

GAME NO. 652
OCTOBER 1979

MIDWAY'S PHANTOM II PARTS AND OPERATING MANUAL



MIDWAY MFG. CO.

A BALLY COMPANY

10750 WEST GRAND AVENUE
FRANKLIN PARK, ILLINOIS 60131
U.S.A.

PHONE: (312) 451-1360 CABLE ADDRESS: MIDCO TELEX NO.: 72-1596

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WARNING

THIS GAME MUST BE GROUNDED. FAILURE TO DO SO MAY RESULT IN DESTRUCTION TO ELECTRONIC COMPONENTS.

GENERAL INSTRUCTIONS FOR PHANTOM II

INSTALLATION

1. Remove shipping cleats located on bottom of cabinet.
2. Install four (4) provided leg levelers to bottom of cabinet and level cabinet.
3. The power is controlled by a switch located on top of the cabinet. Plug into A.C. only, 115 volts, 60 cycles. In low line areas (105 volts or less), a boost in the output voltage of the transformer may be obtained by removing the wire from the 115 volt tap of the transformer and rewiring it to the 105 volt position.

LINE VOLTAGE SAFETY SWITCH:

A line voltage safety switch has been provided for your protection. It is located on the right rear side of the cabinet in the upper back door area. When the back door is removed, it opens the circuit to the line voltage. To restore power (when servicing), pull switch fully out.

VOLTAGE CONTROL POTS:

Located on Power Supply Board (P.C. A080-90400-H000) and is preset at the factory. These pots should not be tampered with unless the Distributor Service Department is contacted.

VOLUME CONTROL POT:

Located on Game Logic Board (P.C. A084-90700-D652) controls the volume of all sounds and may be varied as desired by rotating pot control.

ADJUSTMENT SWITCHES:

Located on Game Logic Board (P.C. A084-90700-D652) and may be adjusted as indicated on separate instruction sheet in back box area.

TO REMOVE LOWER DISPLAY GLASS:

1. Remove upper back door.
2. Remove locking bracket in center of glass.
3. Slide glass out from rear of game.

M051-00652-A006

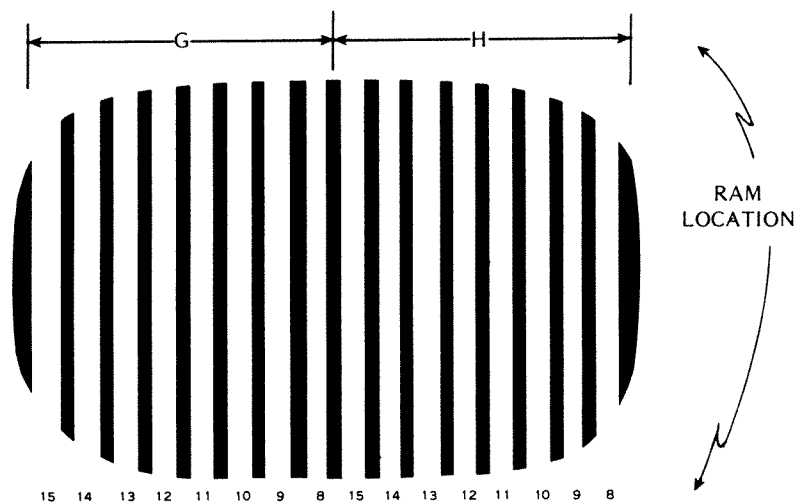
RAMS, PROMS AND ROMS

The PHANTOM II game microprocessor system has been programmed to detect a defective Ram, Prom and/ or Rom. To utilize the test, proceed as follows:

- 1) Set switch #6 to on position (A084-90700-D652).
- 2) Activate coin door tilt switch.
- 3) The Ram test sequence will scan and vertical lines will appear with cloud formations.
- 4) When all Rams are good, the scan will be continuous.
- 5) When a Ram is defective, dark vertical columns will appear (refer to Figure #1 for method of locating a bad Ram).
- 6) When Ram test is completed and all Rams are good, the T.V. screen will blank out to indicate a bad Prom or Rom by displaying letters locating it.
- 7) When Proms and Roms are good, the Ram scan will be continuous.
- 8) Return switch #6 to off position (A084-90700-D652).
- 9) The Ram scan will stop and game will return to normal when the tilt switch is activated.

NOTE: Rams must be good before Prom and Rom test can be made.

Figure One — Method of Locating a Bad RAM



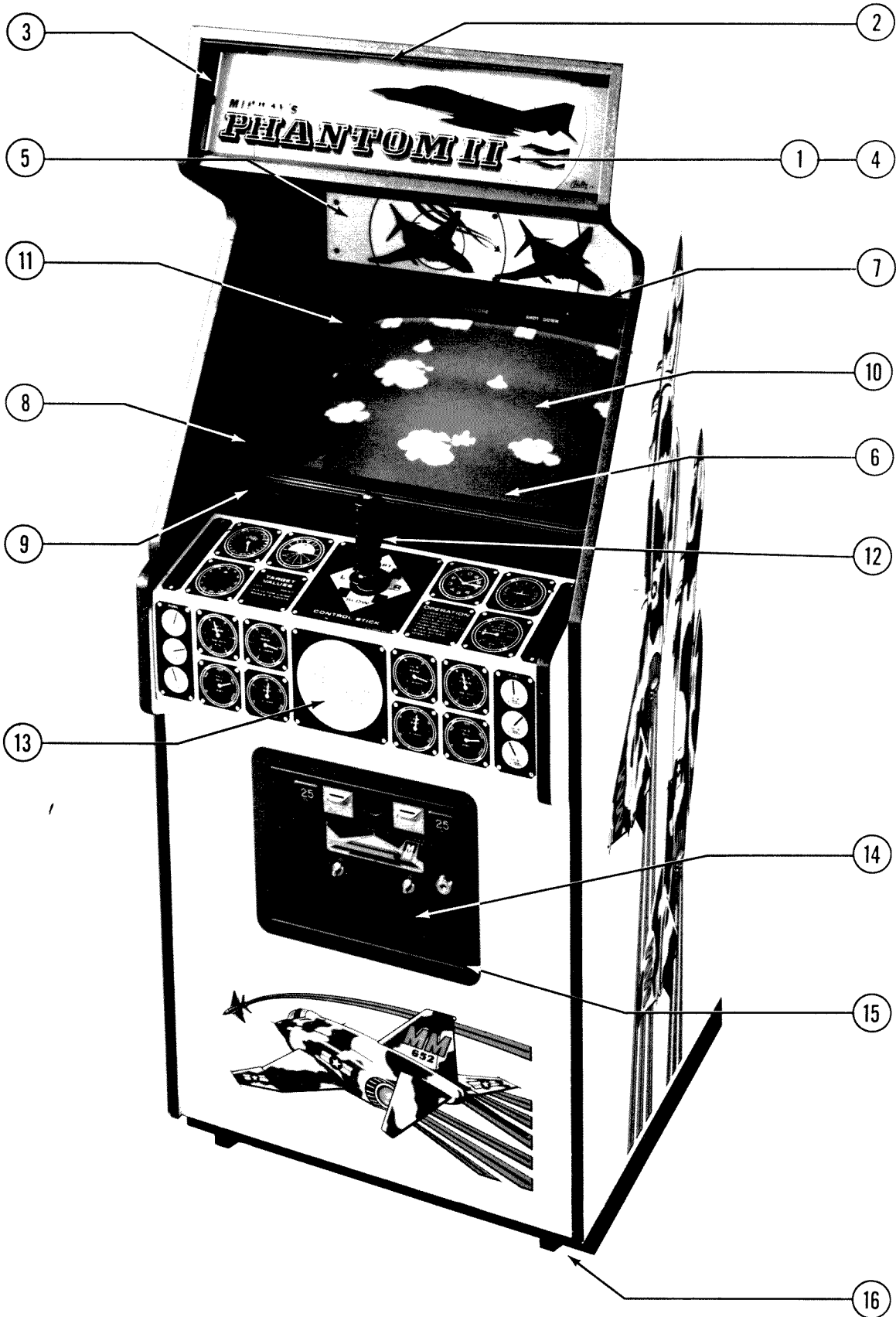
1. When one or more columns are missing or altered, this would indicate a RAM problem.
2. Use Figure One TV display to determine location of faulty RAMs.

ADJUSTMENT SWITCHES

COIN				
1 COIN = 1 PLAY				SW. 1
1 COIN = 2 PLAYS				OFF
				ON
TIME – EXTENDED PLAY				
TIME	EXT. PLAY	SCORE	SW. 2	SW. 3
45 SEC.	20 SEC.	20	ON	ON
60 SEC.	25 SEC.	25	OFF	ON
75 SEC.	30 SEC.	30	ON	OFF
90 SEC.	35 SEC.	35	OFF	OFF
TEST – PLAY				
TEST (RAM/ROM)				SW. 6
PLAY MODE OFF				ON
				OFF

M051-000652-A013

NO. 652 - PHANTOM II - PICTURE

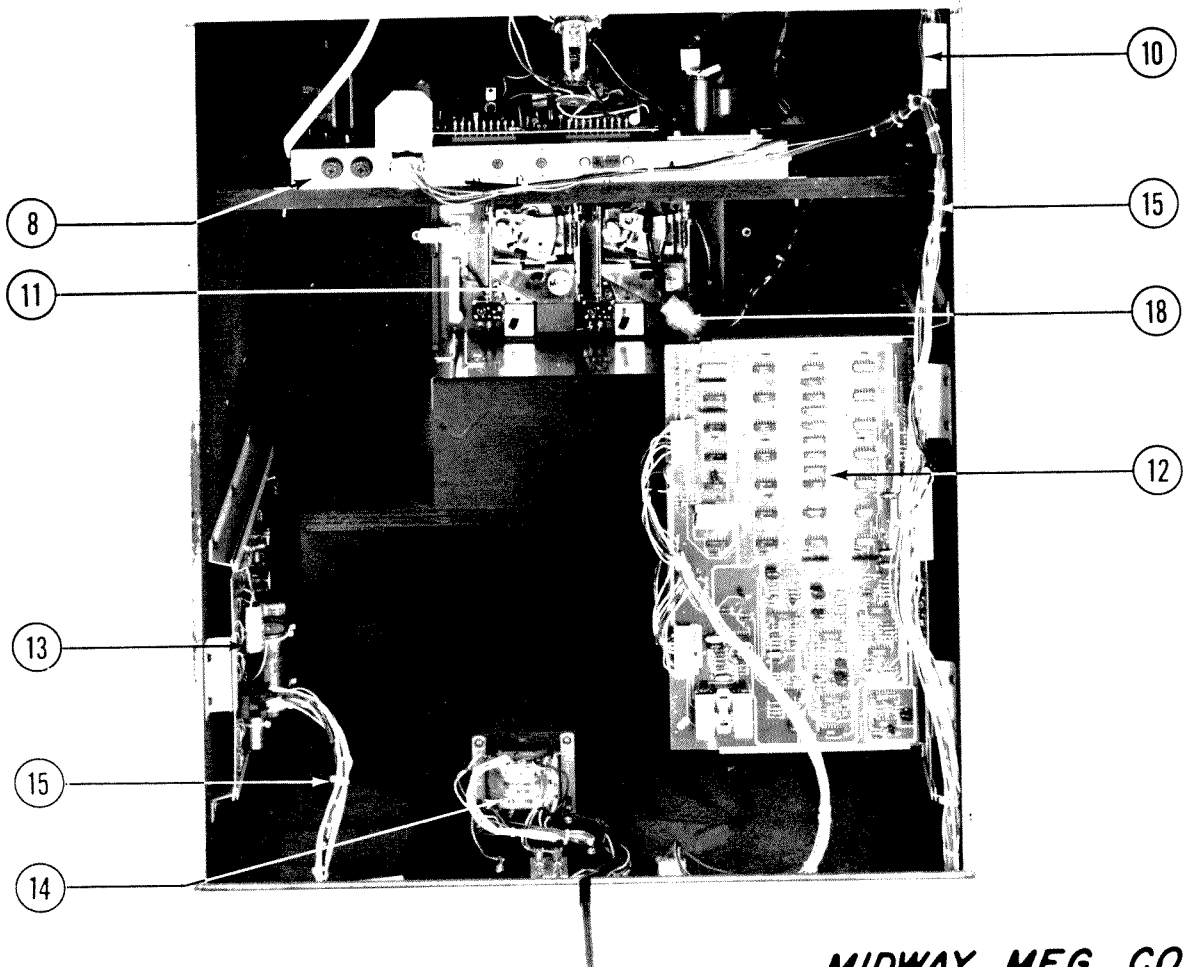
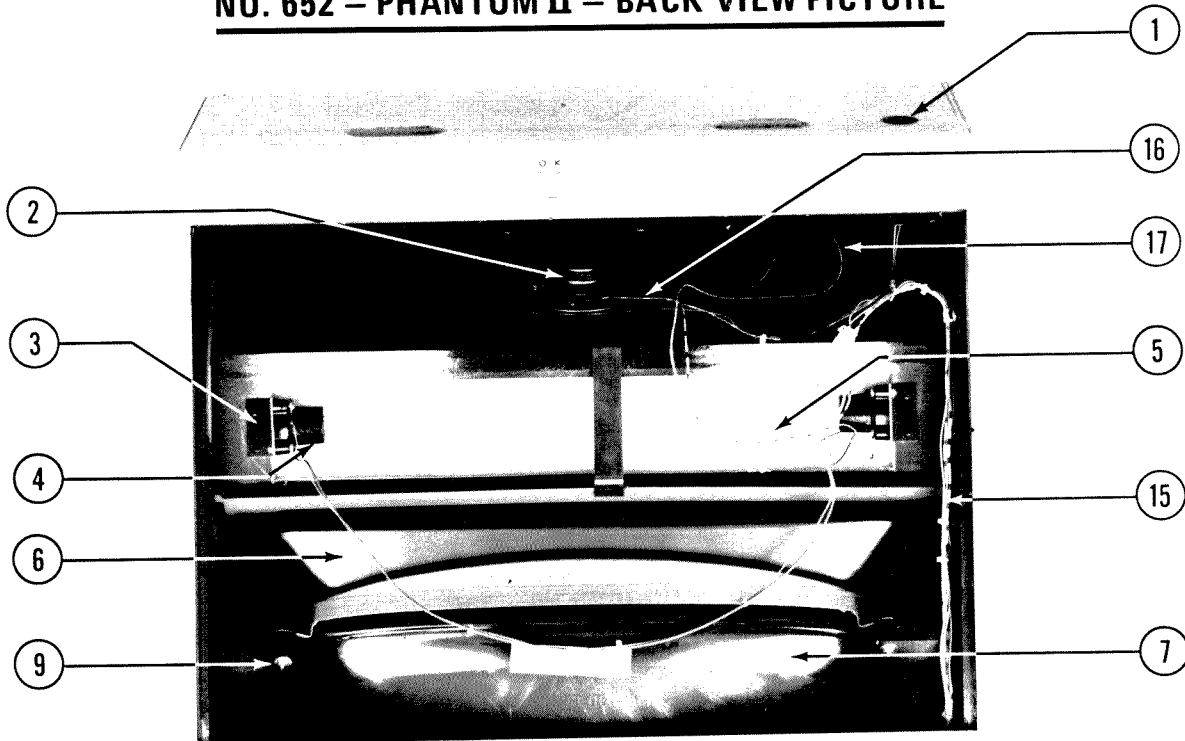


