

GAME NOS. 932, 933 & 934
DECEMBER, 1980

MIDWAY'S

PAC-MAN

PARTS AND OPERATING MANUAL



COCKTAIL #933



UP-RIGHT #932

MINI #934



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WARNING

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

GENERAL INSTRUCTIONS FOR "PAC-MAN" UPRIGHT AND MINI

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. Additional taps have been provided on the transformer to compensate for fluctuating line voltage.

LINE VOLTAGE SAFETY SWITCH

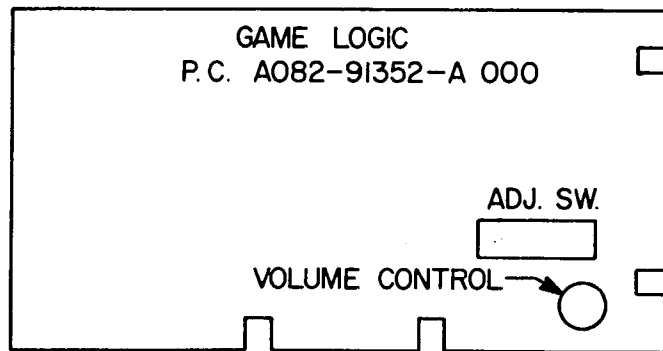
A line voltage safety switch has been provided for your protection. It is located on the right rear side of the cabinet in the back door area. When the back door is removed, it opens the circuit to the line voltage. To restore power (when servicing), pull switch fully out.

VOLUME CONTROL

The volume control pot is located on the Game Logic Board (P.C. A082-91352-A000). This pot 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. A082-91352-A000) and may be adjusted as indicated on separate instruction card in back box area.



TO REMOVE CONTROL PANEL AND MONITOR DISPLAY GLASS

1. Open coin door.
2. Release two (2) clamps located below Control Panel on each side of cabinet.
3. Disconnect control panel jack.
4. Remove control panel.
5. Remove monitor display glass.

CREDIT PUSH BUTTON SWITCH

Located in cash box area and is readily accessible by opening coin door. This switch is provided as a test aid and awards one credit without advancing coin meter.

M051-00932-A003

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 to Subpart J or 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.

GENERAL INSTRUCTIONS FOR "PAC-MAN" COCKTAIL TABLE

INSTALLATION

1. Remove shipping cleats located on bottom of cabinet.
2. Install four (4) provided leg levelers on bottom of cabinet and level cabinet.
3. The power is controlled by a switch located on the bottom of the cabinet. Additional taps have been provided on the transformer to compensate for fluctuating line voltage.

LINE VOLTAGE SAFETY SWITCH

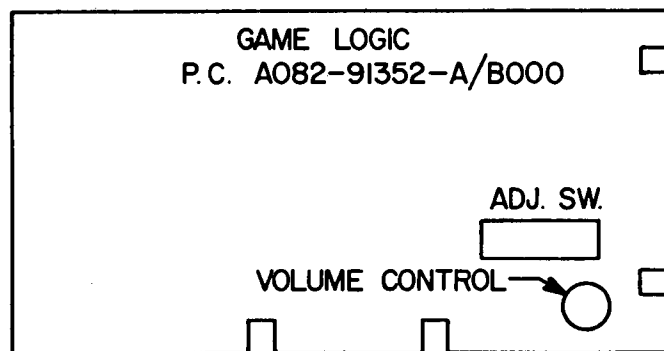
A line voltage safety switch has been provided for your protection. It is located in the cabinet on the left side of the coin door. When the coin door is opened the circuit to the line voltage is interrupted. To restore power (when servicing), pull switch fully out.

VOLUME CONTROL

The volume control pot is located on the Game Logic Board (P.C. A082-91352-A/B000). The pot 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. A082-91352-A/B000) and may be adjusted as indicated on separate instruction card in back door area.



CREDIT PUSH BUTTON SWITCH

Located to right of cash box and is readily accessible by opening coin door. This switch is provided as a test aid and awards one credit without advancing coin meter.

TEST SLIDE

Located to right of cash box and is readily accessible by opening coin door. When placed in "ON" position, this switch indicates test mode.

M051-00933-A003

GAME BOARD TEST

Place test slide switch in "ON" position. If game board is good, the following information will be displayed on the screen:

OK
Coin Adjustment Setting
Bonus Adjustment Setting
Number of PAC-MAN Per Game Setting
Game Version

RAM/ROM TEST

If any of the Rams or Roms are faulty, the following information will be displayed on the screen:

BAD ROM LOCATION CODE

Display	Location
M-Rom-0	6E
M-Rom-1	6F
M-Rom-2	6H
M-Rom-3	6J

BAD RAM LOCATION CODE

Display	Location
Bad V Ram-0	4K
Bad V Ram-1	4N
Bad C Ram-0	4L
Bad C Ram-1	4P
Bad W Ram-0	4M
Bad W Ram-1	4R

CONTROL PANEL AND COIN SWITCH TEST

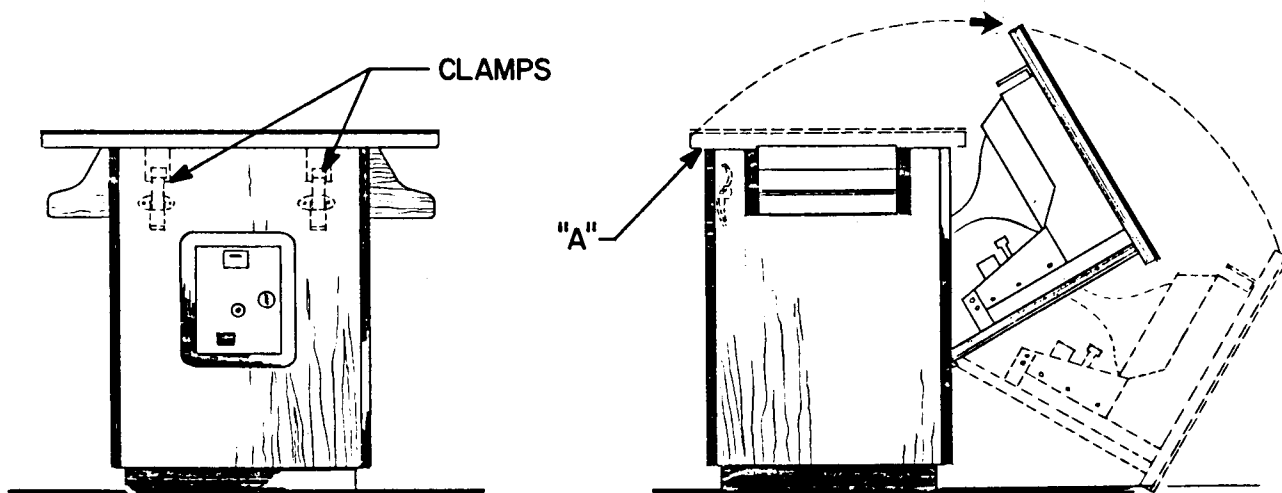
To verify operation of any switch, close switch in question. If switch is operating properly, a game sound will emit when closure is made.

Caution: Be sure to return test switch to game mode when all tests are completed.

TO SERVICE MONITOR, GAME BOARD AND TRANSFORMER ASSY.

1. Open coin box door and release two (2) clamps indicated on sketch below.
2. Grasp monitor mounting panel at "A" and open as indicated in sketch below.

Caution: Due to the weight of the monitor extreme care must be exercised when opening cabinet for service.



MONITOR - GENERAL INSTRUCTIONS

Service Set-Up Procedure

NOTE: All monitors are equipped with automatic degaussing coils which effectively demagnetize the picture tube each time the monitor is turned on. The degaussing coils will operate any time the set is turned on after having been off for at least five minutes.

The degaussing effect is confined to the picture tube since the coils are mounted on the ferrous tube shield. Should any part of the chassis or cabinet become magnetized, it will be necessary to degauss the affected area by means of a manual degaussing coil. Move the coil slowly around the CRT face area, then slowly withdraw for a distance of six feet before disconnecting the coil from the AC power supply.

Normally little, if any adjustment should be necessary. However, when a picture tube, yoke or similar component is replaced, preliminary static convergence should be done before attempting purity adjustment, and so on.

Set up should be done in a north/south direction. Horizontal and vertical centering taps should be set to the centre position if a major component has been changed.

1.0 Purity

- 1.1 Loosen yoke retaining clamp (figure 2), remove adhesive material fixing wedges to CRT. Remove wedges completely and clean off dried adhesive from picture tube and wedges.
- 1.2 A small quantity of "nail polish" has been used to lock the purity convergence rings in place. This seal must be broken with a sharp tipped instrument before any adjustments are attempted. Some models also use a locking ring at either end of the purity and convergence rings. This must be loosened before adjustments are made. It goes without saying that upon completion of all adjustments, the lock must be reset and/or a dab of paint or nail polish must be re-applied to edge of rings to prevent movement.
- 1.3 Connect an appropriate signal source, eg: Electro-home RGB generator producing a white field plus individual red, green and blue fields.
- 1.4 Bring the long and short purity tab protrusions in line with each other to obtain near-zero magnetic field (figure 4) (In some cases bring the flat and indented tabs together to obtain zero field). Protrusions can then be vertical, horizontal or at any convenient angle to start.
- 1.5 Turn off the green and blue fields and adjust setup controls to produce a red field. (See fig. 3)
- 1.6 Pull the deflection yoke back so that a red band appears in the centre of the screen.
- 1.7 Spread the tabs apart as little as necessary and rotate both rings together to center the red band horizontally on the face of the CRT (approximate). (See Fig. 5)
- 1.8 Slide the yoke towards the bell of the picture tube slowly to obtain a uniform red field (pure in color) across the entire tube face. Juggle back and forth slightly as necessary. Lightly tighten yoke retaining clamp.
- 1.9 Momentarily switch on a cross-hatch signal and rotate yoke to level the pattern on the face of CRT.
- 1.10 Return generator to regain red raster.
- 1.11 Turn off red field and check for pure field for each of the green and blue fields. Reposition yoke if necessary to obtain optimum purity on all fields.
- 1.12 Tighten yoke retaining clamp to prevent yoke shift or rotation. (Do not install wedges at this time.)

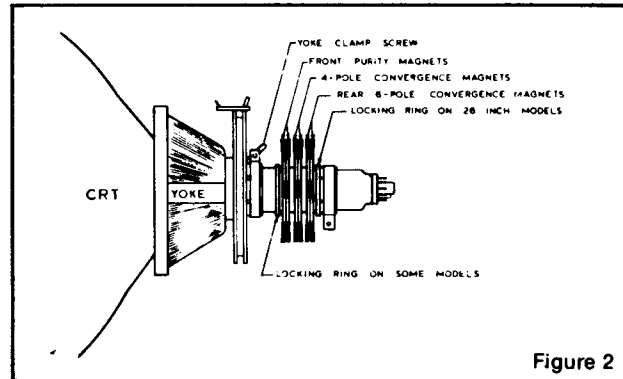


Figure 2

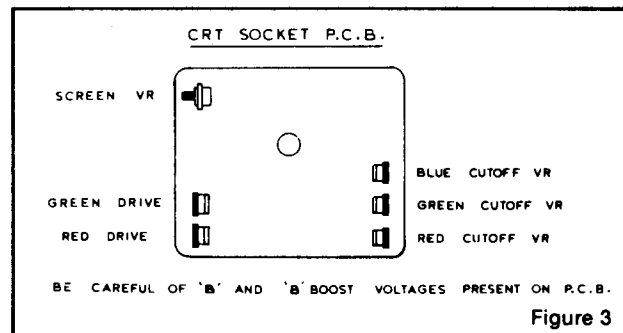


Figure 3

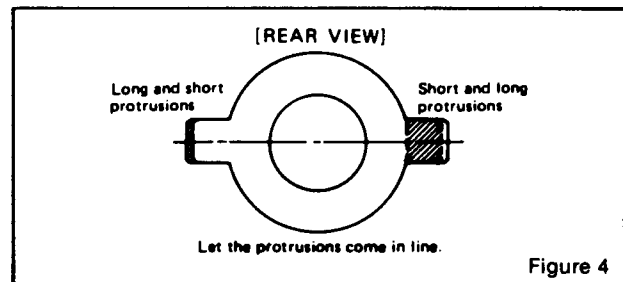


Figure 4

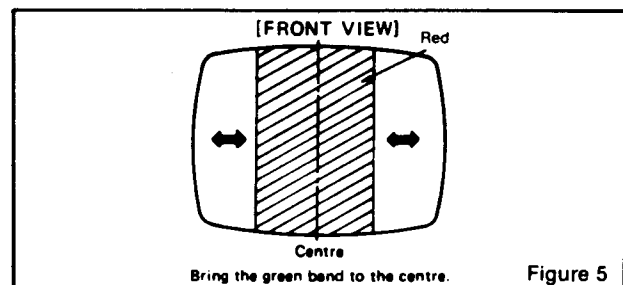


Figure 5

2.0 Static and Dynamic Convergence

NOTE: Static convergence is achieved by four magnets located on the neck, nearest the base of the picture tube, Fig. 2. The middle pair of magnetic rings are adjusted to converge the blue and red crosshatch lines. The rear pair of convergence rings (closest to the base of the picture tube) are adjusted to converge the magenta (blue/red) to the green crosshatch lines. Dynamic convergence is achieved by tilting the deflection yoke up-down and left-right.

- 2.1 Ensure that the controls misadjusted during purity setup (screen, cut-off, etc.) are set to give white balance. See 3.0 below.
- 2.2 Switch generator to the crosshatch pattern.
- 2.3 Adjust convergence around the edges of the picture tube by tilting the yoke up-down and left-right, and temporarily install one wedge at the top of the yoke or in a more optimum position. (Figures 8, 9, 10)
- 2.4 Turn off green input and turn on the red and blue input.
- 2.5 Rotate the 4-pole (middle) pair of magnets as a unit to minimize separation of the red and blue crosshatch lines around the center of the screen (Figure 6). Variation of the angle between the tabs adjusts convergence of red and blue. (Tilt yoke as required to converge red and blue at the edges as in 2.3 above.)
- 2.6 Turn on green input to obtain magenta (red/blue) and green crosshatch lines. Rotate the 6-pole (rear) pair of magnets as a unit to minimize separation of the magenta and green lines (figure 7). Vary angle between the two tabs and further rotate as a unit to finalize.
- 2.7 When convergence of 3 colors is optimized (static in center and dynamic around edges) apply stripe of paint or nail polish to convergence magnet rings to prevent movement. If applicable, tighten locking ring carefully.
- 2.8 Remove temporary wedge from yoke. Tilt yoke in up-down and left-right direction for best circumference convergence and install 3 wedges. (It is best to use 3 new wedges since they have adhesive backing. Simply pull off tape, slide wedge in place and press outer flap down firmly. For more permanency apply small quantity of silastic or similar material at junction of wedges and picture tube. Do not disturb while material is setting. (Order wedges by part number 39-1233-01).

3.0 White Balance (Grey Scale Tracking)

Refer to figure 3. Do the following in subdued light:

- 3.1 Note this adjustment can be accomplished with no signal connected; eg: input connector open or if a signal generator is connected, switch off all 3 inputs at the generator.
- 3.2 Set red and green drive controls to their mechanical center and turn the common G2 screen control and 3 cut-off controls to minimum (fully counterclockwise).
- 3.3 Slowly turn up G2 screen control until the first faint color appears, then back off to edge of visibility. Do not touch the associated cut-off control - it should stay fully CCW for the remaining set-up.
- 3.4 Slowly turn up the other two color cut-off controls in turn to match the first. This should result in the faintest grey.
- 3.5 Turn on the signal generator with all 3 inputs on. (a crosshatch pattern would be appropriate).

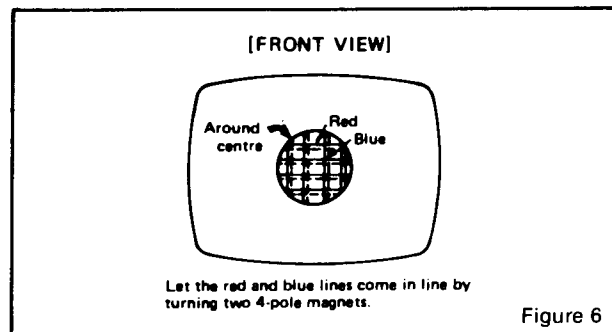


Figure 6

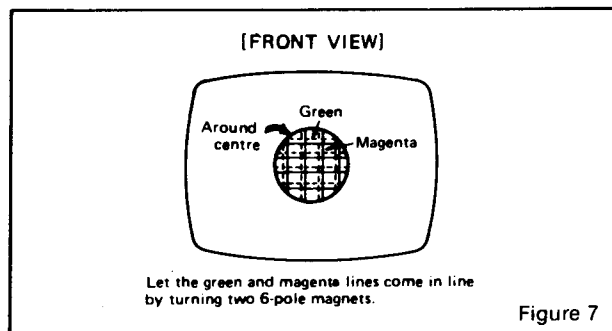


Figure 7

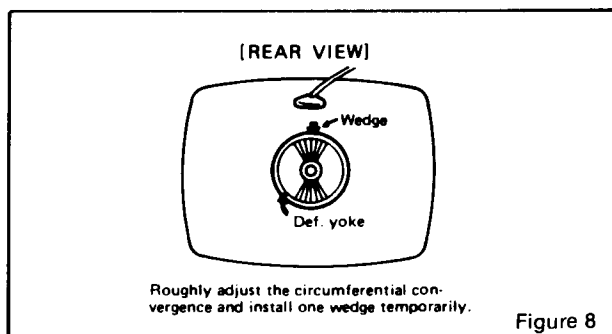


Figure 8

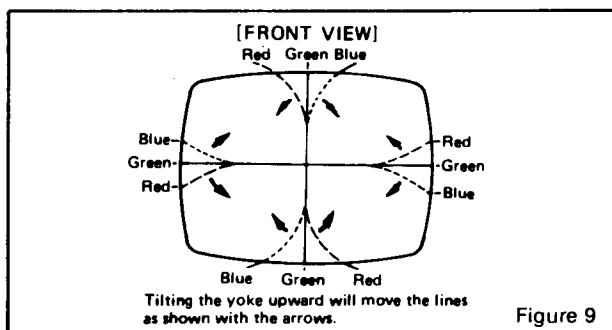


Figure 9

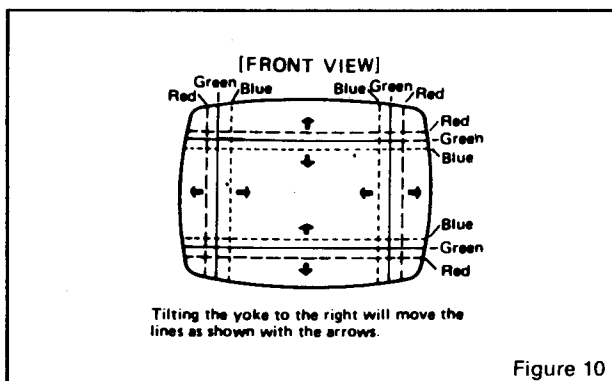


Figure 10

- 3.6 Adjust the red and green drive controls for "neutral white" on high white picture areas. Generally these controls will be left at mech. centre.
- 3.7 Note: When monitor is re-connected with the game the screen control (G2) may require a slight adjustment to obtain proper black level. (the black portion of picture just extinguished).

