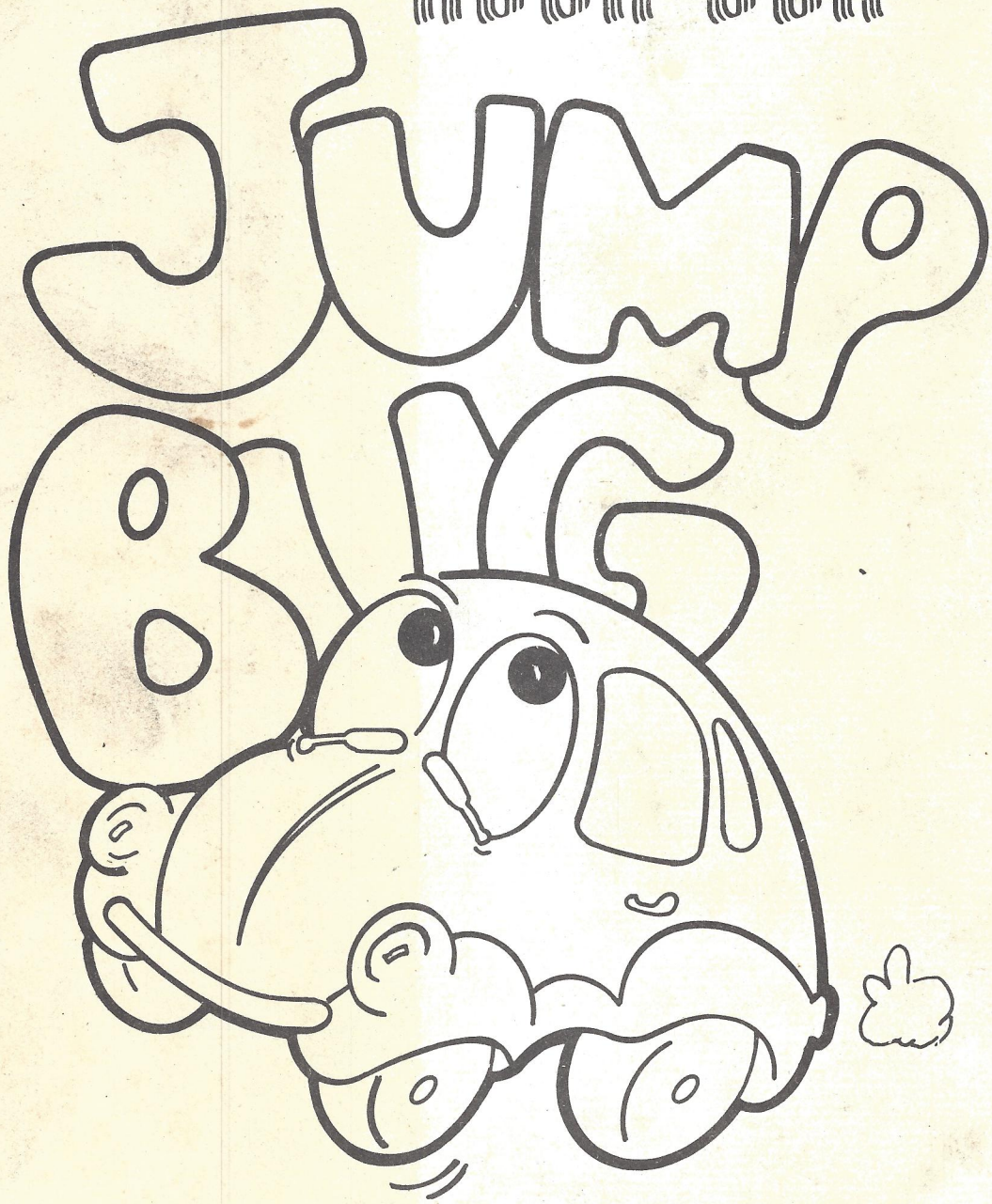


ROCK-O-LA



SERVICE MANUAL
and
PARTS CATALOG

FORM NO. 8112

PRINTED IN U.S.A.

PART NO. G-6082

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INTRODUCTION

HOW TO OPERATE JUMP BUG

Jump Bug is an exciting game which consists of eight scenes. The player must control a car by rhythmically jumping it by the skillful use of an 8 way joystick.

The object of the game is to collect money and points by collecting money bags or diamonds and landing on clouds.

The Jump Bug must avoid contact with blue enemy, jokers, rocks, skulls, bats, jellyfish, bird eggs, flying fish, UFO'S, missiles and volcanoes.

The game begins in scene I, a city. The Jump Bug manouvers thru the city collecting money and points and avoiding the enemy.

In scene II the Jump Bug must avoid rocks, blue enemy and jokers while collecting money, diamonds and points.

In scene III the Jump Bug continues thru an area of volcanoes.

Scene IV takes place in a pyramid. The Jump Bug collects money and points while avoiding skulls, bats and skeletons. The Jump Bug must exit from the top of the pyramid via a water spout or by bouncing up in a circuitous path.

In scene V the Jump Bug continues thru an area of more volcanoes.

Scene VI is underwater. The Jump Bug must avoid jellyfish and birds. When out of the water, avoid bird eggs and flying fish.

Scene VII is also underwater with sea weed at the surface. The Jump Bug cannot get out of the water in this scene. Flying fish which shoot little fish are the enemy. The Jump Bug must land on an elevator to exit this scene.

Scene VIII takes place in the air above the sea. The Jump Bug continues to collect points while avoiding UFO'S and Missiles. Finally the Jump Bug lands on a runway to complete one round of the game. The game then restarts in the city and is more difficult.

RECEIVING AND INSTALLATION (VIDEO GAMES)

RECEIVING INSPECTION

Your game was shipped in ready-to-play condition. However, after removal of the shipping carton, a brief visual examination is suggested.

Naturally, you'll want to make note of any physical damage to the game cabinet and its external components for freight claim purposes. Considering the quality of the shipping carton, any damage to the exterior would indicate possible interior damage as well.

The interior of the game should also undergo a brief examination for: loose mounting hardware (check to be sure that the major components are still securely mounted); disconnected or loose wires, cables or harnesses; electronic devices loose in their sockets; etc.

At this time the game serial number should be logged. Please remember that the game serial number will be required if you need service from your distributor.

ELECTRICAL REQUIREMENTS

A good earth ground is essential for the proper operation of this game or for that matter any electronic device. Problems with instability and erratic operation of computer-type devices can usually be traced to an ineffective ground system. Therefore, plug the game into a properly wired 3 prong outlet. If a 3 prong to 2 prong AC adaptor must be used, an alternate method of grounding the third prong must be used.

INITIAL ADJUSTMENTS

When the game is connected to AC power, one of the game sounds may be heard. This is normal.

The audio level (volume) can be easily adjusted. This is achieved by rotation of the volume control located on the coin door. The audio level should compete with other machines "on the floor" to maximize play time.

OPERATOR OPTIONS

The option switches allow you to select how many credits per coin, how many chances to play per game & bonus scoring. If your machine DOES NOT have multiple pricing capability, refer to page 2-2. If it DOES have multiple pricing capability, skip 2-2 and refer to page 2-3.

CREDIT BUTTON. When you push this button you can increase credits without affecting the counter. It's the red button on the coin door.

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

JUMP BUG OPTION SWITCHES
(LOCATED ON GAME BOARD BETWEEN PLUGS)

CHANGE OF DIP SWITCH

DESCRIPTION	8P. DIP, SW. POSITION				
	SW1	SW2	SW3	SW4	SW5
GAME - DIFFICULT					ON
GAME - EASY					OFF
CAR - DEMONSTRATION MODE			OFF	OFF	
CAR - 3			OFF	ON	
CAR - 4			ON	OFF	
CAR - 5			ON	ON	
COIN 1 - 1 coin / 1 play COIN 2 - 1 coin / 1 play	OFF	OFF			
COIN 1 - 2 coins / 1 play COIN 2 - 2 coins / 1 play	OFF	ON			
COIN 1 - 2 coins / 1 play COIN 2 - 1 coin / 3 plays	ON	OFF			
COIN 1 - 1 coin / 1 play COIN 2 - 1 coin / 6 plays	ON	ON			

Note: Turn off power to game before changing switch positions.
New switch positions become effective on power up.

JUMP BUG OPTION SWITCHES

(MULTI-PRICE OPTIONS)

LOW DENOMINATION - LEFT REJECTOR

SET GAME BOARD SWITCHES

COLUMN	1	2
COINS	2 - (SW 1 OFF)	1 - (SW 1 OFF)
PLAYS	1 - (SW 2 ON)	1 - (SW 2 OFF)

HIGH DENOMINATION - RIGHT REJECTOR

SET MULTI-PRICE BOARD SWITCHES

COINS	PLAYS	1	2	3	4	1	2	3	4
1	2	ON	ON	OFF	ON	ON	OFF	ON	ON
1	3	ON	OFF	OFF	ON	OFF	OFF	ON	ON
1	4	ON	ON	ON	OFF	ON	ON	OFF	ON
1	5	ON	OFF	ON	OFF	OFF	ON	OFF	ON
1	6	ON	ON	OFF	OFF	ON	OFF	OFF	ON
1	7	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
1	8					ON	ON	ON	OFF
1	9					OFF	ON	ON	OFF
1	10								
2	3	OFF	OFF	ON	ON				
2	5	OFF	ON	OFF	ON				
2	7	OFF	OFF	OFF	ON				
2	9	OFF	ON	ON	OFF				

NOTE: 1ST coin gives some credit

For Example:

5 plays for 2 coins gives

2 plays for 1st coin

3 plays for 2nd coin

CIRCUIT DESCRIPTION OF MULTI-PRICING BOARD

The purpose of the multi-pricing board is to establish a pricing scheme for the left rejector that is dependent on but different from that of the right rejector.

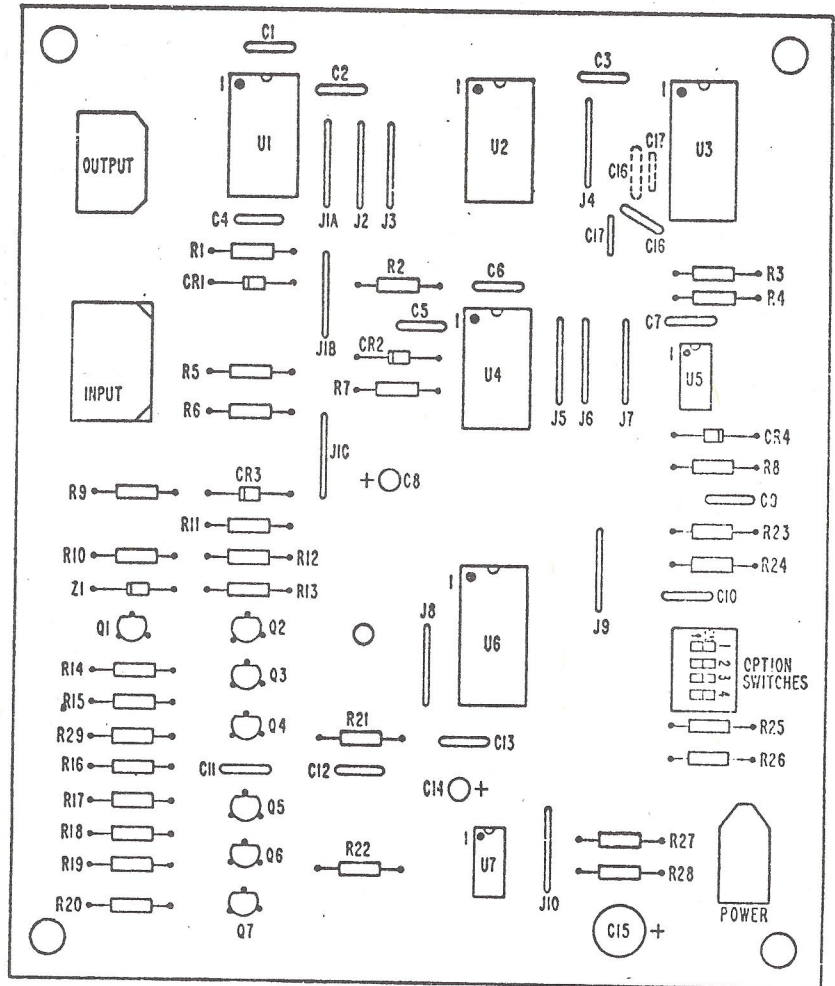
In the case of the right rejector, a coin deposited in the rejector will cause a pulse to be transmitted to the C.P.U. (via the distribution P.C. board) where it is processed as a single coin. Coins deposited in the left rejector are handled by the multi-pricing board to produce more than one pulse per coin — the exact number depending on the setting of the multi-pricing switch. When a coin is deposited in the left rejector, U1-5 will go low and be latched to U1 pin 6 as a high until the coin passes the contacts causing U1-6 to go low again. This positive pulse just created will be integrated and shaped as it arrives at U3-5 as a negative

pulse. U3 counts "up" on the positive-going edge and stores the number of coins deposited. As long as any coin remains unprocessed a high will be seen at U1-13 and if U1-12 is also high, a low will be seen at U1-11. This low gets inverted by U4 and applied as a high to the preset enable of counter U6. U6 had been held in the preset mode until this point but is now ready to count down from the value set in by the DIP switch.

The pulses to count down U6 come from oscillator U7 which is enabled shortly after U6-11 goes high. To make sure that U6 doesn't count down until the pre load has gone high, a time delay is introduced by R21, C12, and U2. U7 will oscillate sending pulses to U6 causing its output to count down. These pulses are also the same pulses sent to the CPU board as "coins."

When U6 counts down to zero, a borrow is sent to one-shot U5. U5 will produce a positive pulse at pin 3. U4 will invert this signal and apply it to U3-4 subtracting one coin from the accumulated count. The one-shot will also cause U1-12 to go low for the duration of the pulse. U1-12 going low pre-loads the counter to the DIP switch value again. If another coin is awaiting processing, we will go again; if not U3 outputs 2, 3, 6, 7 will be low keeping oscillator U7 from running and keeping U6-11 low.

