

COSMIC SERIES

Magical SPOT

Operation, Maintenance and Service Manual





Thank you very much for your purchase of the MAGICAL SPOT. Carrying a CPU, the MAGICAL SPOT is a game machine of the newest type with many features and functions.

This manual describes how to make the most of such features and functions, so please read it carefully in order to make the best use of the machine.

CONTENTS

I. Features of this machine	1
II. How to handle and maintain this machine	2
III. How to play	3
IV. Various optional settings	4
A. Positions of dip switches	4
B. Setting the option (dip switches)	4
C. Volume controller knob	5
V. TV monitor	5
A. Adjustment of TV picture screen	5
VI. Upright type parts catalog	6
A. Component parts related to cabinet (outside)	6
B. Drawing of circuit board mounting positions	7
C. Fuses	7
D. Component parts related to cabinet (inside)	8
a) Operating panel assembly	8
b) Door assembly and parts list	9
c) Lever assembly and parts list	10
E. Component parts related to switches in the cabinet	11
VII. Table type parts catalog	12
A. Component parts related to cabinet (outside)	12
B. Component parts related to cabinet (inside)	13
a) Inside cabinet	13
b) Fuses	14
c) Operating panel assembly	14
VIII. Circuit board	15
A. Circuit board IC location and parts list	15
a) Main circuit board IC location and parts list	15
b) Sub-circuit board IC location and parts list	16
c) Sound circuit board IC location and parts list	17
Wiring diagram (connector)	19
Sound block diagram	20
Power source block diagram	20
Block diagram	20
Schematic diagram (20" color)	21
Schematic diagram (14" color)	22
Main block diagram	23, 24
Postface	25

REFERENCE DRAWING

Fig. 1	Positions of Dip Switches	4
Fig. 2	Position of Volume Controller Knob	5
Fig. 3	Component Parts Related to Cabinet (Outside)	6
Fig. 4	Circuit Board Mounting Positions	7
Fig. 5	Side View of Circuit Board Mounting Positions	7
Fig. 6	Fuses in the Power Source Unit	7
Fig. 7	Fuses in the Power Circuit Board	7
Fig. 8	Component Parts Related to Cabinet (Inside)	8
Fig. 9	Operating Panel Assembly	8
Fig. 10	Inside View of Door Assembly	9
Fig. 11	Lever Assembly	10
Fig. 12	Component Parts Related to Switches in the Cabinet	11
Fig. 13	Component Parts Related to Cabinet (Outside)	12
Fig. 14	Component Parts Related to Cabinet (Inside)	13
Fig. 15	Fuses in the Power Source Unit	14
Fig. 16	Fuses in the Power Circuit Board	14
Fig. 17	Operating Panel Assembly	14
Fig. 18	Main Circuit Board	15
Fig. 19	Sub-circuit Board	16
Fig. 20	Sound Circuit Board	17

— WHEN ORDERING PARTS —

Since each component part is indicated by block, definitely specify both the corresponding Fig. No. and part No. within the Fig. when placing an order for it.

I. FEATURES OF THIS MACHINE

1. The game packs in excellent features capturing the hearts of players.
2. The lever control system is simple to handle.
3. At the flick of a dip switch, you can select among extended play, the number of tanks and time of appearance of an additional tank, etc.
4. High score for the day is always displayed on the screen.
5. Finely designed cabinet and fascinating acoustic effects.

II. HOW TO HANDLE AND MAINTAIN THIS MACHINE

1. Since the UNIVERSAL's MAGICAL SPOT employs a color TV receiving set, be careful not to shake it during transit and when carrying it about.
2. Install it at a location which is not exposed to direct sunlight. In order to prevent the inside temperature rising, avoid as much as possible a location near a heater, etc.
3. Since the grounding terminal is visible, be sure to connect it to a grounding conductor.
4. Insert the power cord into the outlet and turn on the switch.
5. Even if the solid-state module seems to be out of order, do not check the circuit by means of a circuit tester, etc., since the internal voltage of the tester, etc. may sometimes break down the IC.
6. Make sure the machine is well ventiated. If the temperature of the IC and transistor is lower than 60°C, the function normally and may be considered reliable. If it exceeds 60°C, their performance cannot be guaranteed.
7. Make sure that the connector, etc. is not disconnected.
8. Whenever connecting the power cord of the solid-state module to, or disconnecting it from, the outlet, be sure to turn the power off.
9. Although the products of UNIVERSAL are manufactured with the utmost care, they may develop malfunctions when used for long periods. So, be sure to chek this machine daily.

III. HOW TO PLAY

1. By working the lever move the laser ship and shoot down the larvae dropping from the UFO.
 When hit the first time, the larvae change color and slow down. They are destroyed when hit the second time.
 You can also shoot down the grubs dropping from the UFO.
2. When the larvae reach the lowest stage, they creep under the ground one after another and change into cocoons. At this time, the cocoons do not fire a gun however, if the cocoons run into the laser ship the ship will explode.
3. As it becomes increasingly difficult to dodge the enemy's attack, the cocoons accumulate under the base. When 7 cocoons accumulate, they fly up and split on the screen changing into 7 Ultramoths which strongly assault your laser ship.
 The Ultramoths make a frontal attack at your laser ship in a line of 7, and dash against it in the second round.
4. If you dodge the enemy's attack so that the number of cocoons grown is kept under 6, or if you destroy all of the 7 Ultramoths and clear the screen, your rank rises.
 Each time when 2 ranks (Ranks 1 and 2, Ranks 3 and 4, Ranks 5 and 6, and so on) are raised, the screen color changes and the entire enemy nest' level drops one by one. At Ranks 11 and 12 the enemy reaches very close to your laser ship.
 From Rank 13 on, their nest level returns to the Rank 1 position.
5. Scoring 5,000 points awards another laser ship (the number of points can be changed by using dip switches). When all the laser ships are destroyed, the game is over.

Score

Grubs dropping from the UFO	60
Hit the 1st time (color changes)	13
Hit the 2nd time (explodes)	32
Ultramothe (imago)	50 - 90

IV. VARIOUS OPTIONAL SETTINGS

A. POSITIONS OF DIP SWITCHES

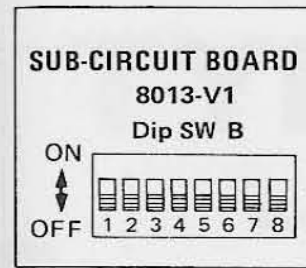
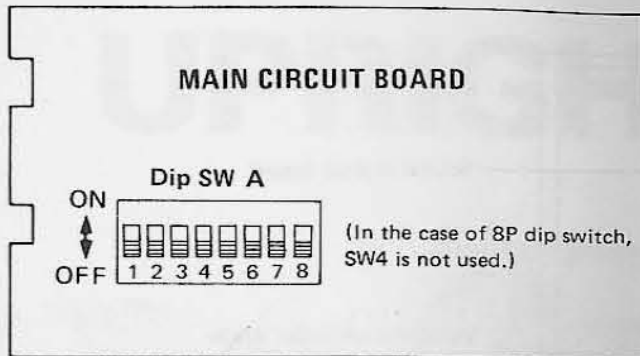


Fig. 1 Positions of Dip Switches

B. SETTING THE OPTION (DIP SWITCHES)

[Dip Switches A]

1. Change-over setting of the mode of game (SW1)

Style	SW1
Table	OFF
Upright	ON

2. Setting the number of LASER SHIPS for game (SW2, 3)

Number of LASER SHIPS	SW2	SW3
2 Ships	ON	ON
3 Ships	ON	OFF
4 Ships	OFF	ON
5 Ships	OFF	OFF

3. Setting the required score for an additional LASER SHIP (SW5, 6)

Score for Extra	SW5	SW6
Over 2000 pts	ON	OFF
Over 3000 pts	OFF	ON
Over 5000 pts	OFF	OFF
No extra	ON	ON

4. Setting the required score for Extra Game (SW7, 8)

Score for Extra	SW7	SW8
Over 5000 pts	ON	OFF
Over 10000 pts	OFF	ON
Over 15000 pts	OFF	OFF
No extra	ON	ON

[Dip Switches B]

1. Setting the game charge (Coin & Credit)

a. Right chute (SW1, 2, 3, 4)

Coin	Credit	SW1	SW2	SW3	SW4
1	1	OFF	OFF	OFF	OFF
1	2	OFF	OFF	OFF	ON
1	3	OFF	OFF	ON	OFF
1	4	OFF	OFF	ON	ON
1	5	OFF	ON	OFF	OFF
2	1	OFF	ON	OFF	ON
2	2	OFF	ON	ON	OFF
2	3	OFF	ON	ON	ON
3	1	ON	OFF	OFF	OFF
3	2	ON	OFF	OFF	ON
3	3	ON	OFF	ON	OFF
3	4	ON	OFF	ON	ON
4	1	ON	ON	OFF	OFF
4	2	ON	ON	OFF	ON
4	3	ON	ON	ON	OFF
4	4	ON	ON	ON	ON

b. Left chute (SW5, 6, 7, 8)

Coin	Credit	SW5	SW6	SW7	SW8
1	1	OFF	OFF	OFF	OFF
1	2	OFF	OFF	OFF	ON
1	3	OFF	OFF	ON	OFF
1	4	OFF	OFF	ON	ON
1	5	OFF	ON	OFF	OFF
2	1	OFF	ON	OFF	ON
2	2	OFF	ON	ON	OFF
2	3	OFF	ON	ON	ON
3	1	ON	OFF	OFF	OFF
3	2	ON	OFF	OFF	ON
3	3	ON	OFF	ON	OFF
3	4	ON	OFF	ON	ON
4	1	ON	ON	OFF	OFF
4	2	ON	ON	OFF	ON
4	3	ON	ON	ON	OFF
4	4	ON	ON	ON	ON

C. VOLUME CONTROLLER KNOB

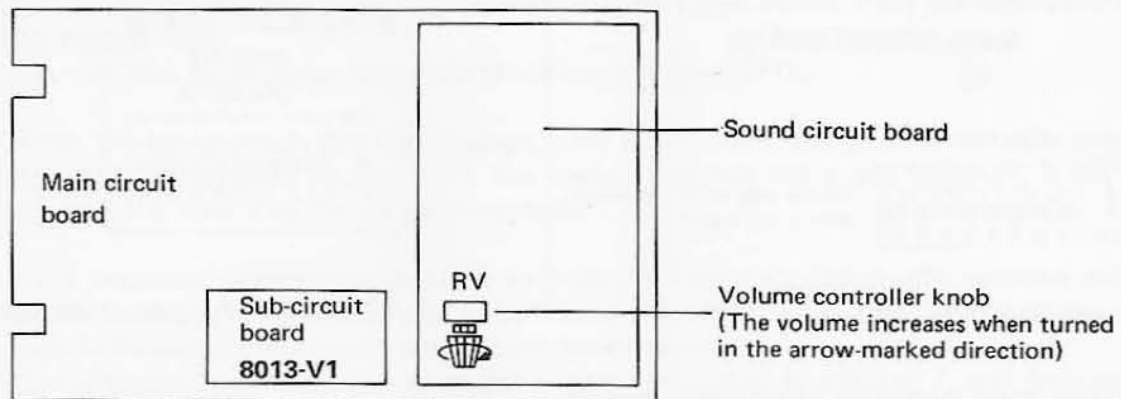


Fig. 2 Position of Volume Controller Knob

V. TV MONITOR

A. ADJUSTMENT OF TV PICTURE SCREEN

Since the TV picture screen has been factory-adjusted to optimum conditions at the time of shipment, it needs no adjustment as a rule. If it should by chance need adjustment, adjustment is possible to some extent by manipulating the knobs which appear in the wiring drawing (20"), (14").

UPRIGHT TYPE



This documentation provides standard information.
Universal reserves the right to change without notice.

UPRIGHT TYPE



Fig. 1. Upright Type

7:17 MONITOR

CONSTRUCTION

The 7:17 monitor is a high resolution, color display unit. It is designed for use with a variety of computer systems. The monitor is constructed from high quality materials and is built to last.