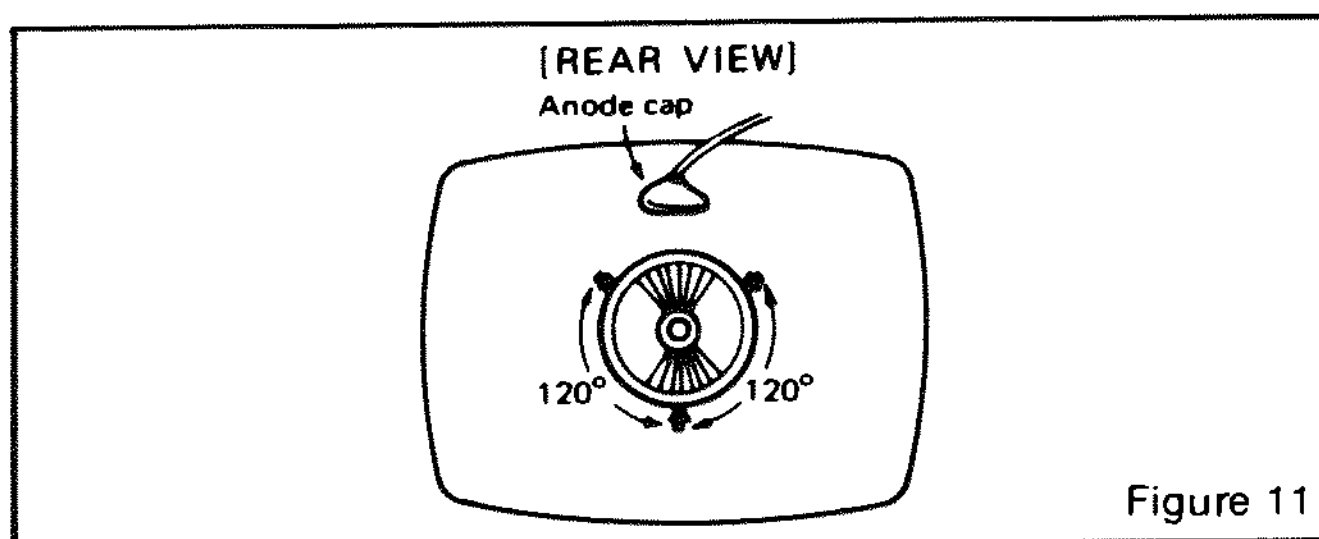


Figure 11

4.0 Power Supply

The regulated +B1 control (R909) has been factory adjusted and normally requires no adjustment. However, if any repairs have been made to the chassis it is recommended that this adjustment should be made.

- Allow 5 minutes to warm up.
- No signal applied.
- Connect an accurate D.C. voltmeter to TP-91 or the emitter of X04 power regulator transistor.
- Adjust R909 for 120V. (See fig. 1)

Note:

Should +B1 control be set too high, it may cause possible component damage. Use an accurate D.C. voltmeter to set B1 (B+).

5.0 Focus

Adjust focus control for best overall definition and picture detail an average signal applied. (Highlights should be favoured.)

6.0 Color Service Generator for G07 Monitor

Electrohome has developed a color service generator that is specifically designed for use with the G07 color data monitor. It provides the monitor with both horizontal and vertical sync, as well as the following test patterns:

- Fine cross-hatch pattern
- Broad bar cross-hatch pattern
- Complete field

Three color selection switches, red, green and blue, provide the ability to display the above patterns in the three primary colors as well as the three secondary colors.

This product may be ordered from:

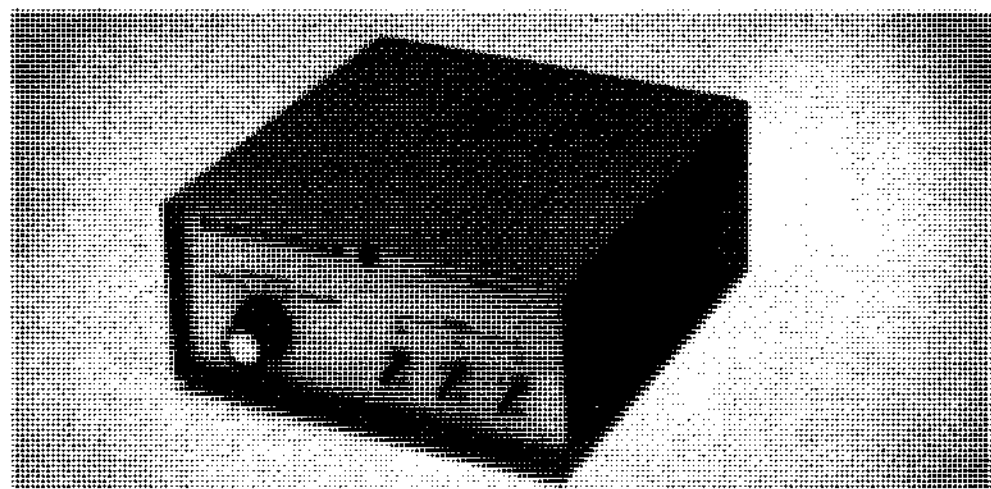
Contracts Marketing
ELECTROHOME Electronics

809 Wellington St. North

Kitchener, Ontario

Canada N2G 4J6

Telephone: (519) 744-7111, Ext. 567



7.0 X-Ray Emission Check

- Assure the power supply B1 is properly adjusted to 120V DC. See Item 4.0 (page 8)
- Assure that the anode voltage does not exceed max. as per Item 2.0 page 4.
- Assure that the high voltage hold down circuit is operating correctly. Use the following procedure.
 - Increase the B1 greater than 138.5V by shorting collector/emitter of the power regulator, X04.
 - Observe that the anode voltage (EHT) goes to 0. If the EHT does not go to 0, a fault must be located and repaired.
 - Remove short and set should return to normal operation. (Note, after the short is removed some monitors may not restart. In this case, remove power from monitor momentarily and normal operation will be restored.

Note:

The protector circuit consists of the components shown below in Fig. 13 with a circuit description.

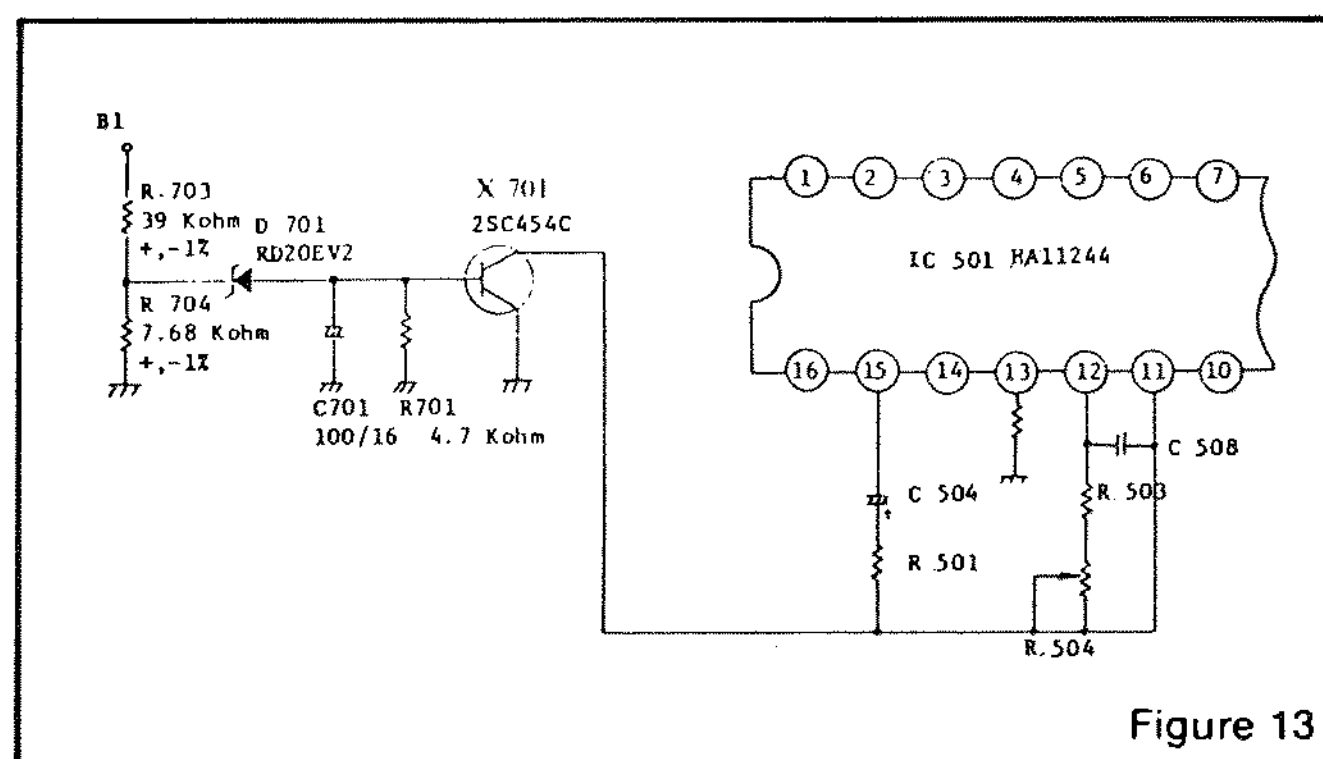


Figure 13

8.0 Circuit Diagram and Description of High Voltage Hold Down or Safety Circuit

- Circuit Diagram of High Voltage Hold Down Circuit.
- Operation of High Voltage Hold Down Circuit.

The high voltage hold-down circuit protects the high voltage circuit from dangerous voltage with short circuiting between emitter and collector of power regulating transistor.

The base voltage of X701 is increased when the B1 voltage is increased more than 138.5 V DC.

When the base of X701 is increased, a short is produced by X701 between pin 11 and ground of IC 501, shutting down the horizontal osc. and high voltage.

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.

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.

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.

INSTALLATION AND SERVICE INSTRUCTIONS

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.

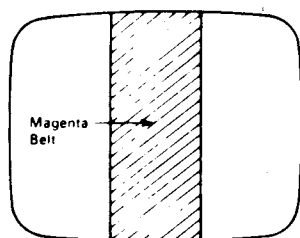


FIGURE 4

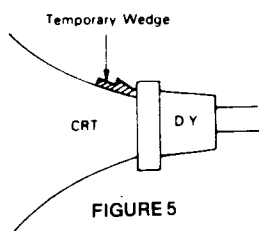


FIGURE 5

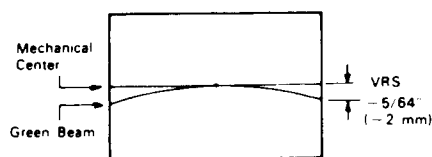
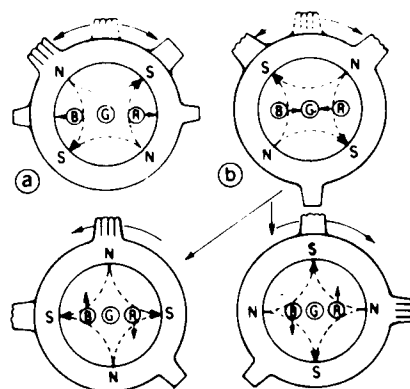
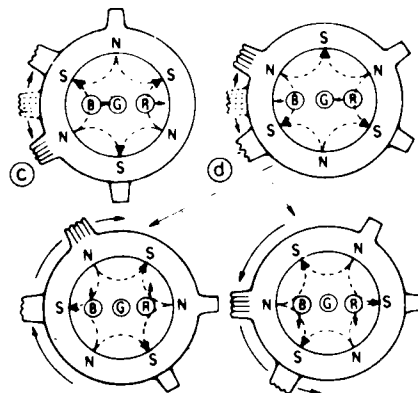


FIGURE 6



4-Pole Magnets and the Movement of Beams

FIGURE 7



6-Pole Magnets and the Movement of Beams

FIGURE 8

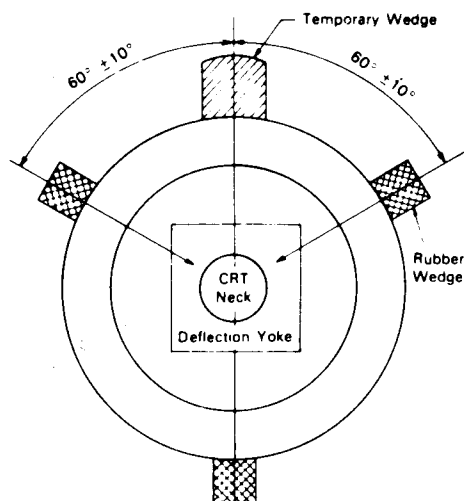
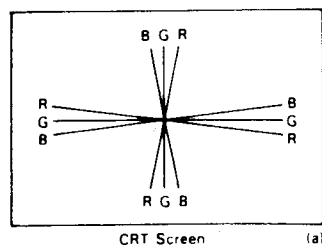
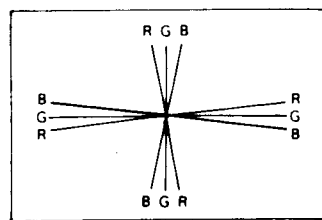


FIGURE 9

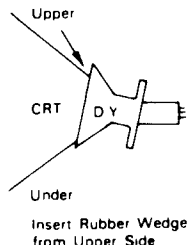


CRT Screen (a)

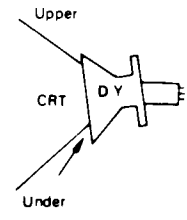


CRT Screen (b)

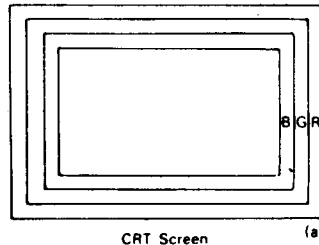
FIGURE 10



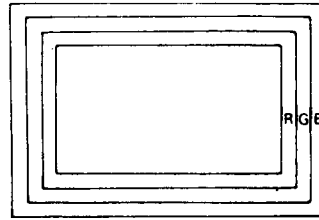
Insert Rubber Wedge from Upper Side



Insert Rubber Wedge from Lower Side

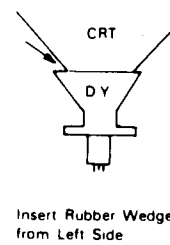


CRT Screen (a)

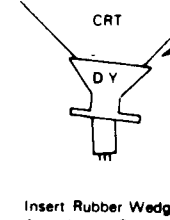


CRT Screen (b)

FIGURE 11



Insert Rubber Wedge from Left Side



Insert Rubber Wedge from Lower Side

METHOD OF PLAY			
SW. #1	SW. #2		
OFF	ON	1 COIN	1 PLAY
ON	OFF	1 COIN	2 PLAY
OFF	OFF	2 COINS	1 PLAY
ON	ON		FREEPLAY
NUMBER OF PACKMEN PER GAME			
SW. #3	SW. #4		
ON	ON	1 PACKMAN	
OFF	ON	2 PACKMEN	
ON	OFF	3 PACKMEN	
OFF	OFF	5 PACKMEN	
BONUS PACKMEN			
SW. #5	SW. #6		
ON	ON	BONUS PACKMAN AT 10,000	
OFF	ON	BONUS PACKMAN AT 15,000	
ON	OFF	BONUS PACKMAN AT 20,000	
OFF	OFF	NO BONUS	
SW. #7	SW. #8		
OFF	OFF	PLAY MODE	
ON	OFF	RACK TEST	
OFF	ON	LOCKS PICTURE	

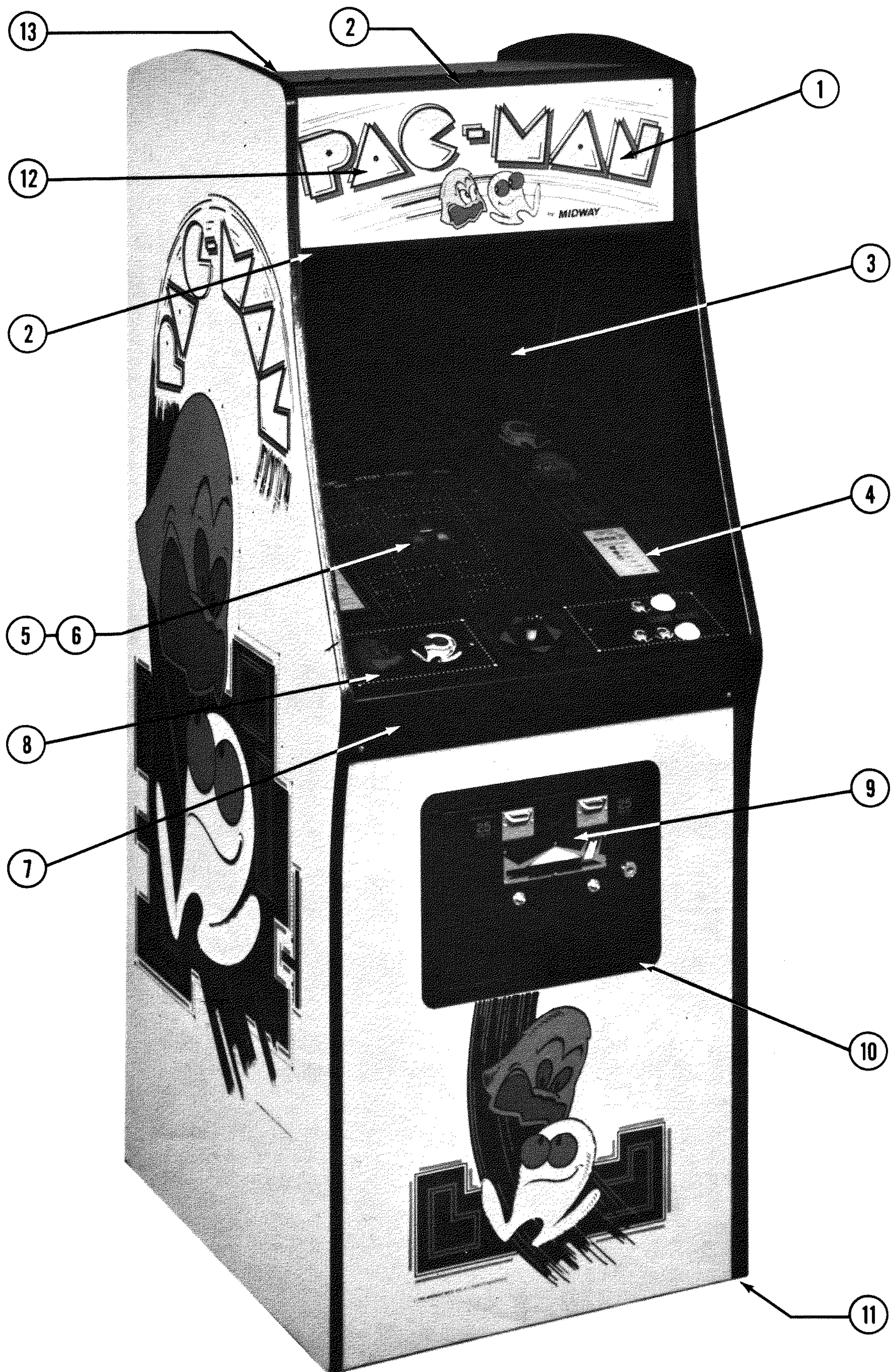
M051-00932-A035

ELECTRICAL BULLETIN: FOR ALL APPARATUS COVERED BY THE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARD C22.2 NO. 1, WHICH EMPLOYS A SUPPLY CORD TERMINATED WITH A POLARIZED 2-PRONG ATTACHMENT PLUG.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