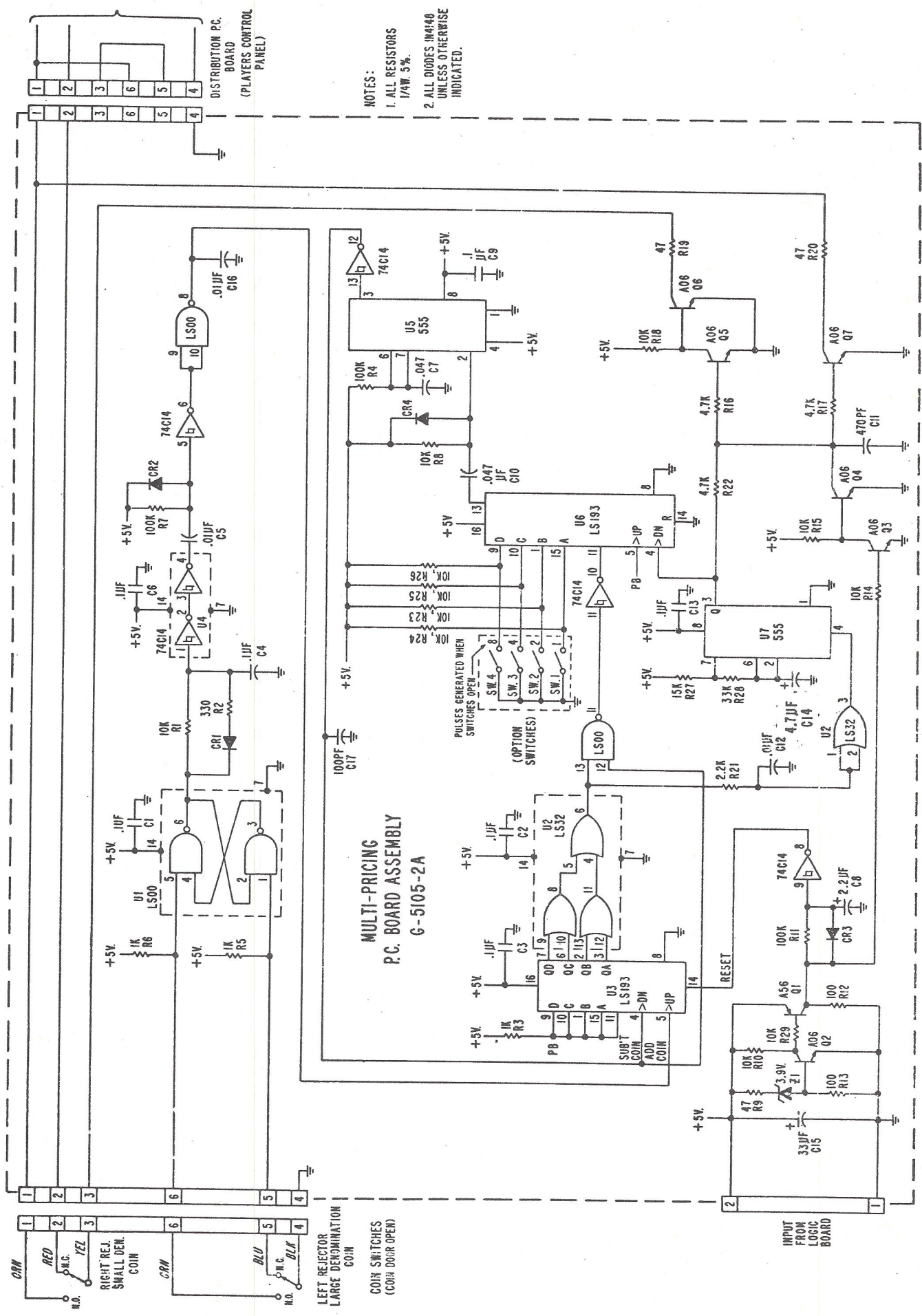
The power on reset signal appears on U3-14. It's purpose is to hold U3 reset until the 5 volts has come up and stabilized, preventing U3 from coming up in any configuration other than all lows on its output. This circuit also prevents erroneous pulses to be sent to the C.P.U. board by holding the collector of Q3 low until Q1 turns off.



MULTI-PRICING P.C. BOARD ASSEMBLY G-5105-1A
(C16 & C17 IN DASHED LINES ARE FOR G-5105-2A)

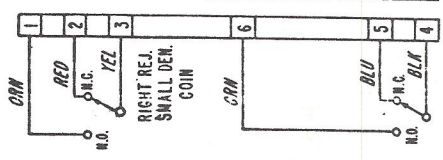
MULTI-PRICING
P.C. BOARD ASSEMBLY
G-5105-2A

Item	Part No.	Description	Item	Part No.	Description
RESISTORS			DIODES		
Note: All Resistors 1/4 Watt 5%					
R1	51293	10K	CR1	51498	IN4148
R2	52344	330	CR2	51498	IN4148
R3	51564	1K	CR3	51498	IN4148
R4	50966	100K	CR4	51498	IN4148
R5	51564	1K	Z1	G-5106	Zener 3.9V 400MW IN478A
R6	51564	1K			
R7	50966	100K			
R8	51293	10K	TRANSISTORS		
R9	52374	47	Q1	47831	MPS-A56 (PNP)
R10	51293	10K	Q2	49415	MPS-A06 (NPN)
R11	50966	100K	thru		
R12	51289	100	Q7		
R13	51289	100	INTEGRATED CIRCUITS		
R14	51293	10K	U1	G-0677	IC Quad NAND Gate 74LS00
R15	51293	10K	U2	G-0683	IC Quad OR Gate 74LS32
R16	51292	4.7K	U3	G-5107	4 Bit Binary Counter 74LS193
R17	51292	4.7K	U4	53338	IC Hex Schmitt Trigger 74C14
R18	51293	10K	U5	51991	IC Timer LM555
R19	52374	47	U6	G-5107	4 Bit Binary Counter 74LS193
R20	52374	47	U7	51991	IC Timer LM555
R21	52358	2.2K	MISCELLANEOUS		
R22	51292	4.7K	SW.	G-5108	4 Station Dip Switch
R23	51293	10K	Soc.	52720	14 Contact Solder Dip Socket
R24	51293	10K	Soc.	52724	16 Contact Solder Dip Socket
R25	51293	10K	Hsg.	G-5117	2 Circ. Plug Housing
R26	51293	10K		G-0614	.093 Pin
R27	52348	15K	Hsg.	G-0657	6 Circ. Receptacle Hsg
R28	49268	33K		G-5110	.093 Socket Solder Tail
R29	51293	10K	Hsg.	G-5109	6 Circ. Plug Hsg.
CAPACITORS				G-0613	.093 Pin Solder Tail
C1	53299	.1 Mfd 50 WVDC 10%		ST-10759	Standoff - P.C.B.
C2	53299	.1 Mfd 50 WVDC 10%		45816	Rubber Cushion (1/4 X 3/8 X 3 3/4 Lg)
C3	53299	.1 Mfd 50 WVDC 10%		G-5095	P.C. Board for G-5105-A
C4	53299	.1 Mfd 50 WVDC 10%		G-5095-1	P.C. Board for G-5105-1A
C5	53302	.01 Mfd 50 WVDC 10%			
C6	53299	.1 Mfd 50 WVDC 10%			
C7	53337	.047 Mfd 50 WVDC 20%			
C8	49146	2.2 Mfd 25 WVDC 20%			
C9	53299	.1 Mfd 50 WVDC 10%			
C10	53337	.047 Mfd 50 WVDC 20%			
C11	33762	470 MMfd 1000V 10%			
C12	53302	.01 Mfd 50 WVDC 10%			
C13	53299	.1 Mfd 50 WVDC 10%			
C14	53339	4.7 Mfd 15 WVDC 10%			
C15	52736	33 Mfd 25 WVDC 10%			
C16	53302	.01 Mfd 50 WVDC 10%			
C17	53327	100 MMfd 63 WVDC 5%			



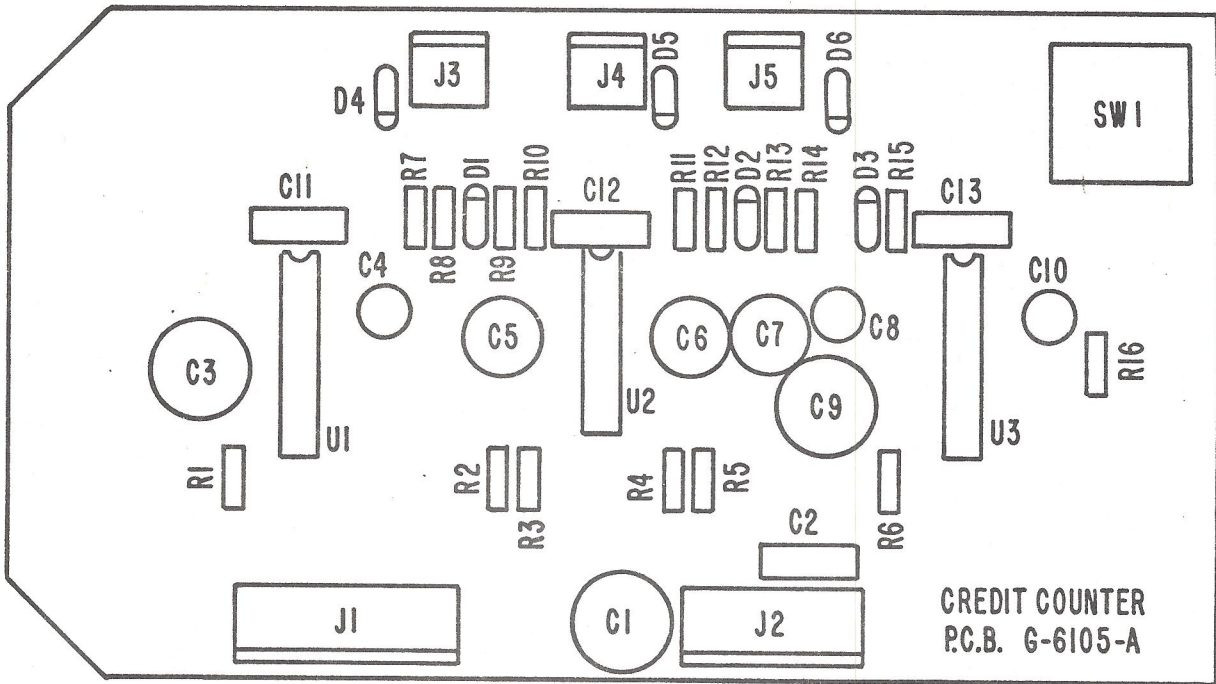
- NOTES:
1. ALL RESISTORS 1/4W. 5%.
 2. ALL DIODES IN4148 UNLESS OTHERWISE INDICATED.

MULTI-PRICING
P.C. BOARD ASSEMBLY
G-5105-2A



LEFT REJECTOR
LARGE DENOMINATION
COIN

COIN SWITCHES
(COIN DOOR OPEN)



CREDIT COUNTER P.C. BOARD ASSEMBLY
G-6105-A

ITEM NO.	PART NO.	DESCRIPTION	REF. DES.	MFGR. PART NO.
1	G-0812	Rectifier	D1, D2, D3, D4, D5, D6	IN4003
2	51289	Resistor 1/4W 5%	R2, R9, R12, R14	100 OHM
3	51564	Resistor 1/4W 5%	R3, R4, R5, R8, R10, R11, R13, R15	1K OHM
4	49269	Resistor 1/4W 5%	R1, R6	27K OHM
5	49268	Resistor 1/4W 5%	R7, R16	33K OHM
6	49146	Capacitor, Tantalum 25V	C4, C5, C6, C7, C10	2.2 MFD
7	53339	Capacitor, Tantalum 15V	C3, C9	4.7 MFD
8	52561	Capacitor, Tantalum 15V	C8	10 MFD
9	51988	Capacitor, Electrolytic 25V	C1	47 MFD
10	33762	Capacitor, Disc 1000V	C2	470 MMFD
11	53299	Capacitor, Monolythic 50V	C11, C12, C13	.1 MFD
12	52720	14 Contact Solder Dip Socket	U2	
13	52724	16 Contact Solder Dip Socket	U1, U3	
14	G-5136	2 Circuit Pin Header	J3, J4, J5	
15	G-5137	5 Circuit Pin Header	J2	
16	G-5459	6 Circuit Pin Header	J1	
17	G-6116	Quad 2-Input Nand Gate	U1	74LS03
18	G-6058	Dual Monostable Multivibrator	U1, U3	74221
19	52725-2	Key Switch - Single Contact - Red	SW1	
20	G-6106	Credit Counter P.C. Board		

GENERAL INFORMATION
AND PERIODIC MAINTENANCE

Your video game contains the same basic building blocks as any other video game.

THE POWER SUPPLY provides all the necessary voltages for the CPU, audio section, monitor and fluorescent light. Always unplug the game before replacing a fuse.

THE CENTRAL PROCESSING UNIT (CPU) is the "brain" of the game. It senses when a coin is dropped in the coin meter, and gives credit. It then reads what is happening at the operator controls, interprets and computes to make the game play according to what buttons the player pushes. It tells the monitor what to draw on the screen. And it tells the audio section when to make appropriate sound effects.

THE AUDIO SECTION generates all the sound effects for the game and powers the loudspeaker.

THE COLOR MONITOR is the picture tube. It draws pictures on the tube screen according to the instructions it receives from the CPU.

THE MAIN WIRING HARNESS carries power from the power supply to the CPU, audio section and monitor. It connects to each section through the Molex plugs. NEVER CONNECT OR DISCONNECT THE MOLEX POWER PLUGS UNLESS THE GAME IS UNPLUGGED.

PERIODIC MAINTENANCE - The only Periodic Maintenance required is an occasional cleaning. The very high voltage used on the picture tube attracts dust that gradually degrades picture quality. To clean: unplug game and let sit for at least 5 minutes to let voltages "bleed-off".

To clean the face of the picture tube and associated plastic parts, remove the control panel by loosening clamps on each side of panel on inside of cabinet. These clamps are accessible thru coin door. Remove the plexiglas window being careful not to scratch clear or painted areas. Window, gray filter and picture tube may now be cleaned with a mild solution of dish detergent. Dry all parts and reassemble.

REPLACEMENT PARTS LIST FOR WELLS-GARDNER COLOR MONITOR

These are Wells-Gardner parts with Wells-Gardner part numbers. Please order these parts from them.

2701 N. Kildare Ave., Chicago, Il. 60639

⚠ ★ SAFETY CRITICAL PARTS LIST

This receiver contains circuits and components included specifically for safety purposes. For continued protection no changes should be made to the original design and components shown in shaded areas of schematic, or ⚠ ★ on parts list should be replaced with exact factory replacement parts. The use of substitute parts may create a shock, fire, x-radiation or other hazard. Service should be performed by qualified personnel only.