NO. 652 - PHANTOM II - PICTURE

ORDER BY PART NUMBER ONLY

ITEM	PART NO	DESCRIPTION
1	0652-00900-00SC	DISPLAY INSERT PLEX - 24-13/16" x 6-1/4" x 3/16"
2	0537-00903-0015	GLASS CHANNEL - 24-1/4" LG. (2 REQ'D.)
3	0537-00903-0030	GLASS CHANNEL - 5-9/16" LG. (2 REQ'D.)
4	A652-00012-0000	DISPLAY INSERT ASSY. - BEHIND DISPLAY INSERT PLEX
	0017-00031-0030	WEDGE BASE LAMP SOCKET (5 REQ'D.)
	0017-00003-0219	#194 WEDGE LAMP - 14V. (5 REQ'D.)
5	0652-00905-00XF	EXPLOSION DISPLAY 24-15/16" x 5-7/8" x 3/32"
	0017-00101-0025	#8 x 1/2 HEX HD. BLK. WD. SCREW (6 REQ'D.)
6	0652-00902-00XF	DISPLAY PLEX - 24-13/16" x 17-3/16" x 3/16" (BLUE)
7	0537-00903-0015	GLASS CHANNEL - 24-1/4" LG.
8	0537-00903-0046	GLASS CHANNEL - 16" LG. (2 REQ'D.)
9	0629-00902-0100	GLASS LIFT CHANNEL - 24" LG.
10	0017-00003-0199	23" MONITOR C.R.T.
11	0652-00903-0000	T.V. BEZEL
12	A625-00025-0000	CONTROL STICK ASSY.
13	0652-00100-00XF	CONTROL PLATE
	0017-00101-0639	#8-32 x 1-1/4 CARRIAGE BOLT (9 REQ'D.)
	0017-00104-0022	#8 WASHER (9 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (9 REQ'D.)
14	A090-00020-2001	FRONT DOOR ASSY.
15	A090-00002-0200	FRONT DOOR FRAME ASSY.
	0017-00101-0555	#6-32 x 5/16 HEX HD. S.M.S. (3 REQ'D.) (MOUNTS DOOR TO FRAME)
	0017-00003-0102	COUNTER METER (MOUNTS ON COIN DOOR)
16	0017-00102-0048	3/8-16 x 2" LEG LEVELERS (4 REQ'D.)
	0017-00103-0026	3/8-16 HEX LEG LEVELER NUTS (4 REQ'D.)

NO. 652 - PHANTOM II - BACK VIEW PICTURE

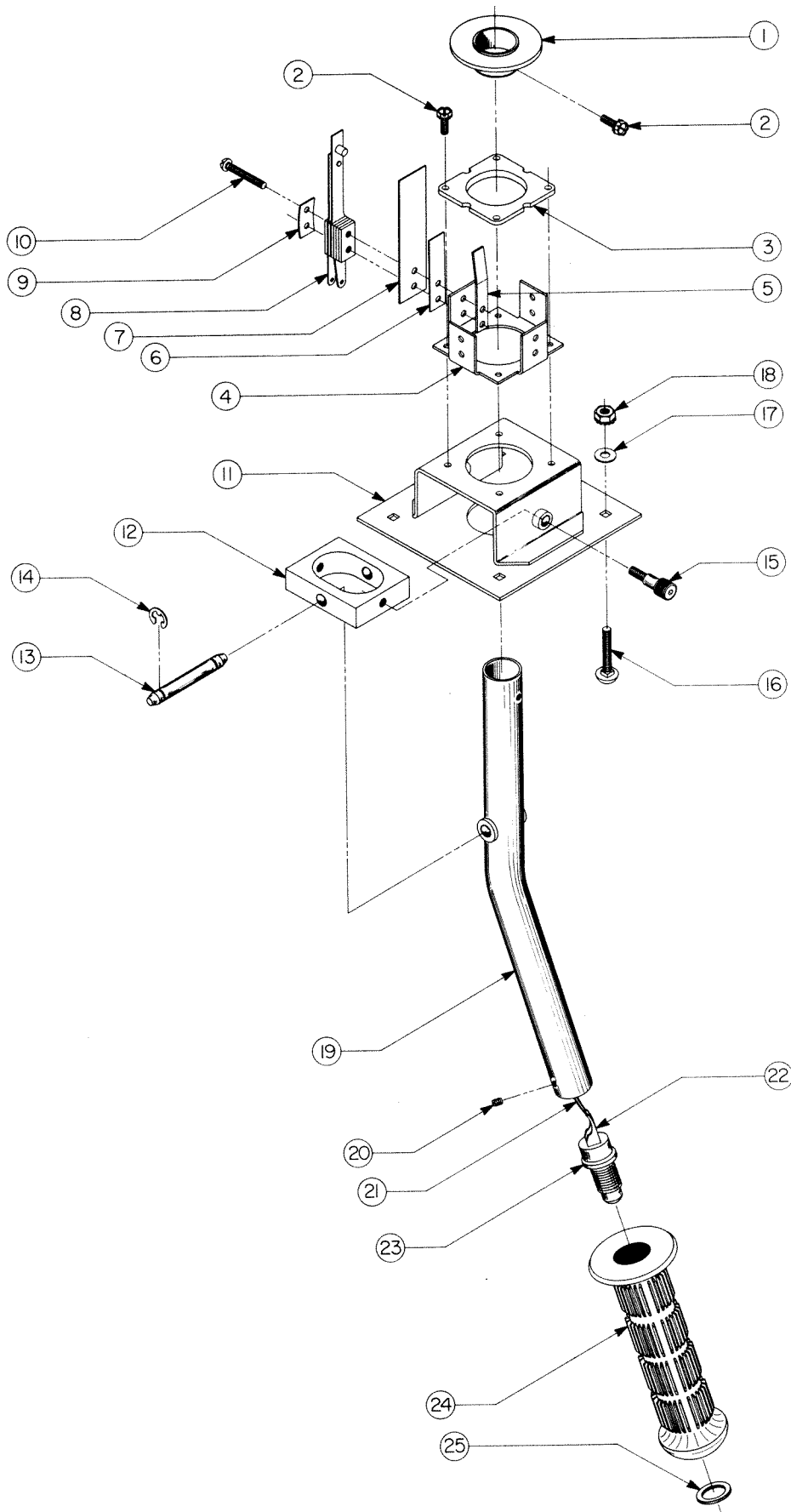


NO. 652 - PHANTOM II - BACK VIEW PICTURE

ORDER BY PART NUMBER ONLY

ITEM	PART NO	DESCRIPTION
1	0586-00036-0000	ON-OFF SWITCH
	0567-00106-0100	SWITCH MTG. PLATE
2	0017-00003-0187	SPEAKER - 6" x 9", 8 OHM, 9W.
	0017-00009-0393	BLACK SPEAKER GRILL W/4 1-1/2" SCREWS
3	0652-00102-0000	SOCKET MTG. BRKT. (2 REQ'D.)
	0017-00101-0626	#8-32 x 3/4 SLT. PAN HD. M.S. (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS. (4 REQ'D.)
	0017-00101-0025	#8 x 1/2 HEX HD. BLK. WD. SCREW (4 REQ'D.)
4	0017-00003-0135	LAMP SOCKET (2 REQ'D.)
5	0017-00003-0291	LAMP, 13V . (2 REQ'D.) 130V, 15W LR 39708
6	0652-00903-0000	T.V. BEZEL
7	0017-00003-0199	23" MONITOR C.R.T.
8	0017-00003-0198	23" CHASSIS
	0017-00003-0208	23" C.R.T. YOKE
	A652-00011-0000	DAG SPRING ASSY.
	3000-17155-0000	GROUND STRAP
	0080-00101-0000	HIGH VOLTAGE SHIELD
	0592-00104-0100	CHASSIS MTG. BRKT. - R.H.
	0592-00104-0200	CHASSIS MTG. BRKT. - L.H.
	0652-00503-0000	CHASSIS MTG. PANEL
9	0017-00101-0639	#8-32 x 1-1/4 CARRIAGE BOLTS (4 TUBE, 4 CHASIS)
	0017-00104-0022	#8 WASHER (4 TUBE, 4 CHASSIS)
	0017-00103-0061	#8-32 HEX NUT - SEMS (4 TUBE, 4 CHASIS)
10	0017-00003-0225	CHEAT INTERLOCK SWITCH 125V., 10A.
	0625-00133-00XF	INTERLOCK SW. MTG. BRKT.
11	A090-00020-2001	DOUBLE ENTRY COIN DOOR ASSY.
12	A084-90700-D652	GAME LOGIC BOARD ASSY.
	0597-00012-0100	P.C. SUPPORT BRKT. ASSY. - R.H.
	0597-00012-0200	P.C. SUPPORT BRKT. ASSY. - L.H.
13	A082-90400-H000	POWER SUPPLY BOARD ASSY.
	0624-00902-0100	P.C. SUPPORT BRKT. - 12" (4 REQ'D.)
	0624-00902-0300	P.C. SUPPORT BRKT. - 2-1/2" (4 REQ'D.)
	0017-00101-0025	#8 x 1/2 HEX HD. WD. SCREW (20 REQ'D. - TOTAL)
	0017-00104-0037	#8 WASHER (20 REQ'D. - TOTAL)
14	A652-00022-0000	TRANSFORMER BOARD ASSY. - DOMESTIC
	A652-00023-0000	TRANSFORMER BOARD ASSY. - FOREIGN
15	A652-00001-0000	MASTER CABLE ASSY.
16	A652-00018-0000	SPEAKER CABLE ASSY.
17	A652-00019-0000	DISPLAY INSERT CABLE ASSY.
18	A652-00020-0000	COIN DOOR CABLE ASSY.
19	A652-00021-0000	EXPLOSION LIGHT CABLE ASSY.