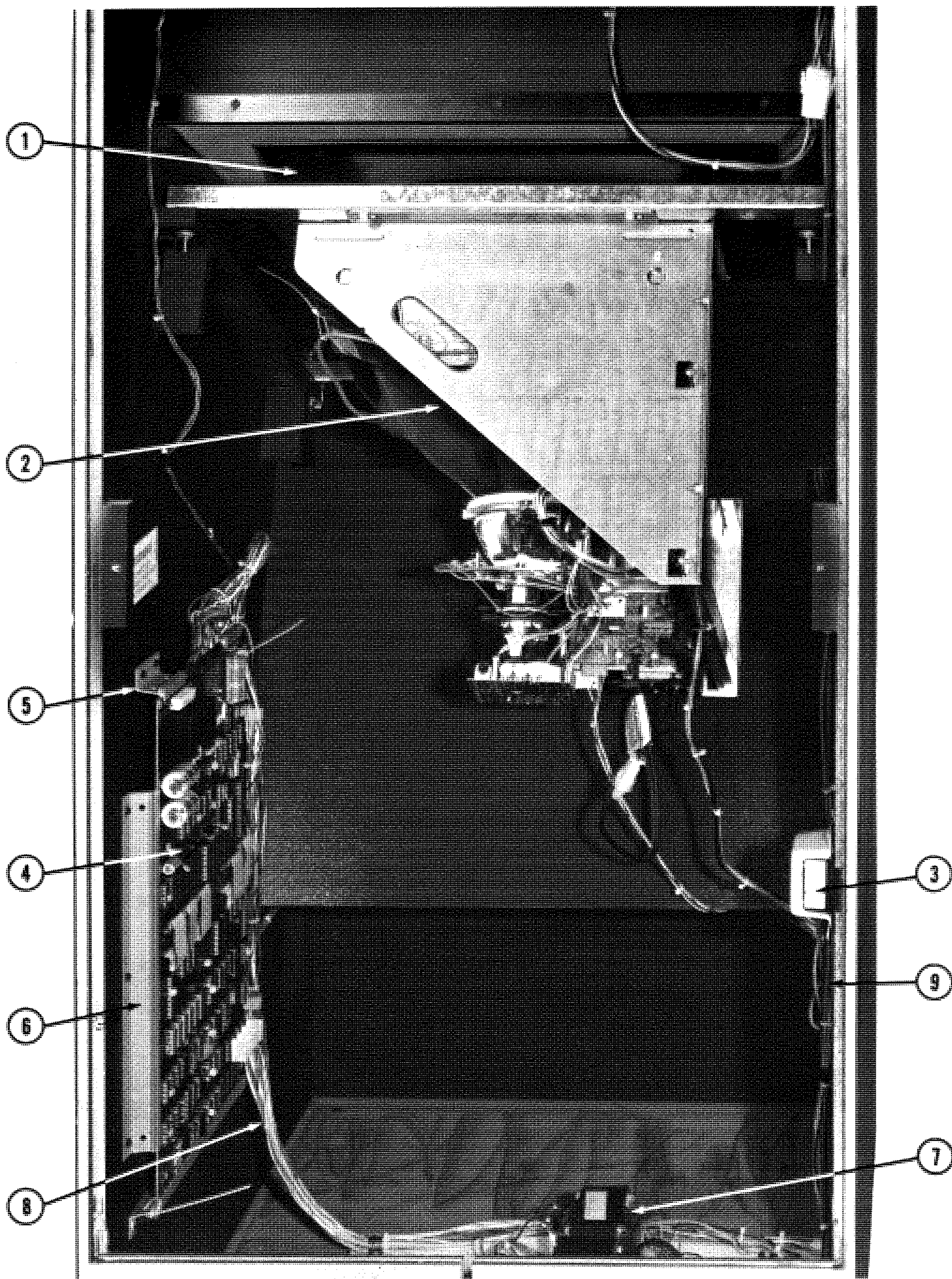
NO. 932 - PAC-MAN UP-RIGHT - PHOTOGRAPH



NO. 932 - PAC-MAN UP-RIGHT - PHOTOGRAPH
ORDER BY PART NUMBER ONLY

ITEM	PART NO	DESCRIPTION
1	0932-00901-00XF	UPPER DECORATIVE PLEX—23'' x 9-1/16'' x 3/16''
2	0866-00103-00XF	PLEXI RETAINING BRKT. (2 REQ'D.)
	0017-00101-0066	#10 x 5/8 PHIL. PAN HD. SCREW (6 REQ'D.)
3	0017-00009-0393	BLACK SPEAKER GRILL W/4, 1-1/2'' SCREWS
	0017-00003-0187	6'' x 9'' SPEAKER 8 OHM, 9W.
4	0932-00900-00XF	MAIN DISPLAY GLASS - 23'' x 16-3/8'' x 3/16''
	M052-00050-0005	FOAM TAPE - 1/4 x 23'' LG.
5	A866-00064-0000	T.V. BEZEL & PLEXI ASSY.
6	0017-00003-0339	19'' COLOR MONITOR & CHASSIS
		W/YOKE - ELECTROHOME
7	0932-00100-00XF	CONTROL SHELF OVERLAY
	0017-00101-0639	#8-32 x 1-1/4 CARRIAGE BOLT (6 REQ'D.)
	0017-00104-0022	STL. FLAT WASHER (6 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (6 REQ'D.)
	0017-00101-0775	#6 x 1/2 PHIL. PAN HD. SCR. (2 REQ'D.)
8	0932-00903-0000	DECORATIVE CONTROL PANEL
9	A090-00076-02BK	DOUBLE ENTRY COIN DOOR ASSY.
10	0090-00002-02BK	COIN DOOR FRAME
11	0017-00102-0048	3/8-16 x 2'' LEG LEVELER (4 REQ'D.)
	0017-00103-0026	3/8-16 HEX NUT (4 REQ'D.)
12	A866-00068-0000	DISPLAY LAMP BRKT. ASSY. (2 REQ'D.)
		LOCATED BEHIND ITEM # 1
	0866-00113-0000	SOCKET MTG. BRKT. (2 REQ'D)
	0017-00003-0135	LAMP SOCKET (2 REQ'D)
	0017-00003-0309	LAMP 12V., 25W. (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.)
13	0586-00036-0000	ON-OFF SWITCH
	0567-00106-0100	SWITCH MTG. PLATE
	0017-00101-0025	#8 x 1/2 STL. HEX HD. WD. SCR. (4 REQ'D.)

NO. 932 - PAC-MAN UP-RIGHT - INTERIOR ACCESS PICTURE

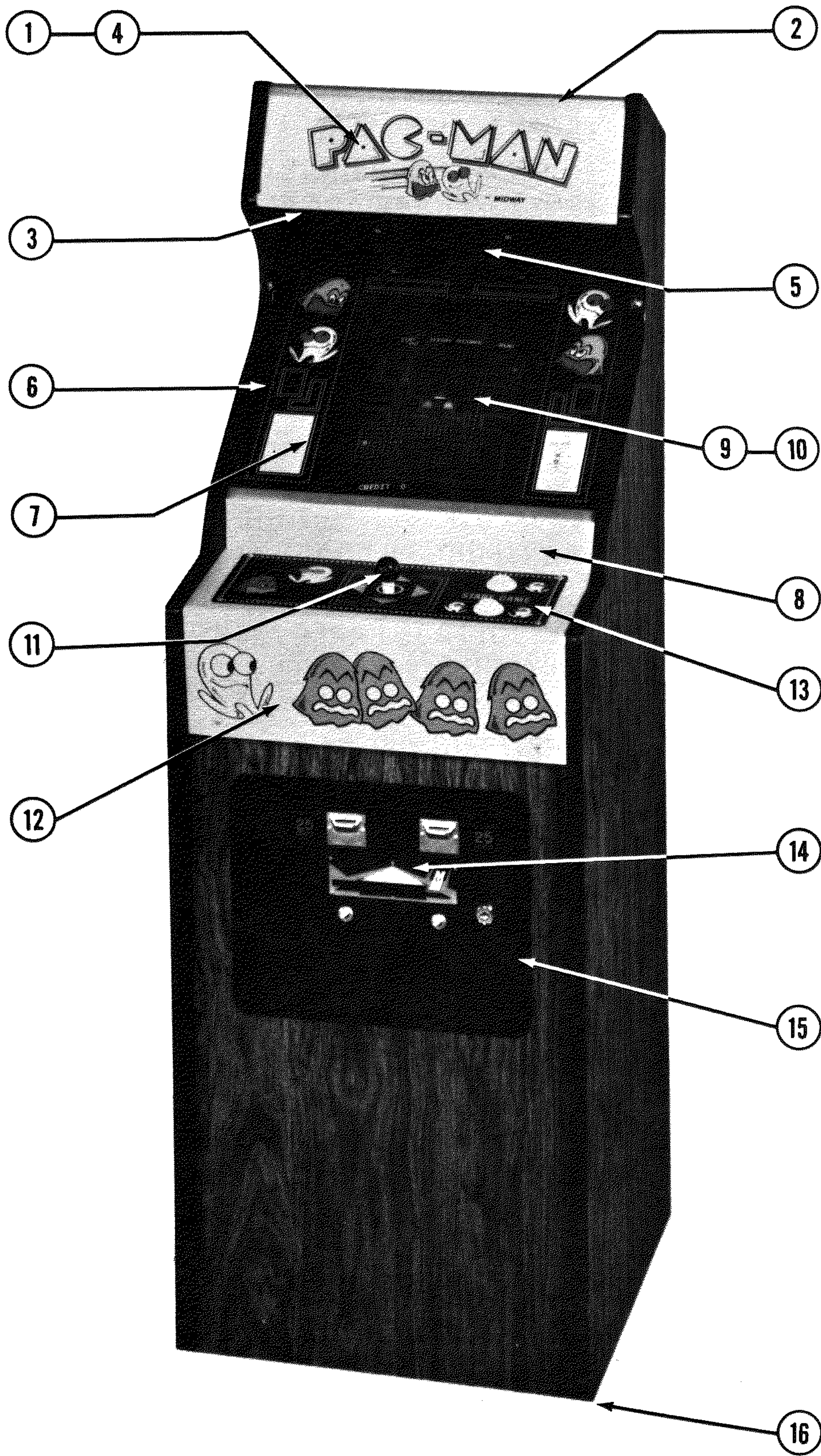


NO. 932 - PAC-MAN UP-RIGHT - INTERIOR ACCESS PICTURE

ORDER BY PART NUMBER ONLY

ITEM	PART NO	DESCRIPTION
1	A866-00064-0000	T.V. BEZEL & PLEXI ASSY.
2	A866-00202-0000	COLOR MONITOR & MTG. CHANNEL ASSY.
	0017-00101-0115	#8-32 x 2" HEX MACH. SCR. (5 REQ'D.)
	0017-00101-0639	#8-32 x 1-1/4 CARRIAGE BOLT
	0017-00101-0628	#8-32 x 3/4 CARRIAGE BOLT (4 REQ'D.)
	0017-00104-0022	#8 WASHER (10 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT SEMS (10 REQ'D.)
3	A866-00035-00XF	INTERLOCK SW. BRKT. ASSY.
	0017-00032-0071	INTERLOCK SWITCH
4	A082-91375-B000	GAME LOGIC P.C. ASSY.
5	0624-00902-0300	P.C. SUPPORT BRKT. - 2-1/2 IN. (3 REQ'D.)
6	0624-00902-0100	P.C. SUPPORT BRKT. - 12 IN. (2 REQ'D.)
	0017-00101-0017	#6 x 1/2 BLK. SLT. HEX HD. SCR. (17 REQ'D.)
7	A932-00020-0000	TRANSFORMER BOARD ASSY.
8	A932-00005-0000	HIGH VOLTAGE CABLE ASSY.
	A932-00006-0000	LOW VOLTAGE CABLE ASSY.
	A932-00010-0000	CONTROL SHELF CABLE ASSY.
	A932-00019-0000	COIN DOOR CABLE ASSY.
9	A082-91109-C000	CREDIT MULTIPLIER BY-PASS P.C. BRD. ASSY.
		<u>ADDITIONAL PARTS LIST</u>
	0017-00009-0033	BASSICK CLAMP (2 REQ'D.)
	0603-00131-0000	STRIKE (2 REQ'D.)
	A866-00036-0000	TEST SWITCH & BRKT. ASSY. (MOUNTED ON BACK OF COIN DOOR)
	0017-00009-0477	CASH BOX-MOLDED
	A905-00026-0000	CASH BOX COVER ASSY.
	A624-00001-0000	CASH BOX GUIDE BRKT. ASSY.
	0624-00101-0000	CASH BOX GUIDE BRKT.
	0017-00101-0628	#8-32 x 3/4" CARRIAGE BOLT (4 REQ'D.)
	0017-00104-0022	#8 WASHER (4 REQ'D.)
	0017-00103-0061	#8-32 LOCK NUT SEMS (4 REQ'D.)
	A097-00001-0000	LOCK ASSY. - BACK DOOR
	0017-00009-0490	VENT GRILL - 5-5/8" SQ. (2 REQ'D.)
	0866-00905-0000	FISHPAPER SHIELD 4 IN. SQ.
	0866-00906-0000	FUSE SHIELD - TRANSFORMER BOARD

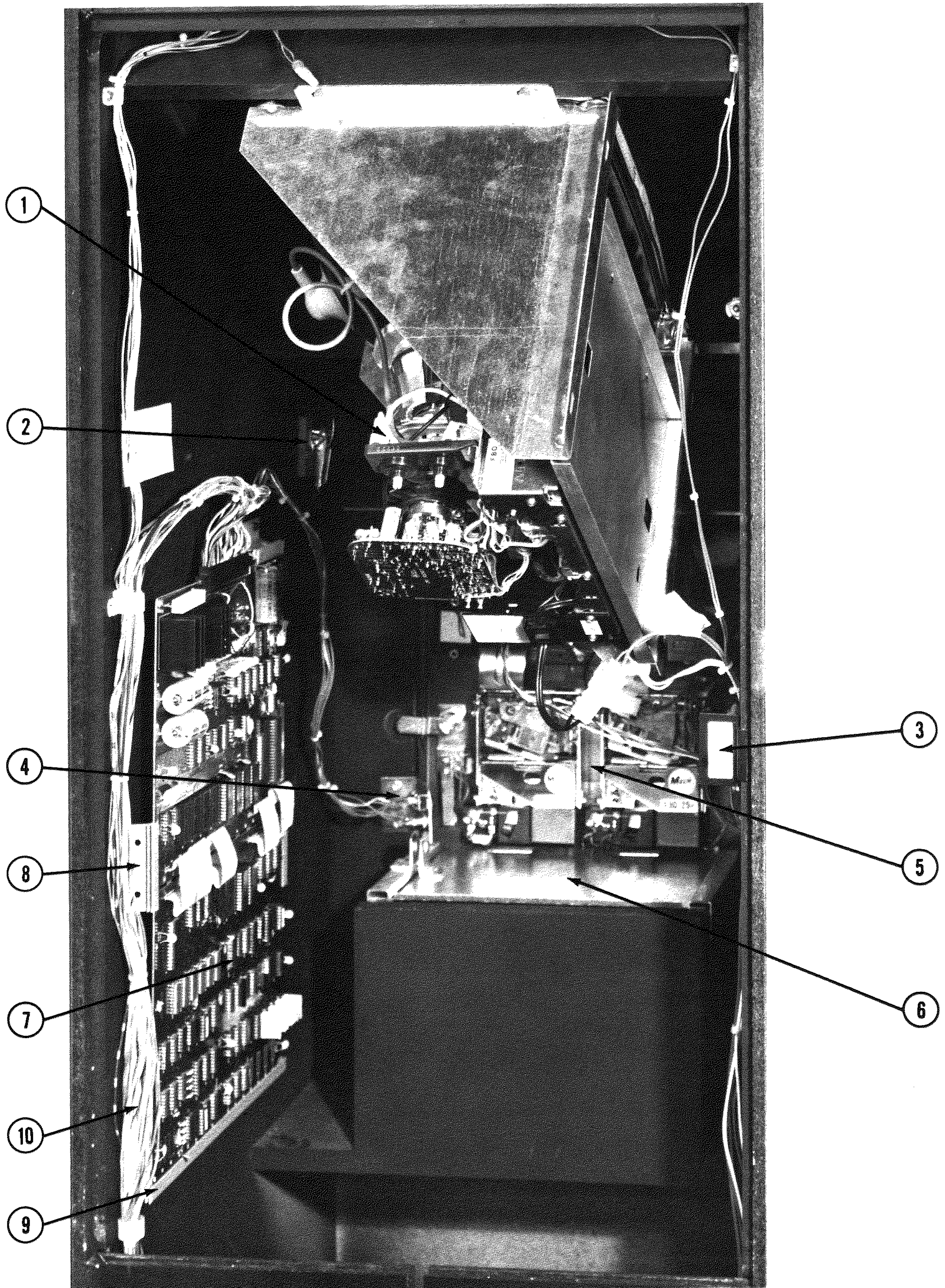
NO. 934 - PAC-MAN MINI - PHOTOGRAPH



ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	0934-00900-00XF	DISPLAY PLEXI (TOP) 17-3/16'' x 5-3/4'' x 3/16''
2	0905-00115-00XF	TOP BRACKET
3	0905-00116-00XF	BOTTOM BRACKET
	0017-00101-0117	#8 x 5/8 PHIL. TRS. HD. M.S. (6 REQ'D.)
	0017-00101-0789	#10-32 x 3/4 HEX BUTTON HD. SCR. (2 REQ'D.)
4	A934-00012-0000	INSERT ASSEMBLY
	0017-00003-0219	#194 WEDGE BASE LAMP 14V. 27A. (5 REQ'D.)
	0017-00031-0030	LIGHT SOCKET (5 REQ'D.)
5	A762-00028-0000	SPEAKER ASSY.
	0017-00009-0393	BLACK RECT. SPEACKER GRILL
	0017-00101-0642	#8-32 x 1-1/2 CARRIAGE BOLT (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
6	0905-00903-0100	GLASS EDGE CHANNEL - 14-1/2'' LG. (2 REQ'D.)
7	0934-00902-00XF	MAIN DISPLAY GLASS - 17-13/16'' x 13-1/8'' x 3/16''
8	0934-00100-0000	GLASS CLAMPING PLATE
	0017-00101-0789	#10-32 x 3/4 HEX BUTTON HD. SCR. (2 REQ'D.)
9	A934-00007-0000	T.V. BEZEL ASSY. W/GREY PLEXI
10	0017-00003-0340	13'' COLOR DUAL SYNC. HORIZ. MONITOR & CHASSIS - ELECTROHOME
11	A932-00008-0000	CONTROL ASSEMBLY
12	0934-00101-00XF	CONTROL PLATE
	0017-00101-0117	#8 x 5/8 PHIL. TRS. HD. SCR. (2 REQ'D.)
13	0934-00904-0000	CONTROL SHELF OVERLAY
	0017-00101-0118	#8-32 x 1-1/8 CARRIAGE BOLT (4 REQ'D.)
	0017-00104-0030	#8 WASHER (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
14	A090-00076-02BK	DOUBLE ENTRY COIN DOOR ASSY.
15	0090-00002-02BK	COIN DOOR FRAME
16	0017-00102-0048	3/8-16 x 2'' LEG LEVELER (4 REQ'D.)
	0017-00103-0026	3/8-16 LEG LEVELER HEX NUT (4 REQ'D.)