MAIN BOARD (MQ-29)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS			CAPACITORS		
R605	203X9014-584	1k Ohm, ± 5%, 1W M.O.	△ C601	203X1800-451	0.1 uF, 125V, ± 20% MM
R606	204X1425-021	470 Ohm, ± 10%, 5W W.W.	△ C603	202X7810-214	2200 pF, 125V Ceramic
★ R607	204X1450-508	2.7k Ohm, ± 10%, 5W W.W.	C608	203X0220-043	330 uF, 200V Electrolytic
R608	203X9014-603	1.2k Ohm, ± 5%, 1W M.O.	C605	203X1205-165	.0068 uF, 600V, ± 10% PP
R610	203X6500-246	22 Ohm, ± 5%, 1/8W Carbon	C607	203X0040-020	10 uF, 160V Electrolytic
R611	203X6700-562	1k Ohm, ± 5%, 1/2W Carbon	C608	203X0040-052	47 uF, 160V Electrolytic
R612	340X3471-944	470 Ohm, ± 10%, 1/2W Carbon	C609	202X7050-366	.0033 uF, 500V, ± 10% Ceramic
R613	203X9010-757	1.2k Ohm, ± 5%, 1W M.O.	C610	202X7050-483	.01 uF, 500V, ± 10% Ceramic
R614	203X5202-320	680k Ohm, ± 5%, 1/2W Comp.	C611	202X8140-022	100 pF, 3KV, ± 10% Ceramic
R615	203X5602-156	270k Ohm, ± 5%, 1/2W Comp.	C612	203X1201-047	.022 uF, 200V, ± 10% PP
R616	203X6500-741	2.7k Ohm, ± 5%, 1/8W Carbon	C613	203X0015-035	220 uF, 25V Electrolytic
R617	203X6501-088	68k Ohm, ± 5%, 1/8W Carbon	C614	203X0015-006	33 uF, 25V Electrolytic
R620	203X6500-508	270 Ohm, ± 5%, 1/8W Carbon	C615	203X1201-288	0.39 uF, 200V, ± 10% PP
R622	203X6500-689	1.5k Ohm, ± 5%, 1/8W Carbon	C616	202X8065-499	47 pF, 500V Ceramic
R624	203X6205-843	1k Ohm, ± 5%, 1/2W Carbon	C617	203X0025-019	1 uF, 50V Electrolytic
R630	203X5601-906	68k Ohm, ± 5%, 1/2W Carbon	C618	202X8000-577	82 pF, 50V, ± 5% Ceramic
R631	203X9015-087	2.2 Ohm, ± 10%, 5W M.O.	C619	203X0025-019	1 uF, 50V Electrolytic
R632	340X8111-731	110 Ohm, ± 5%, 5W Carbon	C620	203X1107-038	0.1 uF, 100V, ± 10% Mylar
R632	340X8121-731	120 Ohm, ± 5%, 5W Carbon	C621	202X9040-155	0.1 uF, 1.5KV, ± 20% Paper
R634	203X6000-002	2.2 Ohm, ± 5%, 1/8W Carbon	C622	203X0020-099	1000 uF, 35V Electrolytic
R635	203X9014-842	12k Ohm, ± 5%, 1W M.O.	C623	203X0015-053	470 uF, 25V Electrolytic
R636	203X6500-645	1k Ohm, ± 5%, 1/8W Carbon	C624	203X0015-021	100 uF, 25V Electrolytic
R640	203X6500-762	3.3k Ohm, ± 5%, 1/8W Carbon	C625	203X0040-020	10 uF, 160V Electrolytic
R641	203X6501-002	33k Ohm, ± 5%, 1/8W Carbon	C626	202X7050-009	100 pF, 500V, ± 10% Ceramic
R642	203X6500-927	15k Ohm, ± 5%, 1/8W Carbon	C627	202X8065-461	39 pF, 500V, ± 10% Ceramic
R643	203X5602-648	3.9M Ohm, ± 5%, 1/2W Comp.	C628	202X7000-327	2200 pF, 50V, ± 10% Ceramic
R646	203X6500-468	180 Ohm, ± 5%, 1/8W Carbon	★ C629	203X1270-470	6900 pF, 1.5KV, ± 5% PP
R647	340X5150-841	15 Ohm, ± 10%, 2W Carbon	C630	202X7810-214	2200 pF, 125V Ceramic
R648	340X2225-934	2.2M Ohm ± 5%, 1/4W Carbon	C632	203X0005-029	470 uF, 6.3V Electrolytic
*For Model K4603 Only			C633	203X0315-033	2.2 uF, 50V Electrolytic
SEMICONDUCTORS			C634	202X8000-164	6 pF, 50V, ± 0.5 pF Ceramic
TR601	200X3189-304	Transistor, 2SC1893	C637	202X8105-014	3 pF, 2 kV, ± 0.5 pF Ceramic
X601	201X3130-109	Rectifier, (Si) RM-2AV 600V	C638	342X5632-040	.056 uF, 10% Mylar
X605	200X8130-171	Diode (HS) SB-2CGL 1200V min.	MISCELLANEOUS		
X606	201X2010-144	Diode (Si) IS2473-772	△ F601	204X7120-062	Fuse (UL/CSA) 3A-125
X607	201X2100-119	Diode (HS) RC-2V 0.8 US	J607	206X5003-960	Socket, 6 Pin
X608	201X2130-234	Diode (HS) RU-2V	P602	204X9600-260	Plug, 3 Pin (GT)
X609	201X2130-234	Diode (HS) RU-2V	P603	204X9600-254	Plug, 3 Pin (NM)
X610	66X0023-009	Rectifier, Power (Si) 500V PIV	P604	204X9600-298	Plug, 4 Pin (NM)
X611	66X0023-009	Rectifier, Power (Si) 500V PIV	P606	204X9600-351	Plug, 6 Pin (NM)
TRANSFORMERS & COILS			P607	204X9600-380	Plug, 6 Pin (GT)
△ L601	201X6000-112	Coil, Line Filter R-3	P608	204X9600-254	Plug, 3 Pin (NM)
L602	201X4600-042	Coil, Filter, 10 uH	P610	204X9600-249	Plug, 2 Pin (GT)
L603	201X4100-024	Coil, Peaking, 22 uH	P611	204X9600-670	Plug, 2 Pin (NM)
L607	201X4710-134	Coil, R-F Choke	TH601	201X011-034	Thermistor
T601	201X9500-337	Transformer, Audio Output	TH602	201X022-007	Varistor
T602	201X1300-080	Transformer, Hor. Drive			
T603	202X1210-191	Transformer, Side PC			
L702	9A2795-001	Horiz. Size			

VERT/HOR BOARD (MT/QJ)

WELLS-GARDNER PARTS...ORDER FROM THEM...SEE PAGE 6-9

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS					
R301	203X6500-628	820 Ohm, ± 5%, 1/8W Carbon	C313	203X0025-087	47 uF, 50V Electrolytic
R302	203X6500-902	12k Ohm, ± 5%, 1/8W Carbon	C315	203X0015-082	10 uF, 25V Electrolytic
R303	203X6500-927	15k Ohm, ± 5%, 1/8W Carbon	C316	203X1100-220	3300 uF, 50V, ± 10% Mylar
R304	203X6500-886	10k Ohm, ± 5%, 1/8W Carbon	C317	202X8000-616	100 pF, 50V, ± 10% Ceramic
R305	203X6501-241	330k Ohm, ± 5%, 1/8W Carbon	C351	202X7000-281	1500 pF, 50V, ± 10% Ceramic
R306	203X6500-645	1k Ohm, ± 5%, 1/8W Carbon	C352	202X7000-247	1000 pF, 50V, ± 10% Ceramic
R307	203X6500-689	1.5k Ohm, ± 5%, 1/8W Carbon	C353	203X1100-573	0.022 uF, 50V, ± 10% Mylar
R309	203X6500-724	2.2k Ohm, ± 5%, 1/8W Carbon	C355	203X1100-858	0.1 uF, 50V, ± 10% Mylar
R310	203X6501-285	470k Ohm, ± 5%, 1/8W Carbon	C356	203X0015-105	4.7 uF, 25V Electrolytic
R311	203X6501-065	56k Ohm, ± 5%, 1/8W Carbon	C357	203X1201-013	0.015uF, 200V ± 10% PP
R312	203X6501-126	100k Ohm, ± 5%, 1/8W Carbon	C358	203X1201-034	0.018 uF, 200V, ± 10% PP
R313	203X6001-326	10k Ohm, ± 5%, 1/8W Carbon	C359	203X0040-013	4.7 uF, 160V Electrolytic
R314	203X6501-044	47k Ohm, ± 5%, 1/8W Carbon	C360	202X7000-482	0.01 uF, 50V, ± 10% Ceramic
R315	203X6500-628	820 Ohm, ± 5%, 1/8W Carbon	C361	203X1100-509	0.015 uF, 50V, ± 10% Mylar
R316	203X6500-420	120 Ohm, ± 5%, 1/8W Carbon	C362	203X0025-058	10 uF, 50V Electrolytic
R317	203X6206-441	2.2 Ohm, ± 5%, 1/2W Carbon	C363	203X1205-487	0.01 uF, 630V, ± 10% PP
R319	203X6500-169	100 Ohm, ± 5%, 1/8W Carbon	C364	202X7000-482	0.01 uF, 50V, ± 10% Ceramic
R320	203X6500-927	15k Ohm, ± 5%, 1/8W Carbon			
R321	203X6700-509	560 Ohm, ± 5%, 1/2W Carbon			
R322	203X9100-121	22 Ohm, ± 5%, 2W M.O.			
R323	203X6500-689	1.5k Ohm, ± 5%, 1/8W Carbon			
R324	203X6500-988	27k Ohm, ± 5%, 1/8W Carbon			
R325	203X6500-326	47 Ohm, ± 5%, 1/8W Carbon	TR301	200X4082-614	Transistor, 2SA826Q
R328	203X6500-628	820 Ohm, ± 5%, 1/8W Carbon	TR302	200X3174-006	Transistor, 2SC1740Q
R330	203X6500-886	10k Ohm, ± 5%, 1/8W Carbon	TR303	200X3174-006	Transistor, 2SA1740Q
R331	203X6501-209	220k Ohm, ± 5%, 1/8W Carbon	TR304	200X3174-006	Transistor, 2SC1740Q
R351	203X6500-724	2.2k Ohm, ± 5%, 1/8W Carbon	TR305	200X4049-081	Transistor, 2SA490YLBGLI
R352	203X6500-927	15k Ohm, ± 5%, 1/8W Carbon	TR306	200X3162-538	Transistor, 2SC1625YLBGLI
R353	203X6500-944	18k Ohm, ± 5%, 1/8W Carbon	TR307	200X3174-014	Transistor, 2SC1740R
R354	203X6500-783	3.9k Ohm, ± 5%, 1/8W Carbon	TR308	200X3174-006	Transistor, 2SC1740Q
R355	203X6500-902	12k Ohm, ± 5%, 1/8W Carbon	TR351	200X4085-415	Transistor, 2SA854Q
R356	203X6500-561	470 Ohm, ± 5%, 1/8W Carbon	TR352	200X3172-208	Transistor, 2SC1722BKBS
R357	203X6500-724	2.2k Ohm, ± 5%, 1/8W Carbon	TR353	200X3174-006	Transistor, 2SC1740Q
R358	203X6500-666	1.2k Ohm, ± 5%, 1/8W Carbon	TR354	200X4082-614	Transistor, 2SA826Q
R359	203X6501-088	68k Ohm, ± 5%, 1/8W Carbon	X301	201X2010-144	Diode, (SI) IS2473-T72
R360	203X5500-471	27 Ohm, ± 5%, 1/4W Comp.	X302	201X2010-144	Diode, (SI) IS2473-T72
R361	203X6000-998	1.2k Ohm, ± 5%, 1/8W Carbon	X303	200X8000-026	Diode, (GE), IN60TVGL
R363	203X6500-666	1.2k Ohm, ± 5%, 1/8W Carbon	X304	200X8010-165	Diode (SI) ISS81
R364	203X9014-988	47k Ohm, ± 5%, 1W M.O.	X305	201X2010-165	Diode (SI) ISS81
R365	203X6700-989	56k Ohm, ± 5%, 1/2W Carbon	X306	201X2010-165	Diode (SI) ISS81
R366	203X6001-148	3.3k Ohm, ± 5%, 1/8W Carbon	X307	200X8010-102	Diode (SI) MA26W
R367	340X2222-734	2.2k Ohm, ± 5%, 1/2W Carbon	X308	200X8010-094	Diode (SI) IS2473
R368	203X6500-785	3.9k Ohm, ± 5%, 1/8W Carbon	X351	201X2010-144	Diode (SI) IS2473-T72
R369	203X6500-762	3.3k Ohm, ± 5%, 1/4W Carbon	X352	201X2010-144	Diode (SI) IS2473-T72
R370	302X6100-961	1k Ohm, ± 5%, 1/4W Carbon	X353	201X2010-144	Diode (SI) IS2473-T72
R371	203X6104-751	2.7k Ohm, ± 5%, 1/4W Carbon	X354	201X2010-144	Diode (SI) IS2473-T72
VR301	204X2122-093	Varistor, 250K Ohm, Vert. Hold	X355	200X8220-851	Diode (Zener) RD10EBI
VR302	204X2114-065	Varistor, 20K Ohm, Vert. Size	X366	200X8100-130	Diode (HS) RU-1 0.3 US
VR351	204X2114-059	Varistor, 50K Ohm, Hor. Hold			
CAPACITORS					
C301	203X1100-928	0.15 uF, 50V, ± 10% Mylar	J301	204X9300-958	Socket, 6 Pin
C302	203X1100-573	0.022 uF, 50V, ± 10% Mylar	J302	204X9300-958	Socket, 6 Pin
C304	203X1100-858	0.1 uF, 50V, ± 10% Mylar	P301	204X9601-195	Plug, 6 Pin
C306	203X0025-026	2.2 uF, 50V, Electrolytic	P302	204X9601-195	Plug, 6 Pin
C307	203X1100-928	0.15 uF, 50V, ± 10% Mylar	TH301	201X0000-534	Thermistor
C309	203X1100-858	0.1 uF, 50V, ± 10% Mylar			
C310	203X0010-011	22 uF, 16V Electrolytic			
C311	203X0020-099	1000 uF, 35V Electrolytic			
C312	202X7000-469	0.0082 uF, 50V, ± 10% Ceramic	L351	201X5200-091	Coil, Horiz. Osc.

CAPACITORS (CONT.)

SEMICONDUCTORS

MISCELLANEOUS

TRANSFORMERS & COILS

POWER BOARD (MV)

RESISTORS

R501	204X1725-052	180 Ohm, ± 10%, 15W WW
R502	203X6000-608	100 Ohm, ± 5%, 1/8W Carbon
R503	203X6000-960	1k Ohm, ± 5%, 1/8W Carbon
R504	203X6000-879	560 Ohm, ± 5%, 1/8W Carbon
R505	203X9014-965	39k Ohm, ± 5%, 1W M.O.
R506	203X6500-842	6.8k Ohm, ± 5%, 1/8W Carbon
R551	203X6500-420	120 Ohm, ± 5%, 1/8W Carbon
VR501	204X2050-001	Varistor Vert. Adj.

CAPACITORS

C501	203X0040-020	10 uF, 160V Electrolytic
C502	202X7000-281	1500 pF, 50V, ± 10% Ceramic

C503	203X0010-011	22 uF, 16V Electrolytic
C551	203X0005-046	220 uF, 10V Electrolytic

SEMICONDUCTORS

TR501	200X3174-006	Transistor, 2SC1740Q
★TR502	200X3145-404	Transistor, 2SC1454
TR551	200X3172-305	Transistor, 2SC1723
X501	201X2230-042	Diode, (SI) Zener EQB01-06V
X502	201X2010-144	Diode, (SI) IS2473-T72

MISCELLANEOUS

J501	204X9300-958	Socket, 6 Pin
P501	204X9601-195	Plug, 6 Pin
TH501	201X0000-618	Thermistor

NECK BOARD (MS/QG)

WELLS-GARDNER PARTS...ORDER FROM THEM...SEE PAGE 6-9

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS					
R401	203X6500-709	1.8k Ohm ± 5% 1/8W Carbon			
R402	203X6500-709	1.8k Ohm ± 5% 1/8W Carbon			
R403	203X6500-709	1.8k Ohm ± 5% 1/8W Carbon			
R404	203X6500-447	150 Ohm ± 5% 1/8W Carbon			
R405	203X6500-481	220 Ohm ± 5% 1/8W Carbon			
R406	203X6500-447	150 Ohm ± 5% 1/8W Carbon			
R407	203X6500-508	270 Ohm ± 5% 1/8W Carbon			
R408	203X6500-508	270 Ohm ± 5% 1/8W Carbon			
R409	203X6500-800	4.7k Ohm ± 5% 1/8W Carbon			
R410	203X6500-800	4.7k Ohm ± 5% 1/8W Carbon			
R411	203X6500-800	4.7k Ohm ± 5% 1/8W Carbon			
R412	203X9104-809	12k Ohm ± 5% 2.0W Metal Oxide			
R413	203X9104-809	12k Ohm ± 5% 2.0W Metal Oxide			
R414	203X9104-809	12k Ohm ± 5% 2.0W Metal Oxide			
R415	203X5601-313	2.7k Ohm ± 10% 1/2W Comp.	TR401	200X3206-800	Transistor, 2SC2068, 2SC1514 (R output)
R416	203X5601-313	2.7k Ohm ± 10% 1/2W Comp.	TR402	200X3206-800	Transistor, 2SC2068, 2SC1514 (G output)
R417	203X5601-313	2.7k Ohm ± 10% 1/2W Comp.	TR403	200X3206-800	Transistor, 2SC2068, 2SC1514 (B output)
R418	203X5602-254	470k Ohm ± 10% 1/2W Comp.			
R419	203X5602-185	330k Ohm ± 10% 1/2W Comp.			
R422	203X9105-117	1.0 Ohm ± 10% 2W Metal Oxide			
R423	203X5102-155	270k Ohm ± 5% 1/4W Carbon	X404	201X2100-126	Diode, IS2367 (protector)
VR401	204X2115-014	500 Ohm Varistor R Drive	X405	201X2100-126	Diode, IS2367 (protector)
VR402	204X2115-014	500 Ohm Varistor B Drive	X406	201X2100-126	Diode, IS2367 (protector)
VR403	204X2115-006	5k Ohm Varistor R Cutoff			
VR404	204X2115-006	5k Ohm Varistor G Cutoff			
VR405	204X2115-006	5k Ohm Varistor B Cutoff			
VR406	204X2000-025	1M Ohm Varistor Screen			
CAPACITORS					
C401	202X7000-247	1000 pF, 50V, 10% Ceramic	J401	206X5003-729	Socket, 5 Pin
C402	202X7000-247	1000 pF, 50V, 10% Ceramic	J402	206X5003-983	Socket, 3 Pin
			P401	204X9600-329	Plug, 5 Pin
			P402	204X9600-254	Plug, 3 Pin
SEMICONDUCTORS					
MISCELLANEOUS					

