	I.C. 7492
F6,16	29R2952-002	I.C. 74161 (9316)
F7,11	22R3035	I.C. 74192
F8,13,14	22R3036	I.C. 74195 (9300)
F4,10	22R3037	I.C. 9368
F15,17	22R2799	I.C. CD4001AE
F19	22R3038	I.C. LM380
F18	22R3039	I.C. NE555V
R01,2	27R3040	Display FND 500
Q3,4,5,6,7,8,9	21S475	Transistor 2N3644
Q10,11	21R2824	Transistor 2N5307
Q1,2	21S474	Transistor 2N3566
D2	19S2288	Diode MR502
D3,8	19S3074	Diode 1N4004
D1,4,5,6,7	19R2016	Diode 1N4148
LED 1 thru 25	36R3041	Indicate LED, Red FLV117
C25	25S511-413	Capacitor 50 MFD 15V Electrolytic
C12	25R2565-003	Capacitor 22 MFD 35V $\pm 10\%$ Tantulum
C2,20,26	25R2565-004	Capacitor 4.7 MFD 35V $\pm 10\%$ Tan.
C4,5,23,34,36,38,40,41	25S510-224	Capacitor .1 MFD 100V Mylar $\pm 10\%$
C1,3,6-11,13-19,21,27-33,35,37	25S3176-129	Capacitor .01 MFD 50V Disc
C22,39	25S3176-122	Capacitor .001 MFD 50V Disc
C24	25S511-407	Capacitor 10 MFD 16V Electrolytic

ITEM	PART NUMBER	DESCRIPTION
R3,6,16,19,20, 22,23	23S300-352	Resistor 22K $\frac{1}{2}$ W 10%
R2,4,9,10,11, 26,7	23S300-340	Resistor 2.2K $\frac{1}{2}$ W 10%
R12	23S300-364	Resistor 220K $\frac{1}{2}$ W 10%
R8	23S300-346	Resistor 6.8K $\frac{1}{2}$ W 10%
R13,21	23S300-362	Resistor 150K OHM. $\frac{1}{2}$ W 10%
R15	23S300-374	Resistor 1.5M OHM $\frac{1}{2}$ W 10%
R14	23S300-353	Resistor 27K OHM. $\frac{1}{2}$ W 10%
R18	23S300-376	Resistor 2.2M OHM. $\frac{1}{2}$ W 10%
R5	23S300-330	Resistor 330 OHM. $\frac{1}{2}$ W 10%
R24	23S300-372	Resistor 1 Meg. OHM. $\frac{1}{2}$ W 10%
R25	23S300-333	Resistor 560 OHM. $\frac{1}{2}$ W 10%
R17	23S300-388	Resistor 22 Meg. OHM. $\frac{1}{2}$ W 10%
R28	23R740-008	Resistor 470 OHM. $\frac{1}{4}$ W 10%
	30R2913	Bead Chain Terminal
LT7	36R3125	Meter Lamp 6.3V/50ma
	27R3042	Meter 0-5 VDC
	18R203-002	Spring Base Socket
LT1-6	36R2588	Lamp #47
VR1	24R469-004	Trim Pot 50K Vert. Mtg.
P1	18S2937-004	Wafer - 12 Pin Male
P2	18S2937-009	Wafer - 10 Pin Male
	18S2937-006	Wafer - 8 Pin Male
	18S2937-002	Wafer - 6 Pin Male
	07R3105-001	Tubing - Shrink $\frac{1}{4}$ " I.D.X.1" Lg.
	07S2621-002	Insulating Spacer $\frac{1}{2}$ " Lg.

(PARTS NOT ILLUSTRATED)

<u>PART NUMBER</u>	<u>DESCRIPTION</u>
11S3097	Striker Plate - Main Lock
57M2986	Wood Back for Aluminum Door
11S2994	Dial Shaft
13R3045	Shaft Bearing 502 I.D.
54A3025-001	Power Supply Harness
54A3025-002	Main Door Harness
18S2937-009	Plug - 10 Pin Female
18S2936-007	Plug - 4 Pin Female
18S2937-001	Terminal - (.045 Female)
18S2936-002	Terminal - (.093 Male)
18S2937-011	Polorizing Plug (for P2)
30R3134	Terminal - 1/4 Str. QC/INS
30R3145	Terminal - 1/4" Ring, #22-#18 Ga.(Red)
30R3095	Terminal - #6 Flanged Spade
30R3146	BX Armored Cable-Less Wires
30R3147	#0 Anti-Short Bushing
18S2936-008	Plug - 4 Pin Male
18S2936-001	Terminal - .093 Female
16R3164-001	Toroid
54A3025-003	PC Logic Wiring
18S2937-007	Plug - 8 Pin Female
18S2937-008	Plug - 2 Pin Female
18S2937-001	Terminal - (.045 Female)
30R3095	Terminal - #6 Flanged Spade
54A3096	Probe with 24" Lead