NO. 934 - PAC-MAN MINI - INTERIOR ACCESS PICTURE

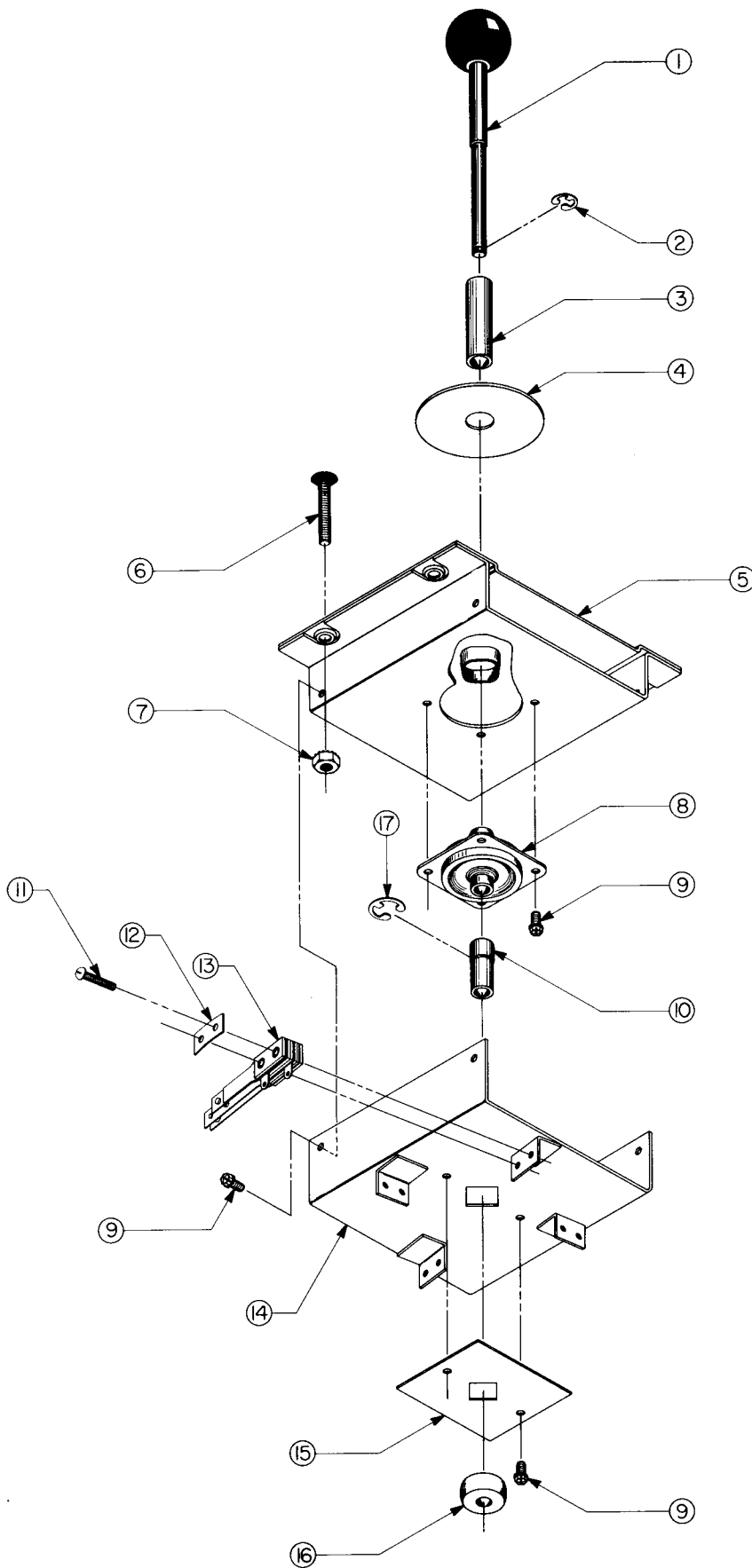


NO. 934 - PAC-MAN MINI - INTERIOR ACCESS PICTURE

ORDER BY PART NUMBER ONLY

ITEM	PART N^o	DESCRIPTION
1	0017-00003-0340	13" COLOR DUAL SYNC. HORIZ. MONITOR & CHASSIS - ELECTROHOME
	0017-00004-0022	304 DYMAX GROUND STRAP
	0017-00102-0013	1/4-20 x 1-1/4 CARRIAGE BOLT (2 REQ'D.)
	0017-00102-0028	1/4-20 x 2-1/2 CARRIAGE BOLT (2 REQ'D.)
	0017-00104-0014	PERIPHERY WASHER (4 REQ'D.)
	0017-00103-0018	1/4 - 20 HEX NUT (2 REQ'D.)
2	0017-00009-0033	BASSICK CLAMP (2 REQ'D.)
	0603-00131-00XF	STRIKE (2 REQ'D.)
	0017-00101-0028	#8 x 3/4 SLT. HEX HD. SCREW (8 REQ'D.)
3	A151-00026-0000	INTERLOCK SW. & BRKT. ASSY.
	0017-00101-0028	#8 x 3/4 SLT. HEX HD. SCR. (2 REQ'D.)
4	A866-00036-0000	TEST SWITCH BRKT. ASSY.
5	A090-00076-02BK	DOUBLE ENTRY COIN DOOR ASSY.
6	A905-00028-0000	CASH BOX ASSY. W/HANDLE
	A905-00026-0000	CASH BOX COVER ASSY.
	A624-00001-0000	CASH BOX GUIDE BRKT. ASSY.
	0624-00101-0000	CASH BOX GUIDE BRKT.
7	A082-91375-B000	GAME LOGIC BOARD ASSY.
8	0624-00902-0300	P.C. SUPPORT BRKT. - 2-1/2 IN. (3 REQ'D.)
9	0624-00902-0100	P.C. SUPPORT BRKT. - 12 IN. (2 REQ'D.)
10	A934-00009-0000	HIGH VOLTAGE CABLE ASSY.
	A934-00008-0000	LOW VOLTAGE CABLE ASSY.
	A934-00010-0000	CONTROL SHELF CABLE ASSY.
	A934-00013-0000	DISPLAY INSERT CABLE ASSY.
	A932-00019-0000	COIN DOOR CABLE ASSY.
		NOT SHOWN LIST
	A082-91109-C000	CREDIT MULT. BYPASS P.C. BRD. ASSY.
	A934-00011-0000	TRANSFORMER BOARD ASSY.
	0017-00032-0083	ON-OFF SWITCH
	0567-00106-0100	SWITCH MTG. PLATE
	0017-00101-0028	#8 x 3/4 SLT. HEX HD. SCR. (4 REQ'D.)
	0017-00009-0490	VENT GRILL - BOTTOM BACK DOOR (2 REQ'D.)
	0618-00117-0000	VENT GRILL - TOP BACK DOOR
	0017-00101-0015	#6 x 1/2 SLT. HEX HD. SCR. (4 REQ'D.)
	0934-00903-0000	PROTECTIVE BUBBLE - BACK DOOR
	0017-00101-0628	#8-32 x 3/4 CARRIAGE BOLT (10 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (10 REQ'D.)
	A151-00029-0000	LOCK ASSY. - BACK DOOR

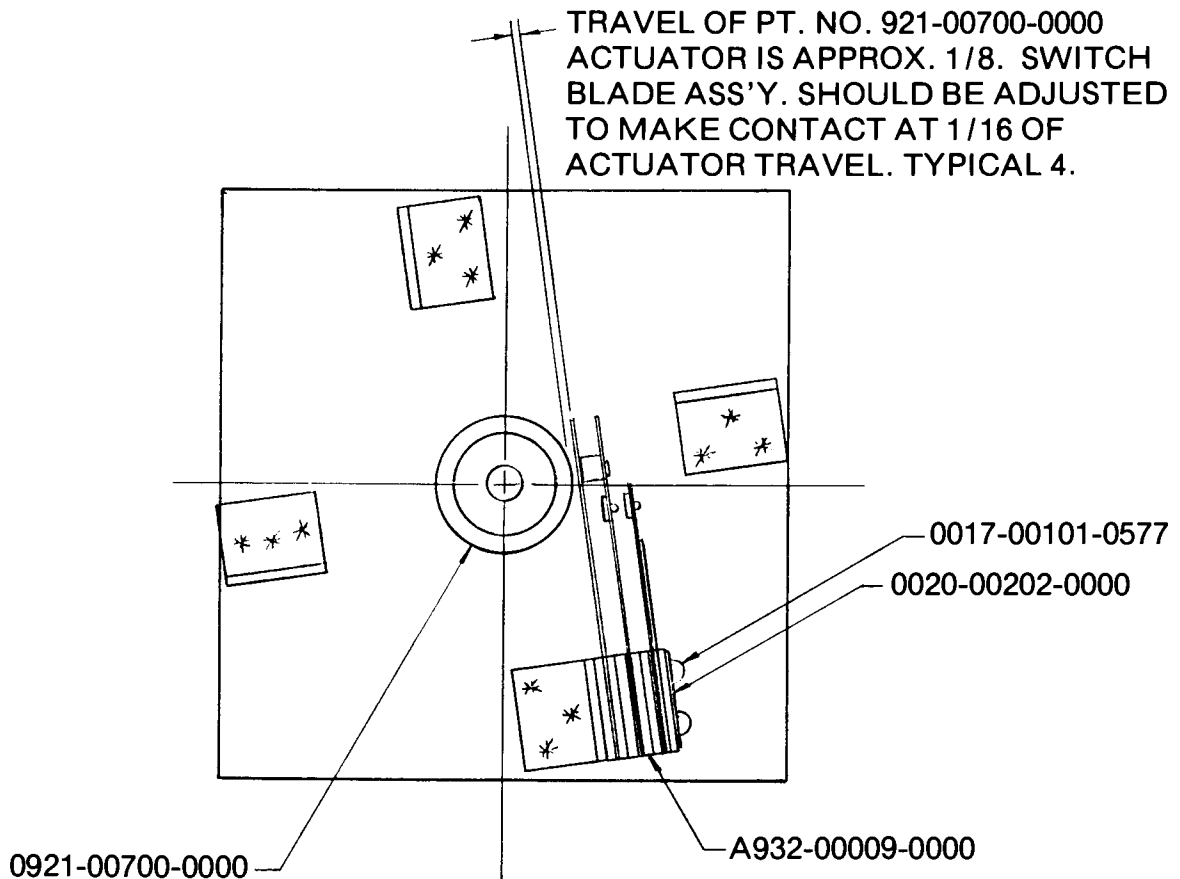
PAC-MAN - CONTROL ASSEMBLY



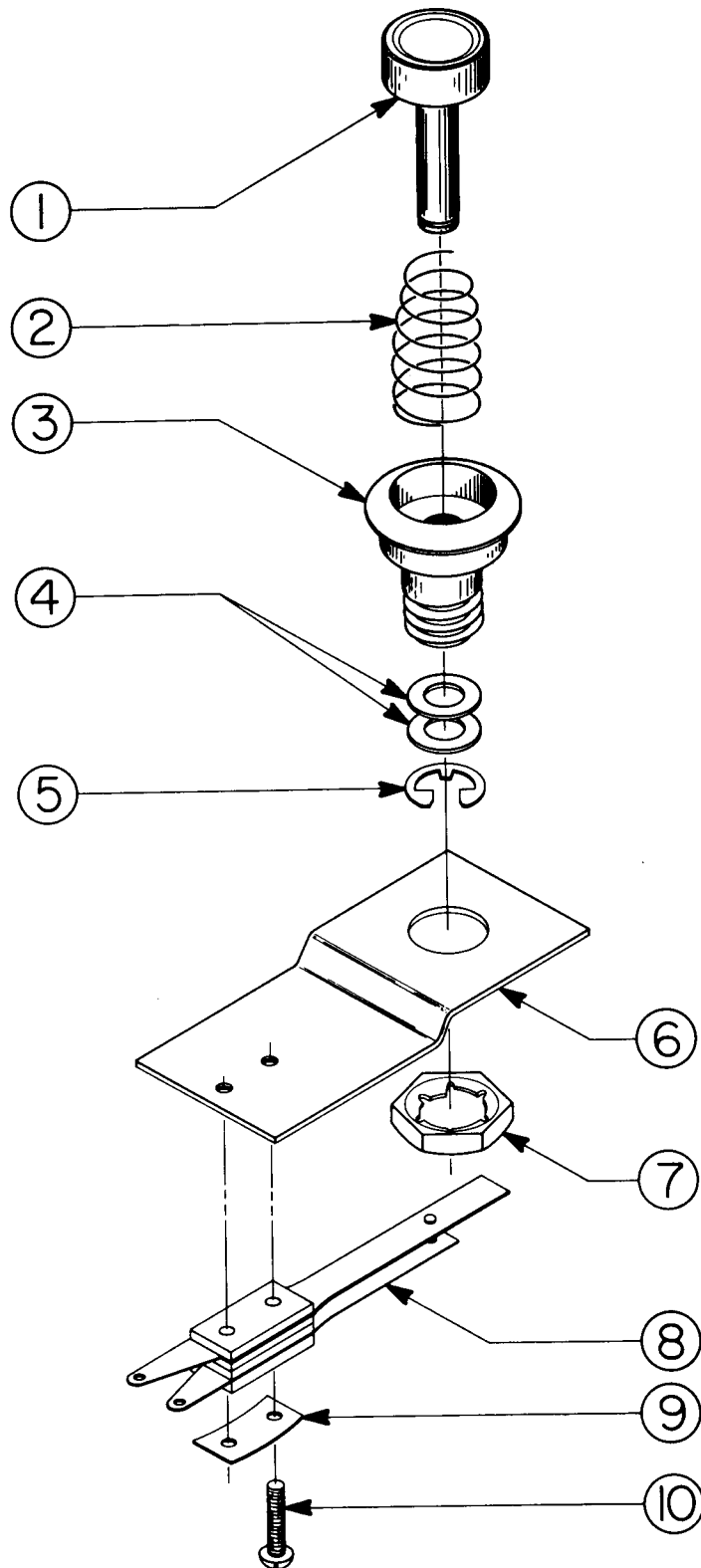
PAC-MAN - CONTROL ASSEMBLY

ORDER BY PART NUMBER ONLY

ITEM	PART NO	DESCRIPTION
1	A921-00012-0000	SHAFT & BALL ASSY. - FIRST 3,000 GAMES
1	A932-00022-0000	SHAFT & BALL ASSY.
2	0017-00100-0025	1/4" E-RING
3	0921-00702-0000	STOP SPACER
4	0921-00902-0000	SLIDE PLATE
5	A932-00011-00XF	SPOT WELD ASSY.
6	0017-00101-0713	#8-32 x 1" SLT. FLAT HD. SCREW (4 REQ'D.)
7	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)
8	0932-00902-0000	GROMMET
9	0017-00101-0598	#8-32 x 5/16 SLT. HEX HD. M.S. (10 REQ'D.)
10	0921-00701-0000	SLEEVE
11	0017-00101-0528	#5-40 x 3/4 SLT. RND. HD. SCR. (8 REQ'D.)
12	0020-00202-0000	SWITCH PLATE (4 REQ'D.)
13	A932-00009-0000	SWITCH ASSEMBLY (4 REQ'D.)
14	A932-00012-00XF	STOP PLATE & SWITCH BRKT. ASSY.
15	0932-00904-0000	WEAR PLATE
16	0921-00700-0000	ACTUATOR
17	0017-00100-0115	7/16" E-RING



NO. 932 & 934 PAC-MAN UP-RIGHT & MINI - PUSH BUTTON ASSY.

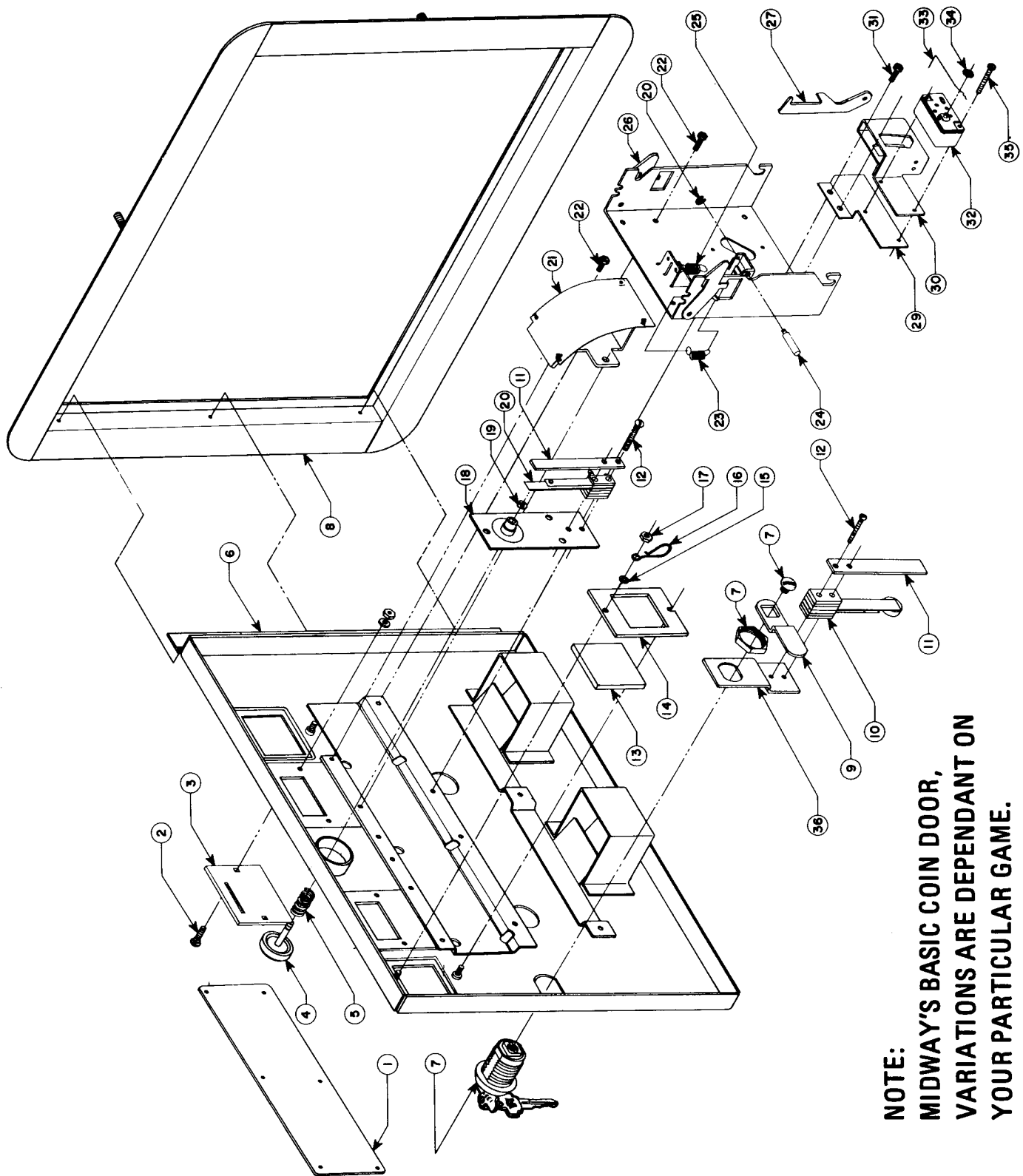


NO. 932 & 934 PAC-MAN UP-RIGHT & MINI - PUSH BUTTON ASSY.

ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	0017-00009-B384	RED BUTTON - MINI ONLY
1	0017-00009-0384	BUTTON
2	0010-00593-0000	SPRING
3	0017-00009-0376	BUTTON HOUSING
4	0017-00104-0028	FLAT WASHER (2 REQ'D.)
5	0017-00100-0025	E-RING
	A761-00014-0000	PUSH BUTTON ASSY. (FIRST 5 ITEMS) - MINI ONLY
	A739-00012-0000	PUSH BUTTON ASSY. (FIRST 5 ITEMS)
6	0586-00107-0000	MOUNTING BRKT.
7	0017-00103-0054	PAL NUT
8	A739-00016-0000	SWITCH ASSY.
9	0020-00202-0000	SWITCH PLATE
10	0017-00101-0526	#5-40 x 9/16 PHIL. HD. M.S. (2 REQ'D.)

NO. 932 & 934 PAC-MAN UP-RIGHT & MINI - FRONT DOOR ASSY.



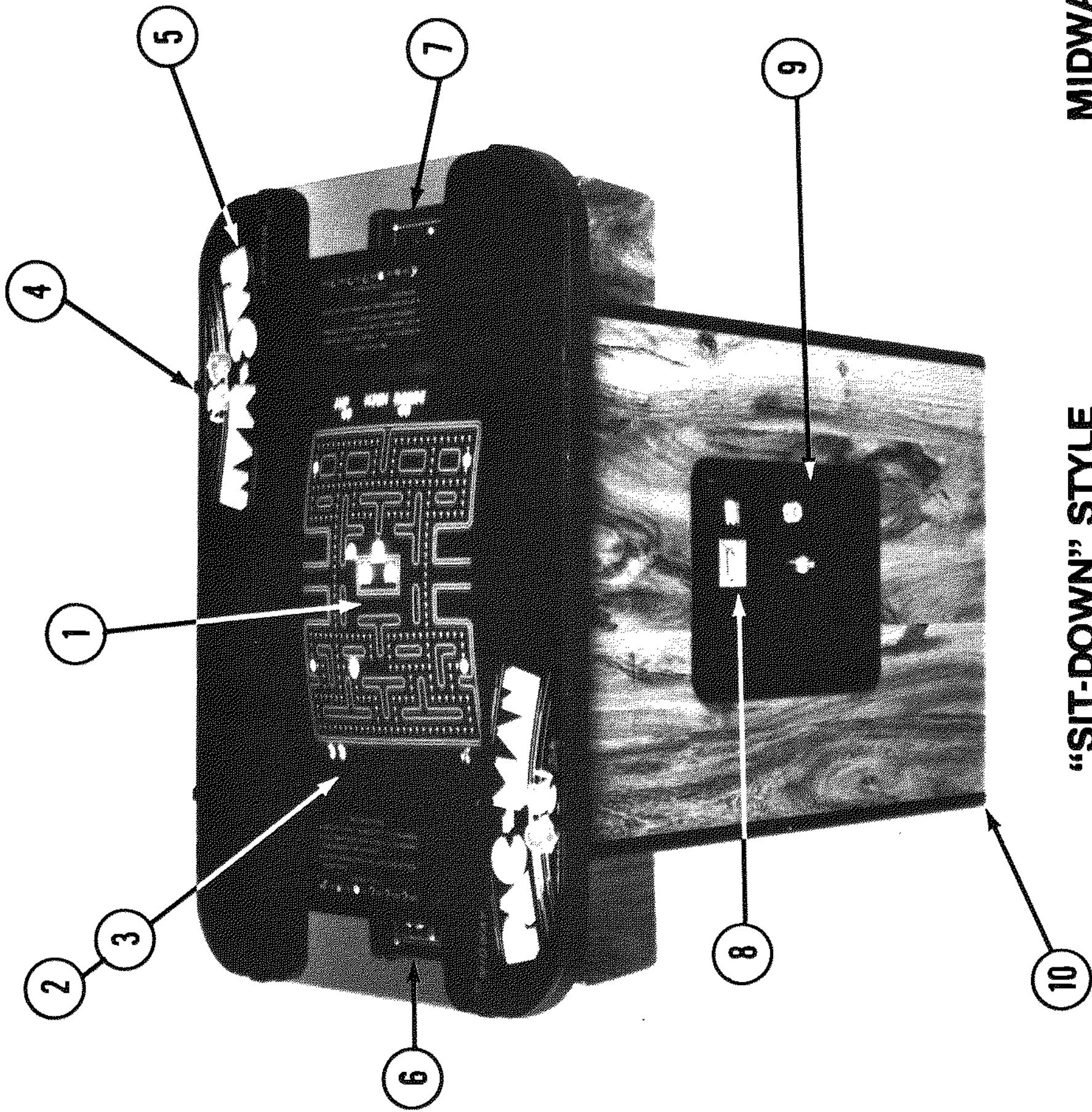
**NOTE:
MIDWAY'S BASIC COIN DOOR,
VARIATIONS ARE DEPENDANT ON
YOUR PARTICULAR GAME.**

NO. 932 & 934 PAC-MAN UP-RIGHT & MINI - FRONT DOOR ASSY.

ORDER BY PART NUMBER ONLY

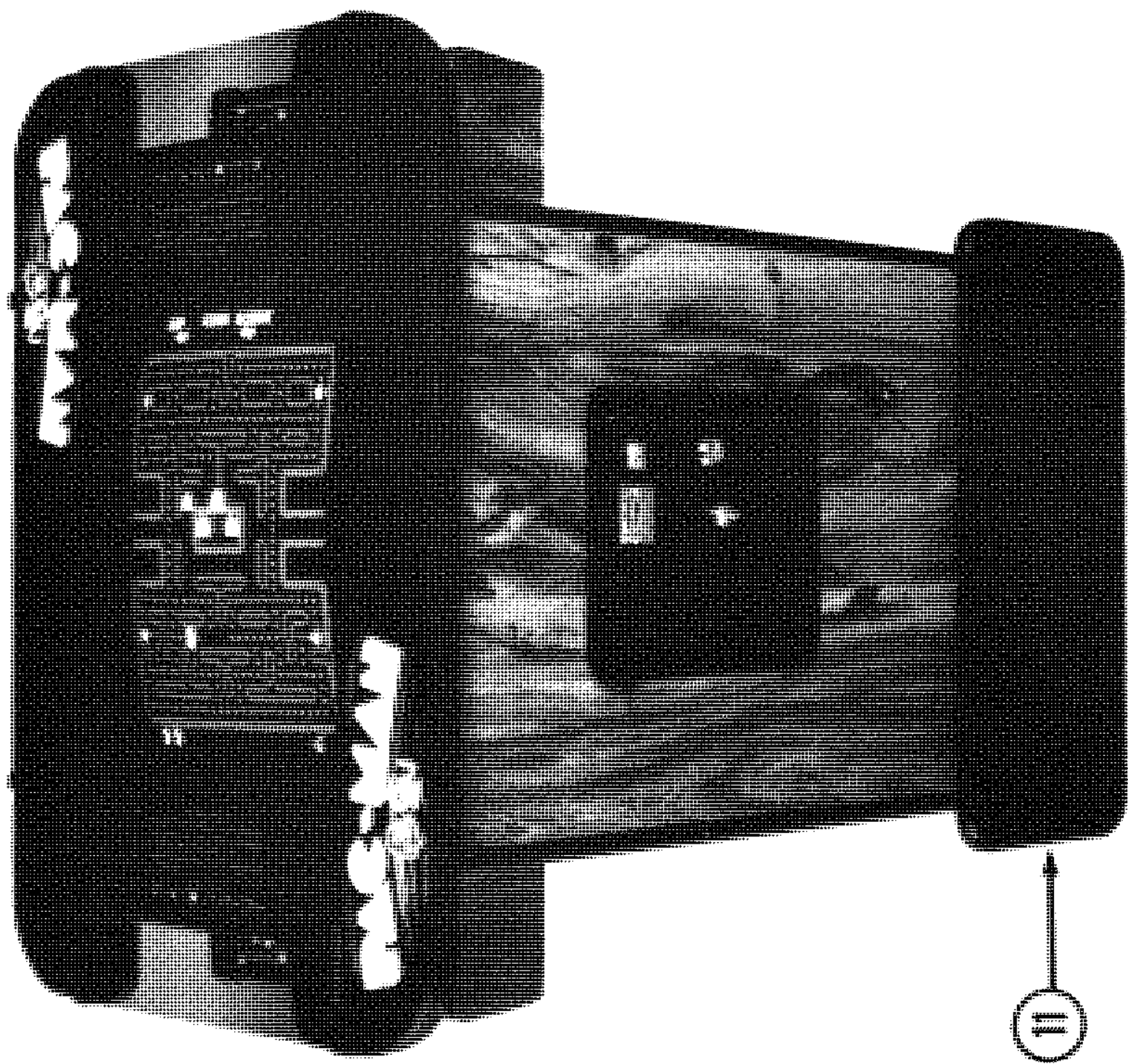
ITEM	PART NO	DESCRIPTION
1	0090-00902-0000	DRESS PLATE
	0090-00902-0100	DRESS PLATE W/O BUTTON TO START GAME
2	0017-00101-0552	#6-32 x 1/4 CARRIAGE BOLT (2)
3	0090-00117-03XF	COIN ENTRY PLATE (25¢)
4	0090-00906-0000	PLASTIC START BUTTON
5	0010-00007-0000	COMPRESSION SPRING
6	A090-00020-2003	DOOR ASSY. DOUBLE ENTRY
7	0017-00005-0050	DOOR LOCK & KEY WITH SCREW & NUT
8	0090-00002-02BK	DOUBLE DOOR FRAME
9	0017-00005-0041	421 N.S. CAM
10	0090-00901-0000	DOOR SWITCH
	0090-00126-01XF	SWITCH BACKUP PLATE
12	0017-00101-0528	#5-40 x 3/4" LNG. M.S.
13	0090-00903-9500	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 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	0090-00162-00XF	COIN SWITCH MTG. BRKT. - SMALL (AMERICAN)
29	0090-00163-00XF	COIN SWITCH MTG. BRKT. - LARGE
30	0017-00005-0203	COIN SWITCH CHUTE - SMALL (AMERICAN)
30	0017-00005-0204	COIN SWITCH CHUTE - LARGE
31	0017-00101-0555	#6-32 x 5/16 SCREW
32	0017-00005-0195	COIN SWITCH
33	0010-00599-0000	COIN SWITCH WIRE
34	0017-00007-0132	PUSH-ON RING (BLK.)
35	0017-00101-0698	#4-40 x 3/4 SCREW (2 REQ'D.)
36	0090-00128-00XF	SWITCH BRKT. - DOOR TILT
	A090-00061-0000	ANTI-STRING DEVICE ASSY. (REPLACES ITEM 30)
	A090-00064-0000	ANTI-PENNY DEVICE ASSY.

NO. 933 - PAC-MAN COCKTAIL - PHOTOGRAPH



"SIT-DOWN" STYLE
DIMENSIONS:
Height: 29" (74 cm)
Width: 32" (81.25 cm)
Depth: 22" (56 cm)

MIDWAY
COCKTAIL TABLE
MODELS
with Flip-Flop Screen
for 2 players



With Base Accessory
Raises cocktail model
to height of 38"
(96.5 cm) for upright
play.

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NO. 933 - PAC-MAN COCKTAIL - PHOTOGRAPH

ORDER BY PART NUMBER ONLY

ITEM	PART N^o	DESCRIPTION
1	0017-00003-0339	19" COLOR DUAL SYNC. HORIZ. MONITOR - ELECTROHOME
	A869-00007-00XF	MONITOR SUPPORT ASSY. - L.H.
	A869-00007-01XF	MONITOR SUPPORT ASSY. - R.H.
	0869-00114-00XF	SUPPORT ANGLE (2 REQ'D.)
	0017-00101-0023	#8 x 3/8 PHIL. TRS. HD. SCR. (10 REQ'D.)
2	0869-00902-0000	T.V. BEZEL
3	0869-00907-0000	PLEXI 15" x 18-3/4"
4	0775-00104-00XF	GLASS CLIP (8 REQ'D.)
	0017-00101-0017	#8 x 5/8 PHIL. TRS. HD. S.M.S. (16 REQ'D.)
5	0933-00900-00XF	GLASS TOP - 32" x 22" x 1/4"
6	0933-00901-0000	DECORATIVE CONTROL PANEL OVERLAY - PLAYER #1
	0933-00100-00XF	STEEL CONTROL PANEL - PLAYER #1
7	0933-00901-0100	DECORATIVE CONTROL PANEL OVERLAY - PLAYER #2
	0933-00100-01XF	STEEL CONTROL PANEL - PLAYER #2
	0017-00101-0341	#6 x 1/4 PHIL. TRS. HD. SCR (4 REQ'D. EACH)
	0017-00101-0620	#8-32 x 1/2 CARRIAGE BOLT (4 REQ'D. EACH)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D. EACH)
	0017-00032-0051	BUTTON SWITCH (2 REQ'D.) PLAYER #1 ONLY
	0921-00903-0000	LIGHT SHIELD (1 REQ'D. EACH)
	0017-00031-0044	LAMP SOCKET - WEDGE BASE (2 REQ'D. EACH)
	0017-00003-0219	#194 LAMP 14V. 27A. (2 REQ'D. EACH)
	0017-00101-0555	#6-32 x 5/16 SLT. HEX HD. SCR. (2 REQ'D. EACH)
8	A090-00078-00BK	SINGLE COIN DOOR ASSY.
9	0090-00002-01BK	COIN DOOR FRAME
10	0017-00102-0048	3/8-16 x 2" LEG LEVELERS (4 REQ'D.)
	0017-00103-0026	3/8-16 LEG LEVELER HEX NUTS (4 REQ'D.)
11	0933-00501-0000	WOOD PEDESTAL - OPTIONAL
		<u>NOT SHOWN LIST</u>
	0869-00901-00XF	HINGE (CABINET TOP)
	0017-00101-0672	#10-32 x 1-1/8 CARRIAGE BOLT (8 REQ'D.)
	0017-00104-0004	#10 WASHER (8 REQ'D.)
	0017-00103-0010	#10-32 HEX NUT (8 REQ'D.)
	0017-00003-0187	6" x 9" SPEAKER 8 OHM, 9W
	0017-00009-0393	BLACK SPEAKER GRILL
	0017-00101-0642	#8-32 x 1-1/2 CARRIAGE BOLT (4 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (4 REQ'D.)

NO. 933 - PAC-MAN COCKTAIL - PHOTOGRAPH

ORDER BY PART NUMBER ONLY

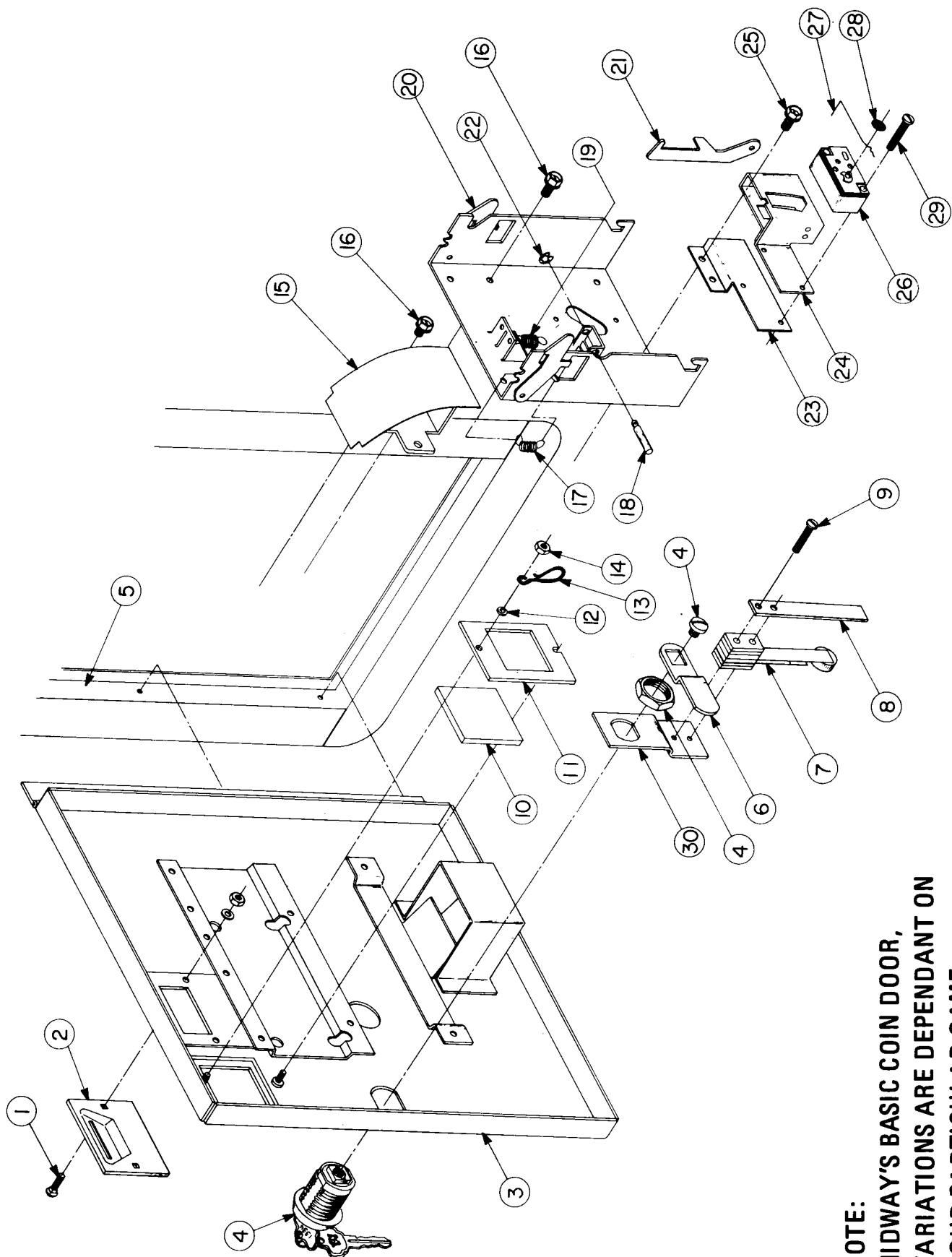
ITEM	PART N ^o	DESCRIPTION
	0017-00003-0222	<u>FAN ASSY.</u>
	0775-00110-00XF	FAN
	0749-00106-00XF	FAN PLATE
	0017-00101-0347	VENT SCREEN
	0017-00104-0009	#6-32 x 1/2 PHIL R.H.M.S. (4 REQ'D.)
	0017-00103-0005	#6 EXT. WASHER (4 REQ'D.)
	0017-00101-0026	#6-32 HEX NUT (4 REQ'D.)
		#8 x 5/8 SLOT HEX HD. M.S. (4 REQ'D.)