NO. 652 - PHANTOM II - CONTROL STICK ASSEMBLY

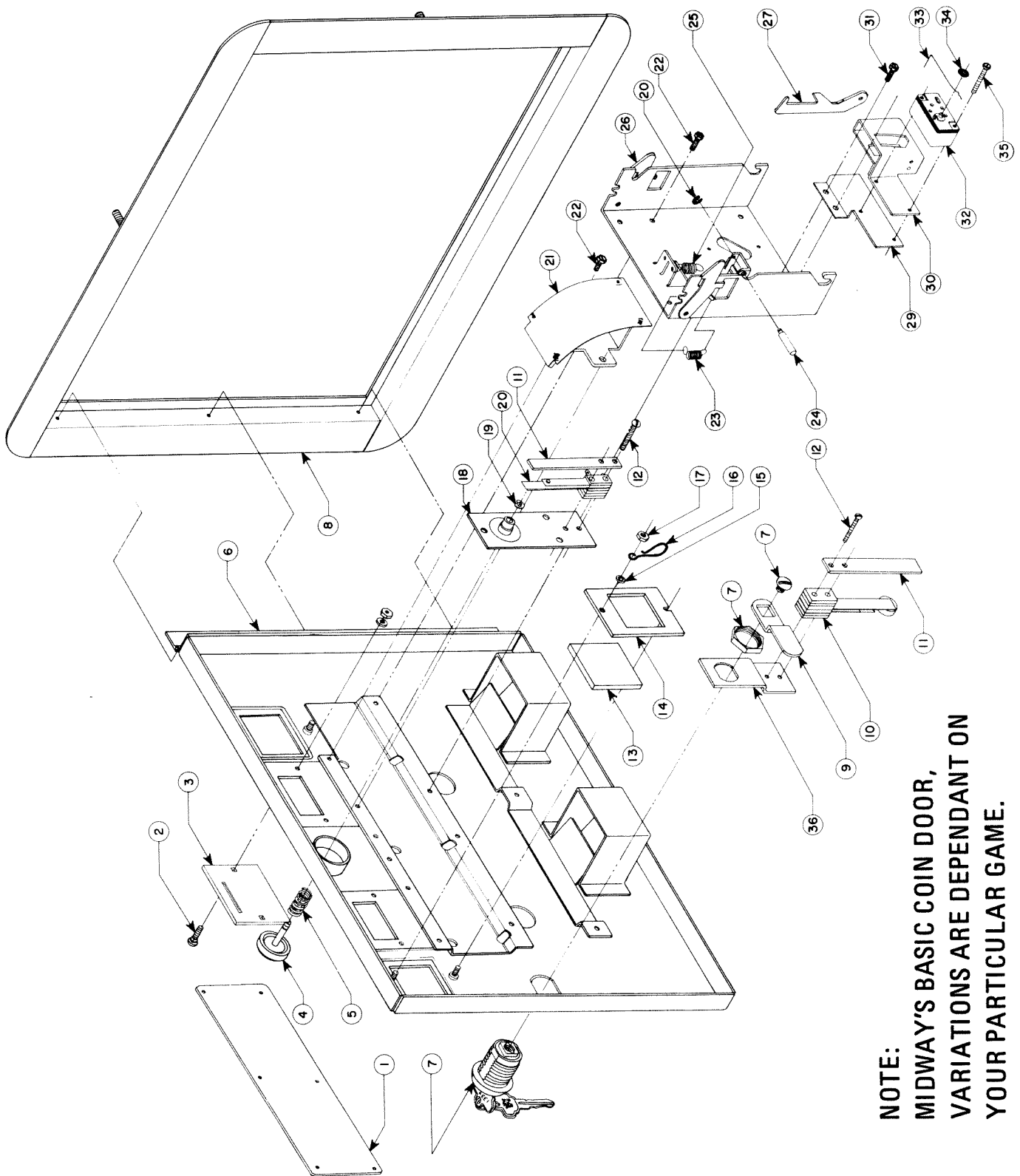


NO. 652 - PHANTOM II - CONTROL STICK ASSEMBLY

ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	A652-00016-0000	WASHER & BUSHING SUB. ASSY.
2	0017-00101-0599	#8-32 x 3/8 SLT. EXT. HEX S.T.M.S. (6 REQ'D.)
3	0652-00906-0000	STOP
4	0652-00103-00XF	SWITCH MTG. BRKT.
5	0652-00105-00XF	POSITIONING BLADE (4 REQ'D.)
6	0020-00230-0100	NYLON INSULATOR (4 REQ'D.)
7	0652-00106-0000	CENTERING BLADE (4 REQ'D.)
8	A652-00026-0000	LEAF SWITCH ASSY. (4 REQ'D.)
9	0020-00202-0000	SWITCH PLATE (4 REQ'D.)
10	0017-00101-0529	#5-40 x 1-3/4" SLT. RD. HD. S.T.M.S. (8 REQ'D.)
11	A652-00017-0000	MOUNTING BRKT. BEARING ASSY.
12	0652-00700-00XF	SWIVEL BAR
13	0652-00703-00XF	PIVOT SHAFT
14	0017-00100-0025	1/4" "E" RING (2 REQ'D.)
15	0017-00101-0110	#10-24 x 3/8 SHOULDER SOC. SCREW (2 REQ'D.)
16	0017-00101-0637	#8-32 x 1" CARRIAGE BOLT (4 REQ'D.)
17	0017-00104-0022	#8 FLAT WASHER (4 REQ'D.)
18	0017-00103-0061	#8-32 HEX NUT W/SEMS. (4 REQ'D.)
19	A652-00015-0000	HANDLE ASSY.
20	0017-00101-0307	#8-32 x 1/8 SET SCREW (2 REQ'D.)
21		WIRE LEADS (2 REQ'D.)
22	0623-00911-0000	SHRINK TUBING (2 REQ'D.)
23	0017-00032-0004	PUSH BUTTON SWITCH
24	0652-00908-0000	HAND GRIP - MODIFIED
25	0017-00021-0009	15/32 - 32 NUT
		<u>NOT SHOWN LIST</u>
	0652-00910-0000	SLIDE - NEOPRENE
	0652-00109-00XF	PROTECTIVE BRKT. (MOUNTS ON CONTROL SHELF)
	0010-00225-0100	EXTENSION SPRING (LOCATED AROUND WIRE LEADS)
	0017-00042-0001	1/8 CLAMP
	0017-00101-0555	#6-32 x 5/16 SLT. HEX WD. SCREW

NO. 652 – PHANTOM II – FRONT DOOR ASSY.



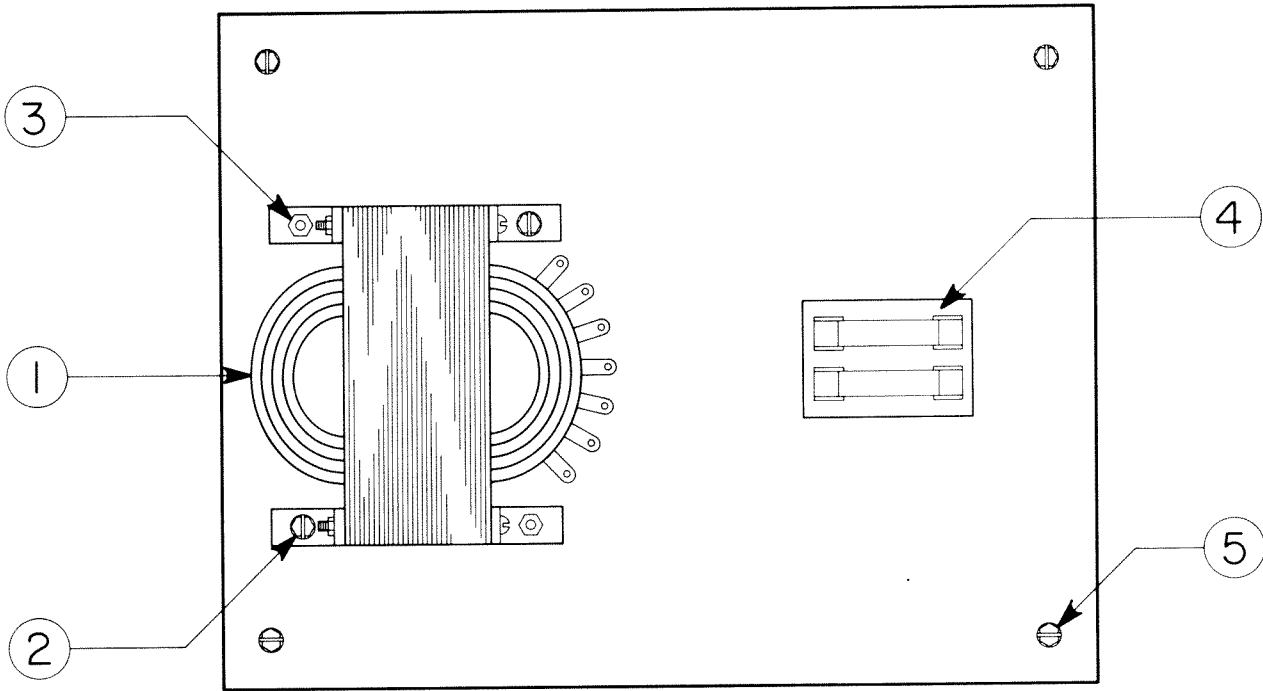
**NOTE:
MIDWAY'S BASIC COIN DOOR,
VARIATIONS ARE DEPENDANT ON
YOUR PARTICULAR GAME.**

NO. 652 – PHANTOM II – FRONT DOOR ASSY.

ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	0090-00902-0000 0090-00902-0100	DRESS PLATE DRESS PLATE (W/O PRESS BUTTON TO START GAME)
2	0017-00101-0552	#6 - 32 x 1/4 CARRIAGE BOLT (2)
3	0090-00117-03XF	COIN ENTRY PLATE (25¢)
4	0090-00906-0000	PLASTIC START BUTTON
5	0010-00007-0000	COMPRESSION SPRING
6	0090-00013-0200	DOOR ASSY. DOUBLE ENTRY
7	0017-00005-0050	DOOR LOCK & KEY WITH SCREW & NUT
8	0090-00002-02BR	DOUBLE DOOR FRAME
9	0017-00005-0041	421 N.S. CAM
10	0090-00901-0000	DOOR SWITCH
11	0090-00126-01XF	SWITCH BACKUP PLATE
12	0017-00101-0528	#5-40 x 3/4" LNG. M.S.
13	0090-00903-0040	25¢ WINDOW
14	0090-00143-0000	COIN PLEX RETAINER
15	0017-00104-0002	SPLIT LOCK WASHER
16	0017-00007-0019	KEY HOOK
17	0017-00103-0005	#6 - 32 HEX NUT
18	0090-00010-0000	SW. PLATE & OILLITE ASSY.
19	0017-00100-0018	"E" RING
20	0090-00131-0000	SWITCH
21	0090-00104-0000	TOP & BTM. COIN CHUTE W/BRKT. ASSY.
22	0017-00101-0598	#8 - 32 x 5/16 SCREW
23	0010-00181-0100	SPRING
24	0090-00129-00XF	PIVOT POST
25	0010-00134-0000	SPRING
26	0090-00008-0000	ACCEPTOR FRAME ASSY.
27	0093-00155-00XF	REJECTOR LEVER
28	0017-00100-0012	"E" RING
29	0093-00151-00XF	COIN GUIDE MTG. BRACKET
30	0090-00005-0000	COIN GUIDE ASSY.
31	0017-00101-0555	#6 - 32 x 5/16 SCREW
32	0017-00005-0039	COIN SWITCH
33	0010-00557-2500	TRIP WIRE
34	0017-00007-0132	PUSH-ON RING (BIK)
35	0017-00101-0507	#4 - 36 x 3/4 SCREW
36	0090-00128-00XF	SWITCH BRKT. – DOOR TILT

NO. 652 – PHANTOM II – TRANSFORMER BOARD ASSY.



MIDWAY MFG. CO.
A BALLY CO.

NO. 652 – PHANTOM II – TRANSFORMER BOARD ASSY.

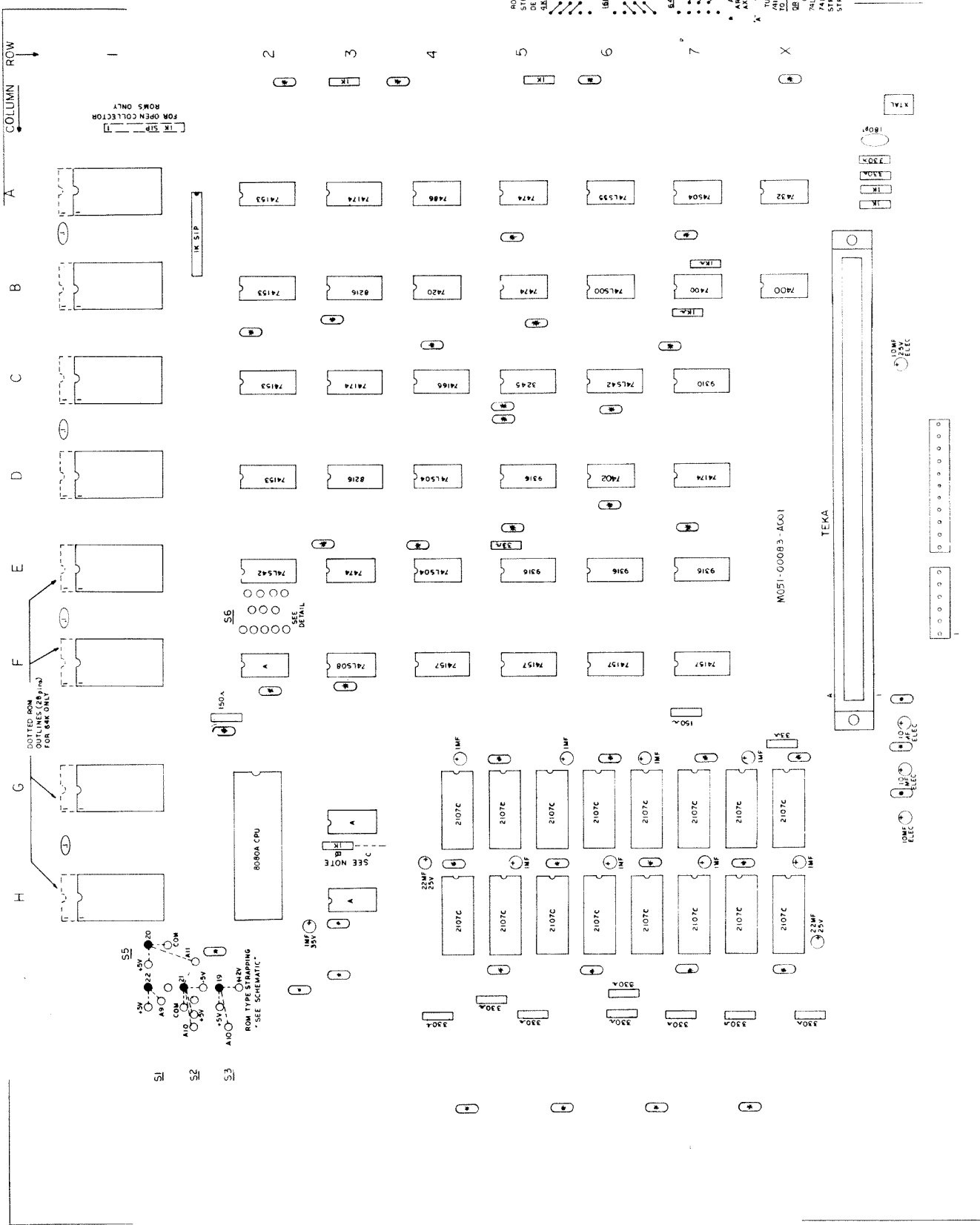
ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	MT00-00058-0000 MT00-00059-0000	TRANSFORMER – 60 CYCLE – DOMESTIC (OR) TRANSFORMER – 50 CYCLE – FOREIGN
2	0017-00101-0017	#6 x 1/2 SLT. HEX HD. WD. SCR. (2 REQ'D.)
3	0017-00101-0637 0017-00103-0008	#8-32 x 1" CARRIAGE BOLT (2 REQ'D.) WITH #8-32 HEX NUT (2 REQ'D.)
4	0720-00001-0200 0017-00003-0103 0017-00003-0006	2 POSITION FUSE BLOCK FUSE 1 AMP FUSE 3 AMP
5	0017-00101-0018 0017-00003-0064	#6 x 3/4 SLT. HEX HD. SCREW (5 REQ'D.) 16 FT. LINE CORD – NOT SHOWN