△★ 297X2000-072 HIGH VOLTAGE ASSEMBLY (T701)

△★ R701 VR702 X701 X702 X703	204X1625-058 204X3901-125	3.3 Ohm, ± 10% 10W WW Resistor Focus Control Diode (SI HV) Diode (SI HV) Diode (SI HV)	} Part of T701
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FINAL ASSEMBLY PARTS

△★ 88X-0129-506 38A5554-000 205X9800-256 △★ 202X1110-810 208X2000-946 297X2000-072 6A0397 9A2753-003	19VJTP22 Pix Tube Assy. Purity Shld/Degaussing Lateral/Purity Assembly Yoke, Deflection CRT Socket HV Unit (T701) Plug, Line Cord Degaussing Coil (L701)
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INTERFACE BOARD

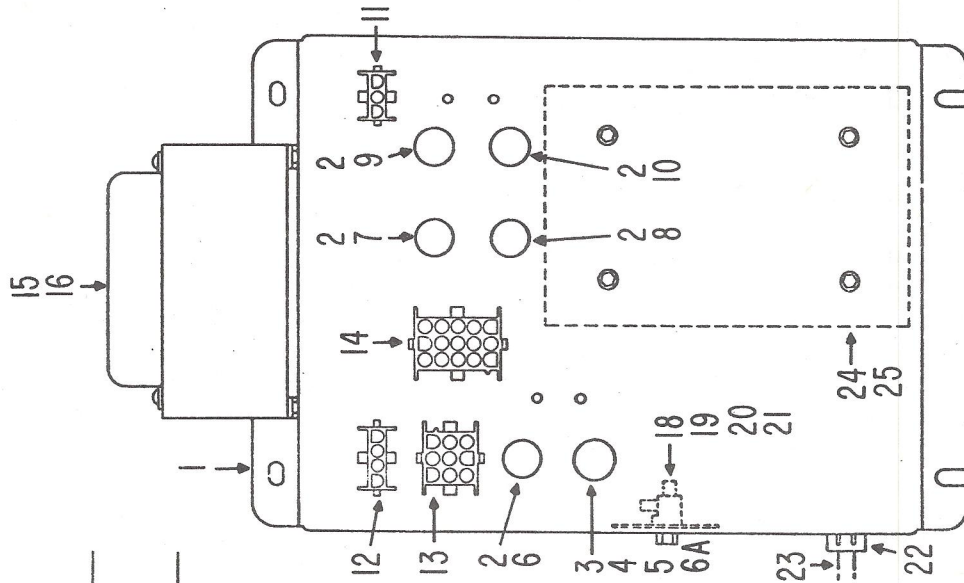
MODEL K4675

WELLS-GARDNER PARTS...ORDER FROM THEM...SEE PAGE 4-1

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS			CAPACITORS		
R201	340X3910-934	1/2W 5% 91 Ohm	C201	45X0524-038	16V 1000mf
R202	340X2223-934	1/4W 5% 22K Ohm	C202	45X0524-053	16V 470mf
R203	340X3102-934	1/2W 5% 1K Ohm	C203	349X2232-109	100V .022mf
R204	340X2101-934	1/4W 5% 100 Ohm	C204	80X0099-020	680pf
R205	340X2104-934	1/4W 5% 100K Ohm	SEMICONDUCTORS		
R206	340X3331-944	1/2W 10% 330 Ohm	TR201	86X0113-001	Transistor NPN
R207	340X2222-934	1/4W 5% 2.2K Ohm	TR202	86X0113-001	Transistor NPN
R208	340X2222-934	1/4W 5% 2.2K Ohm	TR203	86X0113-001	Transistor NPN
R209	340X2104-934	1/4W 5% 100K Ohm	TR204	86X0066-001	Transistor PNP
R210	340X2101-934	1/4W 5% 100 Ohm	TR205	86X0066-001	Transistor PNP
R211	340X2471-934	1/4W 5% 470 Ohm	TR206	86X0066-001	Transistor PNP
R212	340X2471-934	1/4W 5% 470 Ohm	TR207	86X0113-001	Transistor NPN
R213	340X2471-934	1/4W 5% 470 Ohm	TR208	86X0113-001	Transistor NPN
R214	340X2151-934	1/4W 5% 150 Ohm	TR209	86X0113-001	Transistor NPN
R215	340X2151-934	1/4W 5% 150 Ohm	TR210	86X0113-001	Transistor NPN
R216	340X2151-934	1/4W 5% 150 Ohm	X201	66X0046-001	Diode, Silicon
R217	340X2101-934	1/4W 5% 100 Ohm	X202	66X0046-001	Diode, Silicon
R218	340X3102-934	1/4W 5% 1K Ohm	X203	66X0046-001	Diode, Silicon
R219	340X3102-934	1/2W 5% 1K Ohm	X204	66X0046-001	Diode, Silicon
R220	340X3681-934	1/2W 5% 680 Ohm	ZD201	66X0040-019	Diode, Zener
R221	340X3271-934	1/2W 5% 270 Ohm	MISCELLANEOUS		
R222	340X3271-934	1/2W 5% 270 Ohm	J201	204X9300-958	Socket, 6 Pin
R223	340X2104-934	1/4W 5% 100K Ohm	J202	204X9300-958	Socket, 6 Pin
R224	340X3102-934	1/2W 5% 1K Ohm	J203	206X5019-207	Socket, 4 Pin
R225	340X2822-934	1/2W 5% 8.2K Ohm	P201	204X9601-195	Plug, 6 Pin
R226	340X2822-934	1/2W 5% 8.2K Ohm	P202	204X9601-195	Plug, 6 Pin
R227	340X2822-934	1/2W 5% 8.2K Ohm	P203	204X9600-845	Plug, 4 Pin
			P204	6A393-003	Plug, 3 Pin
			P205	6A0393-006	Plug, 6 Pin

POWER SUPPLY ASSEMBLY

G-6060-A



ITEM NO.	PART NO.	DESCRIPTION
1	G-6063-A	Power Supply Chassis Weld Assembly
	G-6071-A	Power Supply Chassis Weld Assembly Canada only
2	49250	Shock Safe Fuseholder
3	G-5403-A	Fuseholder Assembly - Canada only
4	44935	Snap-in Steel Clip - Canada only
5	ST-9843	Tapered Caplug #5 - Red
6	ST-3090	3 Amp 250V Slo-Blo Fuse
6A	44930	Fusetron GMQ 3.2A Fuse (F1) Canada only
7	ST-9631	5 Amp 250V Slo-Blo Fuse
8	ST-4332	1 Amp 250V Slo-Blo Fuse
9	ST-4367	1.5 Amp 250V Slo-Blo Fuse
10	ST-10703	0.5 Amp 250V Slo-Blo Fuse
11	ST-10589	3 Circuit Universal Socket Housing
12	ST-10588	4 Circuit Universal Socket Housing
13	ST-10570	9 Circuit Universal Socket Housing
14	ST-10500	15 Circuit Universal Socket Housing
15	G-6059-A	Power Transformer Assembly
	G-6059-CA	Power Transformer Assembly Canada only
16	ST-8722	10-32 Hex Flg Whiz-Lock Nut
17	ST-10062	8-36 X 5/16 M.S. Brass - Green Iridite
18	49007	Input Terminal Insulator
19	47827	3 Pole Input Terminal
20	ST-4518	6-32 X 1/2 Mach. Screw
21	ST-8715	6-32 Nut, Hex Flange - Serrated
22	ST-10762	Universal Strain Relief
23	G-5357	3 Conductor Cord & Plug - Domestic, Canada
	G-5377	3 Conductor Cord & Plug - Australia
	G-5378-A	3 Conductor Cord & Plug - England
	G-5376	Cordset - Germany, Belgium, France
24	G-6062-A	Switching Regulator MC014A
25	ST-8267	8-32 X 1/4 Tapping Screw

JUMP BUG
PARTS LIST
G-203

OVERALL ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION
1	G-6080-A	Cabinet Assembly
2	G-6090-A	Control Panel Assembly
3	G-6100-A	Monitor Assembly - Complete
4	G-6095-A	Game P.C. Board Assembly
5	G-6060-A	Power Supply - Complete - Domestic
6	G-6082	Parts Catalog
CABINET ASSEMBLY - JUMP BUG		
G-6080-A		
1	G-24185-A	Cabinet - Wood
2	G-6078	Decal - Jump Bug
3	G-6115-A	Coin Door - Complete - Canada & Domestic
	G-6115-AA	Coin Door - Complete - Australia
	G-6115-BA	Coin Door - Complete - Belgium
	G-6115-FA	Coin Door - Complete - France
	G-6115-GA	Coin Door - Complete - Germany
	G-6115-JA	Coin Door - Complete - Japan
4	G-6108-A	Counter #1 - Complete (Single Price)
5	G-6109-A	Counter #1 & #2 - Complete (Multi-Price)
6	G-5419-A	Counter Assembly Only
7	G-6072-A	Coin Switch Cable
8	G-5092-A	Braided Shield - Short
9	G-5693	Bracket - Volume Control
10	G-5694	Potentiometer (Small) - Standard
11	G-5664	Pointer Knob
12	G-5454	Bracket - Volume Control
13	G-5422	Potentiometer (Large) - Alternate
14	33463	Pointer Knob
15	G-6105-A	Credit Counter P.C.B. Only (w/o Brkt)
16	ST-10539	Circuit Board Support (5/8")
17	ST-3340-D	10-24 X 1 1/4 Carriage Bolt - Blk Ox
18	ST-4813	.203 I.D. X 1/2 O.D. X .032 Fl. Washer - Z.P.
19	ST-8724-D	10-24 Hex Flg Whiz Lock Nut - Blk Ox
20	G-5282	Speaker Grille - Blk
21	G-5022	Speaker - 6 X 9
22	G-5199	Mounting Rail - 19"
23	ST-1443-D	1/4-20 X 1 1/4 Carriage Bolt - Blk Ox
24	ST-301	1/4 Int. Lock Washer
25	ST-1376	1/4-20 Wingnut
26	G-6060-A	Power Supply - 120V. Note Suffixes -CA Canada, -EA England, -AA Australia, -GA Germany, Belgium, France
27	G-5012-1	Tongue Brkt - C.B.
28	G-5048-A	Coin Box & Handle Assy
29	G-5014	Coin Box Cover
30	G-5439	Retainer - P.C.B. (Runner - R.H. Top)
31	ST-9741	8 X 1/2 Hex Flg (Type A) Z.P.
32	G-6100-A	Monitor - 19" Raster - Complete (w/Guard & Cable)
33	G-6101-A	Monitor - 19" Raster (Monitor only)
34	G-5428-A	Monitor Power Cable Assy
35	G-5638	Guard - CRT

CABINET ASSEMBLY - JUMP BUG

G-6080-A

ITEM NO.	PART NO.	DESCRIPTION
36	G-24073	Monitor Platform Rail (Wood)
37	G-5441	End Mounting Bracket
38	ST-10904	10-32 X 1 Hex Flg Swageform - Z.P.
39	ST-3340-D	10-24 X 1 1/4 Carriage Bolt - Blk Ox
40	ST-3139	.203 I.D. X 5/8 O.D. X .031 Fl. Wshr - Z.P.
41	ST-8724-D	10-24 Hex Flg Whiz Lock Nut - Blk Ox
42	G-0831	Bezel - CRT (Blk)
43	G-5436	CRT Filter - Gray
44	G-5413-A	Light Assembly - 120V
	G-5414-A	Light Assembly - 220/240V
45	ST-3341-D	8-32 X 1 Carriage Bolt - Blk Ox
46	ST-8721	8-32 Hex Flg Whiz Lock Nut - Z.P.
47	49557	Ballast Plate
48	49554-2	Ballast Insulator
49	11556	14-15-20 Watt Starter (FS-2)
	49301	Insulated Starter 20 Watt 220/240V
50	G-5043	Fluorescent Lamp (F15T12) CW 15 Watt
51	G-6076	Top Window - Jump Bug
52	G-5254	Retainer - Inner Top (Blk)
53	G-5253	Retainer - Top (Blk)
54	ST-10753-D	8 X 5/8 Pan Hd. Box Dr. (Type A) Blk Ox
55	G-5342	Clamp Fastener (Cabinet)
56	G-6090-A	Control Panel - Jump Bug - Complete
57	G-6077	Control Panel - Screened (Jump Bug)
58	G-0623	Switch & Mtg. Assembly
59	G-0624	Button Assembly - Long
60	G-5341	Control Panel Clip
61	G-6046-A	Joystick Assembly - 8 Way
62	G-5433-1	Cover Plate - Joystick - Green
63	G-5429-A	Control Panel Cable Assy
64	G-5469	Retainer - Front (Blk)
65	G-5252	Retainer - Center (Blk)
66	G-5249	Retainer - Rear
67	G-5247	CRT Window - Vertical (Blue)
68	G-5031-1	Price Card - 25¢
	G-5032-1	Price Card - Germany
	G-5033-1	Price Card - Belgium
	G-5034-1	Price Card - France
	G-5037-1	Price Card - England
69	G-5697	Label "Enter Initials"
70	G-5373-A	Interlock Switch and Cable Assembly - 120V - Canada and Domestic (White Plug) -EA (England - 240V) Green Plug -GA (Germ - Belg - France - 220V) Blue Plug
71	G-6070-A	Game P.C.B. (Complete) 3 Boards (See breakdown of individual Boards)
72	G-5409-A	Braided Shield Assembly
73	G-6068-A	Main Cable Assembly (Cab)
74	G-5257-1A	Back Door Assembly - Complete
75	G-24085-1A	Back Door Assembly - Blue (Wood Only)
76	G-5126	Lock Bracket
77	ST-10760	Lock, Cam Bolts & Keys