NO. 933 - PAC-MAN COCKTAIL - ADDITIONAL PARTS LIST

ORDER BY PART NUMBER ONLY

ITEM	PART N^o	DESCRIPTION
	A749-00003-0000	COIN BOX ASSY.
	A627-00056-0000	COIN BOX COVER ASSY.
	A625-00024-0000	COIN BOX GUIDE BRKT. ASSY.
	0625-00117-0000	COIN BOX SIDE CHANNELS
	0017-00101-0628	#8-32 x 3/4 CARRIAGE BOLT (4 REQ'D.)
	0017-00103-0008	#8-32 HEX NUT
	A749-00005-0000	INTERLOCK SWITCH ASSY.
	0017-00101-0028	#8 x 3/4 HEX HD. S.M.S. (6 REQ'D.)
	0017-00032-0083	ON-OFF SWITCH
	0567-00106-0100	SWITCH MTG. PLATE
	0017-00009-0033	BASSICK CLAMP (2 REQ'D.)
	0017-00101-0026	#8 x 5/8 HEX HD. M.S. (4 REQ'D.)
	0610-00132-0000	STRIKE (2 REQ'D.)
	0017-00101-0028	#8 x 3/4 HEX HD. S.M.S. (4 REQ'D.)
	A866-00036-0000	TEST SWITCH BRKT. ASSY.
	0869-00908-0000	FISHPAPER SHIELD
	A082-91348-C000	CREDIT MULTIPLIER P.C. ASSY.
	A082-91375-B000	GAME LOGIC BRD. ASSY.
	0624-00902-0100	P.C. SUPPORT BRKT. - 12" (2 REQ'D.)
	0624-00902-0300	P.C. SUPPORT BRKT. - 2-1/2" (2 REQ'D.)
	0624-00902-0500	P.C. SUPPORT BRKT. - 6"
	0017-00101-0028	#8 x 3/4 HEX HD. M.S. (12 REQ'D.)
	0017-00104-0031	#8 WASHER (12 REQ'D.)
	A933-00008-0000	HIGH VOLTAGE CABLE ASSY.
	A933-00009-0000	LOW VOLTAGE CABLE ASSY.
	A933-00012-0000	COIN DOOR CABLE ASSY.
	A933-00011-0000	CONTROL SHELF CABLE ASSY. - PLAYER #2
	A933-00010-0000	CONTROL SHELF CABLE ASSY. - PLAYER #1
	A933-00013-0000	TRANSFORMER BOARD ASSY.
	0017-00009-0393	BLACK VENT GRILL (2 REQ'D.)
	0017-00101-0118	#8-32 x 1-1/8 CARRIAGE BOLT (8 REQ'D.)
	0017-00103-0061	#8-32 HEX NUT W/SEMS (8 REQ'D.)

NO. 933 - PAC-MAN COCKTAIL - FRONT DOOR ASSY.

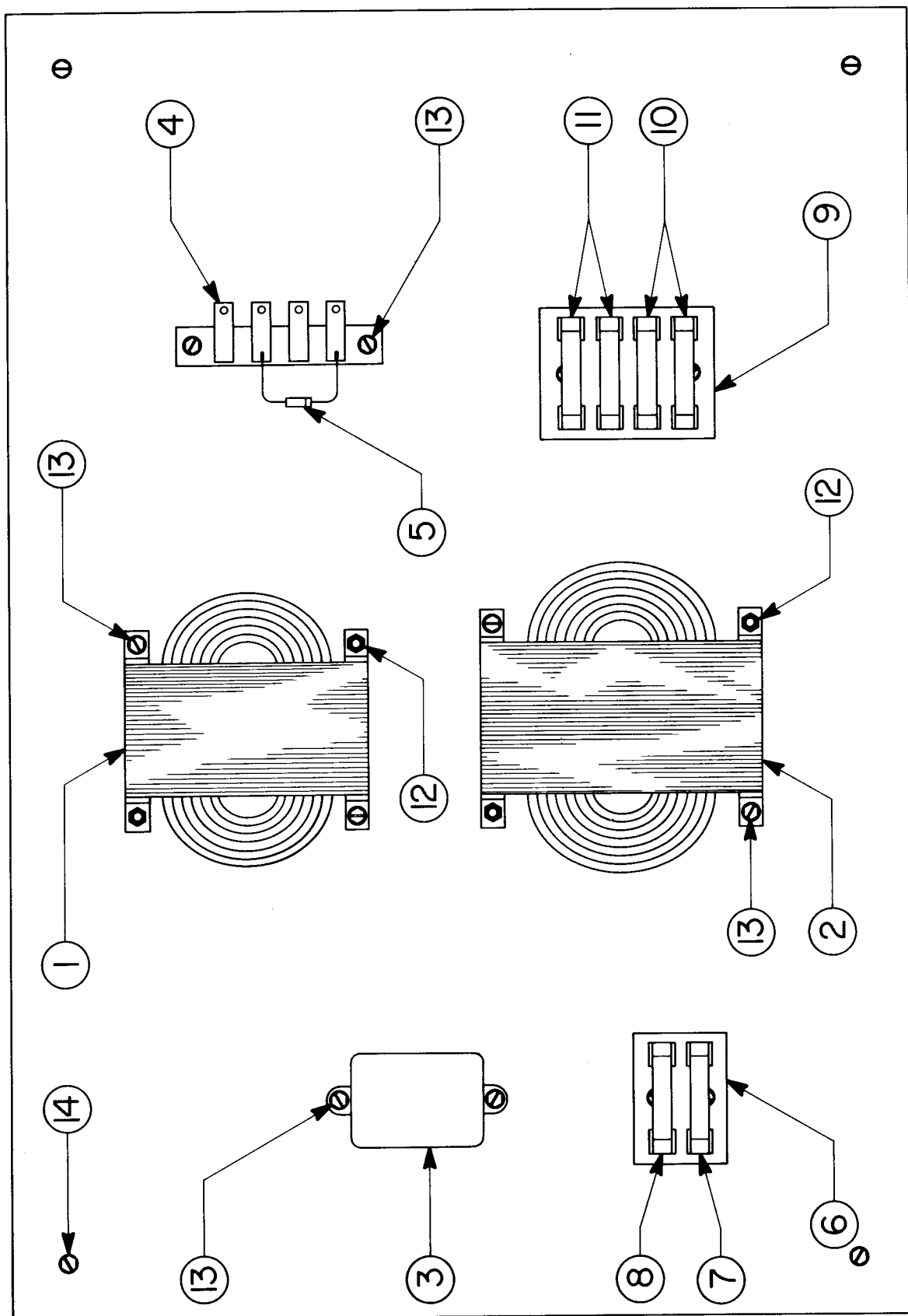


NOTE:
MIDWAY'S BASIC COIN DOOR,
VARIATIONS ARE DEPENDANT ON
YOUR PARTICULAR GAME.

NO. 933 - PAC-MAN COCKTAIL - FRONT DOOR ASSY.

ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	0017-00101-0552	#6-32 x 1/4 CARRIAGE BOLT (2 REQ'D.)
2	0090-00117-03XF	COIN ENTRY PLATE (25¢)
3	A090-00058-0000	DOOR ASSY. SINGLE ENTRY
4	0017-00005-0050	DOOR LOCK & KEY WITH SCREW & NUT
5	0090-00002-01BK	SINGLE DOOR FRAME
6	0017-00005-0041	421 N.S. CAM
7	0090-00901-0000	DOOR SWITCH
8	0090-00126-01XF	SWITCH BACKUP PLATE
9	0017-00101-0528	#5-40 x 3/4 LONG M.S. (2 REQ'D.)
10	0090-00903-9500	25¢ WINDOW
11	0090-00143-0000	COIN PLEX RETAINER
12	0017-00104-0002	SPLIT LOCK WASHER (2 REQ'D.)
13	0017-00007-0019	KEY HOOK
14	0017-00103-0005	#6-32 HEX NUT (2 REQ'D.)
15	0090-00104-0000	TOP & BOTTOM COIN CHUTE W/BRKT. ASSY.
16	0017-00101-0598	#8-32 x 5/16 SCREW (4 REQ'D.)
17	0010-00181-0100	SPRING
18	0090-00129-00XF	PIVOT POST
19	0010-00134-0000	SPRING
20	0090-00008-0000	ACCEPTOR FRAME ASSY.
21	0093-00155-00XF	REJECTOR LEVER
22	0017-00100-0012	E-RING
23	0090-00162-00XF	COIN SWITCH MTG. BRKT. - SMALL (AMERICAN)
23	0090-00163-00XF	COIN SWITCH MTG. BRKT. - LARGE
24	0017-00005-0203	COIN SWITCH CHUTE - SMALL (AMERICAN)
24	0017-00005-0204	COIN SWITCH CHUTE - LARGE
25	0017-00101-0555	#6-32 x 5/16 SCREW (2 REQ'D.)
26	0017-00005-0195	COIN SWITCH
27	0010-00599-0000	COIN SWITCH WIRE
28	0017-00007-0132	PUSH-ON RING (BLK.)
29	0017-00101-0698	#4-40 x 3/4 SCREW (2 REQ'D.)
30	0090-00128-00XF	SWITCH BRKT. - DOOR TILT
	A090-00061-0000	ANTI-STRING DEVICE ASSY. (REPLACES ITEM 24)
	A090-00064-0000	ANTI-PENNY DEVICE ASSY.

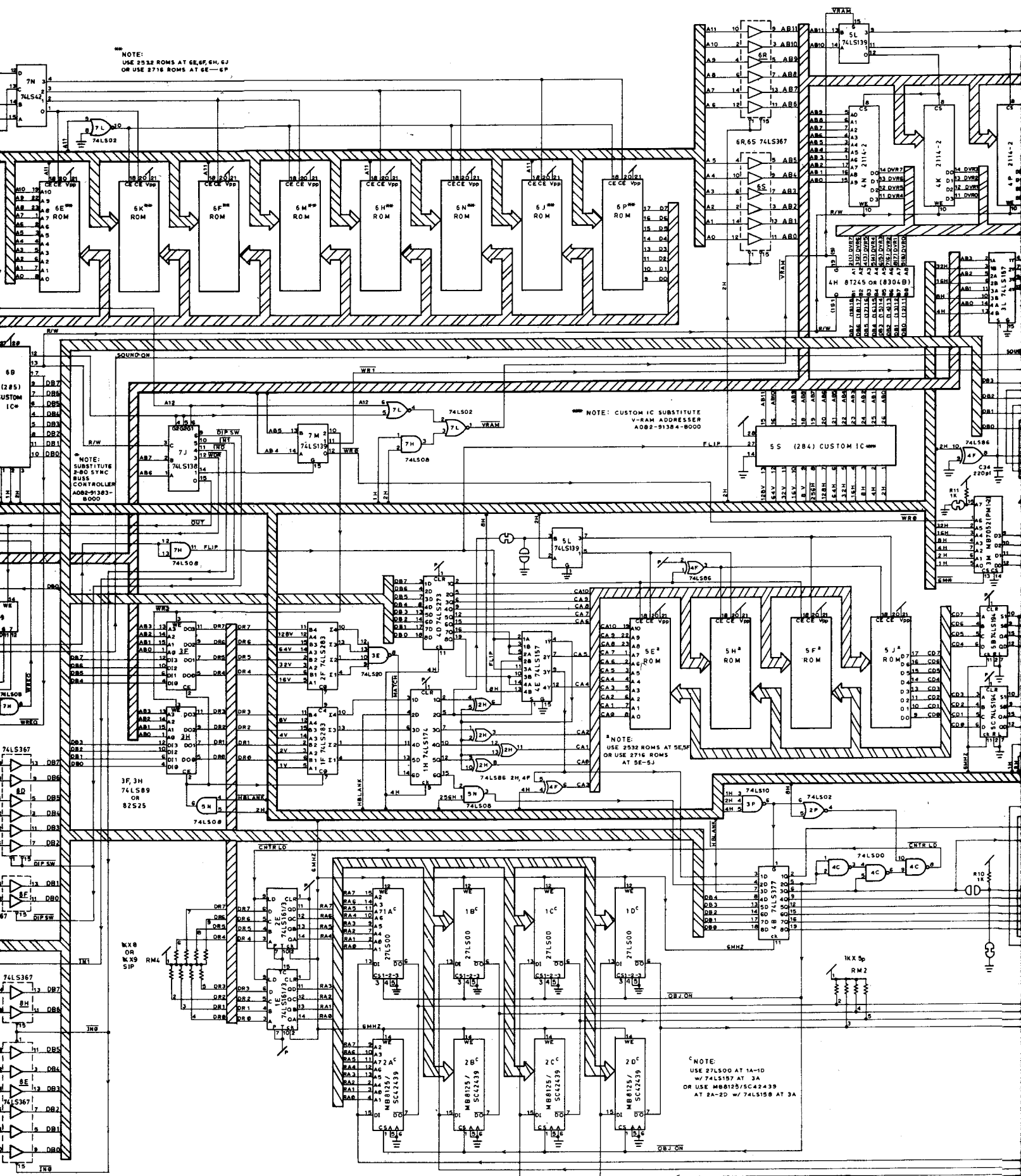


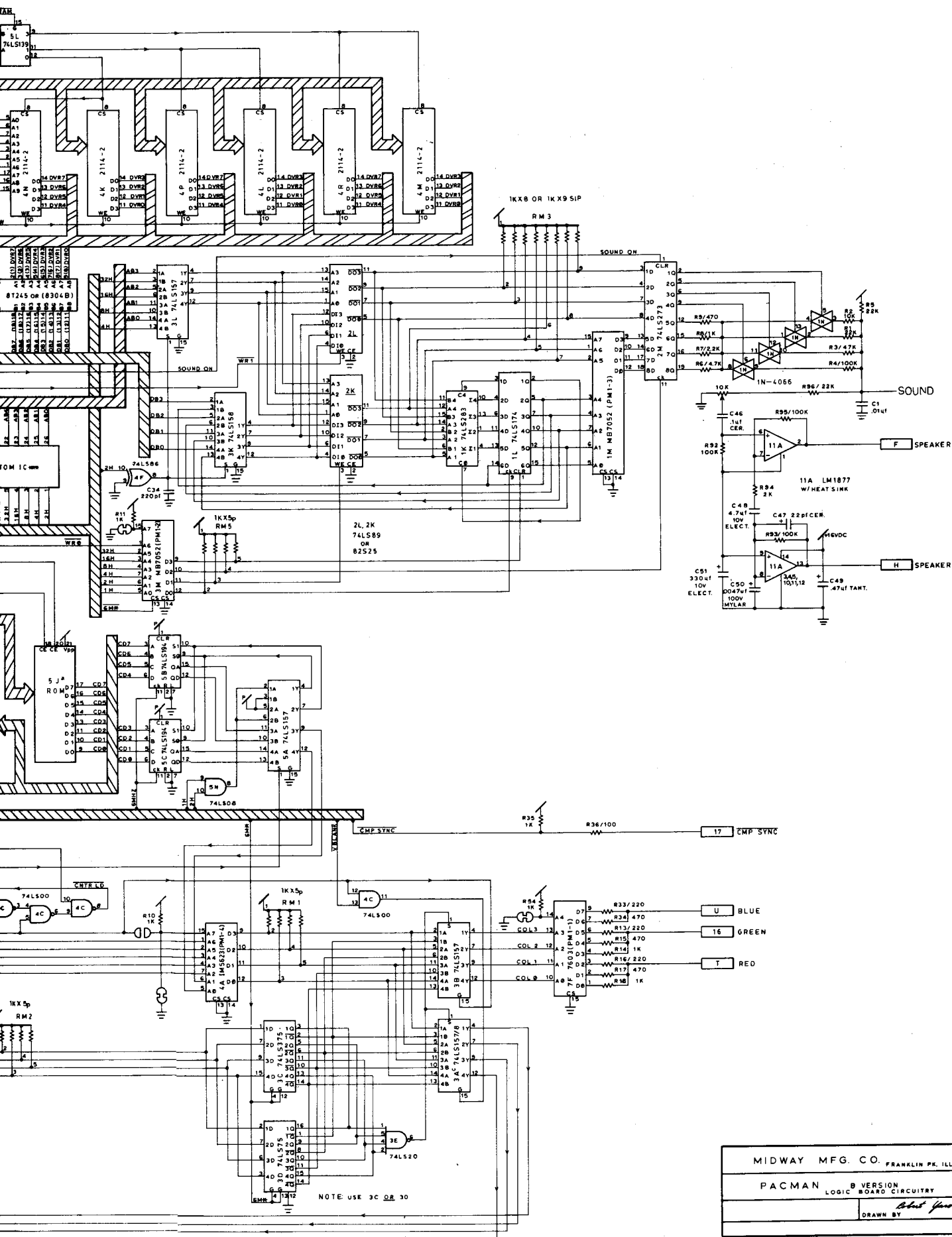
ORDER BY PART NUMBER ONLY

ITEM	PART N ^o	DESCRIPTION
1	MT00-00080-0000	TRANSFORMER - 110 VOLT
2	MT00-00081-0000	TRANSFORMER - 240 VOLT
3	0017-00003-0114	NOISE FILTER
4	A932-00024-0000	TERMINAL STRIP ASSY.
5	0064-030XX-XXPX	IN4004 400 V. DIODE
6	0720-00001-0200	2 POSITION FUSE CLIP
7	0017-00003-0004	FUSE 2A. SLO-BLO
8	0017-00003-0261	FUSE 1.5A. SLO-BLO
9	0720-00001-0400	4 POSITION FUSE CLIP
10	0017-00003-0169	FUSE 5A. (2 REQ'D.)
11	0017-00003-0001	FUSE 1A. (2 REQ'D.)
12	0017-00101-0637	#8-32 x 1-1/4 CARRIAGE BOLT (4 REQ'D.)
	0017-00103-0008	#8-32 HEX NUT (4 REQ'D.)
13	0017-00101-0014	#6 x 1/2 SLT. HEX HD. WD. SCR. (12 REQ'D.)
14	0017-00101-0018	#6 x 3/4 SLT. HEX HD. WD. SCR. (4 REQ'D.)
	A866-00049-0000	LINE CORD ASSY. - NOT SHOWN