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For more information, contact your local distributor or write to: www.rockwell.com

VI. UPRIGHT TYPE PARTS CATALOG

A. COMPONENT PARTS RELATED TO CABINET (OUTSIDE)

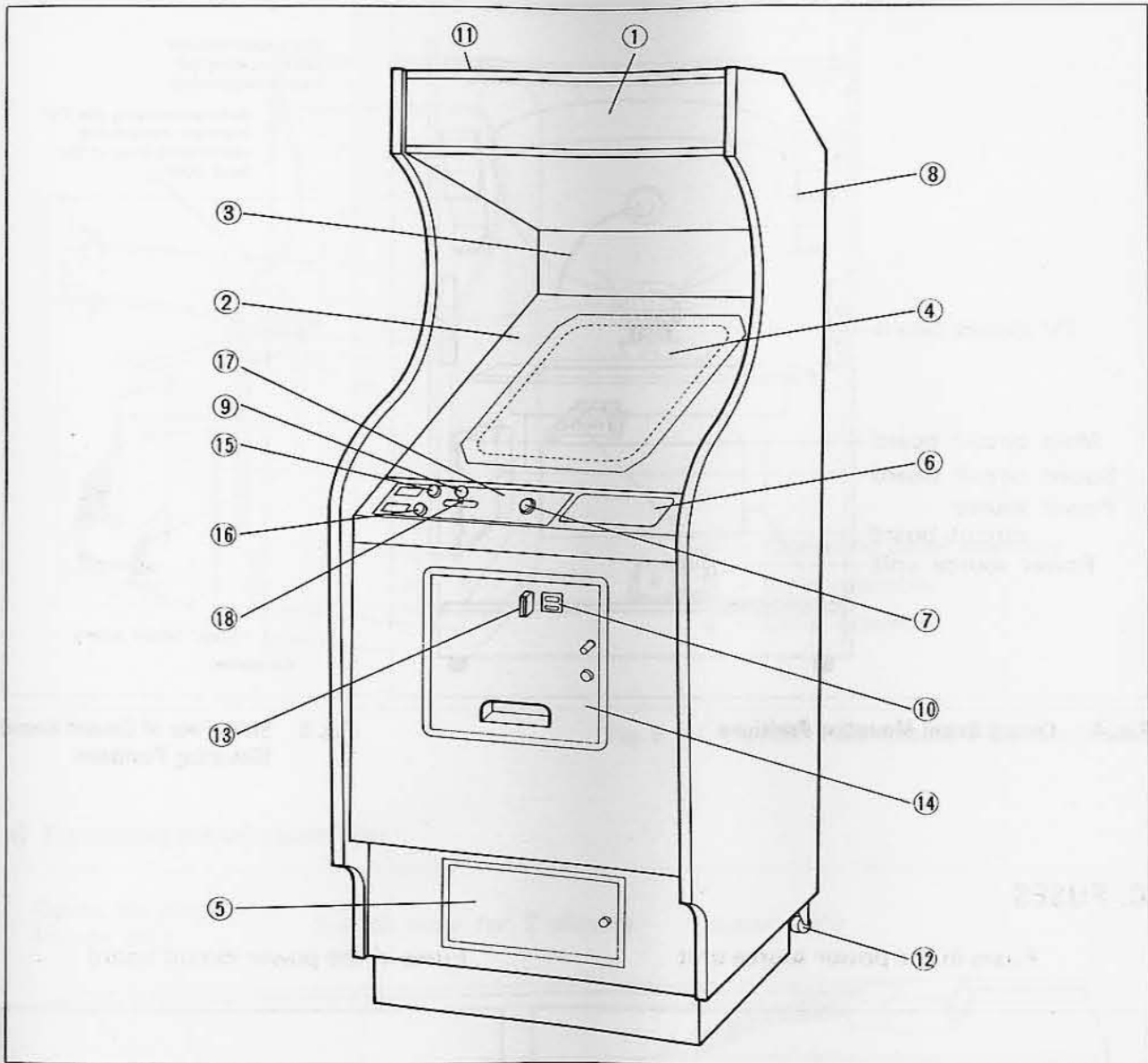


Fig. 3 Component Parts Related to Cabinet (Outside)

OUTSIDE CABINET PARTS LIST

Ref. No.	Name	Ref. No.	Name
1	Title panel	11	Title panel fixture
2	Illustrated glass A	12	Caster
3	Illustrated glass B	13	Coin slot
4	CRT	14	Main door
5	Cash box door	15	Push button (1 player)
6	Sticker for game rules	16	Push button (2 players)
7	Push button (Fire)	17	Operating indication panel
8	Cabinet proper	18	Control lever (general name)
9	Knob 32-Dim.		
10	Coin indication panel		

UNIVERSAL TYPE PARTS CATALOG

B. DRAWING OF CIRCUIT BOARD MOUNTING POSITIONS

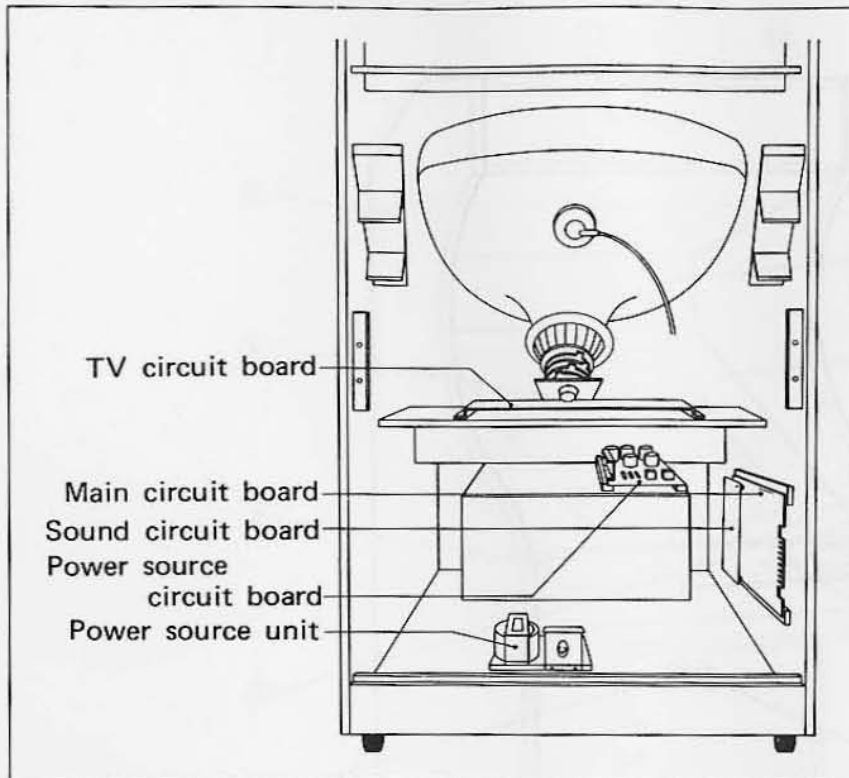


Fig. 4 Circuit Board Mounting Positions

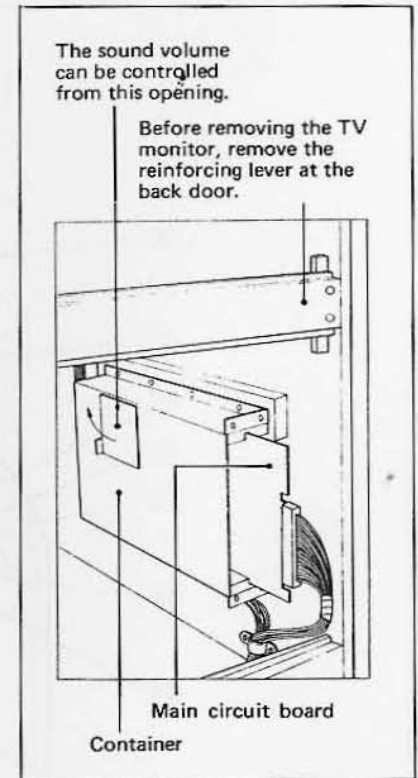


Fig. 5 Side View of Circuit Board Mounting Positions

C. FUSES

Fuses in the power source unit

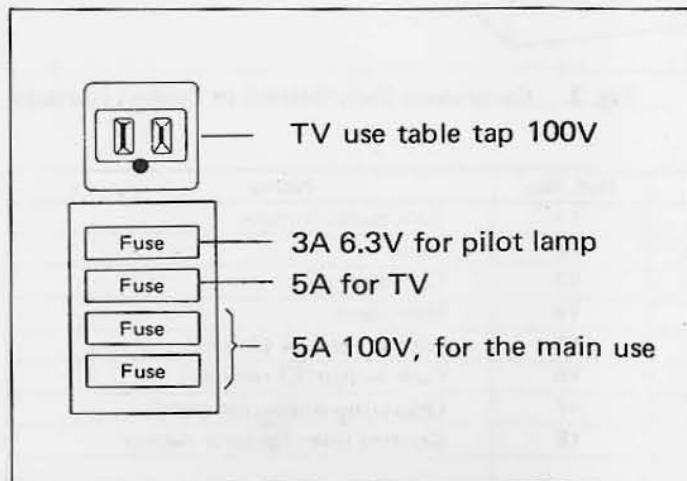


Fig. 6 Fuses in the Power Source Unit

Fuses in the power circuit board

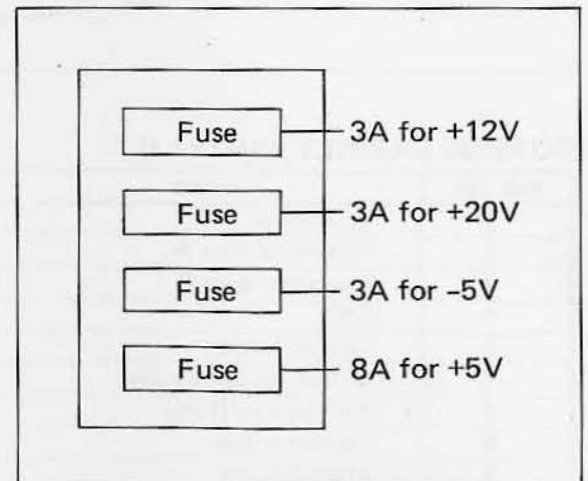


Fig. 7 Fuses in the Power Circuit Board

D. COMPONENT PARTS RELATED TO CABINET (INSIDE)

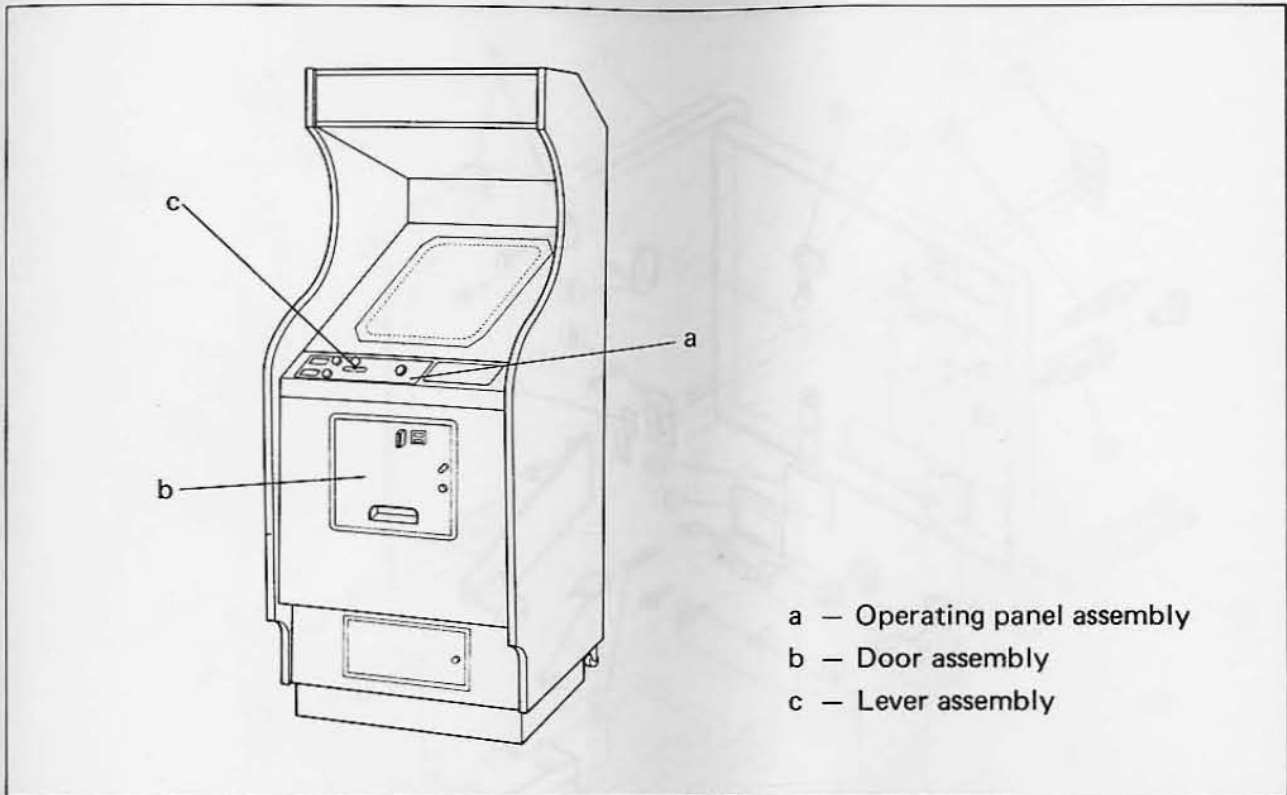


Fig. 8 Component Parts Related to Cabinet (Inside)