JUMP BUG
 GAME P.C. BOARD ASSEMBLY
 G-6095-A

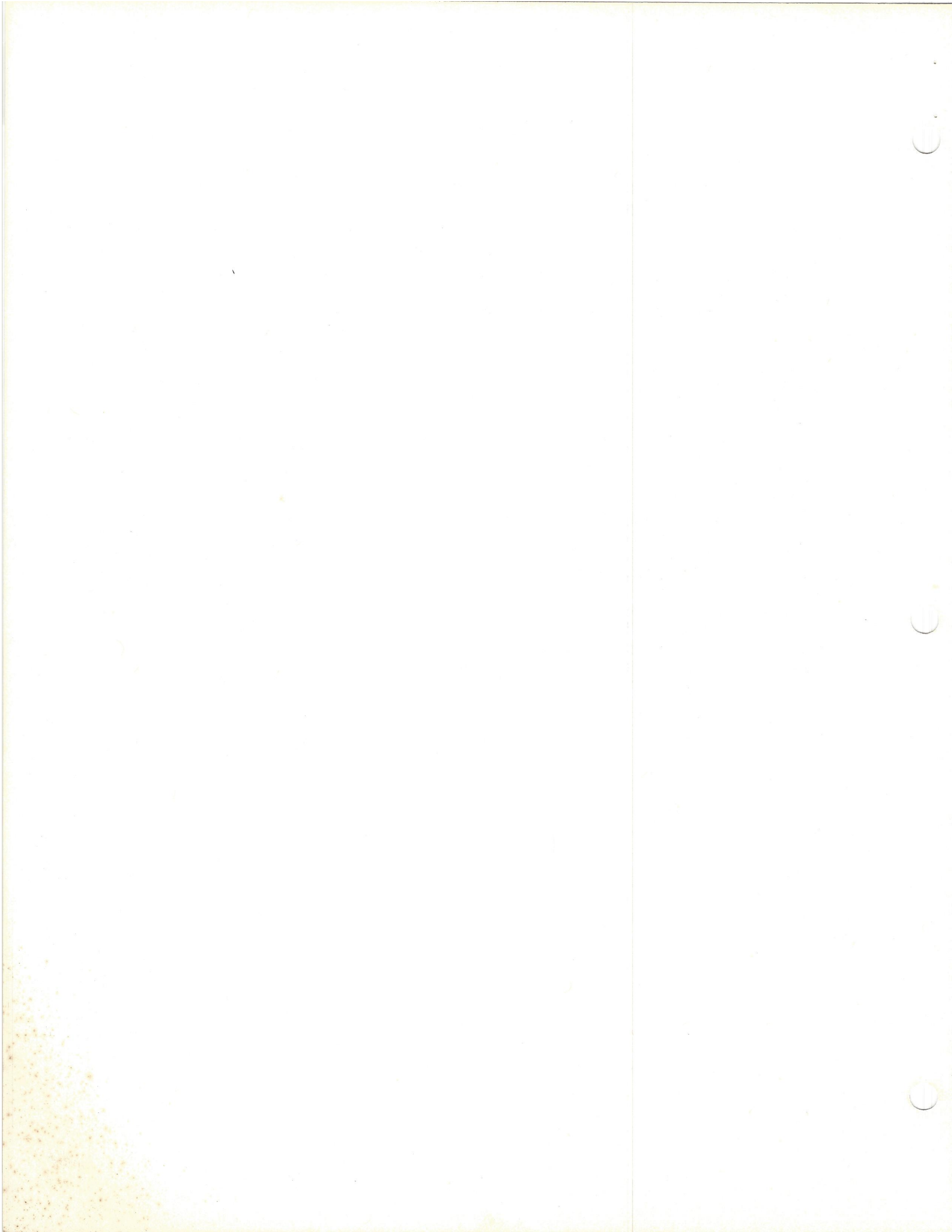
ITEM NO.	PART NO.	DESCRIPTION	REF. DES.	MFGR. PART NO.
1	G-6250	CPU (4MHZ)	K9	Z-80A
2	G-6206	GI Sound	L10	AY-3-8910
3	G-6251	Game Program "A"	A8	2732
4	G-6252	Game Program "B"	B8	2732
5	G-6253	Game Program "C"	D8	2732
6	G-6254	Game Program "D"	E8	2732
7	G-6255	Game Program "E"	H8	2732
8	G-6256	Game Program "F"	J8	2732
9	G-6257	Game Program "G"	L8	2732
10	G-6258	Character Generator "I"	J1	2716
11	G-6259	Character Generator "J"	K1	2716
12	G-6260	Character Generator "K"	M1	2716
13	G-6261	Character Generator "L"	N1	2716
14	G-6262	Character Generator "M"	R1	2716
15	G-6263	Character Generator "N"	S1	2716
16	G-6264	Custom Chip	M8	T00
17	G-6265	D-ROM No. 1 (32 X 8)	R11	6331-1J
18	G-0667	S-RAM (256 X 4)	H6, H7	2101
19	G-6019	S-RAM (1K X 4)	F2, H2, P8, R8, S8, T8	2114
20	G-6266	nMOS S-RAM (1K)	N4, P4, R4, S4, T4	2125
21	G-6267	Op. Amplifier	D10, C11	LM2902
22	G-6020	Quad Analog Switch	E10, B11	MC14066
23	51991	Timer	A11	555
24	G-6268	Audio Amplifier	D12	T-7222AP
25	G-0677	Quad 2-Input Nand Gate	T3, S5, S6, B7, R10	74LS00
26	G-0678	Quad 2-Input Nor Gate	F1, D7, S10	74LS02
27	G-0679	Hex Inverter	S3, B4, R5, A7, E9	74LS04
28	G-0680	Quad 2-Input And Gate	R3, B5, C6, T6, C7	74LS08
29	G-0681	Triple 3-Input Nand Gate	C2, P3, L6	74LS10
30	G-6273	Dual 4-Input Nand Gate	D1, B3, P6, R6	74LS20
31	G-6001	8-Input Nand Gate	F4, N7	74LS30
32	G-0683	Quad 2-Input Or Gate	T5, L7, T9	74LS32
33	53706	Dual D-Latch	E1, A3, A4, C4, C5, B6, M6, M7, F9	74LS74
34	G-6274	Full Adder	J4, H5	74LS83
35	G-0686	Quad 2 Input Ex. Or	H1, E3, N3, E4, M4, F5, A6	74LS86
36	G-0687	Dual J-K Flip Flop	C1	74LS107
37	G-6117	Quad Bus Buffer Gate	H9	74LS125
38	G-6005	1 of 8 Decoder/Demultiplexer	A9, B9, C9	74LS138
39	G-6006	Dual 1 of 4 Decoder/Demult.	A2, B2, F7, J9	74LS139
40	G-0689	Quad 2 to 1 Multiplexer	D2, E2, K2, L2, P2, F3, H3, A5, D6, E6, F6	74LS157
41	G-6008	4 Bit Binary Counter	C3, D3, M3, D4, K4, L4, E5, K5, L5, M5, H10, J10	74LS161

JUMP BUG
GAME P.C. BOARD ASSEMBLY
G-6095-A

ITEM NO.	PART NO.	DESCRIPTION	REF. DES.	MFGR. PART NO.
42	G-0691	Shift Register	P7, R7	74LS164
43	G-6009	Hex D-Type Flip Flop	P5	74LS174
44	G-6010	Quad D-Type Flip Flop	N5	74LS175
45	G-0692	4 Bit Shift Register	M2, N2, R2, S2	74LS194
46	G-6121	Octal Buffer Invert	J5, K6, P9, R9	74LS244
47	G-6272	Octal Tranceiver	J3, K7	74LS245
48	G-0694	8 Bit Latch	D9, A10, B10	74LS259
49	G-6012	Octal D-Type Flip Flop	L3, H4, K10, S11	74LS273
50	G-6015	Hex Inverter	B1, S7, H11, J11, K11, L11, M11, T11	74LS368
51	G-0696	Octal D Flip Flop	J2, N6	74LS377
52	G-0697	Dual Counter	F10	74LS393
53	G-6271	Dip Switch SPST 5 Contact	DIP SW.	
54	G-6036	18.432 MHz Crystal	X-TAL	
55	G-6134	P.C. Trim Control	VR1	50K OHM
56	G-6269	P.C. Trim Control	VR2	2.2K OHM
57	51289	Resistor 1/4 Watt 5%	R13, R15, R17, R32, R33, R34, R38, R39, R40, R41, R42	100 OHM
58	53838	Resistor 1/4 Watt 5%	R14, R16, R18	150 OHM
59	53982	Resistor 1/4 Watt 5%	R24, R26, R29	220 OHM
60	52344	Resistor 1/4 Watt 5%	R10, R11	330 OHM
61	49264	Resistor 1/4 Watt 5%	R6, R7, R25, R27, R30, R83	470 OHM
62	51564	Resistor 1/4 Watt 5%	R1, R4, R5, R8, R19, R20, R21, R22, R23, R28, R31, R35, R36, R37, R43, R44, R45, R69, R80, R81, R82	1K OHM
63	52358	Resistor 1/4 Watt 5%	R49, R50, R54, R59, R68, R73, R75	2.2K OHM
64	51293	Resistor 1/4 Watt 5%	R2, R3, R12, R46, R48, R55, R57, R58, R66, R67, R74	10K OHM
65	53847	Resistor 1/4 Watt 5%	R56	12K OHM
66	51291	Resistor 1/4 Watt 5%	R47, R52, R62, R64, R71, R84	22K OHM
67	49268	Resistor 1/4 Watt 5%	R63	33K OHM
68	52349	Resistor 1/4 Watt 5%	R76	39K OHM
69	51294	Resistor 1/4 Watt 5%	R79	47K OHM
70	52514	Resistor 1/4 Watt 5%	R77	82K OHM
71	50966	Resistor 1/4 Watt 5%	R51, R65, R70	100K OHM
72	52351	Resistor 1/4 Watt 5%	R78	120K OHM
73	50968	Resistor 1/4 Watt 5%	R60	150K OHM
74	53593	Resistor 1/4 Watt 5%	R53, R61, R72	470K OHM
75	53978	Resistor Pack	RM1, RM2, RM3	1K OHM X 8
76	G-6173	Capacitor, Electrolythic 16V	C1, C18, C25, C42	47 MFD

JUMP BUG
 GAME P.C. BOARD ASSEMBLY
 G-6095-A

ITEM NO.	PART NO.	DESCRIPTION	REF. DES.	MFGR. PART NO.
77	G-6281	Capacitor, Electrolythic 16V	C41	220 MFD
78	G-6278	Capacitor, Electrolythic 16V	C46, C47, C48, C49	1000 MFD
79	G-6279	Capacitor, Electrolythic 16V	C45	1000 MFD
80	G-6138	Capacitor, Tantalum 16V	C9, C10, C11, C12, C13, C16	1 MFD
81	G-0807	Capacitor, Tantalum 35V	C15	2.2 MFD
82	G-6283	Capacitor, Film 50V	C32, C36, C37	0.001 MFD
83	G-0947	Capacitor, Film 50V	C14, C19, C20, C23, C24, C28, C30, C31, C32, C33	0.01 MFD
84	G-0948	Capacitor, Film 50V	C21, C22, C26, C27, C29, C34, C35, C38, C39, C40, C43, C44	0.1 MFD
85	G-0949	Capacitor, Film 50V	C17	0.22 MFD
86	53327	Capacitor, Disc 50V	C5	100 PF
87	G-6177	Capacitor, Disc 50V	C4, C7	220 PF
88	G-0940	Capacitor, Disc 50V	C6, C8	0.001 MFD
89	53994	Capacitor, Disc 50V	C2, C3	0.01 MFD
90	G-6137	Capacitor, Disc 50V	ALL PC	0.1 MFD
91	G-6276	Diode 10D-1	D1	
92	G-6277	Diode 1S1588	D2, D3, D4, D5	
93	52724	16 Contact Solder Dip Socket		
94	52722	24 Contact Solder Dip Socket		



SECTION 5

BASIC TROUBLESHOOTING

GENERAL

Be careful - certain components of monitor utilize high voltage

Solid-State Control Panel

Turn off power before changing components

Do not use VOM on P.C. Board as use may damage P.C. Board components

When attaching connectors, be sure to observe polarity

K4600 COLOR MONITOR SAFETY INFORMATION

WARNING:

An isolation transformer must be used between the AC supply and the AC plug of the monitor before servicing or testing is performed since the chassis and the heat sink are directly connected to one side of the AC line, which could present a shock hazard. The chassis of the monitor should NEVER be connected to ground. Before servicing is performed, read all the precautions labeled on the CRT and chassis.

WARNING:

Parts which influence x-ray radiation in horizontal deflection, high voltage circuits and picture tube etc. are indicated by ★ in the parts list for replacement purposes. Use only the type shown in the parts list.

WARNING:

For continued safety replace safety critical components only with manufacturer recommended parts. These parts are identified by shading and by \triangle on the schematic diagram.

For replacement purposes, use the same type or specified type of wire and cable, ensuring that the positioning of the wires is followed (especially for high voltage and power supply circuits). Use of alternative wiring or positioning could result in damage to the monitor or in a shock or fire hazard.

The picture tube used employs integral implosion protection and should be replaced with a tube of the same type number for continued safety.

IMPORTANT: In the event that game exhibits erratic behavior, i.e. resetting in the middle of a game, or failure to power op, **CHECK THE FUSES!**

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

When handling the CRT, shatterproof goggles should be worn after completely discharging the high voltage circuit. DO NOT lift the picture tube by the neck.

PERFORMANCE AND OPERATING DATA

Apply a suitable power source to the monitor through an isolation transformer.

Apply a suitable signal source to the monitor PCB by means of P205.

Set up controls.

All controls are preset at the factory, but may be adjusted to suit program material.

1. SUPPLY

Voltage 108 VAC - 132 VAC

Frequency 50 Hz - 60 Hz

Note: Apply supply voltage through an isolation transformer with 1 Amp. capability.

2. HIGH VOLTAGE (EHT)

For 19"V models 25.5 ± 0.8 K.V. at 0 Beam

Note: Condition for above 1 (beam) = 0
A.C. = 120V

3. SERVICE SET-UP CONTROLS

A. V. Adjustment VR501 set for 127V DC

B. Vertical Size Cont = VR302

C. Vertical Hold Cont = VR301

D. Horizontal Hold Cont = VR351

E. Horizontal Width Cont = L702

F. Focus Control = VR702

G. Screen Control = VR406

H. Video Drive Controls - Red Drive = VR401

Green Drive = VR402

I. CRT Cut Off Controls - Red Cutoff = VR403

Green Cutoff = VR404

Blue Cutoff = VR405

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

COLOR MONITOR SERVICE INSTRUCTIONS

FOCUS

Adjust the Focus control (VR702), located on the HV unit (T701), for maximum over-all definition and fine picture detail.

+127V ADJUSTMENT (See Fig. 1)

The +127V adj. control (VR501) is adjusted at the factory. However, if readjustment should be required, proceed as follows.

1. Operate monitor for at least 15 minutes at 120V AC line.
2. Connect Positive lead of V.T.V.M. to blue lead of TR502 negative lead to chassis ground.
3. Adjust VR501 to obtain +127V reading.
4. After adjustment VR501 must be locked with a sealing varnish.

CIRCUIT PROTECTION

A 3.0A pigtail fuse, mounted on the Main Board has been provided to protect the Power Output Circuit.

HORIZONTAL OSC. ALIGNMENT (See Fig. 2)

A warm-up period of at least five minutes should be allowed before alignment is carried out. Set VR351 to center position. Adjust L351 after grounding R328 plug. (TP32 of Vert/ Horiz. P.C. Board) through a 1 μ F/50V capacitor. Adjust L351 to obtain normal picture. After adjustment, remove 1 μ F/50V capacitor.