NO. 652 – PHANTOM II – ADDITIONAL PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
	A652-00006-0000	LOWER BACK DOOR ASSY.
	A652-00007-0000	UPPER BACK DOOR ASSY.
	A097-00001-0000	LOCK ASSY. (1 LOWER, 1 UPPER)
	0618-00117-0000	VENT GRILL (1 UPPER, 1 LOWER)
	A623-00110-0000	CASH BOX ASSY.
	A623-00013-0000	CASH BOX COVER ASSY.
	A624-00001-0000	CASH BOX GUIDE BRKT. ASSY.
	0624-00101-0000	CASH BOX SIDE CHANNEL
	0017-00101-0628	#8-32 x 3/4 CARRIAGE BOLTS (4 REQ'D.)
	0017-00104-0022	#8 WASHER (4 REQ'D.)
	0017-00103-0008	#8-32 HEX NUT (4 REQ'D.)
	0652-00101-0000	GLASS LOCK BRKT. (2 REQ'D.)
	0652-00108-0000	RETAINING BRKT.
	0017-00009-0033	BASSICK CLAMPS (2 REQ'D.)
	0603-00131-0000	STRIKE (2 REQ'D.)
	A084-90000-L652	MOTHER BOARD ASSY.
	A084-90700-D652	GAME BOARD ASSY.
	A082-90400-H000	POWER SUPPLY BOARD ASSY.
	0017-00009-0419	PIN EXTRACTOR TOOL (PIN POPPER) (MOLAX JACKS ONLY)



FOR OPEN COLLECTOR ROMS ONLY

COLUMN ROW

ROM SITE STRAPPING DETAILS S6

ALL CAPACITORS MARKED WITH A MIN. LEAD

74LS08 (304) CAN BE SUBSTITUTED WITH 7405, 74LS16, 74LS32, 74LS66, 7486, 7432, 74LS05 WHEN STRAPPED TO COMMON WITH STRAP 'C'.

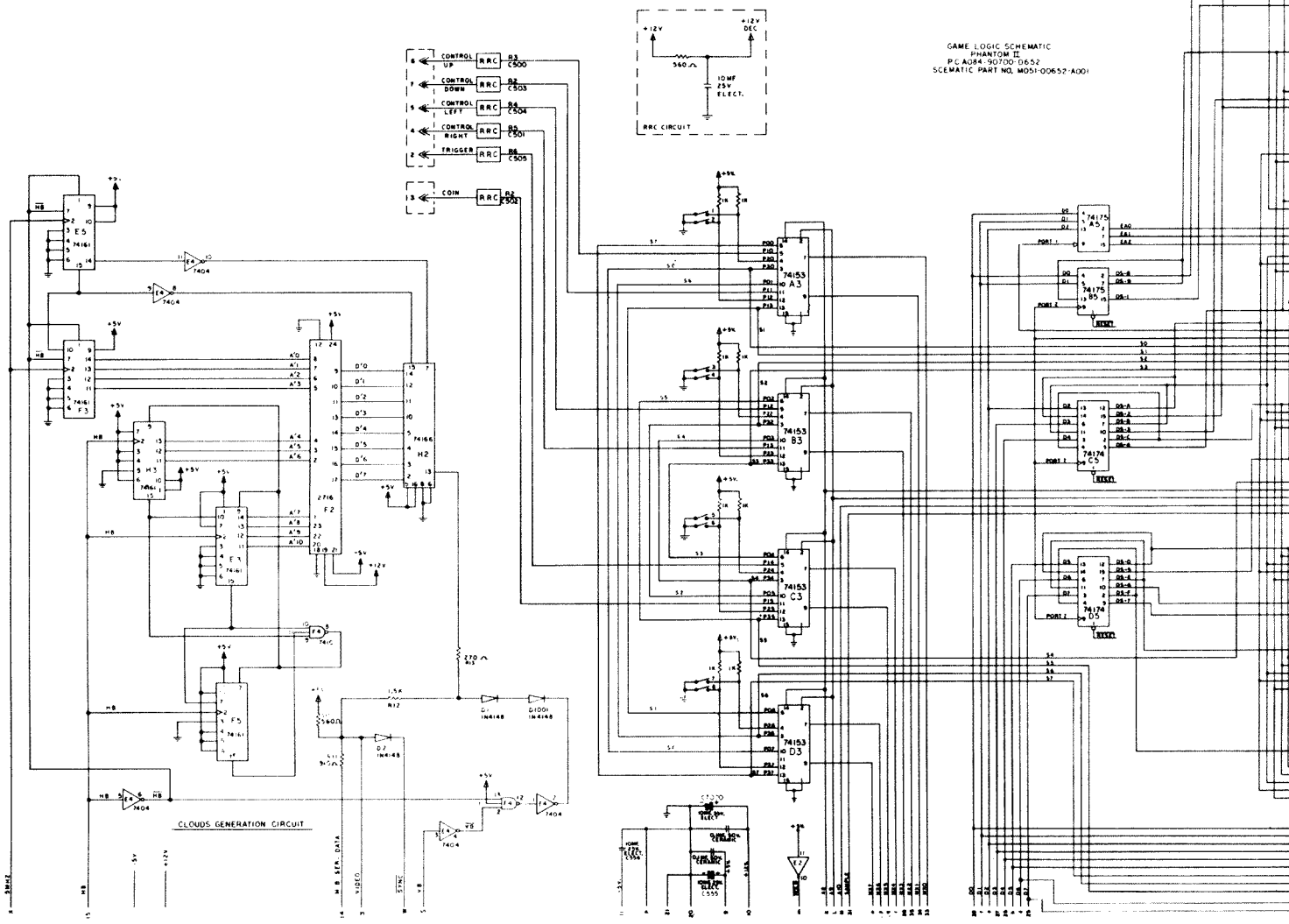
DB CAN BE SUBSTITUTED WITH 74LS32, 74LS66, 7486, 7432, 74LS05 WHEN STRAPPED TO COMMON WITH STRAP 'C'.

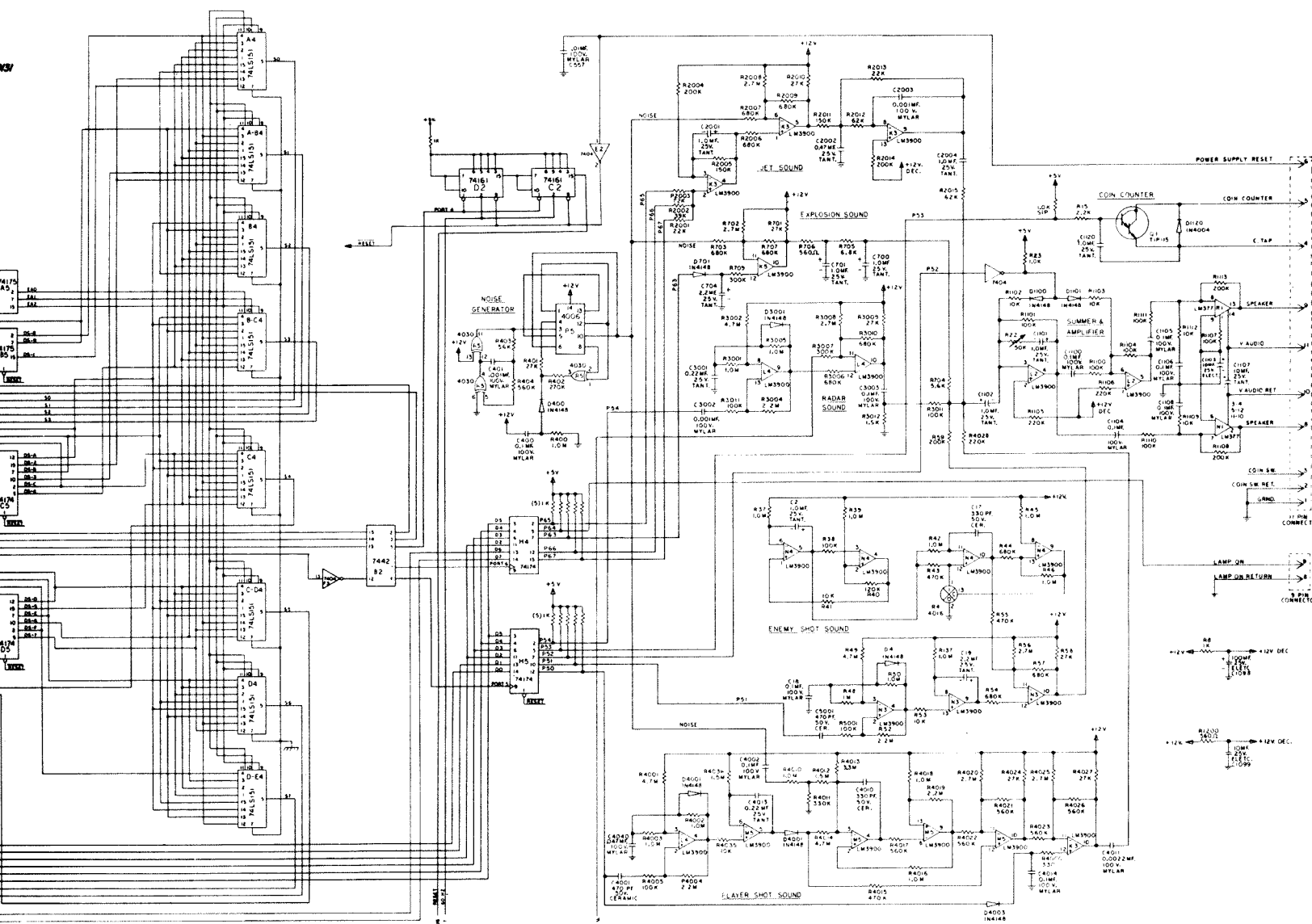
TANTALUM UNLESS NOTED OTHERWISE.

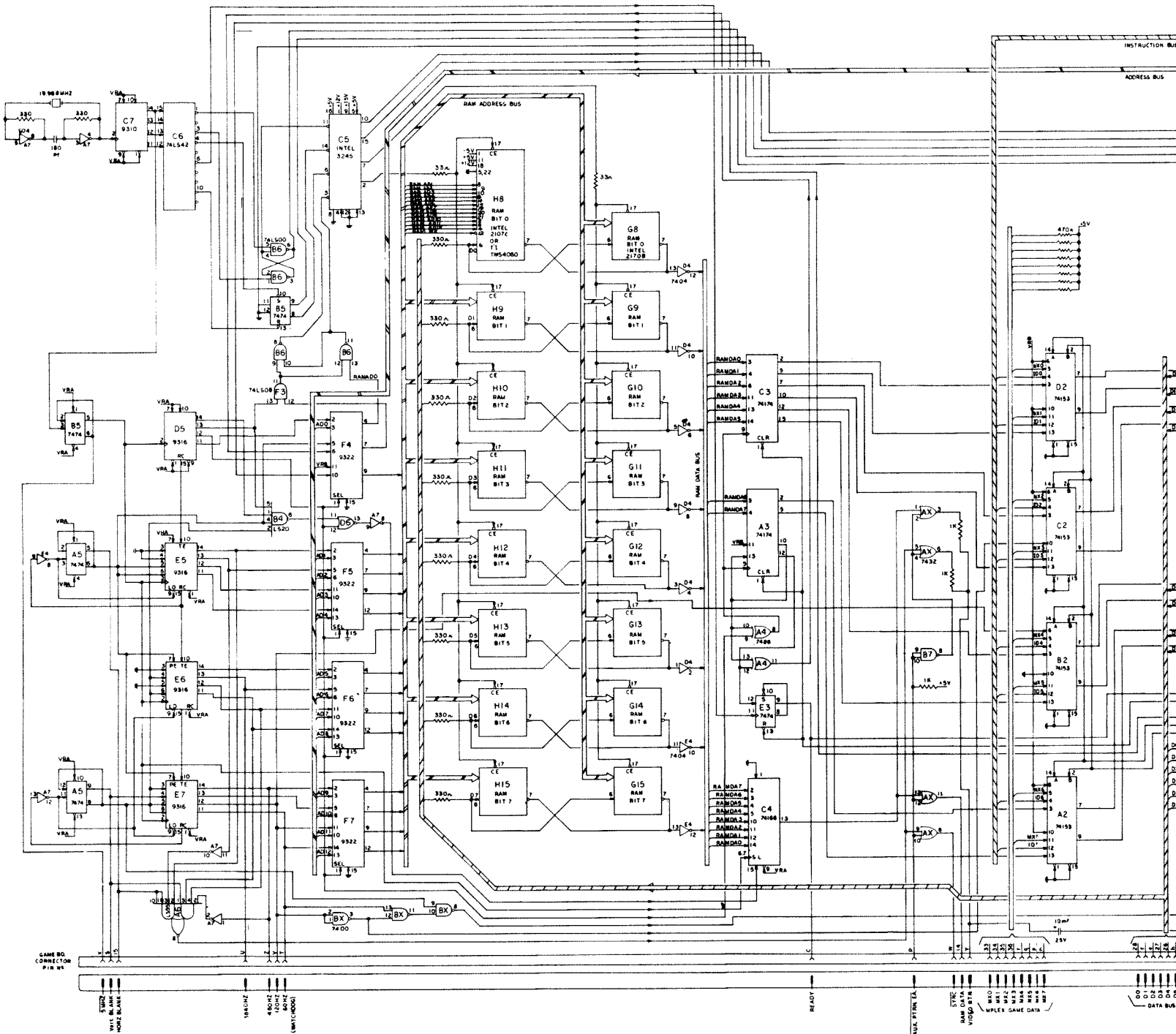
MOTHER BOARD COMPONENT LAYOUT
A084-90000-L652