a) Operating panel assembly

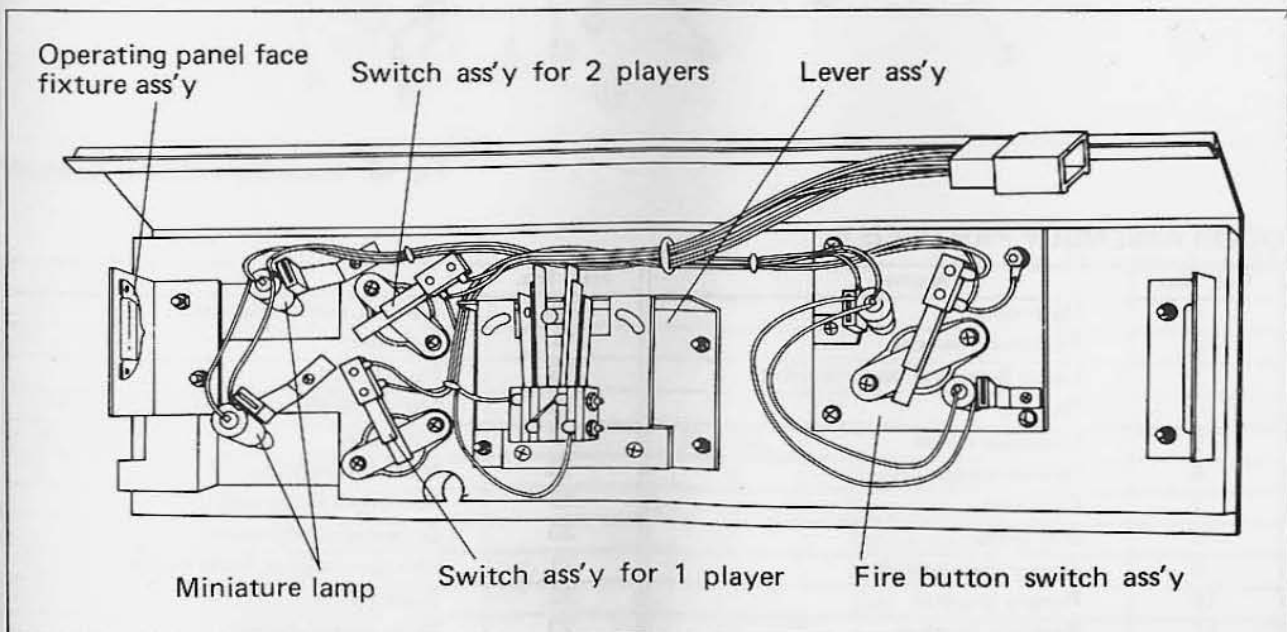


Fig. 9 Operating Panel Assembly

b) Door assembly and parts list

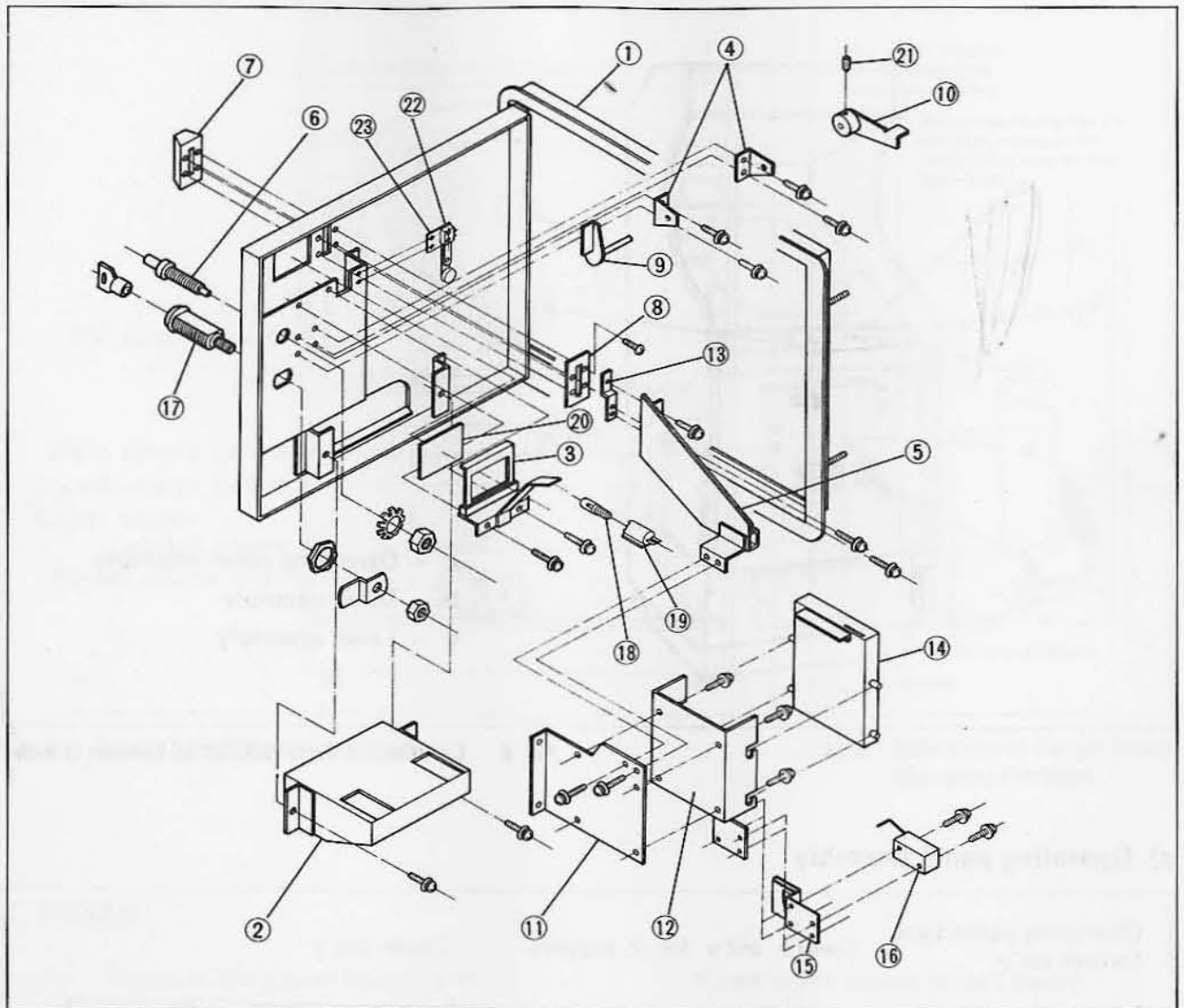


Fig. 10 Inside View of Door Assembly

DOOR ASSEMBLY PARTS LIST

Ref. No.	Name	Ref. No.	Name
1	Main door	13	Coin slot shute holder
2	Returning soucer	14	Rejector
3	Lamp & plastic plate bracket	15	Sensor slot
4	Rearing	16	Micro switch
5	Coin slot shute	17	Key sets
6	Returning button	18	Miniature lamp
7	Coin slot	19	Miniature lamp socket
8	Slot plate	20	Coin indication panel
9	Transmission shaft	21	Hexagon socket head screw
10	Rotary bracket	22	Slam switch
11	Rejector bracket	23	Slam switch holder
12	Rejector case		

c) Lever assembly and parts list

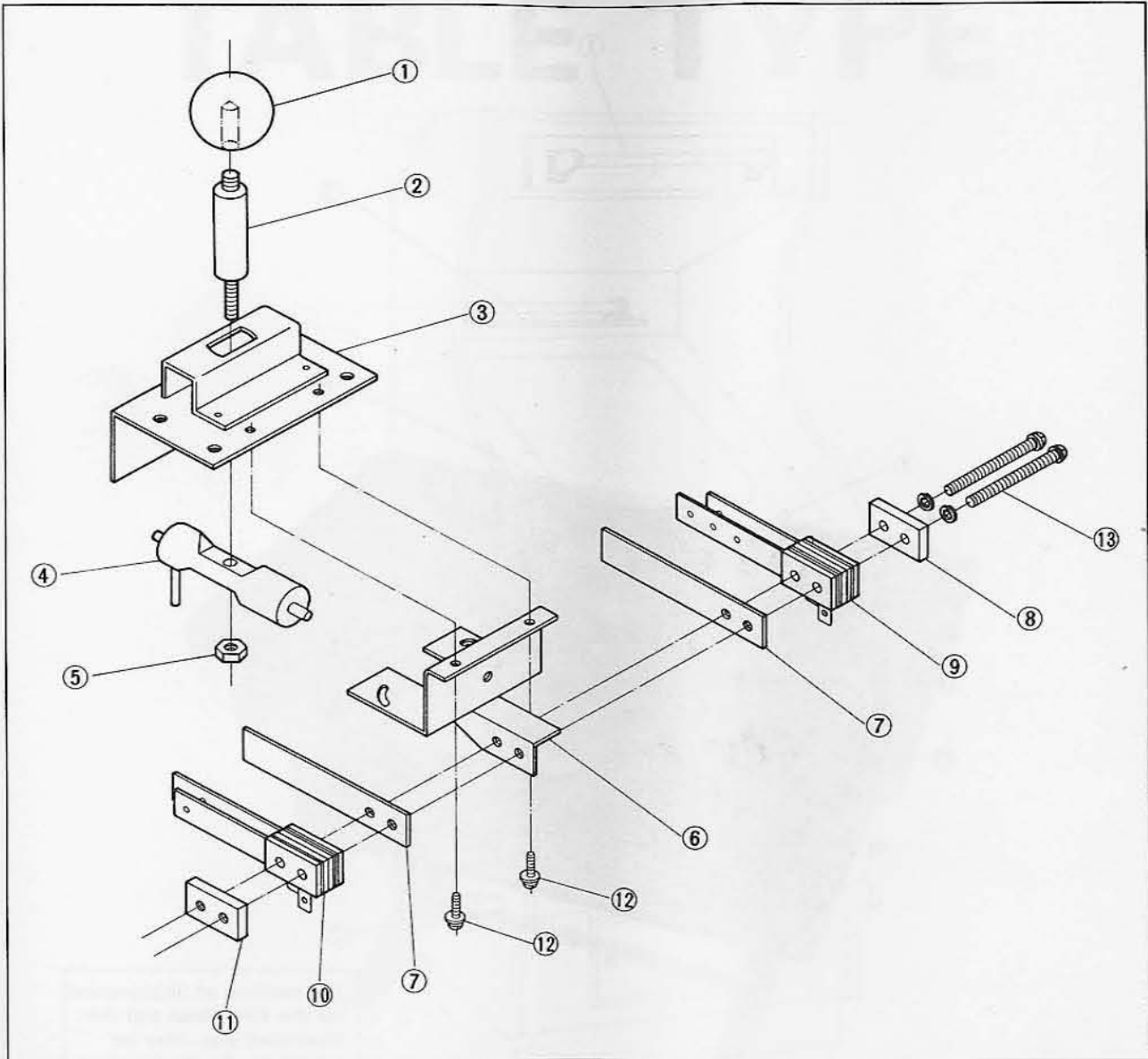


Fig. 11 Lever Assembly

LEVER ASSEMBLY PARTS LIST

Ref. No.	Name	Ref. No.	Name
1	Knob 32-Dim.	8	Spring holder
2	Lever shaft	9	Blades switch
3	Lever guide & stopper	10	Blades switch
4	Transmission bar	11	Spring holder with nut
5	Nut with stopper	12	Bolt
6	Switch bracket	13	Bolt
7	Spring		

E. COMPONENT PARTS RELATED TO SWITCHES IN THE CABINET

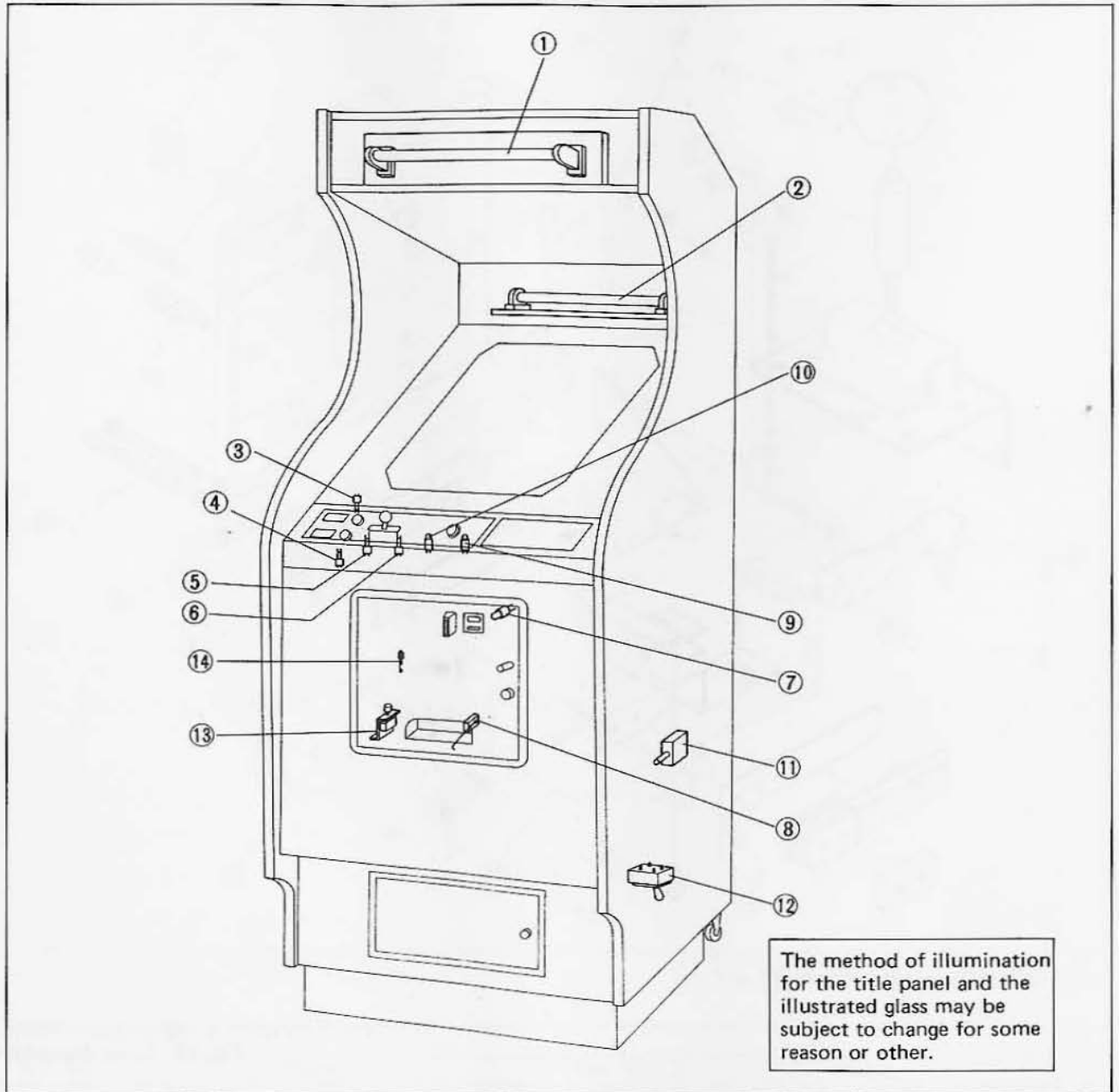


Fig. 12 Component Parts Related to Switches in the Cabinet

INSIDE CABINET PARTS LIST

Ref. No.	Name	Ref. No.	Name
1	Fluorscent lamp assembly	8	Micro switch
2	Fluorscent lamp assembly	9	Miniature lamp assembly
3	Blades switch	10	Miniature lamp assembly
4	Blades switch	11	Door switch
5	Blades switch	12	Toggle switch
6	Blades switch	13	Micro switch
7	Miniature lamp assembly	14	Slam switch