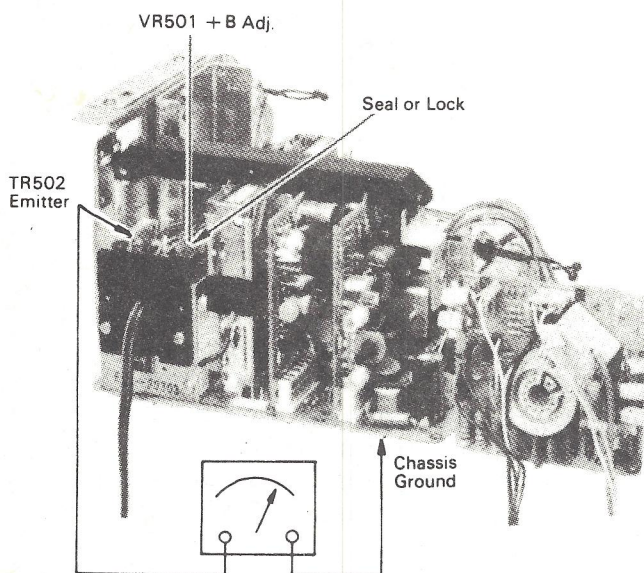


FIGURE 1

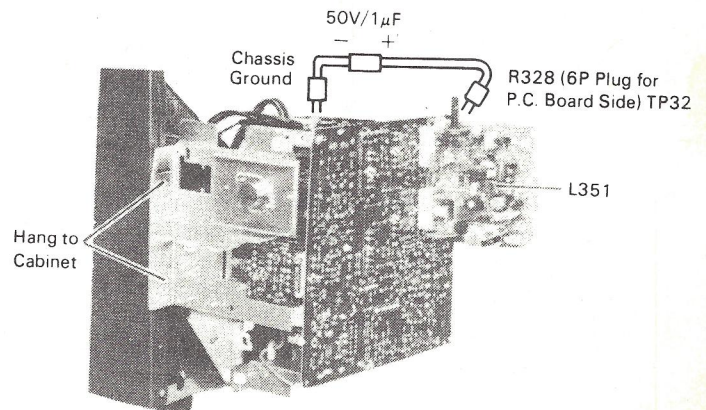


FIGURE 2

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

COLOR MONITOR SERVICE INSTRUCTIONS

BLACK LEVEL CONTROL ADJUSTMENT

This control has been set at the factory and should not need further attention. If however when the game is connected a slight adjustment of VR201 may be necessary to obtain the proper black level (the black portion of the picture just extinguished).

VERTICAL SIZE (HEIGHT)

The vertical height control is a screw-driver adjustment. Location of this control is shown in Fig. 3. This control must be adjusted slowly, if necessary, until the picture or test pattern attains the correct vertical proportions.

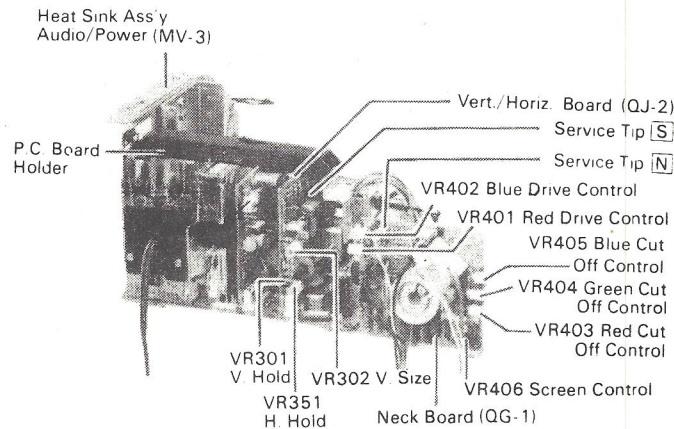


FIGURE 3

INSTALLATION AND SERVICE INSTRUCTIONS

COLOR PURITY AND VERTICAL CENTERING ADJUSTMENT

For best results, it is recommended that the purity adjustment be made in the final monitor location. If the monitor will be moved, perform this adjustment with it facing west or east. The monitor must have been operating 15 minutes prior to this procedure and the faceplate of the CRT must be at room temperature. The monitor is equipped with an automatic degaussing circuit. However, if the CRT shadow mask has become excessively magnetized, it may be necessary to degauss it with manual coil. Do not switch the coil OFF while the raster shows any effect from the coil.

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

INSTALLATION AND SERVICE INSTRUCTIONS

COLOR PURITY AND VERTICAL CENTERING ADJUSTMENT (CONT'D)

Purity Magnets are used for Color Purity and V Centering Adjustment.

Purity Adjustment procedure is as follows.

1. Remove R-G-B signal from monitor.
2. Turn Green Cut off Control (VR404) on the Neck Board fully CCW.
Turn Red and Blue Cut off Control (VR405) fully CW.
3. Pull the Deflection Yoke backward so that the Magenta belt will appear. (See Fig. 4)
4. Move the two Purity Magnets and bring the Magenta belt to the mechanical center of the screen (See Fig. 5) The vertical center position should be set VRS to $-5/64$ " (-2 MM) as shown in Fig. 6.
Insert service tip "N" on Neck circuit board to "S" on Vert./Horiz. circuit board (See Fig. 13). To check, use the Green raster at low intensity. Be sure to return the service tips to their original positions for the next check.
5. Push the Deflection Yoke forward gradually and fix it at the place where the Magenta screen becomes uniform throughout.
6. Turn Cut off Control, and Drive Control and confirm that each color is uniform.
7. If the color is not uniform, re-adjust it moving Purity Magnets slightly.
8. Move a pair of Purity Magnets at the same time (do not change the angle of the pair), and adjust the vert. center to center of screen.
9. Obtain the three colors and confirm whether white uniformity is balanced.
10. Insert the temporary wedge as shown in Fig. 5 and adjust the angle of Deflection Yoke.

STATIC CONVERGENCE ADJUSTMENT

A recently developed Deflection Yoke and Electron Guns construction has been used on this equipment in combination with In-Line Guns and Black Stripe Screen to make a barrel-type magnetic-field distribution for vertical deflection and a pin-cushion-type magnetic field for horizontal deflection with which a self-converging system can be obtained. This type is different from conventional unity-magnetic field distribution type deflection yoke. 4-Pole Magnets and 6-Pole magnets are employed for static convergence instead of a Convergence Yoke.

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

STATIC CONVERGENCE ADJUSTMENT (CONT'D)

1. A cross hatch signal should be connected to the monitor.
2. A pair of 4-Pole Convergence Magnets are provided and adjusted to converge the blue and red beams. When the Pole opens to the left and right 45° symmetrically, the magnetic field maximizes. Red and blue beams move to the left and right oppositely (See Fig. 7-a and 7-b). Variation of the angle between the tabs adjusts the convergence of red and blue vertical lines. When the both 4-Pole Convergence Magnet Tabs are rotated as a pair, the convergence of the red and blue horizontal lines is adjusted.
3. A pair of 6-Pole Convergence Magnets are also provided and adjusted to converge the magenta (red + blue) to green beams. When the Pole opens to the left and right 30° symmetrically, the magnetic field is maximized. Red and blue beams both move to the left and right (See Fig. 8-c and 8-d). Variation of the opening angle adjusts the convergence of magenta to green vertical lines. When both 6-Pole Convergence Magnet Tabs are rotated as a pair the convergence of magenta to green horizontal lines is adjusted.

PRECISE ADJUSTMENT OF DYNAMIC CONVERGENCE (See Fig. 10 and 11)

1. Feed a cross hatch signal to the monitor.
2. Insert the temporary wedge and fix Deflection Yoke so as to obtain the best circumference convergence (See Fig. 10 and 11).
NOTE:
The temporary wedges may need to be moved during adjustments.
4. Insert three rubber wedges to the position as shown in Fig. 9 to obtain the best circumference convergence.
NOTE:
 - 1) Tilting the angle of the yoke up and down adjusts the crossover of both vertical and horizontal red and blue lines. (See Fig. 10 (a) and (b).
 - 2) Tilting the angle of the yoke sideways adjusts the parallel convergence of both horizontal and vertical lines at the edges of the screen. See Fig. 11-a and b.
 - 3) Use three rubber wedges (thick and thin rubber wedges are used for a purpose).
 - 4) The angle of each rubber wedges are shown in Fig. 9.
 - 5) After three rubber wedges have been inserted, pull out the temporary wedge.
 - 6) Fix the rubber wedges with chloroprene rubber adhesive.

SECTION 5

BASIC TROUBLESHOOTING (CONT'D)

BLACK AND WHITE TRACKING (With R/G.B. inputs grounded)

1. Set Black Level Control (VR201) to mid point.
2. Set Red and Blue Drive Controls (VR401 & VR402) to their mechanical center.
3. Set the G2 Screen Control (VR406) and the 3 Cut-off Controls (VR403, VR404, & VR405) to minimum (CCW).
4. Slowly turn up G2 screen control until the first faint color appears.
5. Slowly turn up the other two color cut-off controls in turn to match the first.
6. Remove ground from R/G/B/ inputs. Adjust Red and Blue Drive Controls (VR401 & VR402) for white screen.

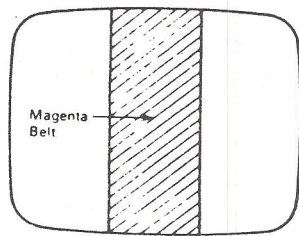


FIGURE 4

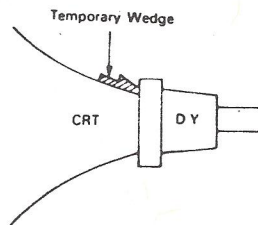


FIGURE 5

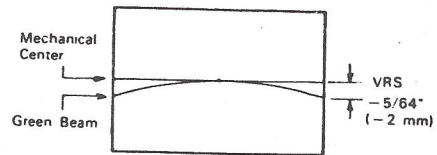
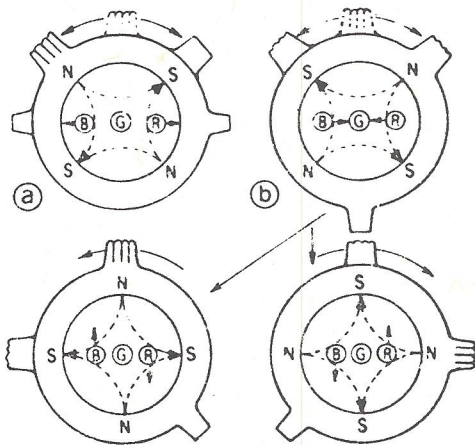
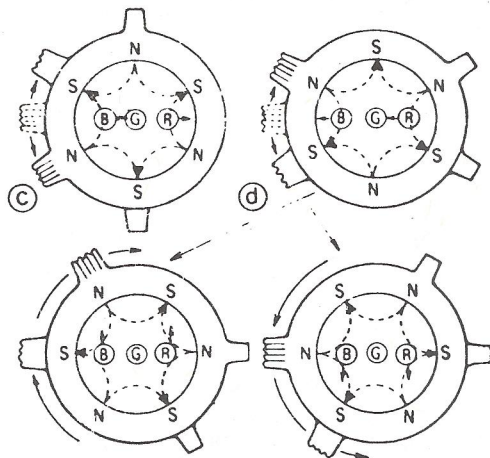


FIGURE 6



4-Pole Magnets and the Movement of Beams

FIGURE 7



6-Pole Magnets and the Movement of Beams

FIGURE 8

INSTALLATION AND SERVICE INSTRUCTIONS

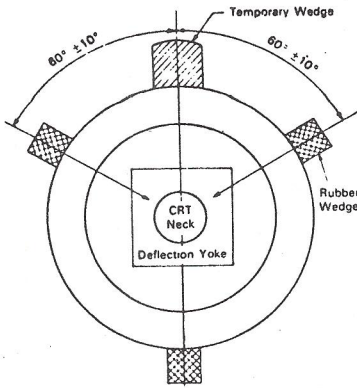
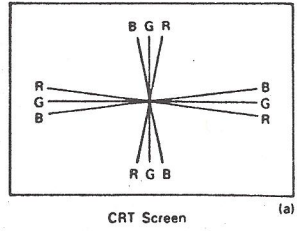
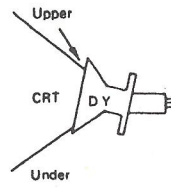


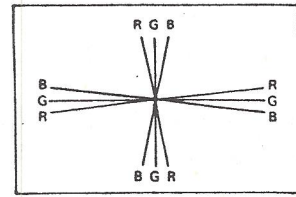
FIGURE 9



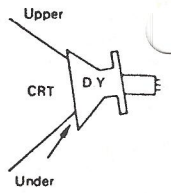
CRT Screen (a)



Insert Rubber Wedge from Upper Side

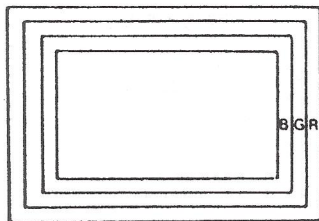


CRT Screen (b)

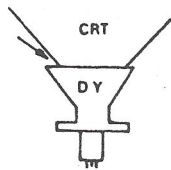


Insert Rubber Wedge from Lower Side

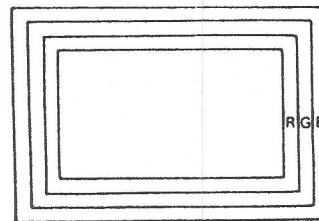
FIGURE 10



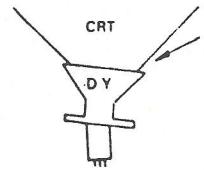
CRT Screen (a)



Insert Rubber Wedge from Left Side

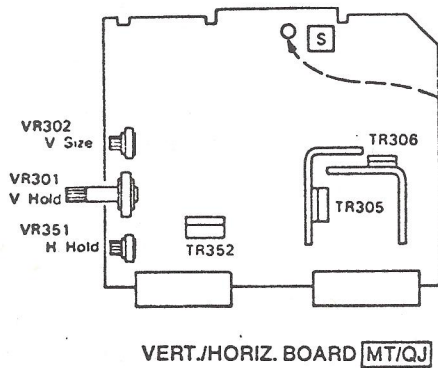


CRT Screen (b)

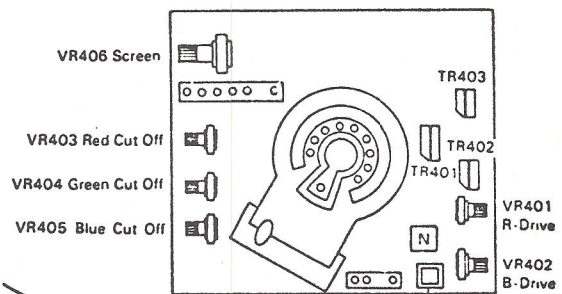


Insert Rubber Wedge from Lower Side

FIGURE 11



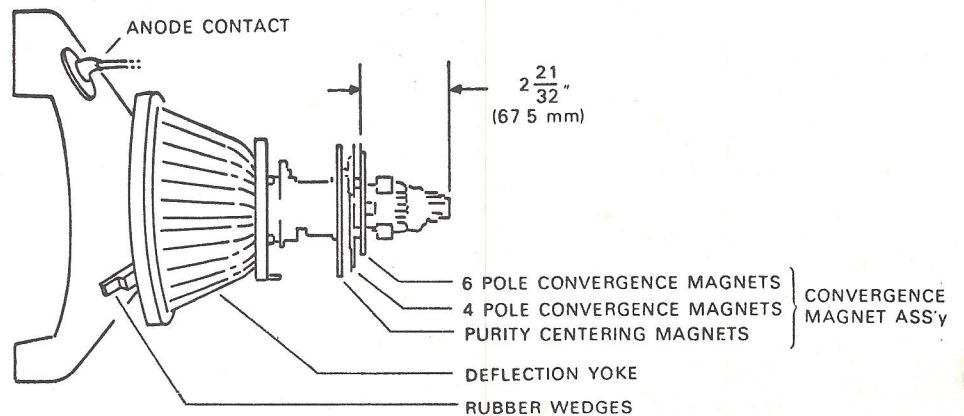
VERT./HORIZ. BOARD **MT/QJ**

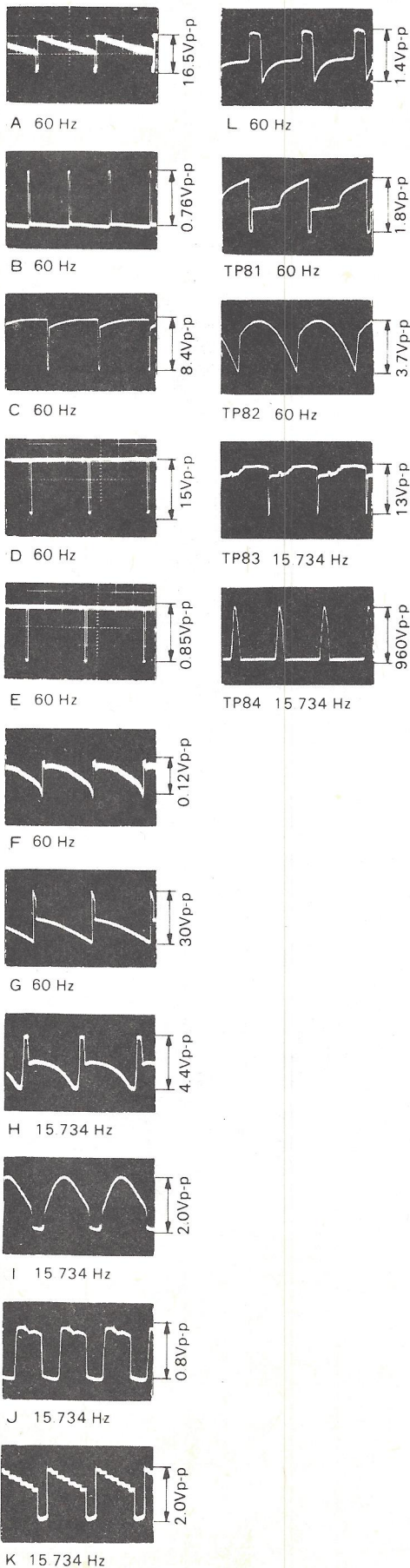


NECK BOARD **MS/QG**

FIGURE 12

FIGURE 13.
PICTURE TUBE NECK
COMPONENTS LOCATION





Power Supply Voltage and Symbols

Symbols	Line Voltage	Working Circuit
	15V	Vert. — Drive stage ABL — Bias CRT Cut-Off
	30V	Vert. Output Side pin Trans. — Bias
	127V	Horiz. Osc. Horiz. Drive Horiz. Output
	160V	Video Output
	890V	Screen-Bias



SERVICE TECHNICIAN WARNING X-RAY RADIATION PRECAUTION:

THIS PRODUCT CONTAINS CRITICAL ELECTRICAL AND MECHANICAL PARTS ESSENTIAL FOR X-RAY RADIATION PROTECTION.