MIDWAY MFG. CO.
10750 W. GRAND AVE.
FRANKLIN PARK, ILL. 60151

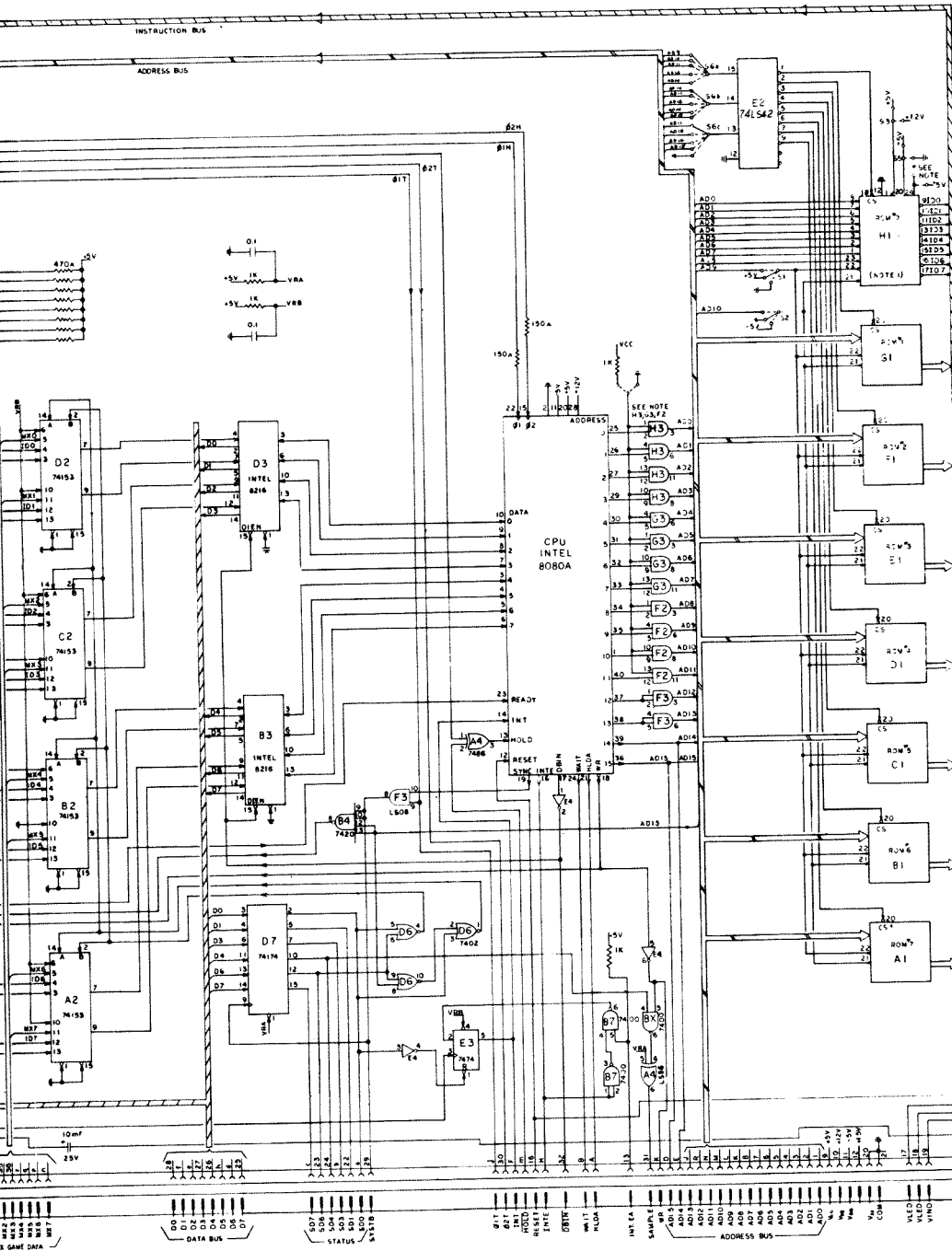
GAME LOGIC SCHEMATIC
PHANTOM II
P.C. A084-90700-0652
SCHEMATIC PART NO. M051-00652-A001







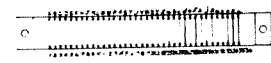
AD06 ○ ○ AD12
 AD10 ○ ○ AD14
 AD11 ○ ○ AD15
 AD12 ○ ○
 AD14 ○ ○ COM



NOTE 1 OTHER AVAILABLE CHIPS AND STRAP ARRANGEMENT IF USED

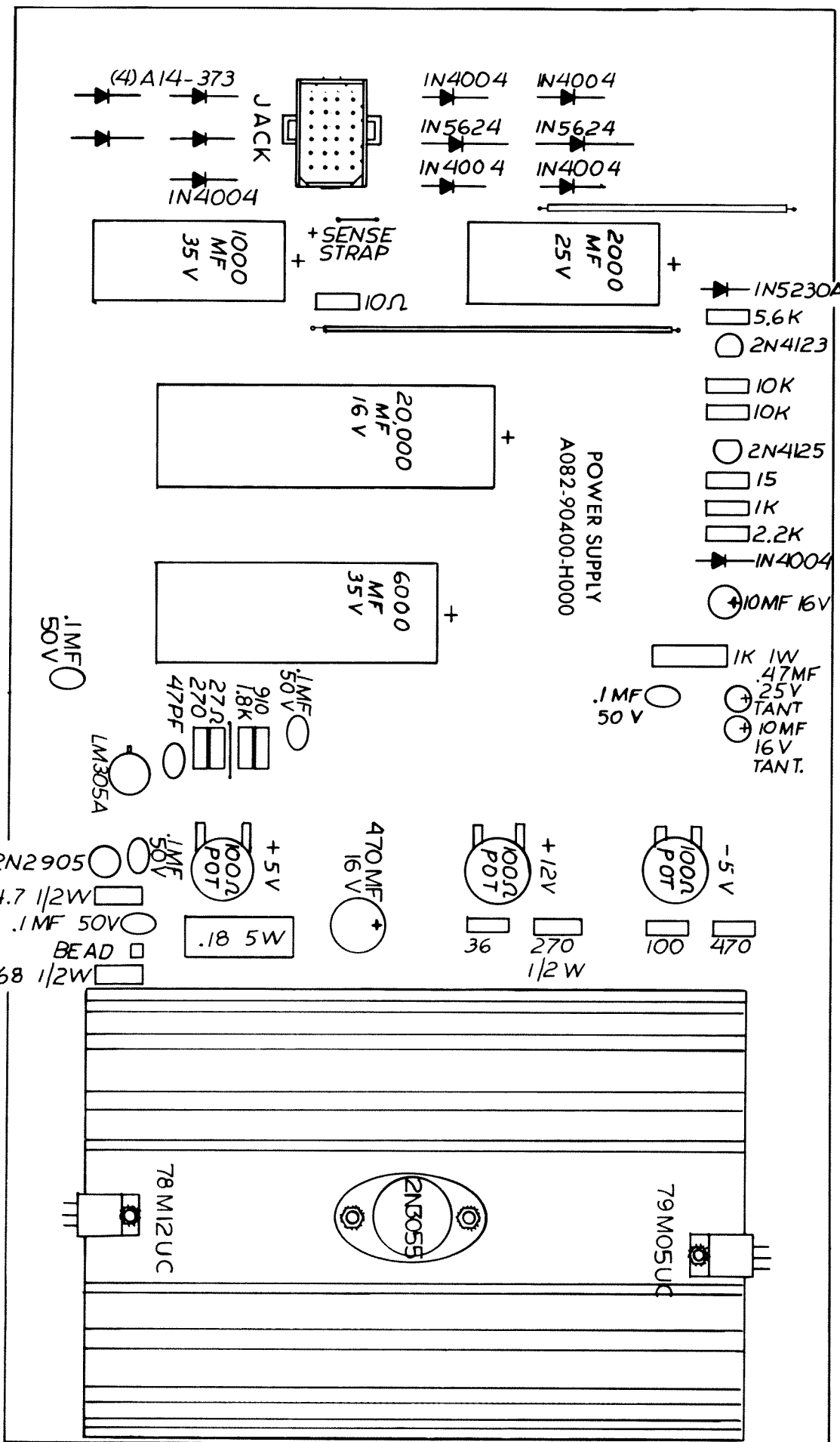
FROM	MFG.	56A	56B	56C	55	53	52	51	MS1P
EPROM		PIN 15	PIN 14	PIN 13	PIN 10	PIN 9	PIN 21	PIN 22	NEEDS
27581	AMD	AD10	AD11	AD12	COM	+5V	COM	AD9	+5V NO
2708	INTEL	AD10	AD11	AD12	COM	+12V	+5V	AD9	+5V NO
2716	TI	AD11	AD12	AD14	AD10	+12V	+5V	AD9	+5V NO
9316	GI	AD11	AD12	AD14	COM	AD10	COM	AD9	+5V NO

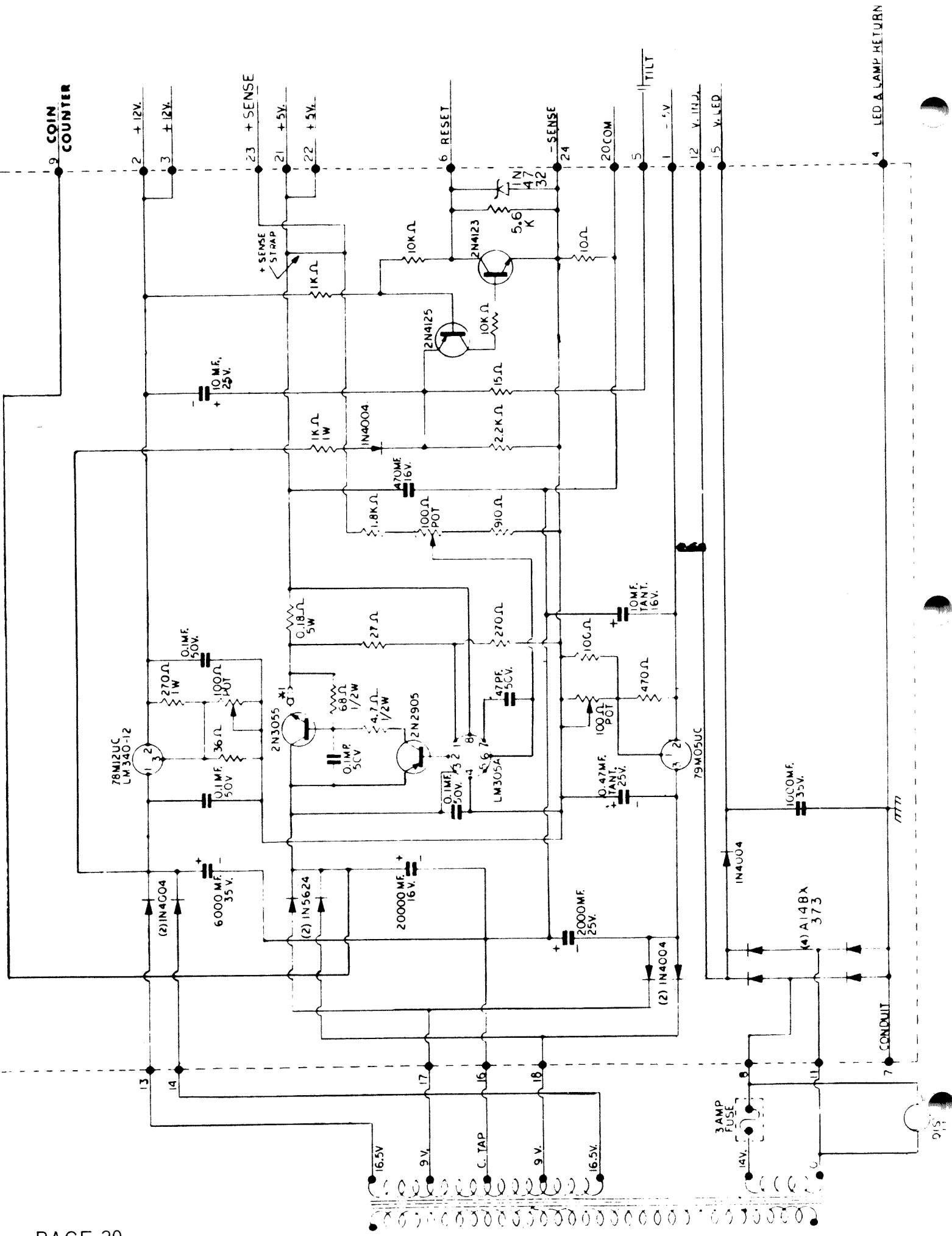
128 PIN CONNECTOR



128 PIN CONNECTION

MOTHER BOARD SCHEMATIC
 A084-90000-L652





9 COIN COUNTER

2 +12V.