TABLE TYPE



This documentation provides standard information.
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TABLE TYPE

VII. TABLE TYPE PARTS CATALOG

A. COMPONENT PARTS RELATED TO CABINET (OUTSIDE)

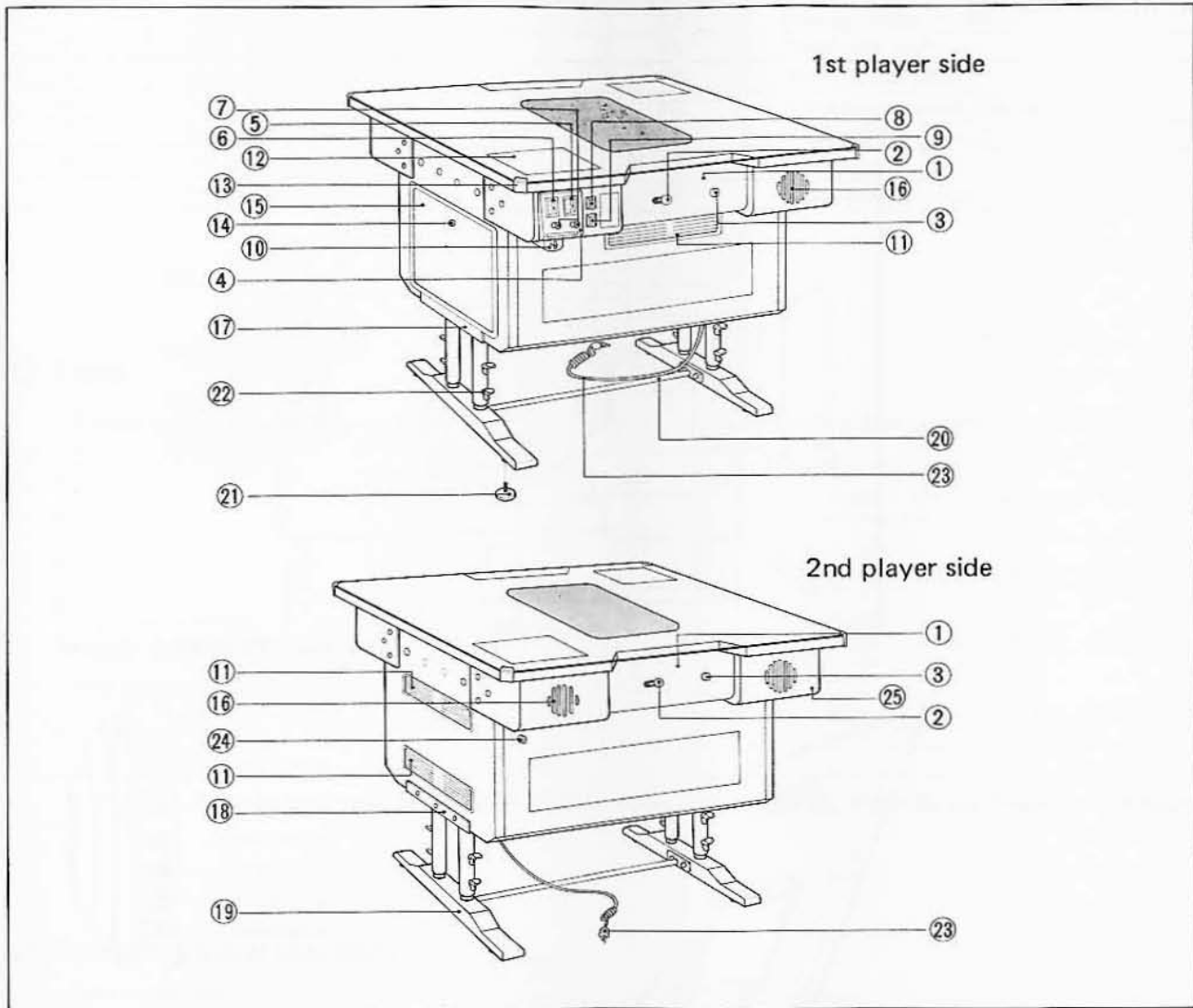


Fig. 13 Component Parts Related to Cabinet (Outside)

OUTSIDE CABINET PARTS LIST

Ref. No.	Name	Ref. No.	Name
1	Operating indication illustrated panel	13	Glass fittings
2	Control lever	14	Cash box door key
3	FIRE button	15	Cash box door
4	Coin slot frame	16	Speaker (x2)
5	Selector plate (1)	17	Leg (left)
6	Selector plate (2) [not used in case of 1-way]	18	Leg (right)
7	Cancel button	19	Foot
8	Push button ass'y (for 1 player)	20	Foot support
9	Push button ass'y (for 2 players)	21	Leg adjuster
10	Cancel coin receptacle	22	Thumbscrew (x8)
11	Ventilating panel (x3)	23	Power cord (AC)
12	Sticker for game rules (x2)	24	Door key
		25	Cabinet corner box

B. COMPONENT PARTS RELATED TO CABINET (INSIDE)

a) Inside cabinet

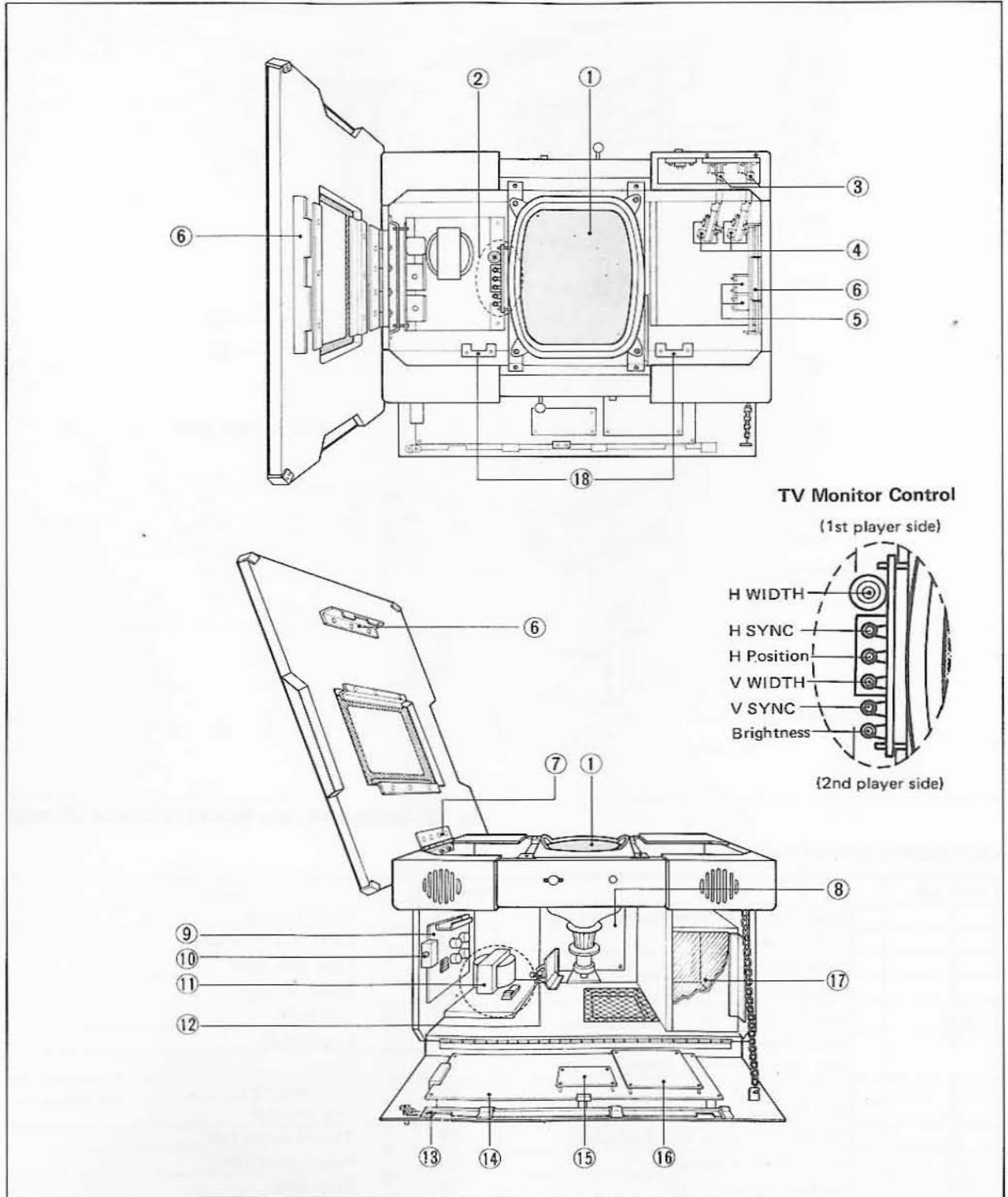


Fig. 14 Component Parts Related to Cabinet (Inside)

INSIDE CABINET PARTS LIST

Ref. No	Name	Ref. No.	Name
1	CRT (14" color)	10	Door switch
2	TV monitor control	11	Power source unit
3	Rejector ass'y	12	Demagnetization switch
4	Coin micro switch	13	Door lock ass'y
5	Coin counter	14	Main circuit board
6	Table lock mechanism ass'y	15	Sub-circuit board (8013-V1)
7	Butterfly plate ass'y	16	Sound circuit board
8	TV monitor circuit board	17	Cash box
9	Power source circuit board	18	Metal door fixture