FOR REPLACEMENT PURPOSES, USE ONLY TYPE PARTS SHOWN IN THE PARTS LIST.



CAUTION: FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

OSCILLOSCOPE WAVEFORM PATTERN

The waveforms shown are as observed on the wide band oscilloscope with the monitor turned to a reasonably strong signal and a normal picture. The voltages shown on each waveform are the approximate peak amplitudes. The frequency accompanying each waveform indicates the repetition rate of waveform not the sweep rate of the oscilloscope.

If the waveforms are observed on the oscilloscope with a poor high frequency response, the corner of the pulses will tend to be more rounded than those shown and the amplitude of any high frequency pulse will tend to be less.

P.C. BOARD LAYOUT

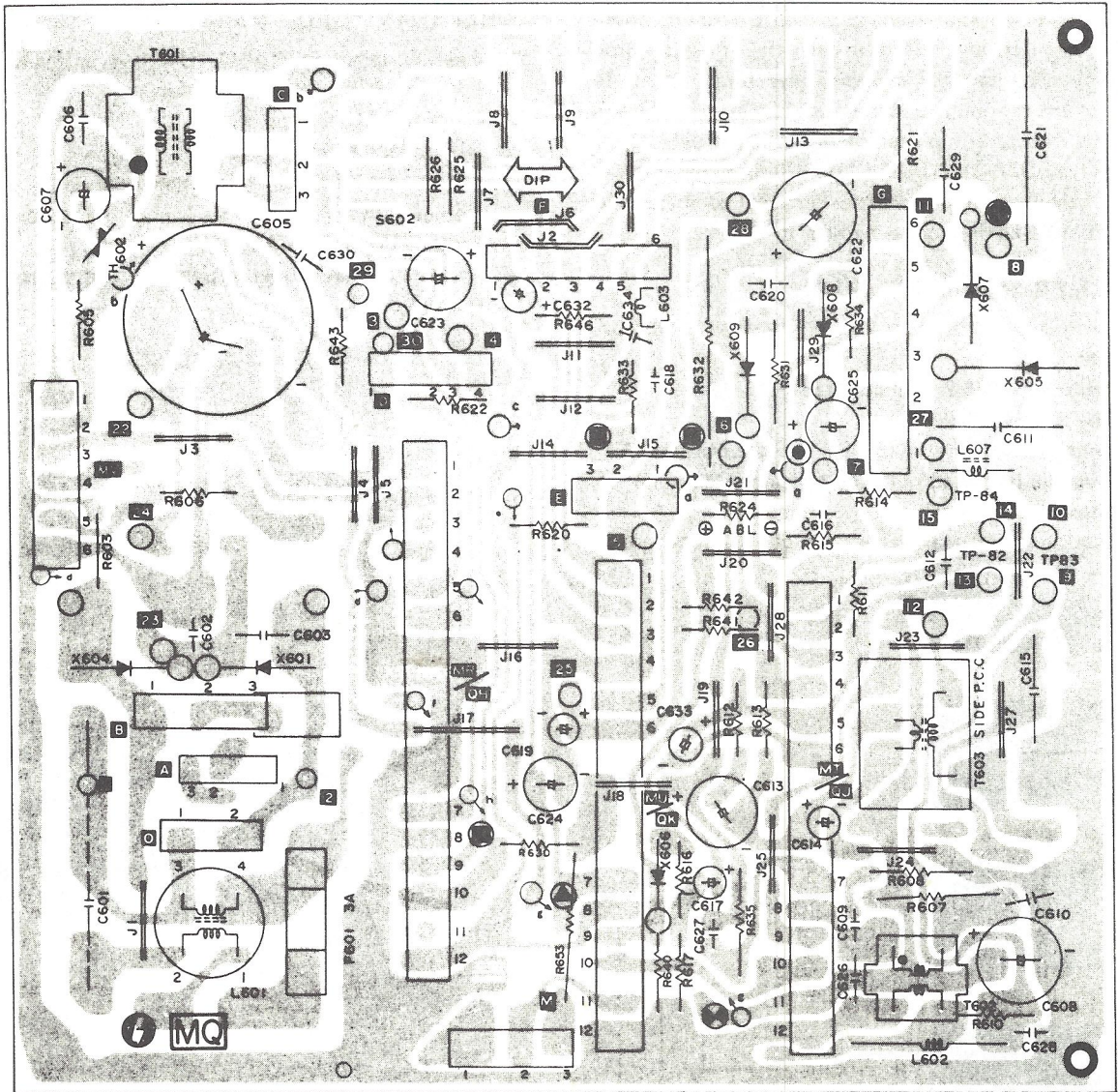


FIGURE 14. MAIN P.C. BOARD MQ-29

P.C. BOARD LAYOUT

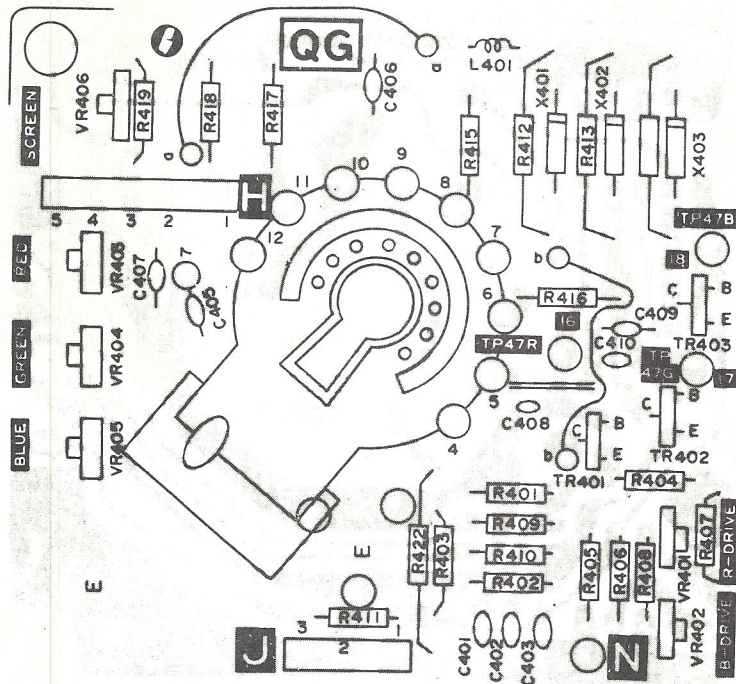


FIGURE 15. NECK P.C. BOARD MS/QG

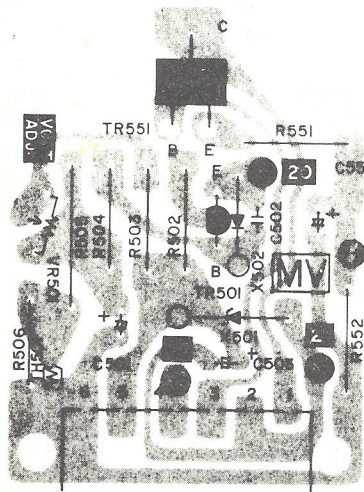


FIGURE 16. POWER PC BOARD MV

P.C. BOARD LAYOUT

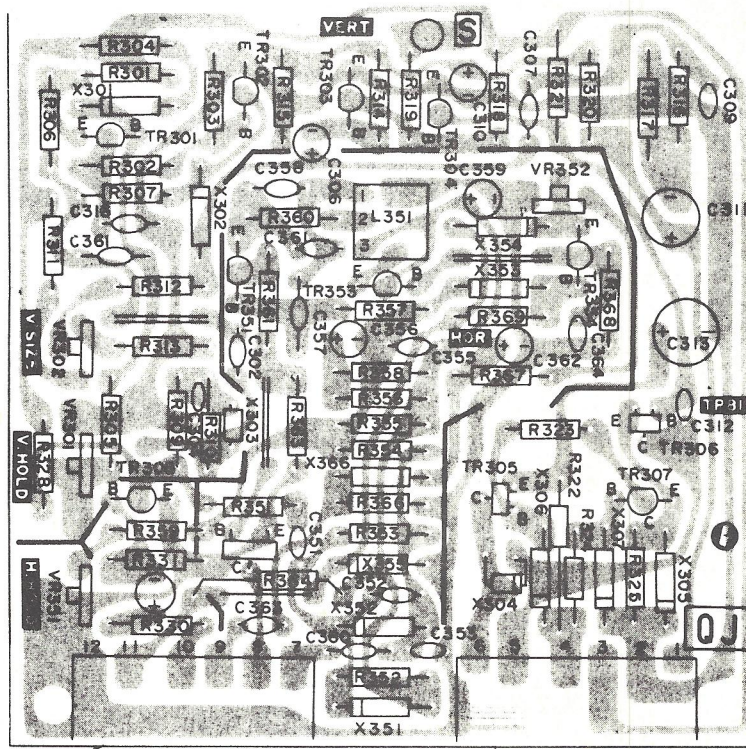
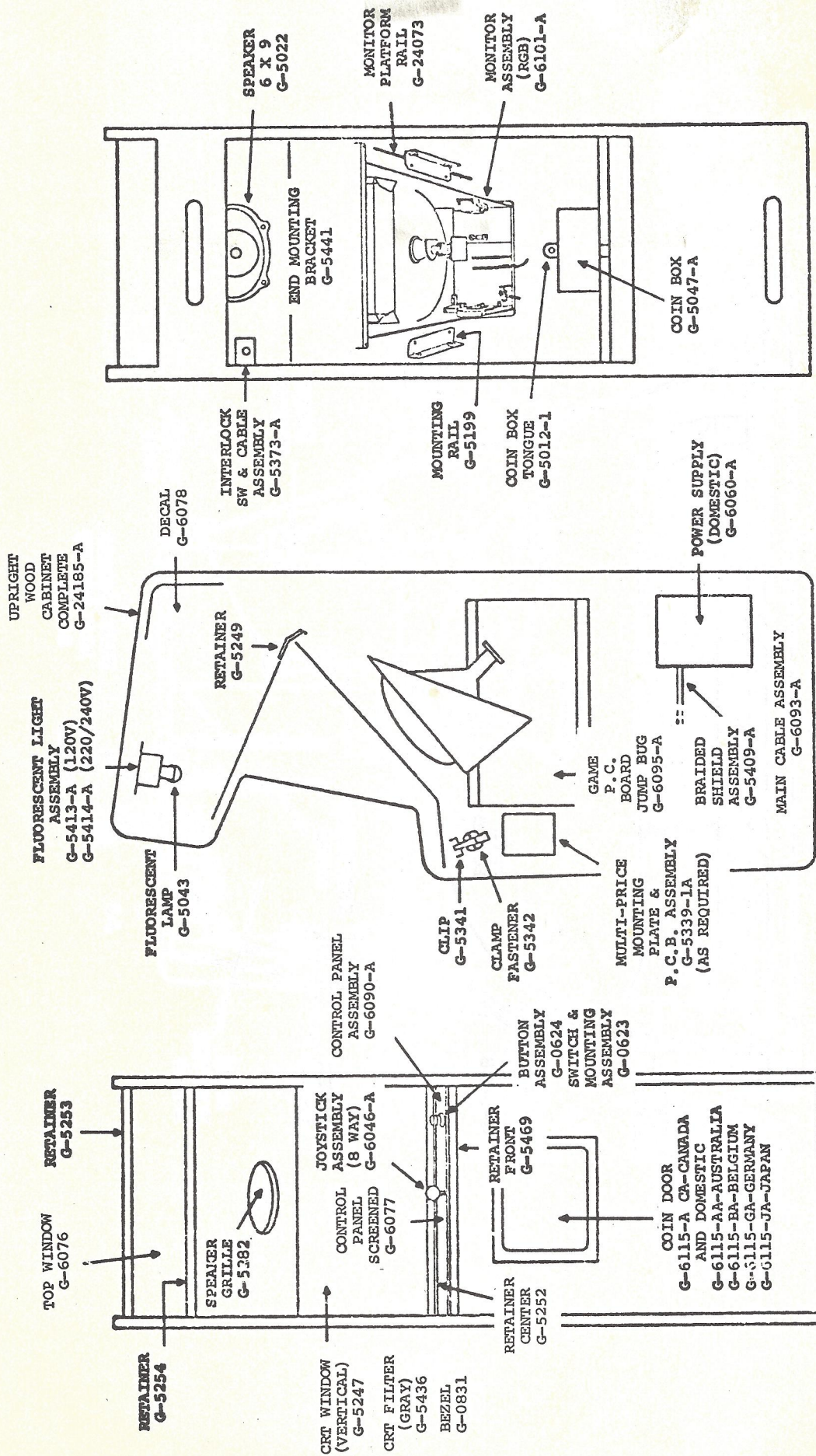
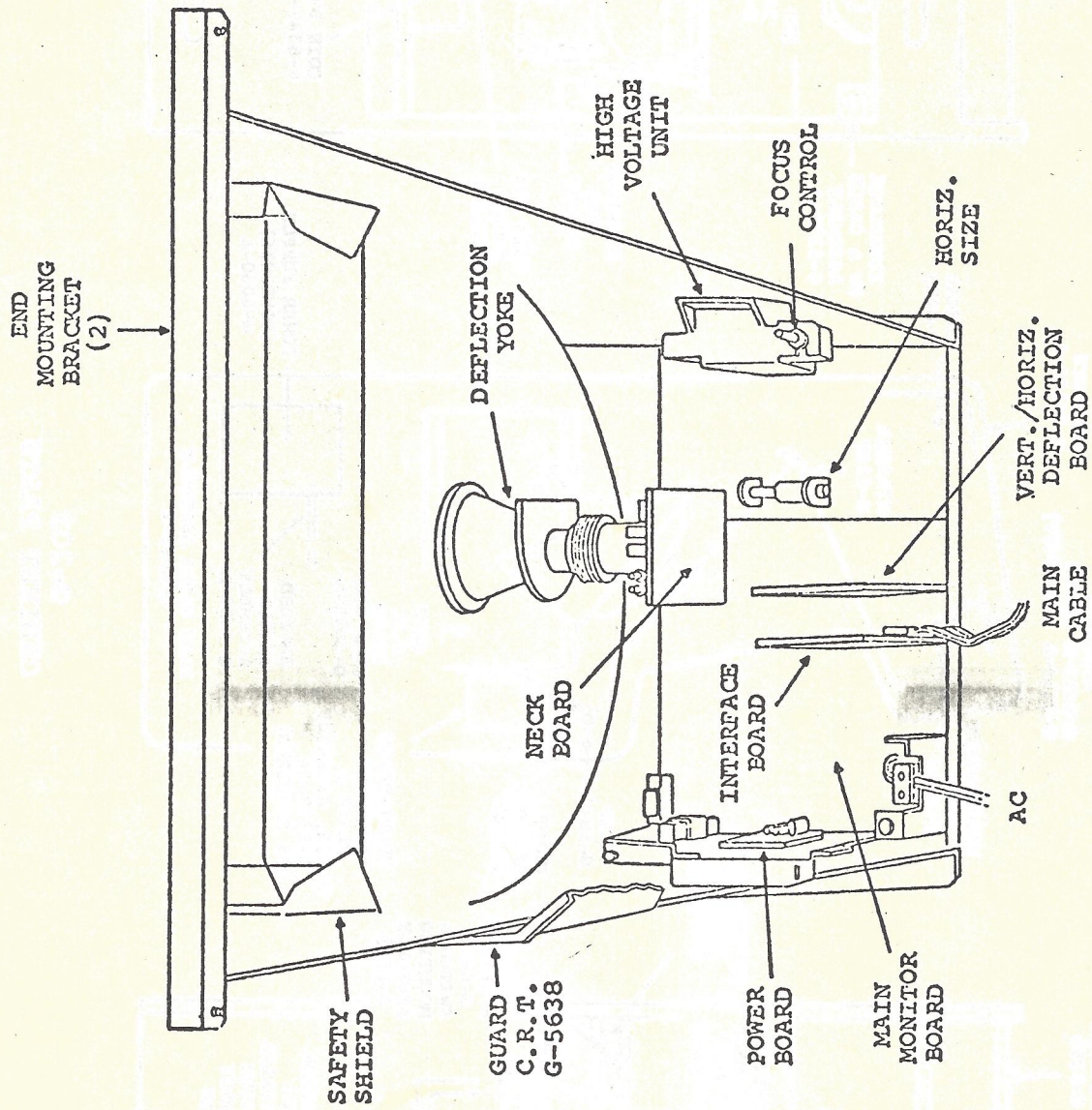