3 +12V.

23 +SENSE

21 +5V.

22 +5V.

6 RESET

24 -SENSE

20COM

5

12 Y. 1142

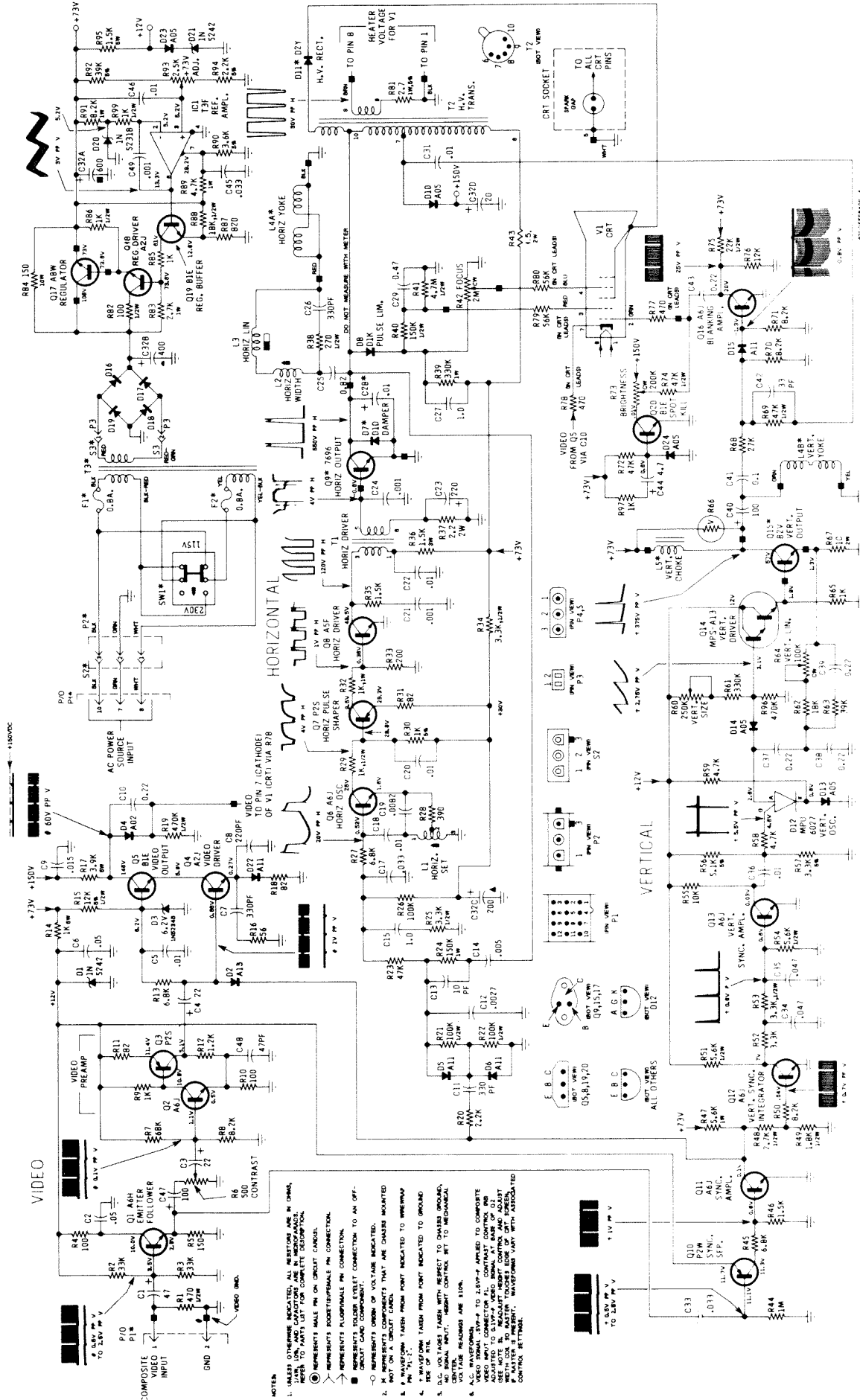
15 Y. LED

4 LED LAMP RETURN

7777

913

POWER SUPPLY



- NOTES:**
1. UNLESS OTHERWISE INDICATED, ALL CAPACITORS ARE IN OHMS.
 2. ALL VOLTAGE TAPERS WITH RESPECT TO CHASSIS (GROUND), NO SIGNAL INPUT, HEIGHT CONTROL SET TO MECHANICAL VOLTAGE REQUIRED ARE 110V.
 3. ALL VOLTAGE TAPERS WITH RESPECT TO CHASSIS (GROUND), NO SIGNAL INPUT, HEIGHT CONTROL SET TO MECHANICAL VOLTAGE REQUIRED ARE 110V.
 4. SIZE OF PNL FLASH FROM POINT INDICATED TO SURROUND.
 5. D.C. VOLTAGE TAPERS WITH RESPECT TO CHASSIS (GROUND), NO SIGNAL INPUT, HEIGHT CONTROL SET TO MECHANICAL VOLTAGE REQUIRED ARE 110V.
 6. A.C. WAVEFORMS TO 2.50V-PP APPLIED TO COMPLETE VIDEO INPUT CONNECTOR A1, CONTRAST CONTROL, AND DEVIATE TO SIMULATED CONTRAST CONTROL AND ADJUST WITH COIL TO MASTER TOLERANCE RANGE OF CRT. VOLTAGE TAPERS TO MASTER TOLERANCE RANGE OF CRT. VOLTAGE TAPERS TO MASTER TOLERANCE RANGE OF CRT. VOLTAGE TAPERS TO MASTER TOLERANCE RANGE OF CRT.

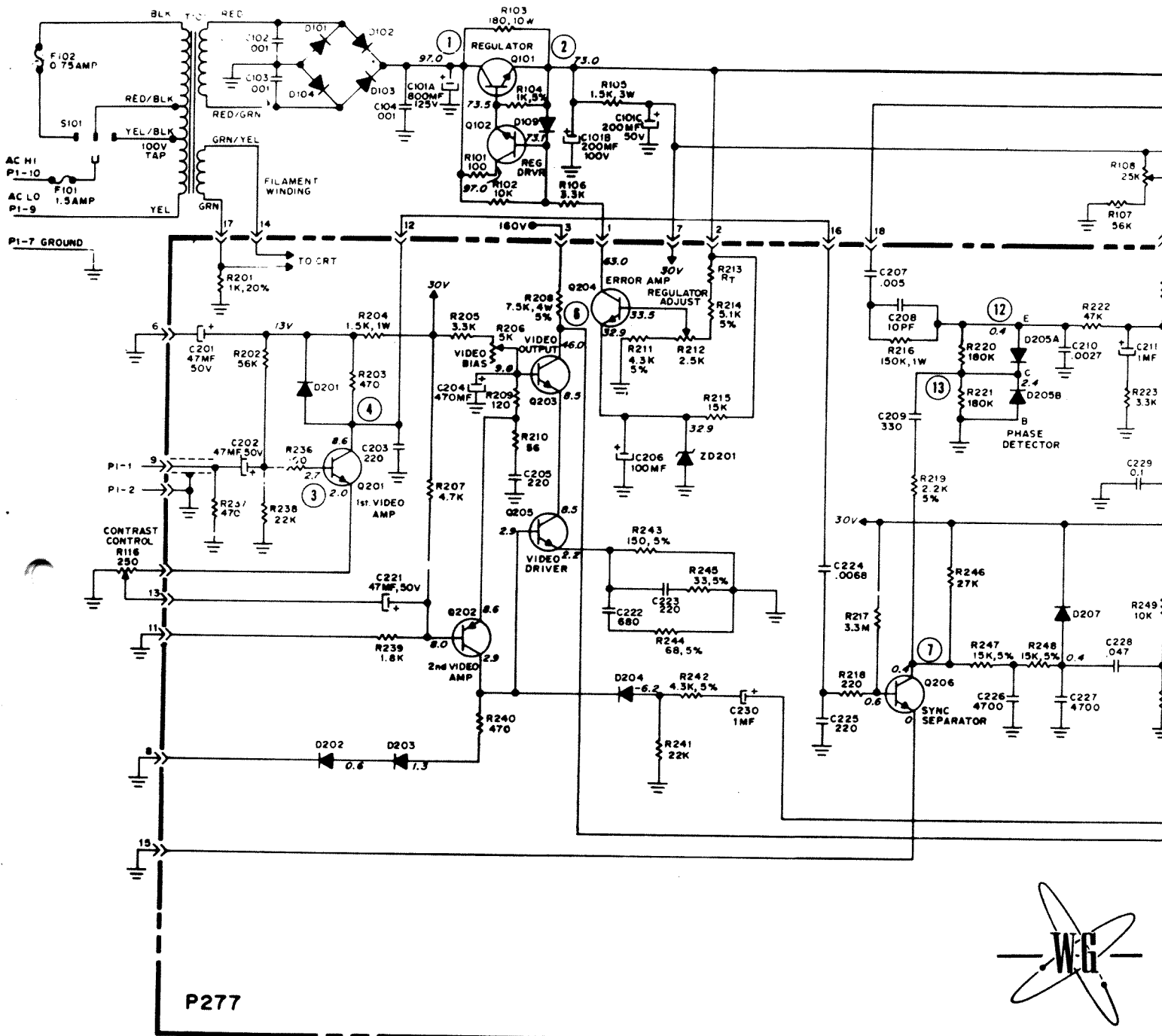
M5000-155, M7000-155 - Diagram Schematic