b) Fuses

Fuses in the power source unit

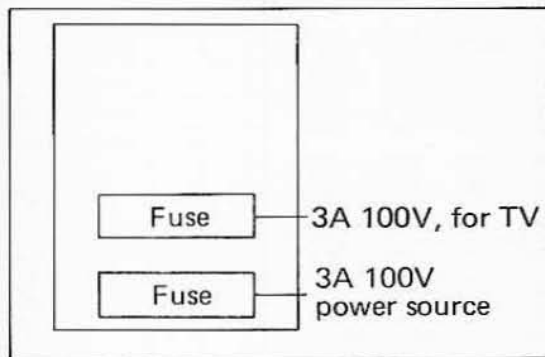


Fig. 15 Fuses in the Power Source Unit

Fuses in the power circuit board

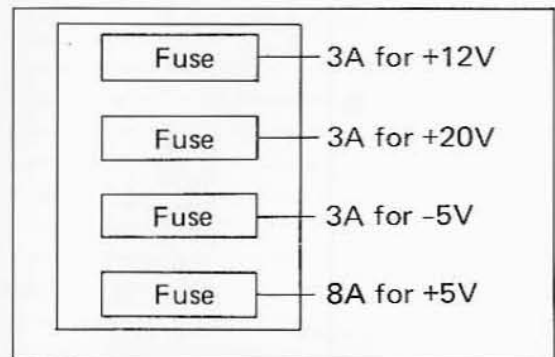


Fig. 16 Fuses in the Power Circuit Board

c) Operating panel assembly

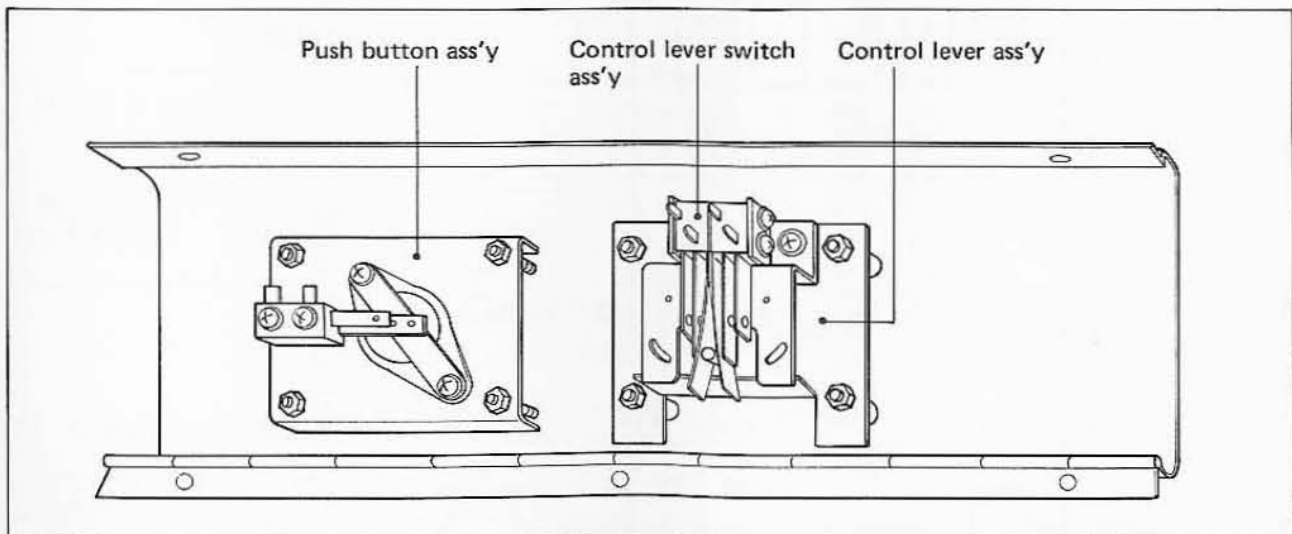


Fig. 17 Operating Panel Assembly

VIII. CIRCUIT BOARD

A. CIRCUIT BOARD IC LOCATION AND PARTS LIST

a) Main circuit board IC location and parts list

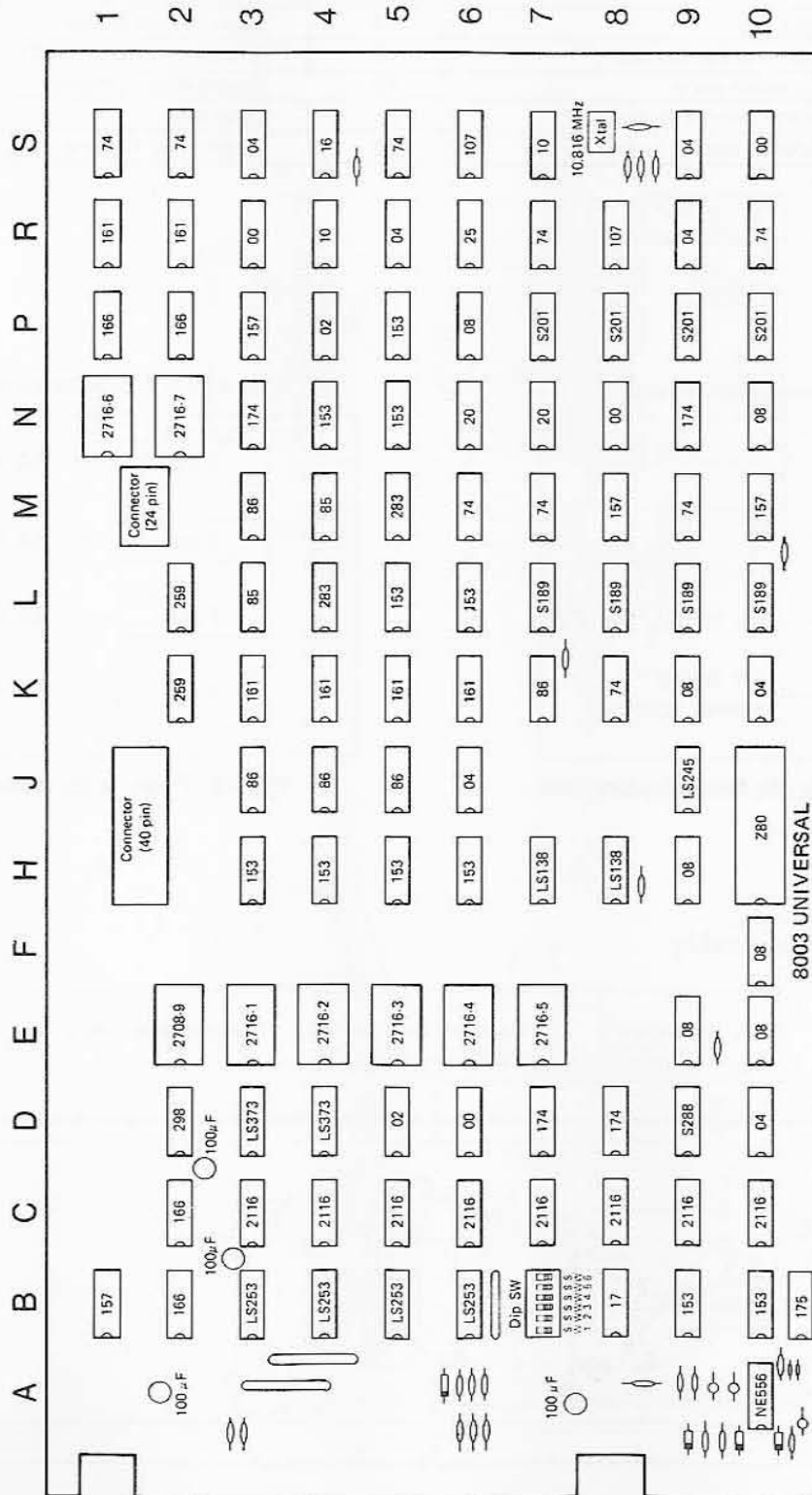


Fig. 18 Main Circuit Board

[1] Integrated Circuit

Item No.	Q'ty	Description
7400N	4	Transistor Logic
7402N	2	"
7404N	7	"
7408N	7	"
7410N	2	"
7416N	1	"
7417N	1	"
7420N	2	"
7425N	1	"
7474N	9	"
7485N	2	"
7486N	5	"
74107N	2	"
74S138N	2	"
74153N	11	"
74157N	4	"
74161N	6	"
74166N	4	"
74174N	4	"
74175N	1	"
74S189N	4	64 bits Bipolar RAM
74S201N	4	256 bits Bipolar RAM
74LS245N	1	Transistor Logic
74LS253N	4	"
74259N	2	"
74283N	1	"
74S288N	1	256 bits Bipolar ROM
74298N	1	Transistor Logic
74LS373N	2	"
2116	8	Nch MOS 16K bits Dynamic RAM
2708	1	Nch MOS 8K bits EPROM

Item No.	Q'ty	Description
2716	8	Nch MOS 16K bits EPROM
Z80	1	Nch MOS CPU
NE556	1	Transistor Logic

[2] Other Semiconductor Devices

Item No.	Q'ty	Description
10D1	4	Diode

[3] Capacitors

Rating	Q'ty	Description
100PF/12V	1	Ceramic Capacitor
150PF/12V	1	"
0.1μF/12V	55	"
1μF/50V	1	Chemical Capacitor
10μF/16V	2	"
100μF/25V	4	"

[4] Resistors

Rating	Q'ty	Description
MS1028AM	3	1KΩ Resistor Array
10Ω 1/4W	3	Carbon Solid Resistor
47Ω "	3	"
270Ω "	3	"
330Ω "	1	"
510Ω "	3	"
1KΩ "	8	"
4.7KΩ "	1	"
47KΩ "	2	"

[5] Misc

Name	Q'ty	Description
Dip SW	1	8 Elements Switch Array
X'-tal	1	10.816MHz

b) Sub-circuit board IC location and parts list

(Used in the case of 2-way alone)

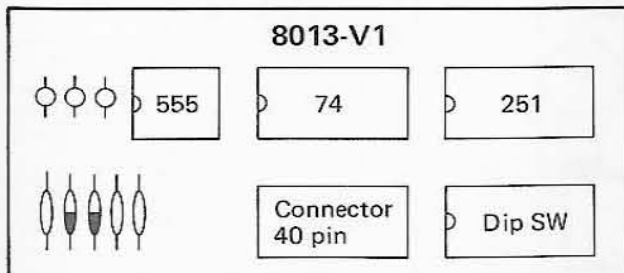


Fig. 19 Sub-circuit Board

[1] Integrated Circuit

Item No.	Q'ty	Description
7474N	1	Transistor Logic
74251N	1	"
NE555	1	Timer

[2] Other Semi Conductor Devices

Item No.	Q'ty	Description
10D1	2	Diode

[3] Capacitors

Rating	Q'ty	Description
0.1μF/12V	4	Ceramic Capacitor
1μF/50V	1	Chemical Capacitor

[4] Resistors

Rating	Q'ty	Description
MS1028AM	1	1kΩ Resistor Array
47Ω	1	Carbon Solid Resistor
1kΩ	1	"
47kΩ	1	"

[5] Misc

Name	Q'ty	Description
Dip SW	1	8 elements Switch Array

c) Sound circuit board IC location and parts list

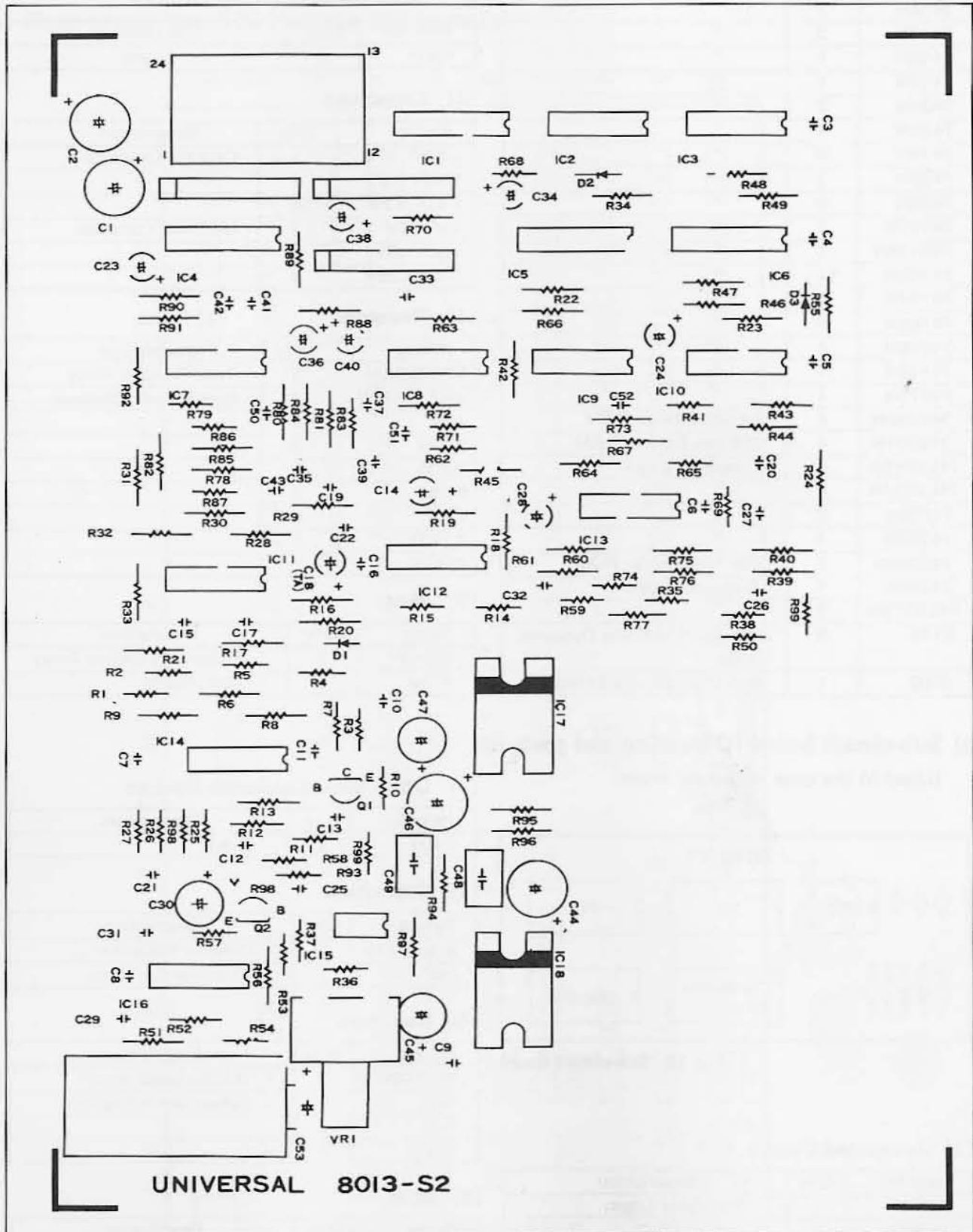


Fig. 20 Sound Circuit Board

(PARTS LIST) (COMPONENTS)