NOTE:
USE 2532 ROMS AT 6E, 6F, 6H, 6J
OR USE 2716 ROMS AT 6E-6F

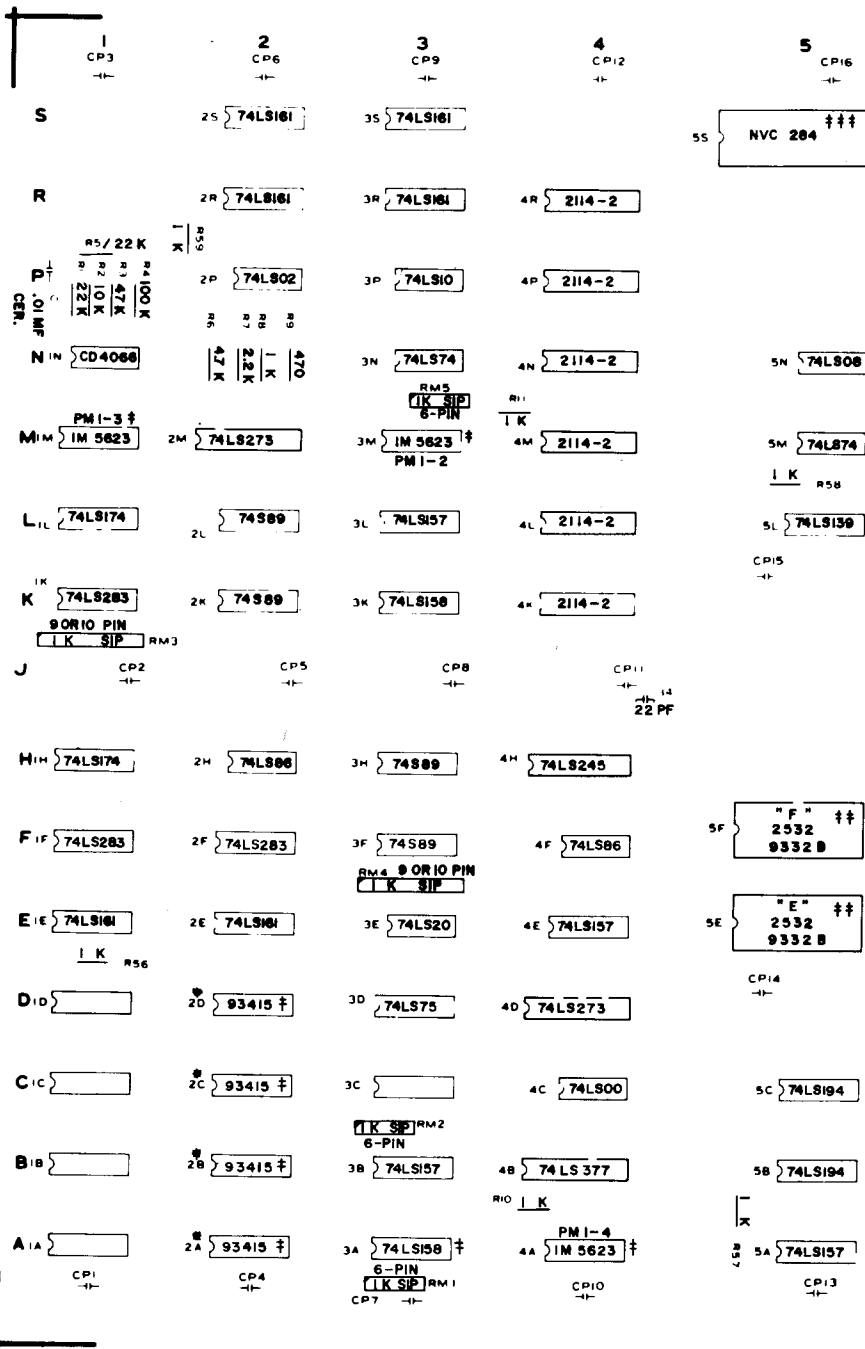


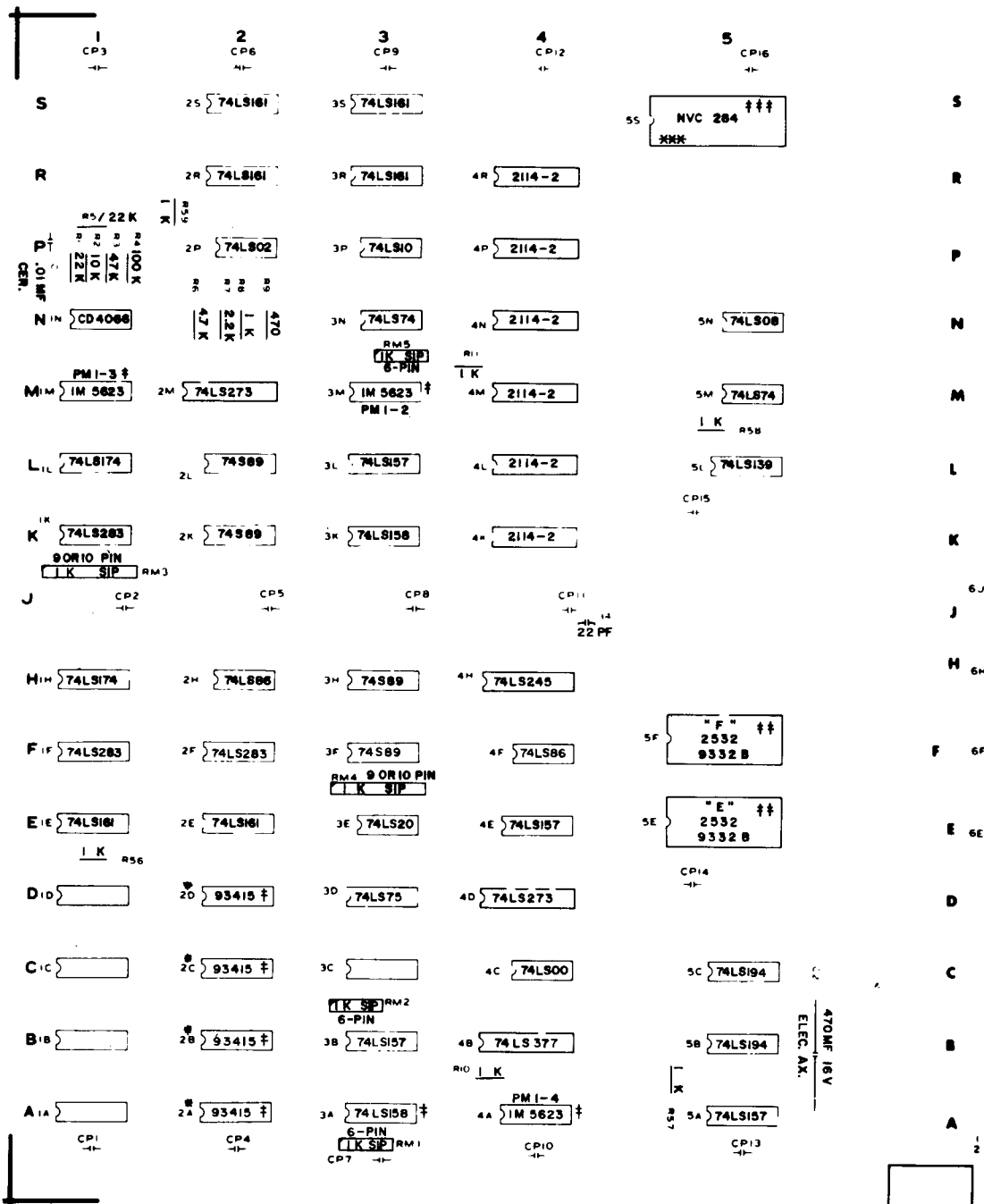


MIDWAY MFG. CO. FRANKLIN, ILL.

PACMAN B VERSION
LOGIC BOARD CIRCUITRY

DRAWN BY *Robert Frank* 12-9-80





* RAM HEAT SINK ASSEMBLY

NOTE 1: PLACE EITHER 74LS259 IN LOC. 8 K
OR CD 4099 IN LOC. 7 K
UNMARKED CAPS ARE .1MF CER. AX.
RESISTOR UNIT = Ohm

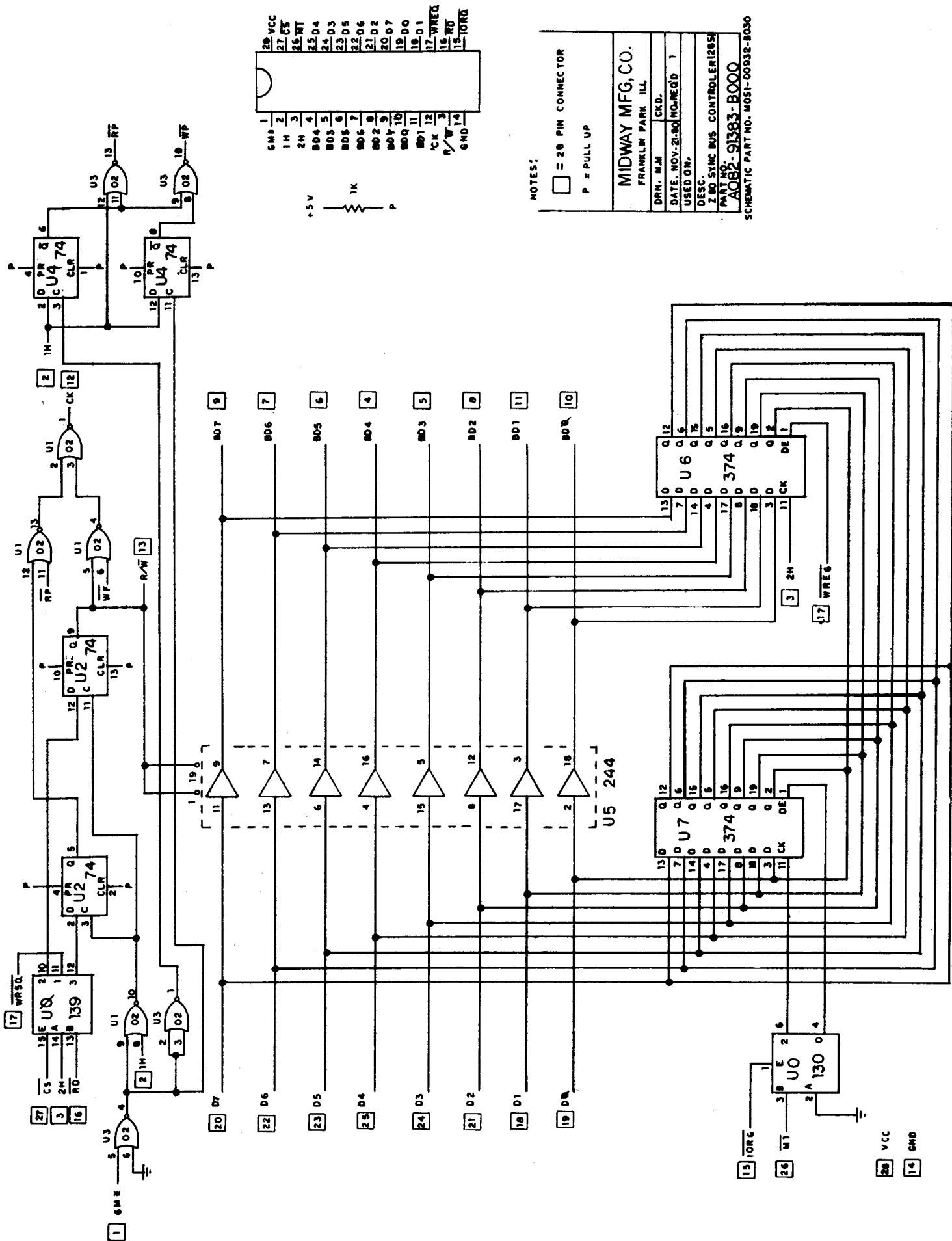
† - 16 PIN SOCKET (2 PER)
†† - 24 PIN SOCKET (6 PER)
††† - 28 PIN SOCKET (2 PER)
†††† - 40 PIN SOCKET (1 PER)

XX NOTE : THIS
(A)
XXX NOTE : THIS
(A)

DO NOT SCALE DWG		HEAT TREAT	SCALE	NO REQ PER	MIDWAY MFG. CO. FRANKLIN PK ILL
DIM TOLERANCES UNLESS SPECIFIED		DATE <i>C.L.</i>	ASSEMBLY DRAWING PAC-MAN		PART NO. A082-91375-B000
DIM TOLERANCES: FRACTIONAL ±.005 DECIMAL ±.005 HOLE DIA. ±.002 DATE 10/9/80		MATERIAL			
		FINISH			

**GAME BOARD P.C.
PAC - MAN
P.C. A082 - 91375 - A000
B000**

CHIP NUMBER	FUNCTION	CHIP NUMBER	FUNCTION
74LS00	Quad 2 input Nand	NVC284	Custom V Ram Addresser
74LS02	Quad 2 input Nor	NVC285	Custom Z80 Sync buss controller
74LS08	Quad 2 input And	CD4066	Quad bilateral switch
74LS10	Triple 3 input Nand	2114	Ram 1K x 4
74LS20	Dual 4 input Nand	1M5623	Prom 256 x 4
74LS42	BCD to decimal decoder	7603	Prom 32 x 8
74LS74	Dual "D" Flip-Flop	MCM 2532	Prom 4K x 8
74LS75	Quad latch	SL 4239	Ram 1K x 1
74LS86	Quad 2 input exclusive or	93415	Ram 1K x 1
74S89	64 Bit Ram 16 x 4	27LS00	Ram 1K x 1
74LS107	Dual "JK" Flip-Flop	MB 8125	Ram 1K x 1
74LS138	3 to 8 line decoder	CD 4099	8 bit addressable latch
74LS139	Dual 2 to 4 line decoder	N8T245	Octal bus transceiver
74LS157	Quad 2 to 1 line multiplexer	54LS174	Hex "D" Flip-Flop
74LS158	Quad 2 to 1 line multiplexer inverting	MB7052	Prom 256 x 4
74LS161	4 Bit binary counter	MB7051	Prom 32 x 8
74LS174	Hex "D" Flip-Flop	8304	Octal bus transceiver
74LS194	8 bit shift register	Additional Devices	
74LS245	Octal bus transceiver	78GVIC	Voltage regulator
74LS259	8 bit addressable latch	D44VM4	Transistor NPN
74LS273	Octal "D" Flip-Flop	D40K1	Transistor NPN
74LS283	4 Bit full adder	2N3391	Transistor NPN
74LS367	Hex bus driver	1N4004	Diode
74LS368	Hex bus driver inverting	A15	Diode
74LS377	Octal "D" Flip-Flop	1N914B	Diode
Z80	CPU	1N4737	6.2V Zener diode
LM377 - LM877	Dual audio amplifier	18.4320	Crystal

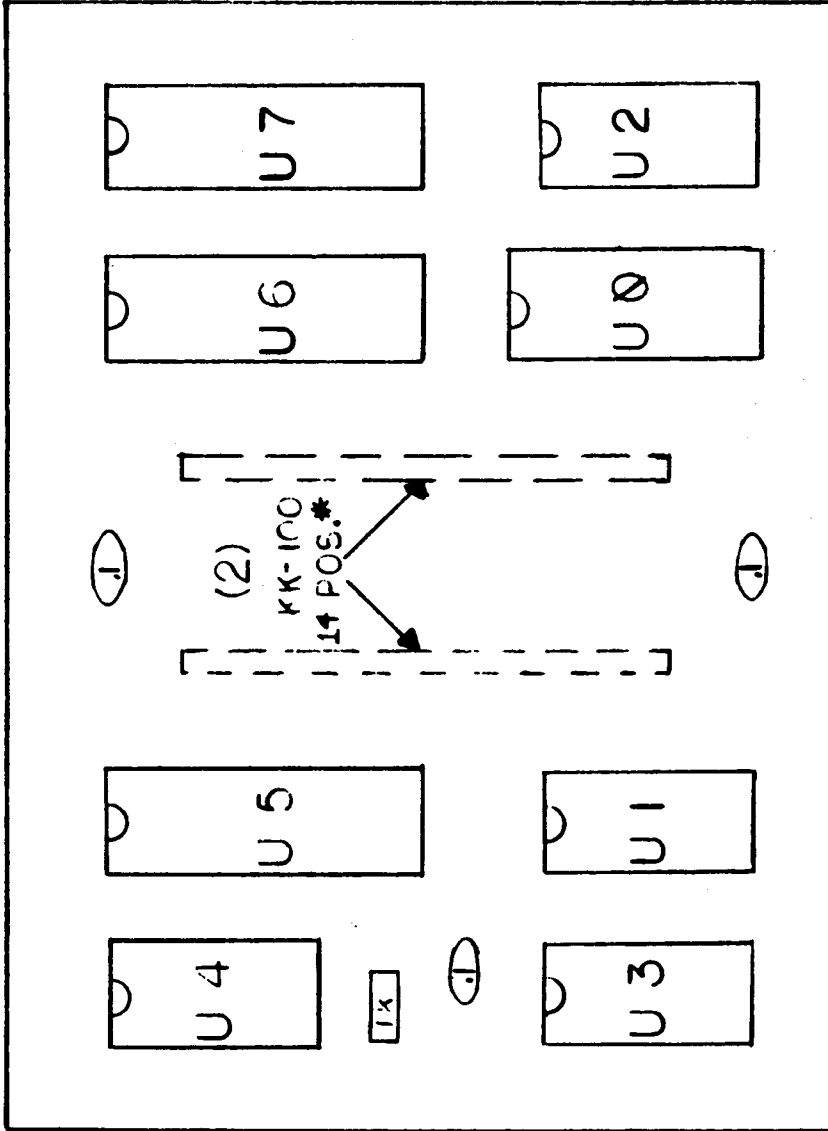


U0-74LS139
 U1-74LS02
 U2-74LS74
 U3-74LS02
 U4-74LS74
 U5-74LS244
 U6-74LS374
 U7-74LS374

(3)-JMF 50V
 AX. CER.

(1)-1K $\frac{1}{4}$ W RESIS.

* MOUNTED ON
 SOLDER SIDE



MO51-00932-B031

REVISIONS	

MIDWAY MFG. CO.

FRANKLIN PK. ILL.

PART NO.

A082-91383-B000

USED ON	PAR - MAM
NO. REQ'D	1 - PER

SCALE

HEAT TREAT

2-80 SYNC BUSS CONTROLLER(265)

COMPONENT LAYOUT

DO NOT SCALE DWG.

DRN. M.M

UNLESS SPECIFIED

CONCENTRICITY T.I.R. .002

FRACTIONAL .001

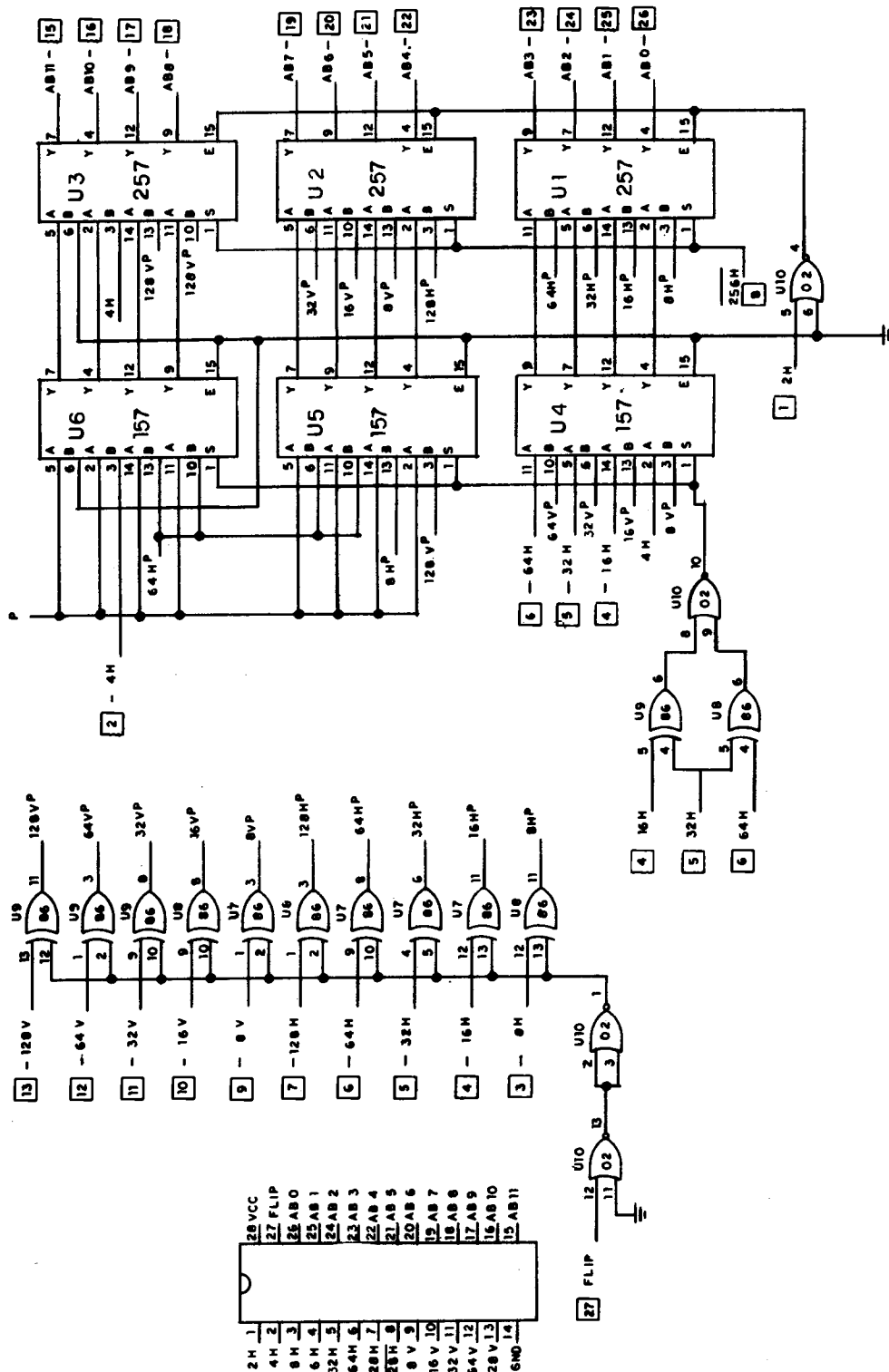
DECIMAL .001

HOLE DIA. .002-.005

MAT'L.