REF. NO.	PART NUMBER	DESCRIPTION	REF. NO.	PART NUMBER	DESCRIPTION
ELECTRICAL PARTS			COILS & CHOKES		
	1Y25017A01	MONITOR PANEL: complete; KT364LM	L-1	24D68822A08	HORIZ SET
	1Y25017A02	POWER, Audio Panel: complete; KT365LM	L-2	24D68801A67	COMPENSATING: 2000 uh
			L-3	24D69163A18	HORIZ LINEARITY
			L-4	24V25000A74	HORIZ WIDTH: incl's C42 & R68
			L-5	24D68523A15	DEFLECTION YOKE
CAPACITORS			TRANSISTORS		
C-1	23C65282A41	50 mf 50V Lytic	Q-1	48S137171	1st VIDEO: A6H
C-2	23C65282A41	50 mf 50V Lytic	Q-2	48S137127	2nd VIDEO: P2S
C-3	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	Q-3	48S134919	VIDEO OUTPUT: A1M
C-4	23C65282A41	50 mf 50V Lytic	Q-4	48S137317	VIDEO DRIVER: A8H
C-5	21S180B98	180 pf 10% 500V X5F	Q-5	48S137115	SYNC SEPARATOR: A5U
C-6	23S10255A78	470 mf 16V Lytic	Q-6	48S137172	HORIZ OSCILLATOR: A6J
C-7	21S180C01	680 pf 10% 500V X5F	Q-7	48S137127	HORIZ PULSE SHAPER: P2S
C-8	21S180B85	560 pf 10% 500V X5F	Q-8	48S137093	HORIZ DRIVER: A5F
C-10	8S10191B67	.22 mf 10% 250V Polyester	Q-9	48S137203	HORIZ OUTPUT: A6Z
C-11	8S10191A54	.0068 mf 10% 160V Polyester	Q-10	48S137173	VERT OSCILLATOR (1): P2W
C-12	21S180D10	220 pf 20% 100V X5F (Use 21R132503)	Q-11	48S137171	VERT OSCILLATOR (2): A6H
C-13	21S131625	330 pf 10% X5F	Q-12	48S137115	VERT DRIVER: A5U
C-15	21S180C41	.0027 mf 10% 500V Z5F (Use 21K121699)	Q-13	48S134900	VERT OUTPUT: A1C
C-16	23S10229A07	1.0 mf +40-20% 15V Lytic (Use 23C43280A17)	Q-14	48S134952	REGULATOR DRIVER: A2J
C-17	8S10191B90	.033 mf 10% 160V Polyester	Q-15	48S137315	REFERENCE AMP: A8G
C-18	8S10299A73	.01 mf 10% 100V Poly carb	Q-16	48S137368	REGULATOR: A8W
C-19	8S10299A74	.0082 mf 10% 160V Poly carb	Q-17	48S137172	AUDIO DRIVER: A6J
C-20	8S10191B98	.01 mf 10% 250V Polyester	Q-18	48S137168	AUDIO OUTPUT: P2V
C-21	21S180B51	.001 mf 10% 500V X5F	Q-19	48S137169	5V REGULATOR, Driver: A6G
C-22	8S10191B98	.01 mf 10% 160V Polyester	Q-20	48S137344	5V REGULATOR: A8U
C-23	21S180C02	10 pf 10% N150	Q-21	48S137476	SPOT KILLER: B1E
C-24	23D65282A40	150 mf 10V Lytic	CONTROLS		
C-25	21S180B51	.001 mf 10% 500V X5F	R-5	18D68222A34	CONTRAST: 250 Ohm
C-26	8S10212B53	.47 mf 10% 630V Mtlz Poly	R-10	18D66401A44	VIDEO BIAS: 4K
C-27	8S10212A11	1.0 mf 10% 630V Mtlz Poly	R-17	18D67858A12	FOCUS: 2 meg
C-28	8S10571A06	.01 mf 5% 1200V Poly Prop Foil	R-21	18D68222A35	BRIGHTNESS: 200K
C-29	8S10571A23	.56 mf 10% 250V Mtlz Prop Foil	R-34	18D68222A37	HORIZ HOLD: 25K
C-30	8S10191A32	.047 mf 10% 250V Polyester	R-59	18D66401A44	VERT LINEARITY: 4K
C-31	21S180B87	220 pf 10% 500V X5F	R-65	17D65820A38	VERT SIZE: 15 Ohm
C32	21S180D34	.005 mf 20% 1KV Z5F (Use 21S180D31)	R-74	17D65820A37	REGULATOR ADJUST: 2K
C-33	8S10212A69	.47 mf 10% 100V Mtlz Poly	R-82	18D68222A36	VERT HOLD: 3K
C-34	8S10191A32	.047 10% 250V Polyester	R-85	18D68222A34	VOLUME: 250 Ohm
C-35	8S10191B98	.01 mf 10% 250V Polyester	RESISTORS		
C-36	23S10255A69	4.7 mf 100V Lytic	R-1	6S127633	470 10% 1/2W
C-37	8S10212A20	2.2 mf 10% 100V Mtlz Poly	R-2	6S125568	22K 10% 1/2W
C-38	8S10212A20	2.2 mf 10% 100V Mtlz Poly	R-3	6S127541	56K 10% 1/2W
C-39	8S10191B67	.22 mf 10% 250V Polyester	R-4	6S127633	470 10% 1/2W
C-40	8S10212A10	1.0 mf 10% 100V Mtlz Poly (Use 8S10191A46)	R-6	6S128955	1500 10% 1W
C-41	8S10064A06	.01 mf 10% 600V Mylar	R-7	6S121847	4700 10% 1/2W
C-42	21S180A71	470 pf 10% 500V X5F	R-8	6S122445	1800 10% 1/2W
C-43	23C65807A47	400 mf/125V; 600 mf/50V; 20 mf/200V Lytic	R-9	6S119926	2700 10% 1/2W
C-44	21S180E60	.01 mf +80-20% 50V Z5V	R-11	6S128226	120 10% 1/2W
C-47	*23C65807A52	5000 mf 20V Lytic	R-12	6S127633	470 10% 1/2W
C-49	23S10255A31	470 mf 40V Lytic	R-13	17S10731A02	7500 5% 5W WW
C-50	23D65282A41	50 mf 50V Lytic	R-14	6S124797	150 10% 1/2W
C-51	23S10255B43	40 mf 100V Lytic	R-15	6S127516	82 10% 1/2W
DIODES & RECTIFIERS			R-18	-----	Part of CRT socket assembly
D-1	48S134921	DIODE, Silicon: D1D; Damper	R-19	-----	Part of CRT socket assembly
D-2	48S134978	DIODE, Silicon: D1K; Pulse Limiter	R-20	-----	Part of CRT socket assembly
D-3	48D67120A11	DIODE, Low Power	R-22	6S129296	270K 10% 1/2W
D-4	48S137114	RECTIFIER, H. V.: Silicon: D2Y	R-23	6S10053C67	27K 5% 1/2W
D-5	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-24	6S127538	3.3 meg 10% 1/2W
D-6	48S137469	DIODE, Silicon: zener; D7G	R-25	6S121300	27K 10% 1/2W
D-7	48S134917	DIODE, Dual: D1C; Detector	R-26	6S127541	56K 10% 1/2W
D-8	48S67120A11	DIODE, Low Power	R-27	6S129875	2200 10% 1/2W
D-9	*48S191A10	RECTIFIER, Silicon: 91A10	R-28	6S125531	180K 10% 1/2W
D-10	48S191A10	RECTIFIER, Silicon: 91A10	R-29	6S125531	180K 10% 1/2W
D-11	48S101A10	RECTIFIER, Silicon: 91A10	R-30	6S125892	47K 10% 1/2W
D-12	48S191A10	RECTIFIER, Silicon: 91A10	R-31	6S125534	100K 10% 1/2W
D-13	48D67120A11	DIODE, Low Power	R-32	6S124506	3300 10% 1/2W
D-14	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-33	6S10053C53	6800 5% 1/2W
D-15	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-35	6S127541	56K 10% 1/2W
D-16	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-36	6S125545	390 10% 1/2W
D-17	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-37	6S121301	1000 10% 1/2W
D-18	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-38	6S10053C33	1000 5% 1/2W
D-19	48D67120A11	DIODE, Low Power	R-39	6S127516	82 10% 1/2W
D-20	*48S10641D43	DIODE, Silicon: D4.3	R-40	6S127547	1000 10% 1W
D-21	48D67120A11	DIODE, Low Power	R-41	6S127099	220 10% 1/2W
D-22	48S191A05	RECTIFIER, Silicon: 91A05 (Use 48S191A07)	R-42	6S127513	1500 10% 1/2W
D23	48S191A05	RECTIFIER Silicon: 91A05 (Use 48S191A07)	R-43	17S10130B07	1500 10% 3W fxd mtl film
FUSES			R-44	17S744356	2.2 10% 2W WW
F-1	65S139424	FUSE: 1A-250V	R-45	6S120141	150K 10% 1W
F-2	65S139424	FUSE: 1A-250V	R-46	6S127634	33K 10% 1W
INTEGRATED CIRCUITS			R-47	6S128229	680K 10% 1/2W
IC-1	*51S10732A01	INTEGRATED CIRCUIT: T3F	R-48	6S10053D21	4.7 meg 10% 1/2W
			R-49	6S124797	150 10% 1/2W
			R-50	6S10053C45	3300 5% 1/2W
			R-52	6S124506	3300 10% 1/2W
			R-53	6S129874	68 10% 1/2W
			R-54	6S131972	39 10% 1/2W
			R-55	6S10053C65	22K 5% 1/2W
			R-56	6S125535	39K 10% 1/2W
			R-57	6S124506	3300 10% 1/2W
			R-58	6S129793	82K 5% 1/2W
			R-60	6S129875	2200 10% 1/2W
			R-61	6S10053F29	820 10% 1W
			R-62	6S127515	3900 10% 1/2W

REPLACEMENT PARTS LIST

REF. NO.	PART NUMBER	DESCRIPTION	REF. NO.	PART NUMBER	DESCRIPTION
R-63	6S121301	1000 10% 1/2W			
R-64	17S10130C91	10 10% 1/2W (special)	E-1	50V25008A22 65S139451	SPEAKER: 4" PM; incld D22 LAMP: No. 1436
R-66	6S129064	4700 10% 1W			
R-67	6S122848	18K 10% 1/2W			
R-68	6S124797	150 10% 1/2W			
R-69	17S647132	1200 10% 5W WW (Use 17S136197)			
R-71	6S119926	2700 10% 1/2W			
R-72	6S124551	15K 10% 1/2W		9D66133A28	CAP, SS Rect (HV Transformer - PRI/SEC lead)
R-73	6S129875	2200 10% 1/2W		42B25158A01 31D70080B04	CLAMP, Metal: Defl Yoke Mtg CONNECTOR, PC panel: 9 contact; on chassis
R-75	6S121301	1000 10% 1/2W			
R-76	6S124506	3300 10% 1/2W			
R-77	6S129221	100 10% 1/2W	S-2	*15S10390A06	CONNECTOR, PC panel: 12 contact; less key and contacts (power-audio panel)
R-78	6S127005	5600 10% 1/2W	P-1	*15S10183A69	CONNECTOR, Plug: 12 contact; less contacts (power)
R-79	17S135589	150 10% 10W WW			
R-81	6C66263A08	V-ARISTOR (Use 6S66263A16)			
R-86	6S127099	220 10% 1/2W			
R-88	6S121301	1000 10% 1/2W			
R-89	---	Part of CRT Socket			
R-90	6S131412	56 10% 1/2W		*39S10184A63	CONTACT, Plug: for power connector 15S10183A69
R-91	6S10053C39	1800 5% 1/2W		39S10184A22	CONTACT: for S2 connector
R-92	6S10053C57	10K 5% 1/2W		15S10630A01	COVER, nylon: slide switch; SW1
R-95	6S125568	22K 10% 1/2W		*7S10609A03	GROMMET, Plastic: PC panel mtg
R-96	6S125568	22K 10% 1/2W		26C66745A05	HEAT SINK: Q3
R-97	6S121847	4700 10% 1/2W		*26C25198A01	HEAT SINK: Q20
R-98	6S127099	220 10% 1/2W		9C66238A02	HOLDER, Fuse: F1 & F2
R-99	6S128226	120 10% 1/2W		14A562353	INSULATOR, Mica: Transistor socket; Q9, Q13, Q16 & Q20 (Use 14A543810)
SWITCHES				28S10733A01	KEY, Plug: for S2 connector
SW-1	40S10624A01	SWITCH, Slide: DPDT (115V-230V)		2S7051	NUT, hex: 3/8-32; control mtg
TRANSFORMERS				5S10281A03	RIVET, drive pin: nylon; HV transf mtg
T-1	25D67440A03	HORIZ DRIVER		47C66082A03	ROD, Adjustment: width coil; L4
T-2	24D69791A21	H. V. TRANSFORMER: complete		3S136050	SCREW, tpg: 6-20 x 1/2 clu pan hd; Q9, Q13, Q16 & Q20
T-3	25D65840A22	VERT OUTPUT (Use 25D65840B23)		9S10143A41	SOCKET, lamp: E1
T-4	*25D68164A31	POWER		9D67555V27	SOCKET, CRT: incld leads & resistors
MISCELLANEOUS ELECTRICAL PARTS				*9D25201A01	SOCKET, HV Rectifier (4): complete; incld 2nd anode lead & cup
V-1	20WP4	CRT (XM501-10 19VP111)		9C63825A01	SOCKET, transistor: Q9, Q13, Q16
	23JEP4	CRT (XM701-10 23VP111)		9C63825A02	SOCKET, transistor: Q20
				41D65987A01	SPRING, special: CRT aquadag grnd
				66P65173A47	TOOL, contact removal (S2 connector)
			MECHANICAL PARTS		
* DENOTES NEW ITEM APPEARING ON ANY LIST FOR FIRST TIME.					

MOTOROLA PARTS DEPT.
MOTOROLA INC.
1155 HARVESTER RD.
WEST CHICAGO, IL 60185
PHONE (312) 231-4400



P277



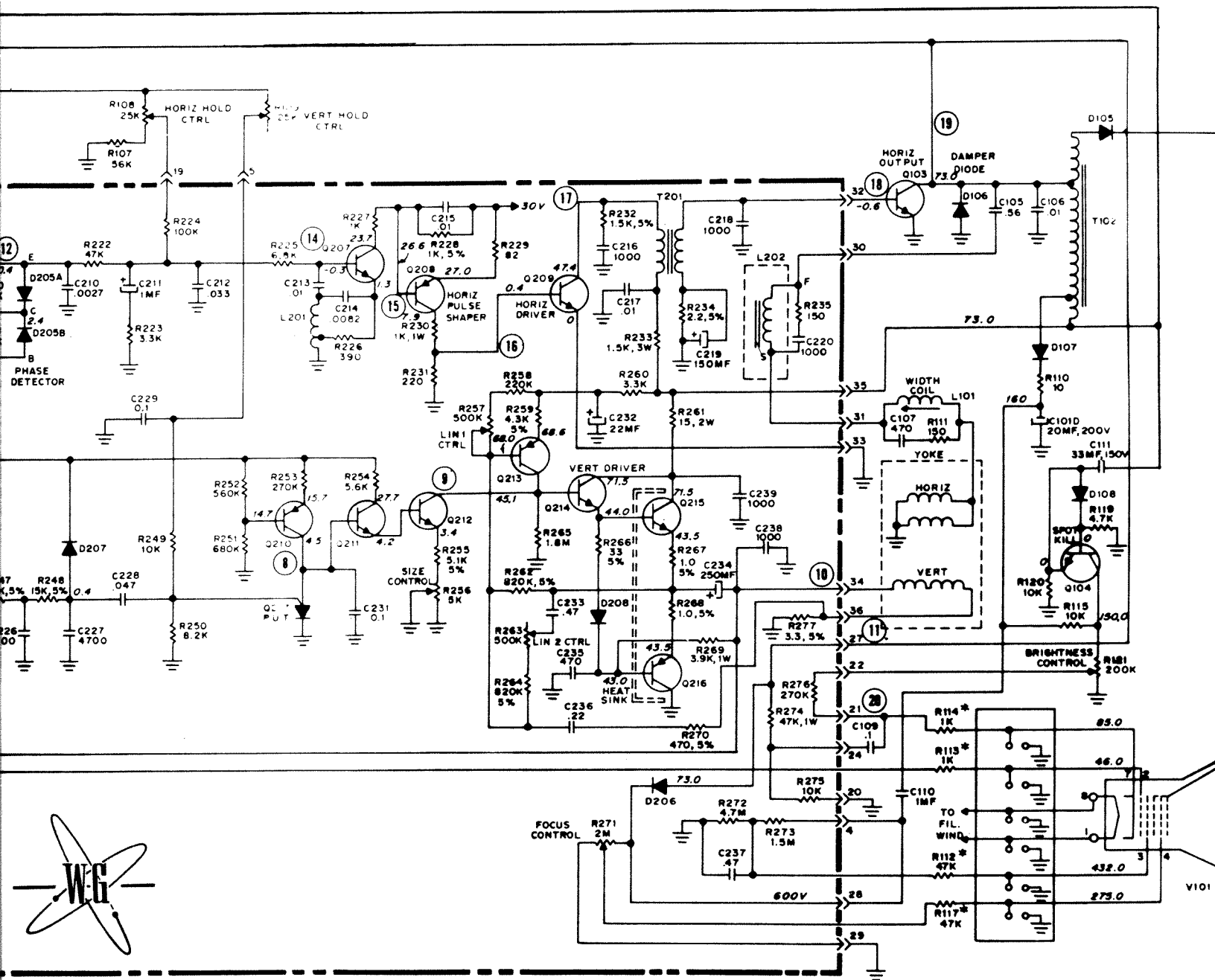
NOTES:

1. VOLTAGE MAY VARY WITH CONTROL SETTING.
2. LINE VOLTAGE MAINTAINED AT 120VAC, 50/60 Hz.
3. ALL D.C. VOLTAGES $\pm 10\%$ MEASURED FROM POINT INDICATED TO CHASSIS USING HIGH IMPEDANCE METER WITH NO SIGNAL INPUT. CONTRAST AND BRIGHTNESS CONTROLS AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.
4. WITH INTERNAL NUMBER INDICATES LOCATION OF WAVE FORM READING.