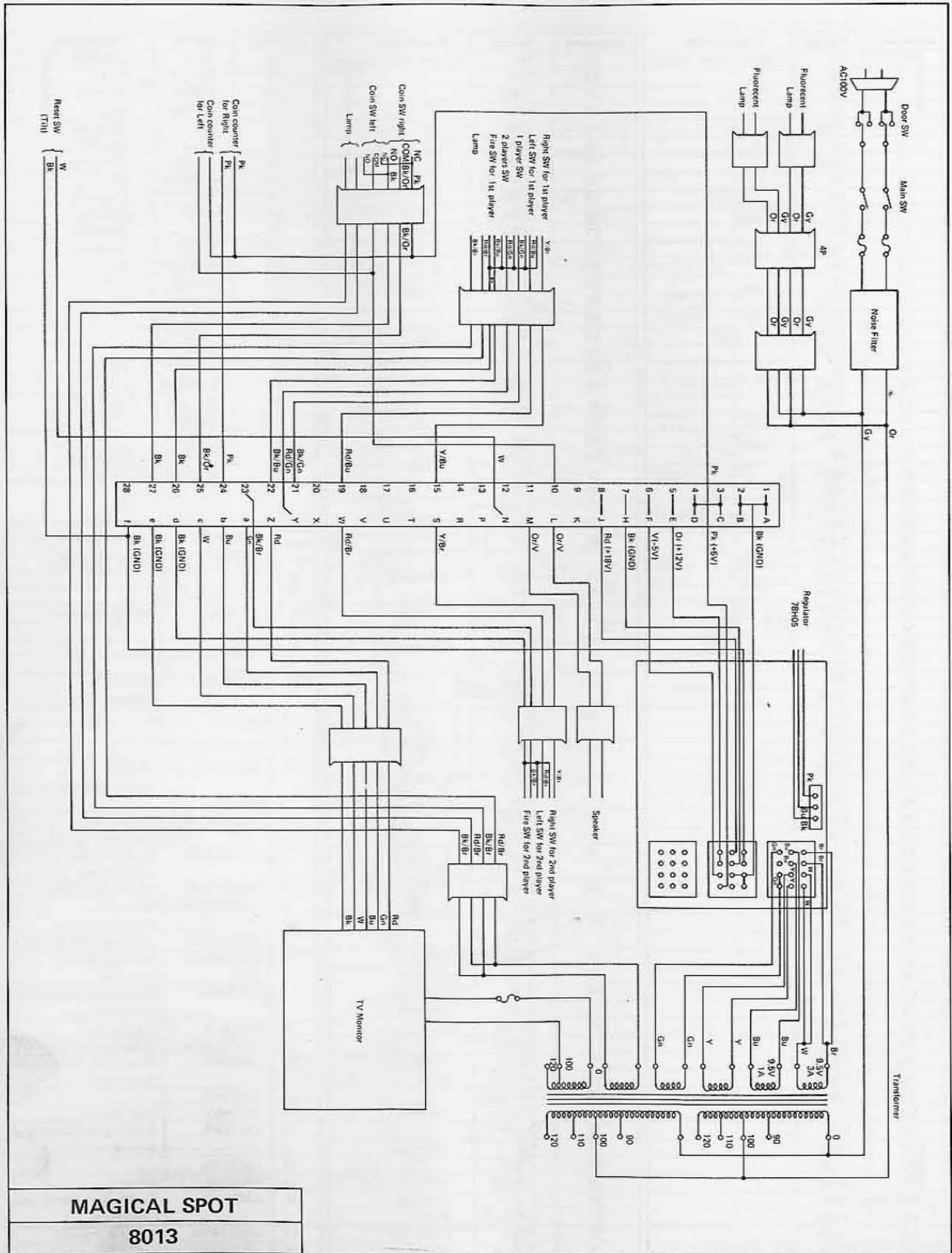
Location	Rating	Description
R1	1K	Carbon solid resistor
2	1K	"
3	1M	"
4	1K	"
5	100K	"
6	1K	"
7	100K	"
8	1K	"
9	1M	"
10	51K	"
11	51K	"
12	100K	"
13	1M	"
14	1K	"
15	470K	"
16	100K	"
17	100K	"
18	120K	"
19	1K	"
20	100K	"
21	100K	"
22	100K	"
23	100K	"
24	1K	"
25	100K	"
26	10K	"
27	10K	"
28	10K	"
29	100K	"
30	100K	"
31	100K	"
32	100K	"
33	100K	"
34	100K	"
35	10K	"
36	1K	"
37	75K	"
38	100K	"
39	51K	"
40	100K	"
41	100K	"
42	220K	"
43	220K	"
44	1M	"
45	220K	"
46	100K	"
47	51K	"
48	24K	"
49	12K	"
50	1K	"
51	1K	"
52	51K	"
53	10K	"
54	330K	"
55	10K	"
56	1K	"
57	100K	"
58	100K	"
59	100K	"
60	100K	"
61	100K	"
62	1K	"
63	51K	"
64	100K	"
65	100K	"
66	330K	"
67	75K	"
68	100K	"
69	100K	"
70	100K	"

Location	Rating	Description
71	1K	Carbon solid resistor
72	51K	"
73	100K	"
74	100K	"
75	100K	"
76	100K	"
77	220K	"
78	100K	"
79	100K	"
80	100K	"
81	100K	"
82	120K	"
83	100K	"
84	100K	"
85	100K	"
86	100K	"
87	220K	"
88	100K	"
89	51K	"
90	100K	"
91	100K	"
92	220K	"
93	10K	"
94	2.2K	"
95	4.7Ω	"
96	1.5Ω	"
97	1.5Ω	"
98	10K	"
99	22K	"
C1	100μF 16V	Chemical
2	100μF 25V	"
3	0.1μF 12V	Ceramic
4	0.1μF 12V	"
5	0.1μF 12V	"
6	0.1μF 12V	"
7	0.1μF 12V	"
8	0.1μF 12V	"
9	0.1μF 25V	"
10	0.1μF 12V	"
11	0.1μF 12V	"
12	0.022μF	Mila
13	0.1μF	Ceramic
14	1μF	Chemical
15	0.1μF	Ceramic
16	0.01μF	Mila
17	6800pF	"
18	0.22μF	Tantalum
19	0.022μF	Mila
20	Not Used	
21	0.1μF	Ceramic
22	0.1μF	"
23	1μF	Chemical
24	2.2μF	"
25	4700pF	Mila
26	0.1μF	Ceramic
27	0.022μF	Mila
28	4.7μF	Chemical
29	0.01μF	Mila

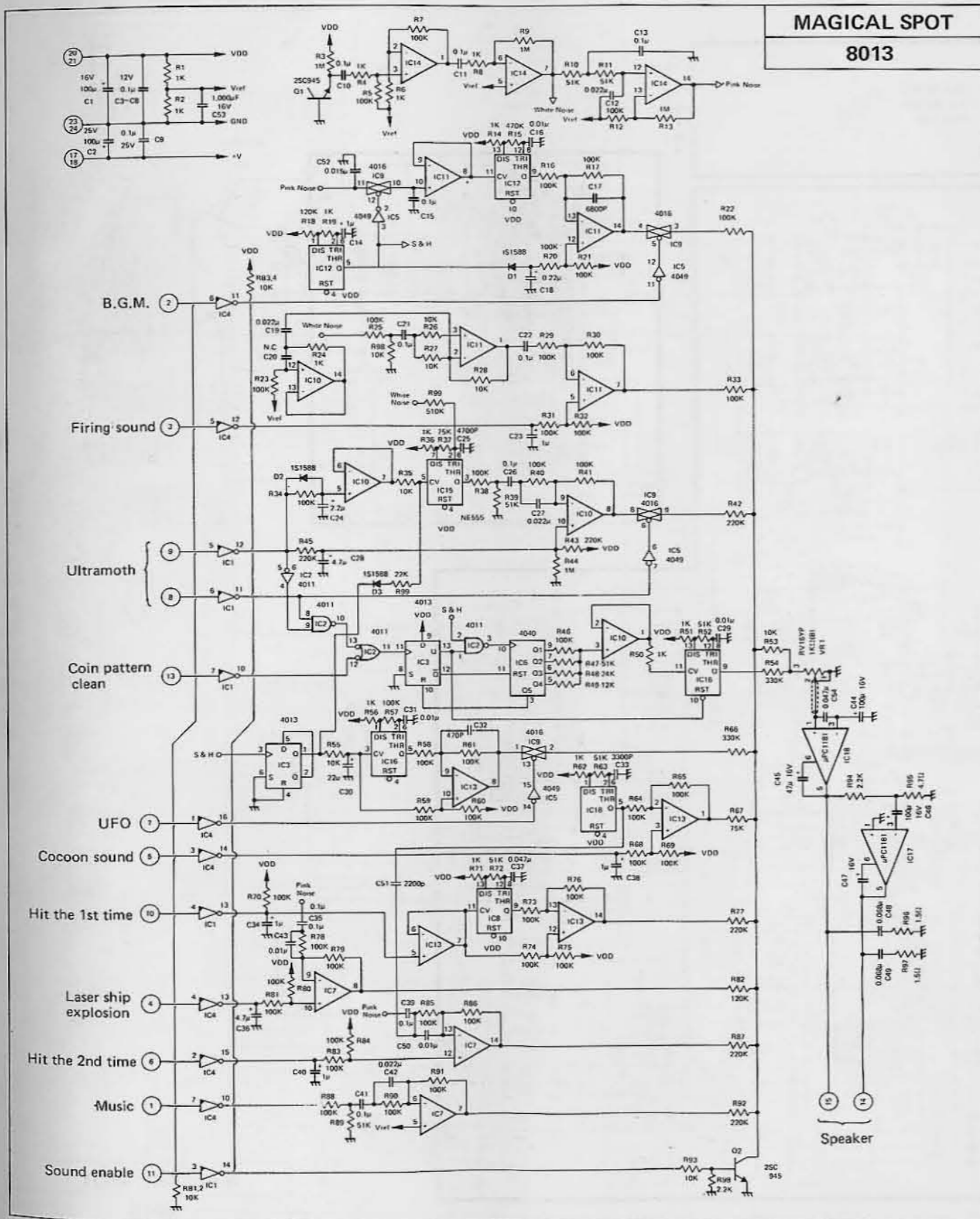
Location	Rating	Description
30	22μF	Chemical
31	0.01μF	Mila
32	470pF	Ceramic
33	3300pF	Mila
34	1μF	Chemical
35	0.1μF	Ceramic
36	4.7μF	Chemical
37	0.047μF	Mila
38	1μF	Chemical
39	0.1μF	Ceramic
40	1μF	Chemical
41	0.1μF	Ceramic
42	0.022μF	Mila
43	0.01μF	"
44	100μF	Chemical
45	47μF	"
46	100μF	"
47	47μF	"
48	0.068μF	Mila
49	0.068μF	"
50	0.01μF	"
51	2200pF	"
52	0.015μF	"
53	1000μF	Chemical
54	0.047μF	Ceramic

Location	Item No.	Description
Q1	2SC945	N-P-N Transistor
2	"	"
D1	1S1588	Switching Diode
2	"	"
3	"	"
RB1	MS1038AM	10KΩ Resistor Array
2	"	"
3	"	"
VR1	RV16YP	1KΩ(B) Variable Resistor
IC1	ULN2003AN	Darlington Transistor Array
2	CD4011CN	Quad 2-Input NAND Gate
3	CD4013CN	Dual D Flip Flop
4	ULN2003AN	Darlington Transistor Array
5	CD4049CN	Hex Inverting Buffer
6	CD4040CN	14-Stage Binary Counters
7	LM324N	Quadruple Operational Amplifiers
8	NE556N	Dual Timer
9	CD4016CN	Quad Bilateral Switch
10	LM324N	Quadruple Operational Amplifiers
11	LM324N	"
12	NE556N	Dual Timer
13	LM324N	Quadruple Operational Amplifiers
14	LM324N	"
15	NE555N	Timer
16	LM324N	Quadruple Operational Amplifiers
17	μPC1181H	Power Amplifier
18	μPC1181H	"