FIGURE 17. HORIZ/VERT P.C. BOARD MT/QJ

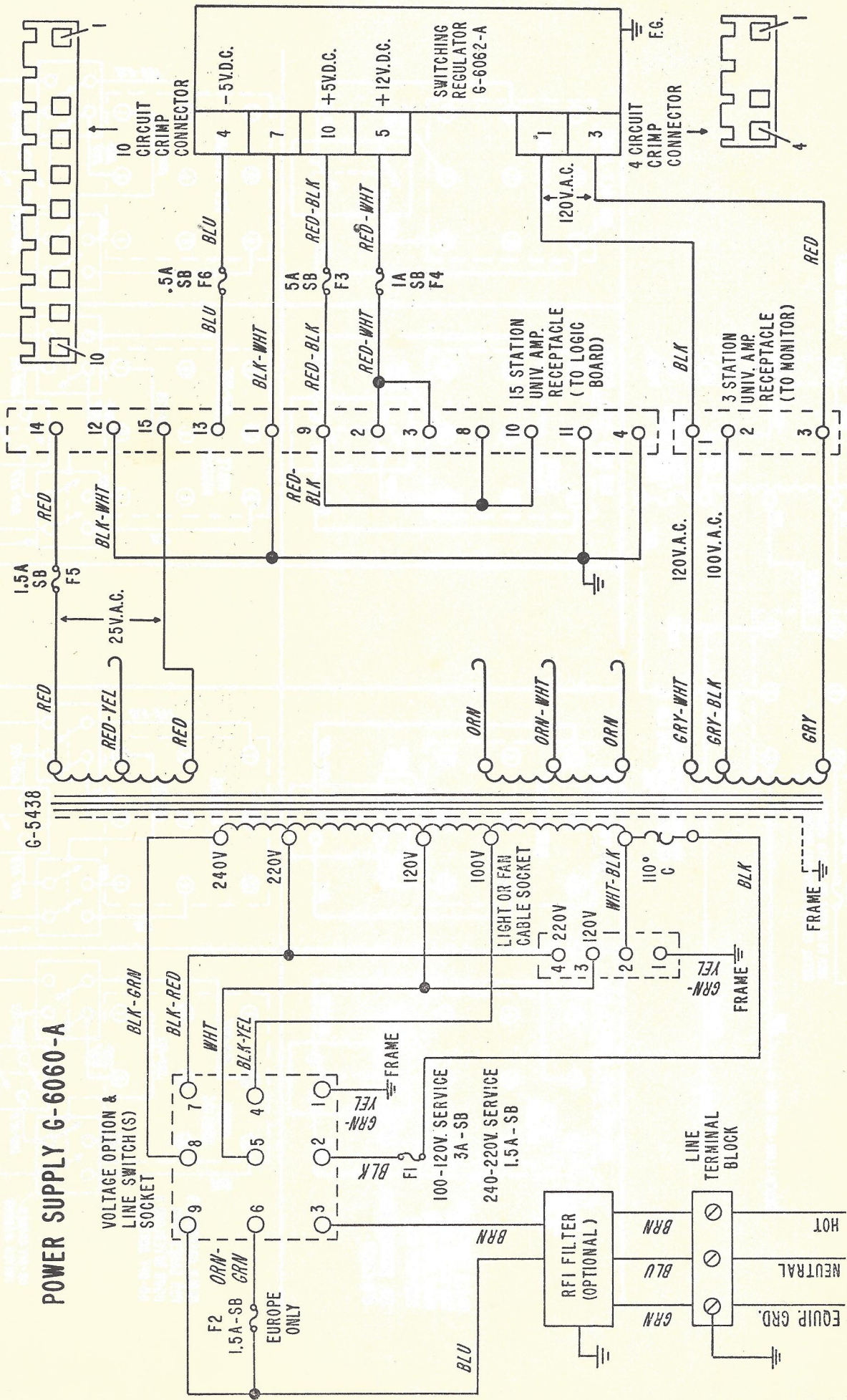


**G-203
CABINET PARTS**

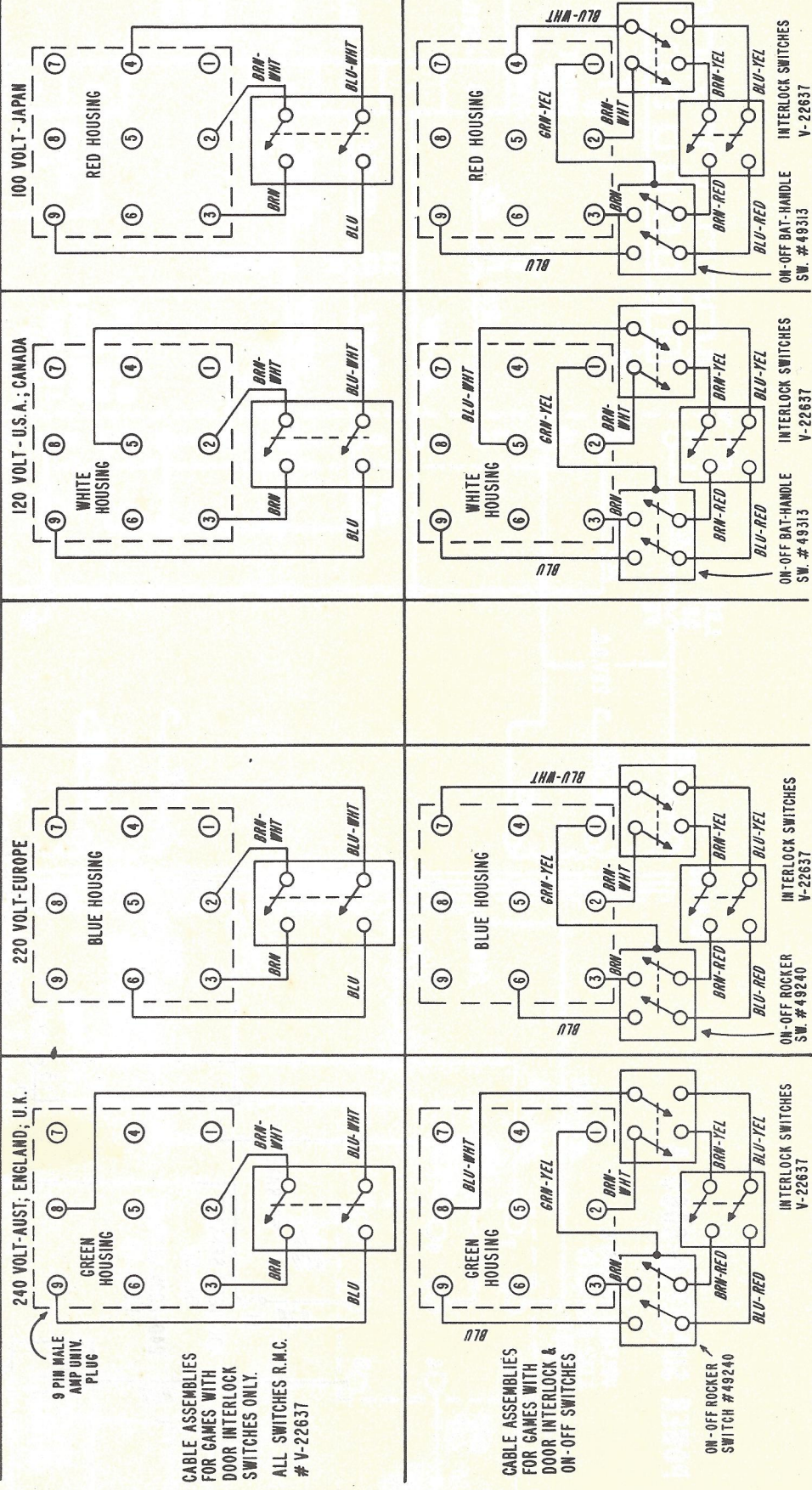
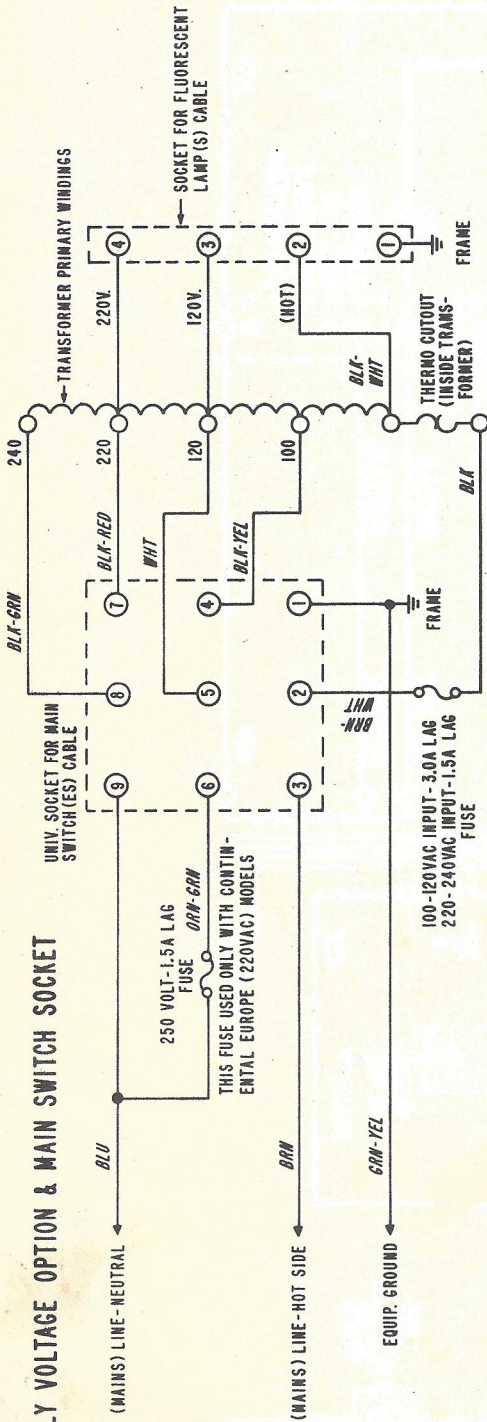


WELLS-GARDNER MONITOR ASSEMBLY

POWER SUPPLY G-6060-A



POWER SUPPLY VOLTAGE OPTION & MAIN SWITCH SOCKET



JOYSTICK SWITCH ADJUSTMENTS

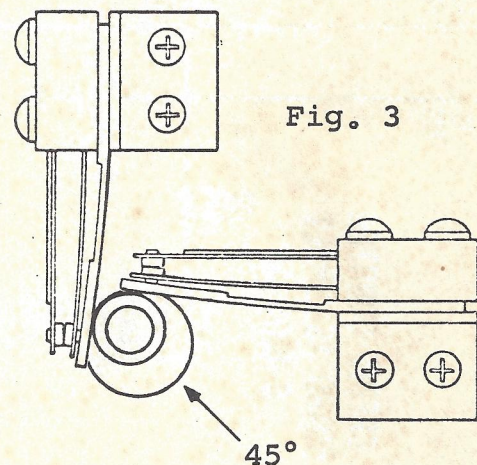
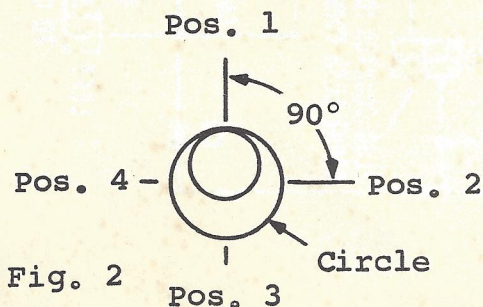
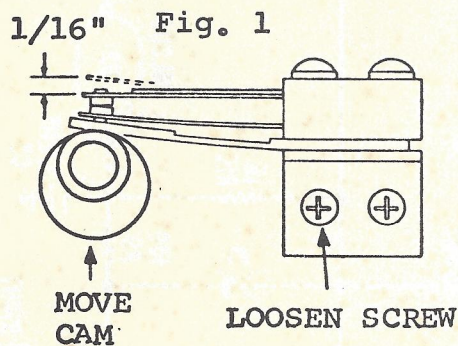
Fig. 1. Adjust each individual switch as follows:

- 1.1 Loosen front screw on switch bracket.
- 1.2 Move cam as far as possible toward switch & hold in this position.
- 1.3 Rotate switch toward cam until switch contacts close.
- 1.4 Continue to rotate switch until top blade deflects approx. 1/16".
- 1.5 Lock front screw on bracket.

Fig. 2. After adjusting all four switches, move lever against top, bottom & sides of circle and check switch action.

- 2.1 Switch #1 must break before switch #2 makes.
No two switches can make contact at the same time at positions 1, 2, 3 & 4.

Fig. 3. Move lever at 45° angle (4 ways) and check. In this position, two switches must make at the same time.



IMPORTANT: TIGHTEN ALL SCREWS
on switch brackets to prevent
any movement after adjusting.

CREDIT COUNTER BOARD ASSEMBLY
G-6105-A