WELLS - GARDNER

CORPORATION

2701 N. KILDARE AVE. • CHICAGO, ILL.



W.G. ELECTRONICS
 CORPORATION
 CHICAGO, ILL. 60639 • ALBANY 2-8220
 TELEX 25-3286

NOTES:
 * INDICATES RESISTORS LOCATED IN PICTURE TUBE LEAD ASSEMBLY.
 RESISTANCE VALUES IN OHMS, 1/2 WATT, 10% UNLESS OTHERWISE NOTED. K=1,000 M=1,000,000
 CAPACITANCE VALUES OF 1 OR LESS ARE IN MICROFARADS. ABOVE 1 IN PICOFARADS UNLESS OTHERWISE NOTED.

MODEL No.
 V1001-5734

REPLACEMENT PARTS LIST

CHASSIS PARTS

CAPACITORS

C101A, B, C, D	45X0558-001	800 μ F/125V, 200 μ F/100V 200 μ F/50V, 20 μ F/200V Electrolytic
C102, 103 104	80X0001-000	.001 μ F, GMV Z5U Cer. Disc.
★C105	342X5642-049	.56 μ F, 400V, 10% Polypropylene
★C106	46X0536-001	.01 μ F, 1200V, 5% Polypropylene
C107	80X0099-006	470 pF, Z5F, 10%
C109	342X1044-040	0.1 μ F, 400V, 20% Mylar
★C110	46X0540-002	1.0 μ F, 630V, 10% Polyester Film
C111	45X0515-032	33 μ F, 150V, Electrolytic

CONTROLS

R108, 109	40X0585-091	25k Ohm, Horiz. & Vert. Hold
R116	40X0585-090	250 Ohm, Contrast
R121	40X0585-092	200k Ohm, Brightness

COILS & TRANSFORMERS

★L101	9A2787-001	Coil, Width
★T101	53X0475-001	Transformer, Power
★T102	53X0474-001	Transformer, Flyback

RESISTORS

R101	340X3101-941	100 Ohm, 10%, 1/2W
R102, 115, 120	340X3103-941	10k Ohm, 10%, 1/2W
★R103	340X0181-341	180 Ohm, 10%, 10W, WW
R104	340X3102-931	1k Ohm, 5%, 1/2W
★R105	340X6152-341	.1.5k Ohm, 10%, 3W, WW
R106	340X3332-941	3.3k Ohm, 10%, 1/2W
R107	340X3563-941	56k Ohm, 10%, 1/2W
R110	340X3100-941	10 Ohm, 10%, 1/2W
R111	340X3151-941	150 Ohm, 10%, 1/2W
R119	340X3472-941	4.7k Ohm, 10%, 1/2W

SEMICONDUCTORS

D101, 102 103, 104	66X0023-009	Rectifier, Silicon 500V 1N444B
★D105	66X0067-001	Rectifier Varo H1802
★D106	66X0068-001	Diode, Damper MR1-1600
D107	66X0053-001	Diode, 350V Amperex BA148
D108, 109	66X0046-001	Diode, Silicon FDH444
★Q101	86X0117-001	Transistor (NPN) 2N5632 Regulator
Q102	86X0071-001	Transistor (NPN) Reg. Driver MPSA06
★Q103	86X0118-001	Transistor (NPN) BU207 Hor. Output
Q104	86X0065-001	Transistor (NPN) D40N5 Spot Kill

MISCELLANEOUS

★F101	16X0171-001	Fuse Holder
★F102	16X0176-001	Fuse, 1.5 Amp, Slo-Blo 3AG
★	16X0175-001	Fuse, 0.75 Amp, Slo-Blo 3AG
★	13X1201-001	HV Lead & Recept. Assy.
★	28X0789-001	Spring, Dag, Grounding
★	9A2786-001	Deflection Yoke & Clamp
★V101	19VARP4	CRT (19V1001)
or	or	
★V101	22VATP4	CRT (22V1001)

★ Product Safety Device

REPLACEMENT PARTS LIST P277 CIRCUIT BOARD ASSY.

CAPACITORS

C201, 202, 221	45X0524-027	47 μ F, 50V, Electrolytic
C203, 205, 223, 225	80X0099-057	220 pF, 10%, Z5F, Cer. Disc.
C204	45X0524-053	470 μ F, 16V, Electrolytic
C206	45X0524-051	100 μ F, 50V, Electrolytic
C207	80X0099-192	.005 μ F, 20%, 1KV, Cer. Disc.
C208	80X0099-036	10 pF, 10%, 500V, Cer. Disc.
C209	80X0099-013	330 pF, 10%, 500V, Cer. Disc.
C210	349X4722-109	.0027 μ F, 10%, Mylar
C211	45X0524-023	1.0 μ F, 15V, Electrolytic
C212	349X3332-109	.033 μ F, Mylar
C213	46X0537-002	.01 μ F, Poly
C214	46X0537-003	.0082 μ F, Poly
C215	349X1032-109	.01 μ F, 10%, 100V Mylar
C216, 218, 220, 238, 239	80X0099-076	1000 pF, 10%, 500V, Cer. Disc.
C217	349X1032-209	.01 μ F, 10%, 200V, Mylar
C219	45X0524-052	150 μ F, 10V, Electrolytic
C222	80X0099-137	680 pF, 10%, 500V, Cer. Disc.
C224	349X6822-109	.0068 μ F, 10%, 100V, Mylar
C226, 227	80X0099-056	4700 μ F, 10%, 500V, Cer. Disc.
C228	349X4732-109	.047 μ F, 10%, 100V, Mylar
C229	349X1044-109	0.1 μ F, 20%, 100V, Mylar
C230	45X0515-014	1.0 μ F, 50V, Electrolytic
C231	349X1042-109	0.1 μ F, 10%, 100V, Mylar
C232	45X0524-026	22 μ F, 100V, Electrolytic
C233	349X4742-109	.47 μ F, 10%, 100V, Mylar
C234	45X0524-025	250 μ F, 100V, Electrolytic
C235	80X0099-006	470 pF, 10%, Z5F, Cer. Disc.
C236	349X2242-109	.22 μ F, 10%, 100V, Mylar
C237	46X0540-001	.47 μ F, 10%, 630V, Polyester Film

CONTROLS

R206, 256	40X0592-008	5k Ohm, Video Output, Size
R212	40X0585-093	2.5k Ohm, Reg. Adj.
R257, 263	40X0592-004	500k Ohm, Lin 1 & 2
R271	40X0585-094	2M Ohm, Focus

COILS & TRANSFORMERS

★L201	9A2788-001	Horiz. Osc.
★L202	9A2789-001	Horiz. Lin.
★T201	52X0126-001	Horiz. Driver

RESISTORS

R201	340X3102-954	1k Ohm, 20%, 1/2W
R202	340X3563-944	56k Ohm, 10%, 1/2W
R203, 237, 240	340X3471-944	470 Ohm, 10%, 1/2W
★R204	340X4152-843	1.5k Ohm, 10%, 1.0W
R205, 223, 260	340X3332-944	3.3k Ohm, 10%, 1/2W
R207	340X3472-944	4.7k Ohm, 10%, 1/2W
★R208	340X7752-733	7.5k Ohm, 5%, 4.0W
R209	340X3121-944	120 Ohm, 10%, 1/2W
R210	340X3560-944	56 Ohm, 10%, 1/2W
R211, 242, 259	340X3432-934	4300 Ohm, 5%, 1/2W
R213	43X0467-001	Thermistor
R214, 255	340X3512-934	5.1k Ohm, 5%, 1/2W
R215	340X3153-944	15k Ohm, 10%, 1/2W
★R216	340X4154-843	150k Ohm, 10%, 1.0W
R217	340X3335-944	3.3M Ohm, 10%, 1/2W
R218, 231	340X3221-944	220 Ohm, 10%, 1/2W
R219	340X3222-934	2.2k Ohm, 5%, 1/2W

★ Product Safety Device

RESISTORS (Cont'd.)

R220, 221	340X3184-944	180k Ohm, 10%, 1/2W
R222	340X3473-944	47k Ohm, 10%, 1/2W
R224	340X3104-944	100k Ohm, 10%, 1/2W
R225	340X3682-944	6.8k Ohm, 10%, 1/2W
R226	340X3391-944	390 Ohm, 10%, 1/2W
R227	340X3102-944	1k Ohm, 10%, 1/2W
R228	340X3102-934	1k Ohm, 5%, 1/2W
R229	340X3820-944	82 Ohm, 10%, 1/2W
★R230	340X4102-843	1k Ohm, 10%, 1.0W
R232	340X3152-934	1.5k Ohm, 5%, 1/2W
★R233	340X6152-743	1.5k Ohm, 10%, 3.0W
R234	340X5022-333	2.2 Ohm, 5%, 2.0W
R235	340X3151-944	150 Ohm, 10%, 1/2W
R236	340X3101-944	100 Ohm, 10%, 1/2W
R238, 241	340X3223-944	22k Ohm, 10%, 1/2W
R239	340X3182-944	1.8k Ohm, 10%, 1/2W
R243	340X3151-934	150 Ohm, 5%, 1/2W
R244	340X3680-934	68 Ohm, 5%, 1/2W
R245, 266	340X3330-934	33 Ohm, 5%, 1/2W
R246	340X3273-944	27k Ohm, 10%, 1/2W
R247, 248	340X3153-934	15k Ohm, 5%, 1/2W
R249, 275	340X3103-944	10k Ohm, 10%, 1/2W
R250	340X3822-944	8.2k Ohm, 10%, 1/2W
R251	340X3684-944	680k Ohm, 10%, 1/2W
R252	340X3564-944	560k Ohm, 10%, 1/2W
R253, 276	340X3274-944	270k Ohm, 10%, 1/2W
R254	340X3562-944	5.6k Ohm, 10%, 1/2W
R258	340X3224-944	220k Ohm, 10%, 1/2W
★R261	340X5150-843	15 Ohm, 10%, 2.0W
R262, 264	340X3824-934	820K Ohm, 5%, 1/2W
R265	340X3185-944	1.8M Ohm, 10%, 1/2W
R267, 268	340X3010-934	1 Ohm, 5%, 1/2W
R269	340X4392-843	3.9K Ohm, 10%, 1/2W
R270	340X3471-934	470 Ohm, 5%, 1/2W
R272	340X3475-944	4.7M Ohm, 10%, 1/2W
R273	340X3155-944	1.5M Ohm, 10%, 1/2W
★R274	340X4473-843	47k Ohm, 10%, 1.0W
R277	340X3033-934	3.3 Ohm, 5%, 1/2W

SEMICONDUCTORS

D201, 202, 203, 204, 207, 208	66X0046-001	Diode, Silicon FDH444
D205A, 205B	66X0066-001	Diode, Dual, MSD6102
D206	66X0054-002	Diode, RCA D2102SF
Q201, 205, 206	86X0113-001	Transistor (NPN) 2N3904
Q202, 208	86X0114-001	Transistor (PNP) 2N3906
Q203	86X0071-001	Transistor (NPN)
Q204, 212	86X0071-001	Transistor (NPN) MP5A06
Q207, 211	86X0058-002	Transistor (NPN) MP5A20
Q209	86X0116-001	Transistor Horiz, Driver (NPN) 2N6557
Q210	86X0066-001	Transistor (PNP) MP5A70
Q213	86X0072-001	Transistor (PNP) MP5A56
Q214	86X0073-001	Transistor (NPN) MP5U07
Q215	86X0074-001	Transistor (NPN) 2N5192
Q216	86X0075-001	Transistor (PNP) 2N5195
Q217	86X0070-001	Transistor (P.U.T.) MPU131
ZD201	66X0040-004	Diode, Zener 31V

MISCELLANEOUS

38A5395-000	Pix Socket & Connector Assy.
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PHANTOM II
Game Logic
A084-90700-D652

Chip Number	Function
7404	Hex inverter
7410	Triple 3 input nand
7442	BCD to decimal decoder
74LS151	Data selector
74153	Dual 4 line to 1 line selector
74161	4 bit binary counter
74166	8 bit shift register
74174	Hex "D" flip-flop
74175	Quad "D" flip-flop
4006	18 bit shift register
4016	Quad switch
4030	Quad exclusive or
LM377	Amplifier
LM3900	Quad op. amp.
2716	16 K Prom
TIP115	NPN darlington transistor