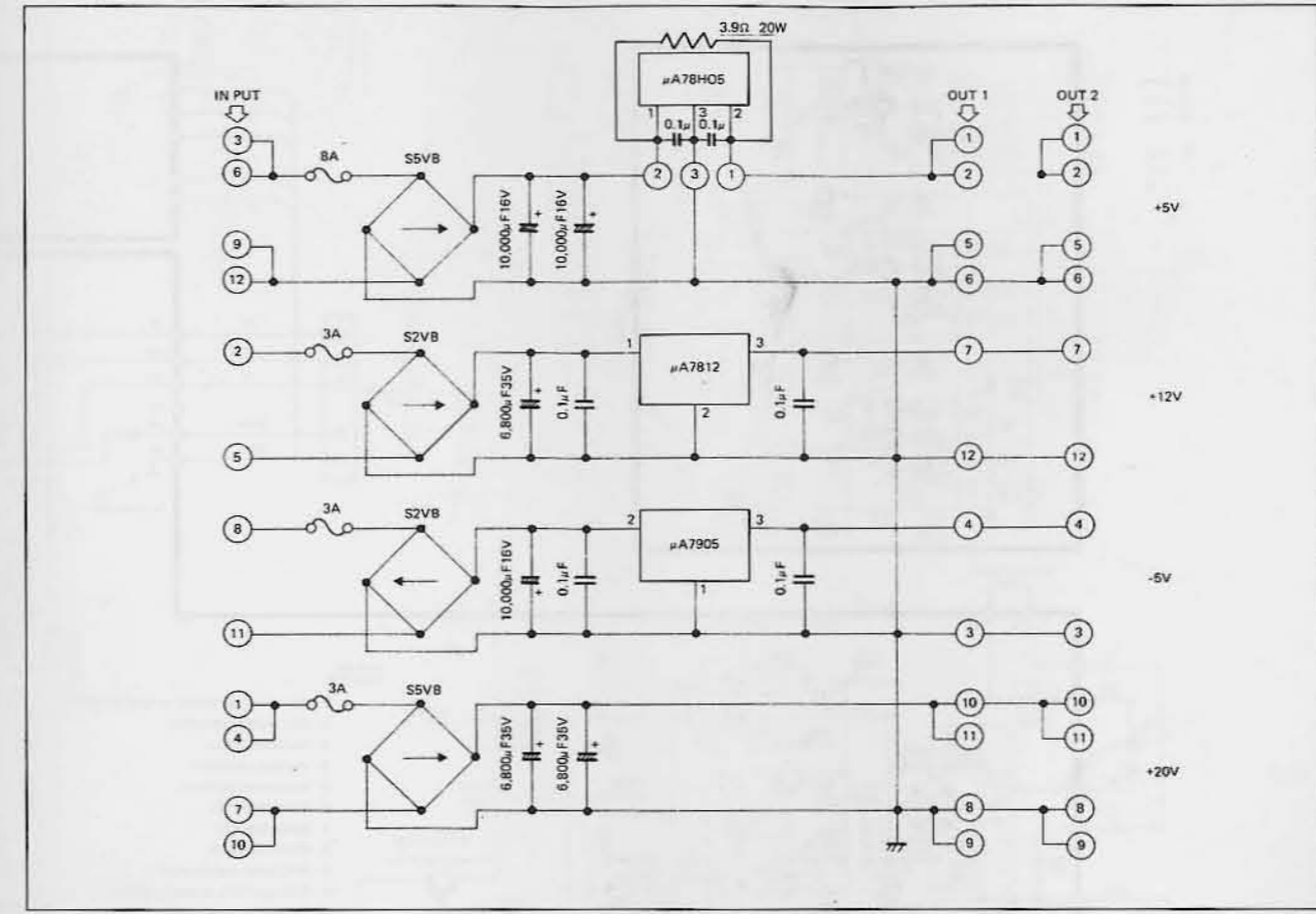
WIRING DIAGRAM (CONNECTOR)



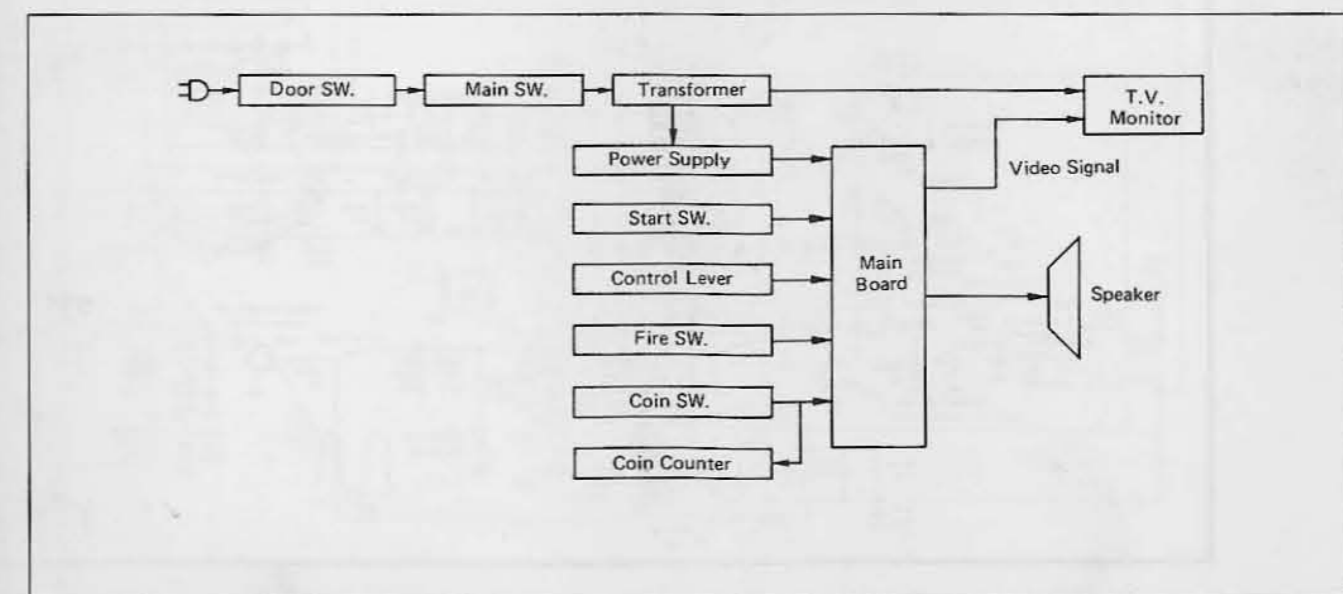
SOUND BLOCK DIAGRAM



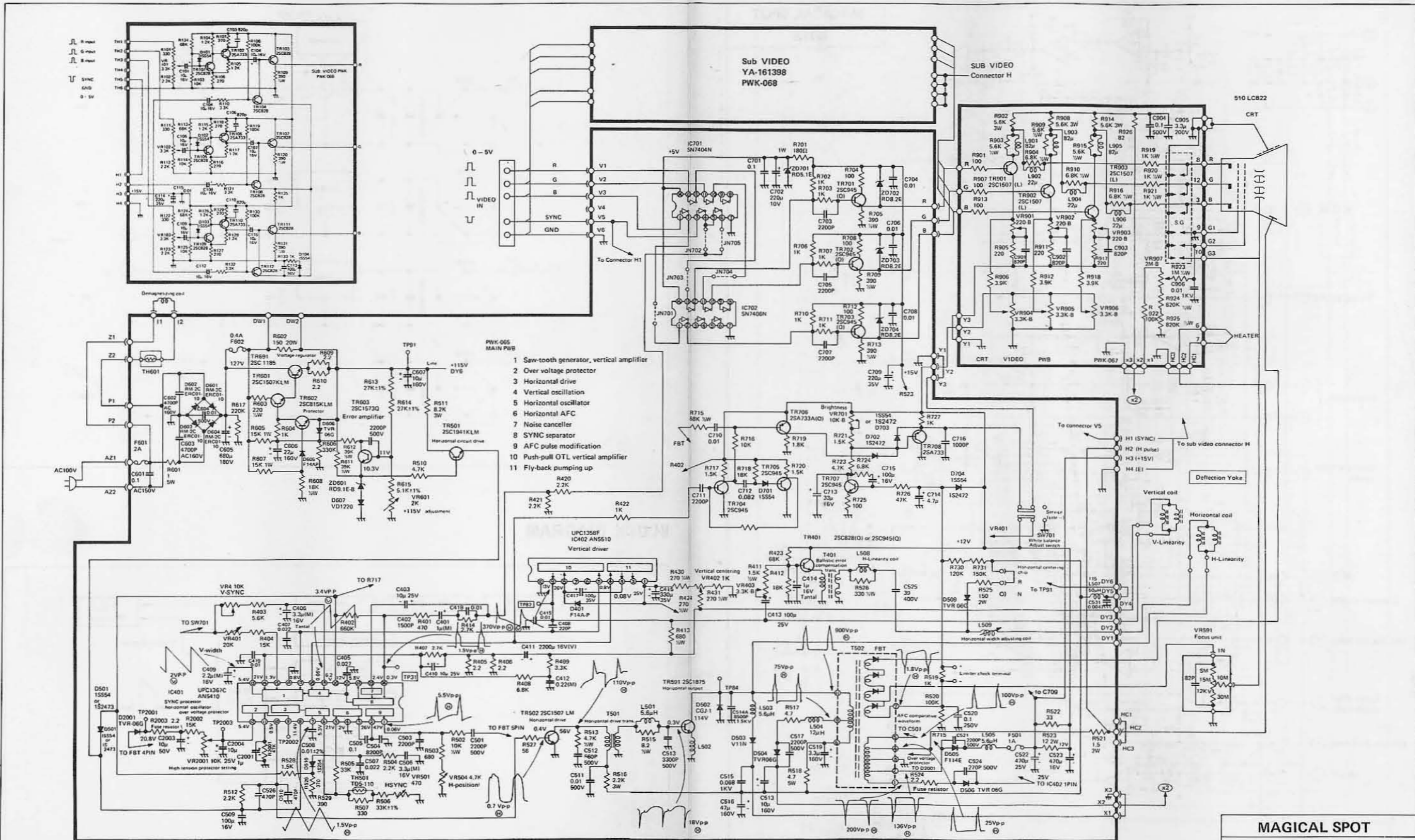
POWER SOURCE BLOCK DIAGRAM



BLOCK DIAGRAM



SCHEMATIC DIAGRAM (20" color)

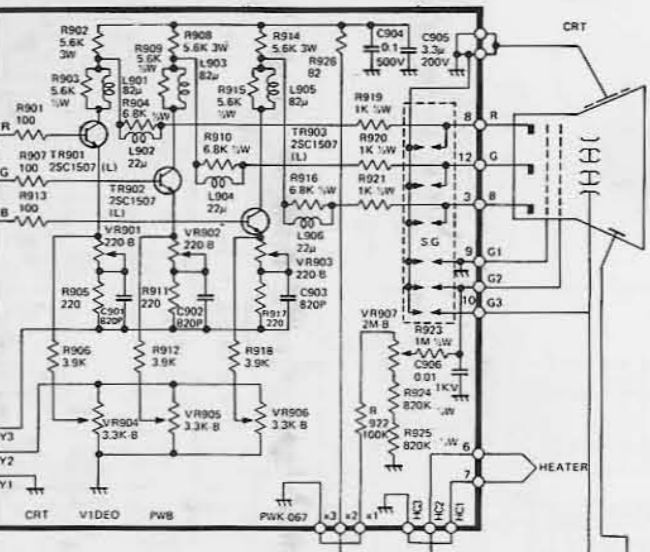
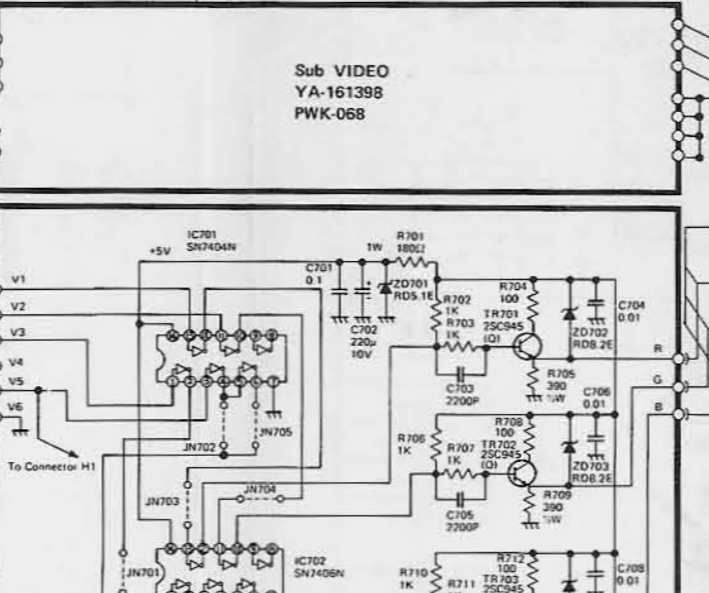
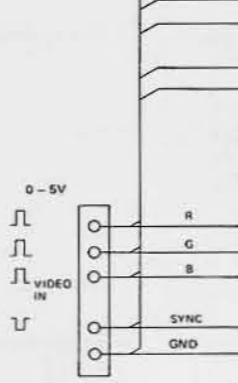
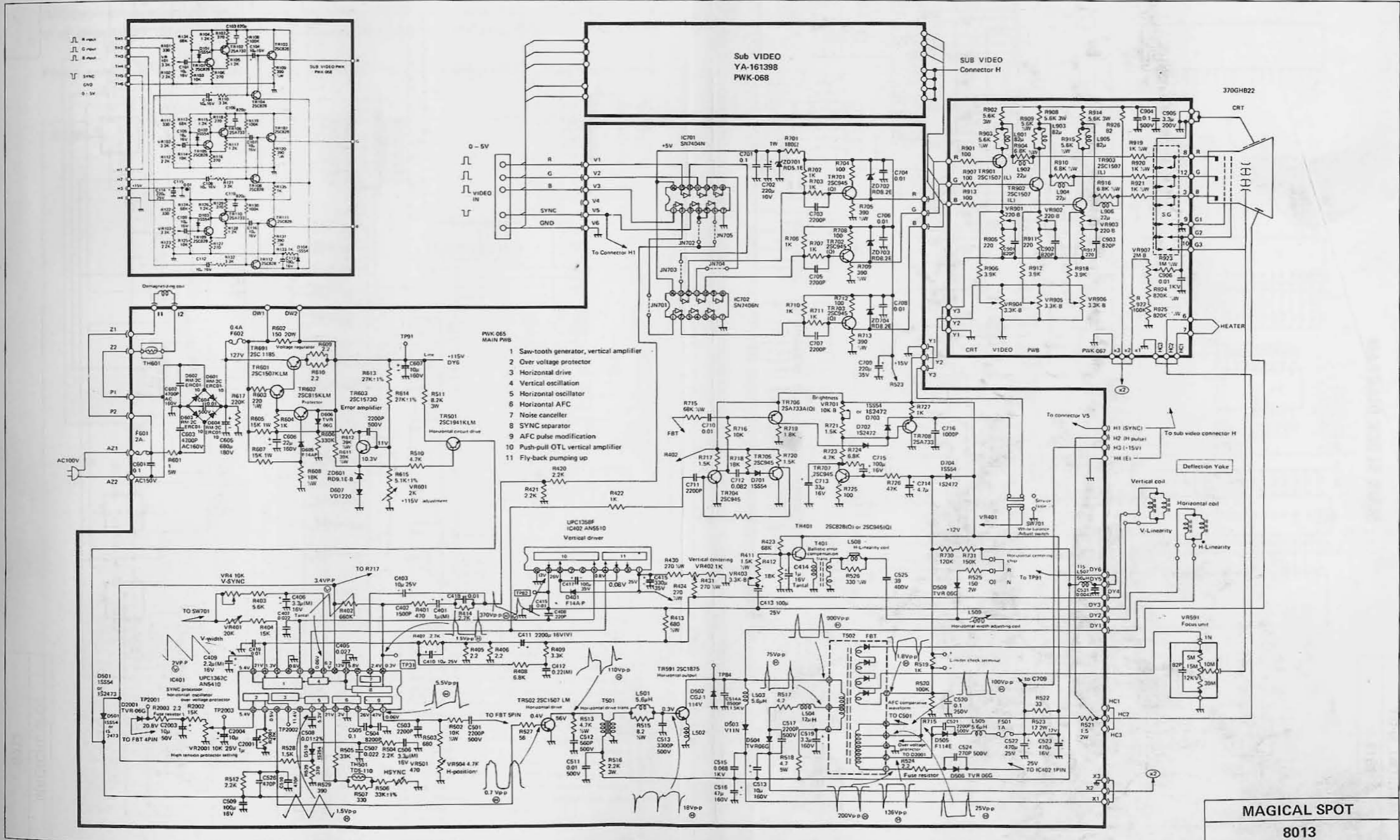


- 1 Saw-tooth generator, vertical amplifier
- 2 Over voltage protector
- 3 Horizontal drive
- 4 Vertical oscillation
- 5 Horizontal oscillator
- 6 Horizontal AFC
- 7 Noise canceller
- 8 SYNC separator
- 9 AFC pulse modification
- 10 Push-pull OTL vertical amplifier
- 11 Fly-back pumping up

MAGICAL SPOT

8013

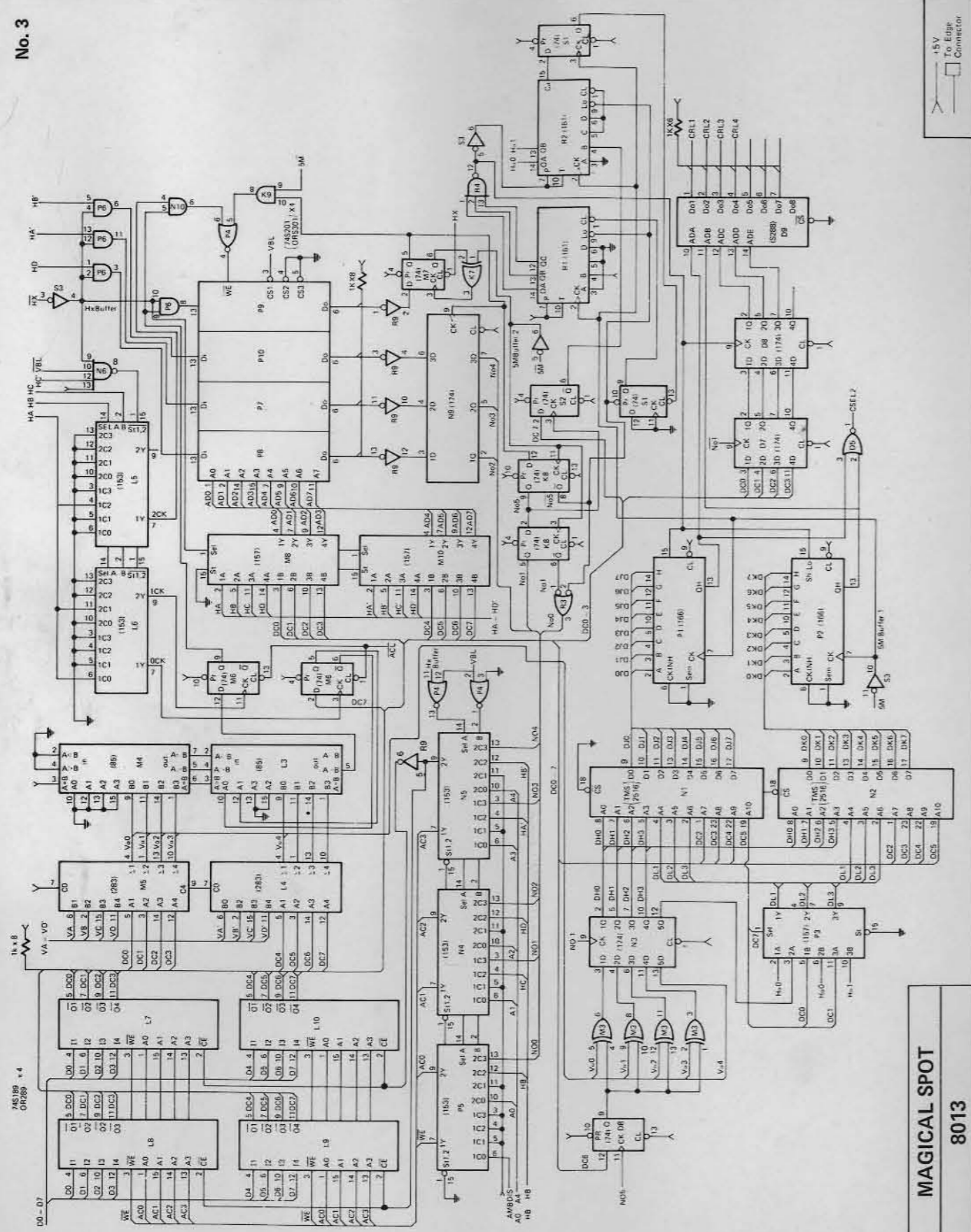
SCHEMATIC DIAGRAM (14" color)



- 1 Saw-tooth generator, vertical amplifier
- 2 Over voltage protector
- 3 Horizontal drive
- 4 Vertical oscillation
- 5 Horizontal oscillator
- 6 Horizontal AFC
- 7 Noise canceller
- 8 SYNC separator
- 9 AFC pulse modification
- 10 Push-pull OTL vertical amplifier
- 11 Fly-back pumping up

MAGICAL SPOT
8013

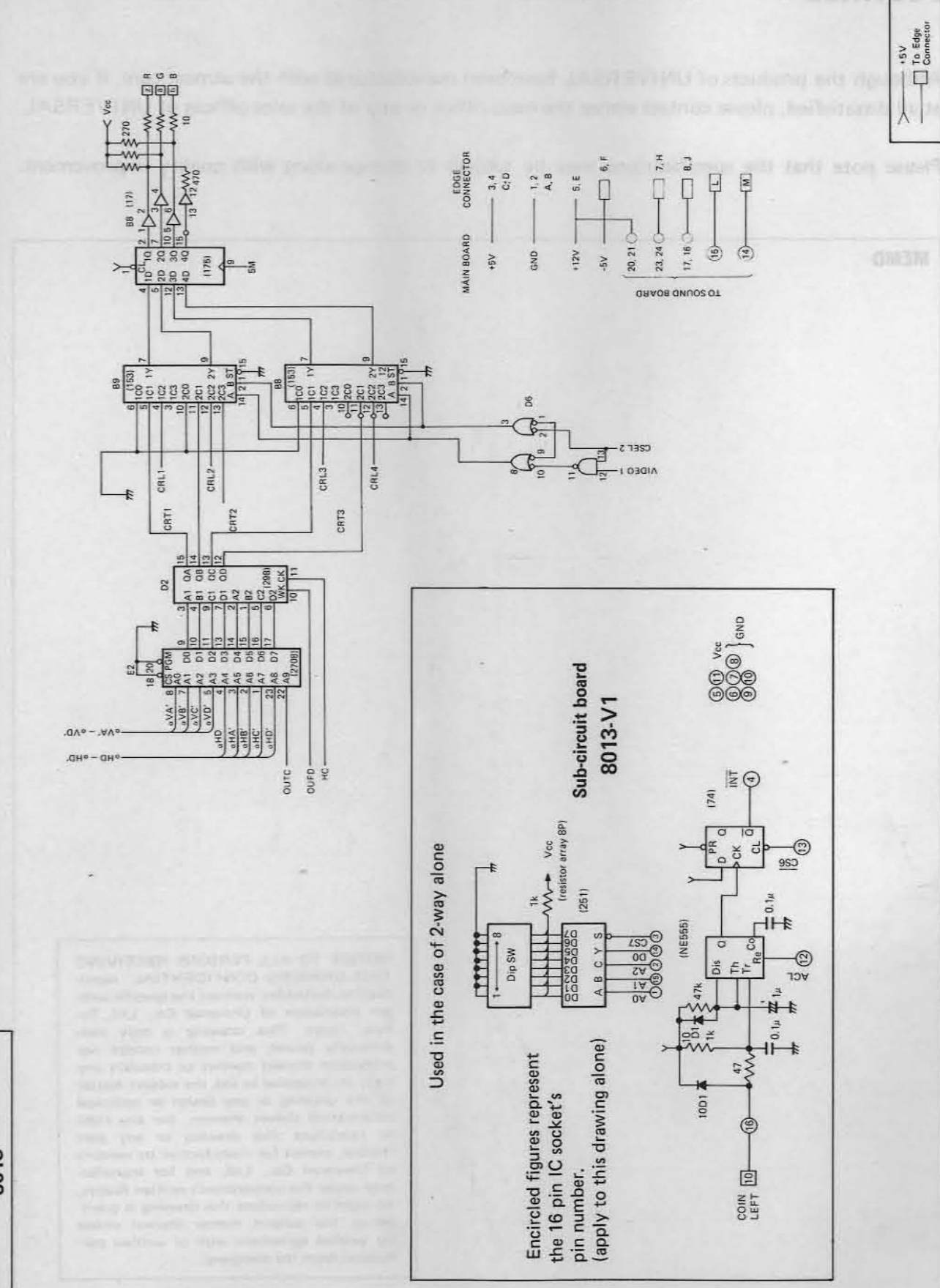
No. 3



MAGICAL SPOT
8013

MAGICAL SPOT
8013

No. 4

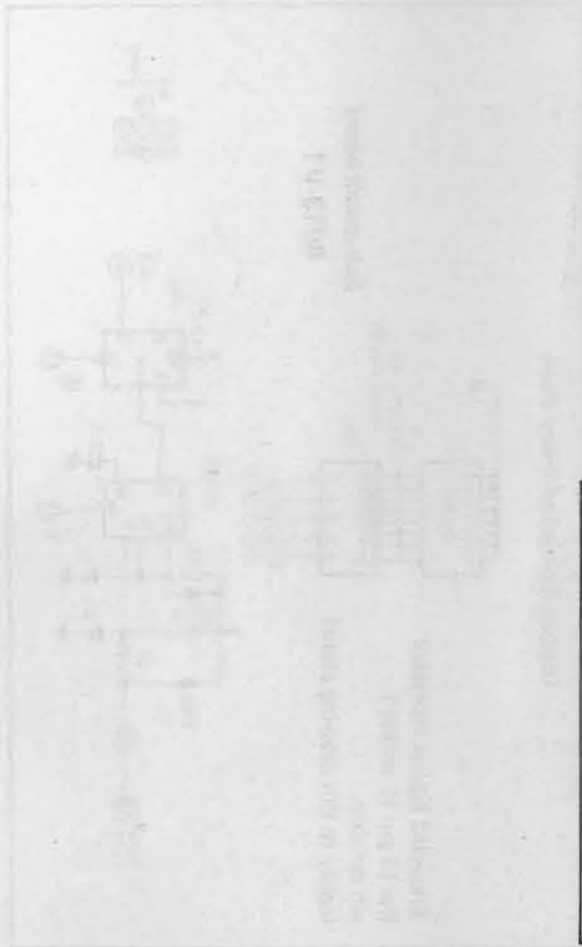


POSTFACE

Although the products of UNIVERSAL have been manufactured with the utmost care, if you are at all dissatisfied, please contact either the head office or any of the sales offices of UNIVERSAL.

Please note that the specifications may be subject to change along with quality improvement.

MEMO



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