FINISH

DATE 10-23-80



□ = 25 PIN CONNECTOR
 P = PULL UP
 MIDWAY MFG. CO
 FRANKLIN PARK ILL
 DRN M/M CKD
 DATE NOV 25 80 NO. REQD 1
 USED ON PAC-MAN
 DESC.
 V RAM ADDRESSER INVC-284
 PART NO.
 A082-91384-B000

SCHEMATIC PART NO. M051 00932 B032

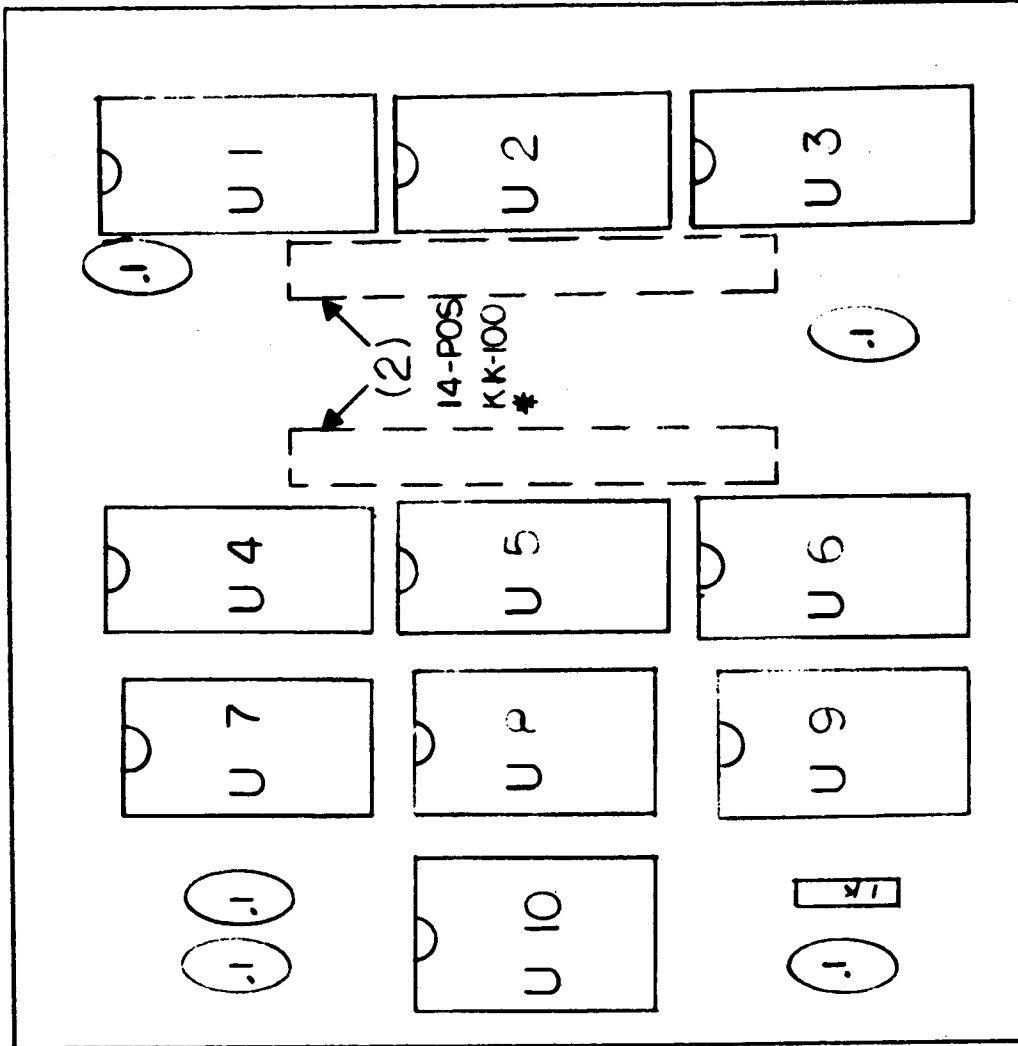
U1, U2, U3, 74LS257
 U4, U5, U6, 74LS157
 U7, U8, U9, 74LS86
 U10, 74LS02

.1 MF 50V - (5)
 AX CER

1K 1/4w - (1)

(2) - 14 - POS. KK-100

* MOUNTED ON
 SOLDER SIDE



M051-00932 - B034

REVISIONS

MIDWAY MFG. CO.

FRANKLIN PK. ILL.

PART NO.

A082-91384-B000

USED ON PAC - MAN

NO. REQ'D 1-PER.

SCALE

HEAT TREAT

DO NOT SCALE DWG.

V-RAM ADDRESSER (284)

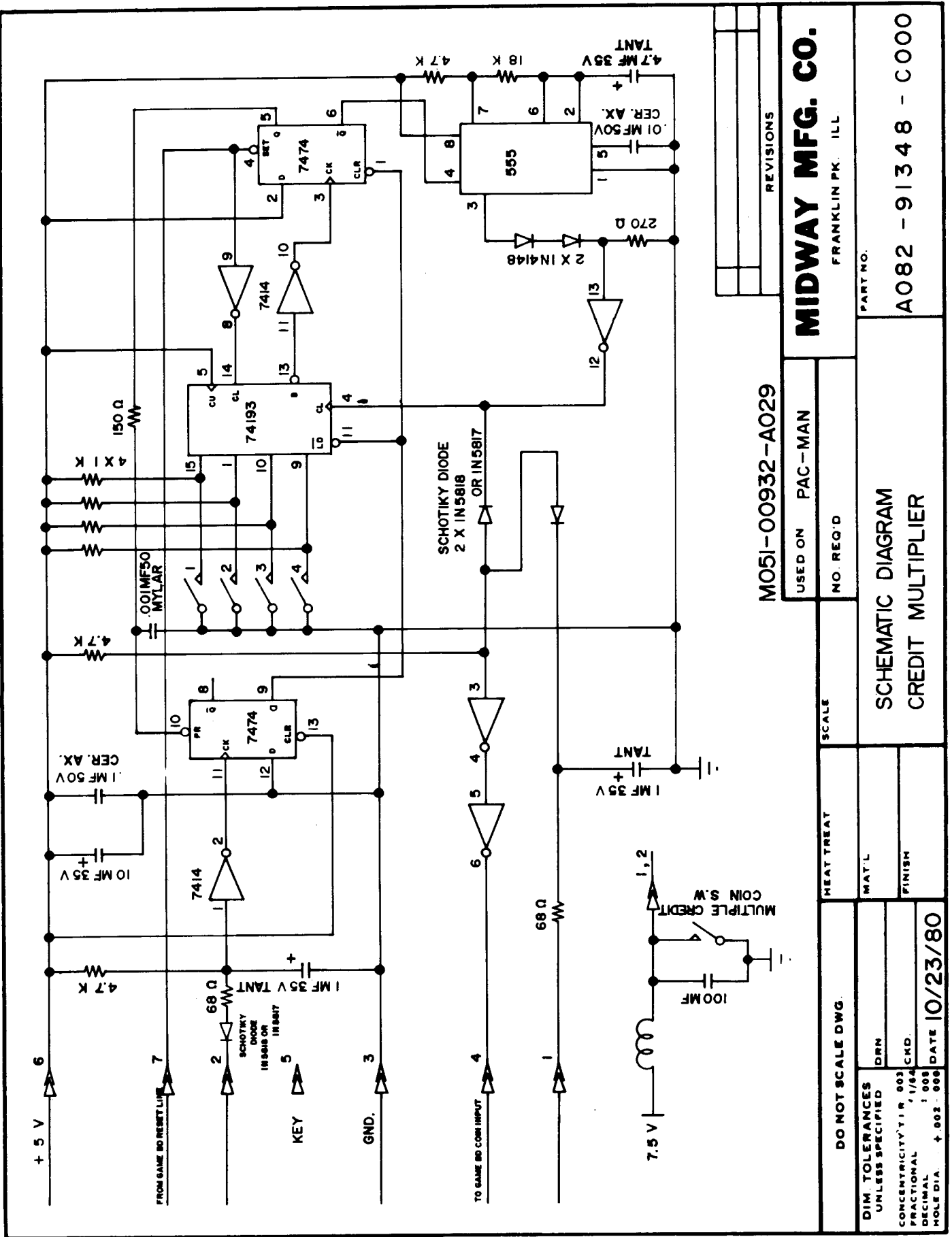
COMPONENT - LAY-OUT

MAT'L

DIM. TOLERANCES
 UNLESS SPECIFIED

CONCENTRICITY T.I.R. .002
 FRACTIONAL .1/64 CKD.
 DECIMAL .005
 HOLE DIA. .002-.005

DATE 10-27-80



M051-00932-A029

REVISIONS

MIDWAY MFG. CO.

FRANKLIN PK. ILL.

USED ON PAC-MAN

NO REQ'D

SCALE

HEAT TREAT

DO NOT SCALE DWG.

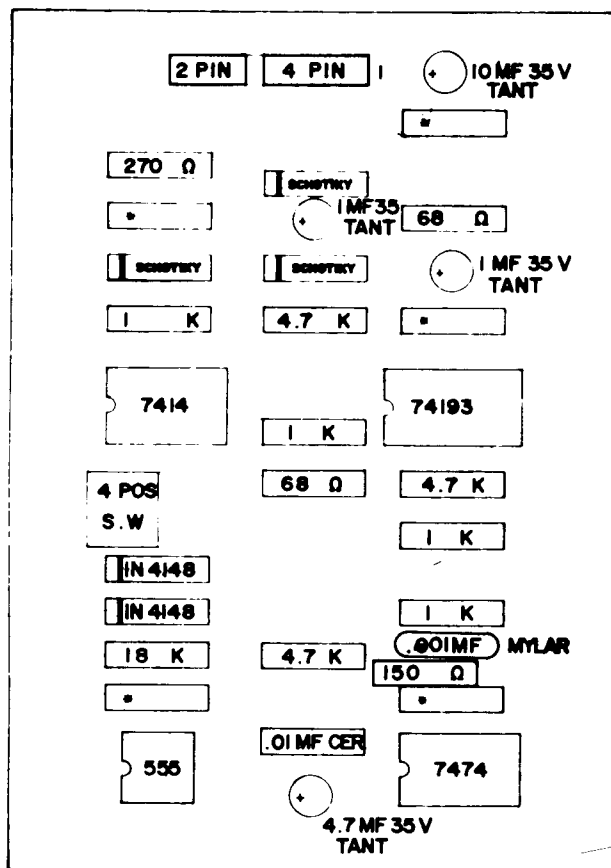
SCHEMATIC DIAGRAM
CREDIT MULTIPLIER

PART NO.

A082 - 91348 - C000

DIM TOLERANCES
UNLESS SPECIFIED
FRACTIONAL
DECIMAL
HOLE DIA

DRN
CKD
DATE 10/23/80



* 1 MF 50 V. CER. AX.

SCHOTKY DIODE - IN5818 OR IN5817

MO51-00932-A027

REVISIONS

MIDWAY MFG. CO.

FRANKLIN PK ILL.

PART NO.

A082-91348-C000

USED ON PAC-MAN

NO REQ'D

SCALE

HEAT TREAT

ASSEMBLY DRAWING
CREDIT MULTIPLIER P.C

DIM. TOLERANCES
UNLESS SPECIFIED

CONCENTRICITY TIR .003

FRACTIONAL 1/64 CHD

DECIMAL .003

HOLE DIA. + .002 .003

MAT'L

FINISH

DATE 10/22/80

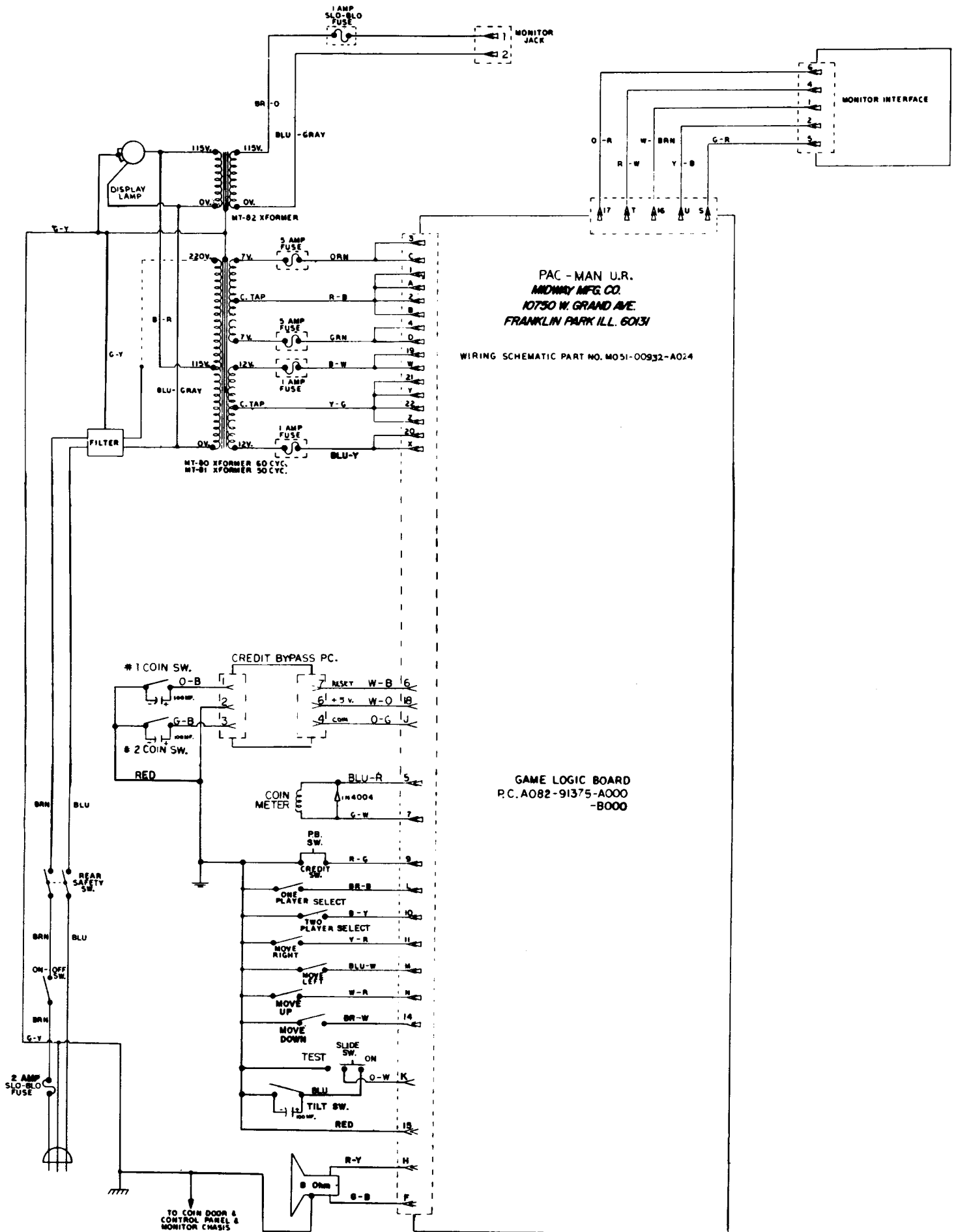
DO NOT SCALE DWG.

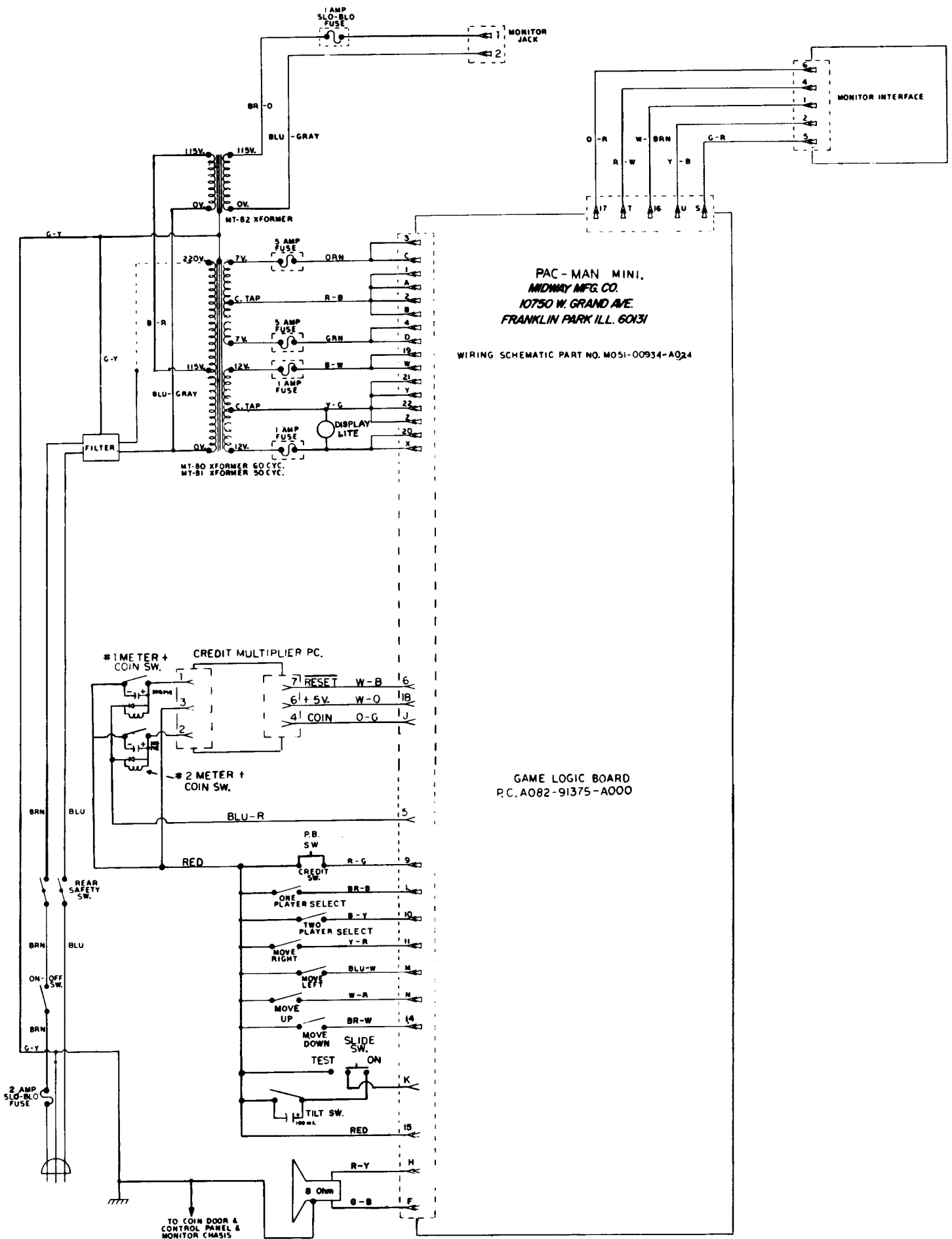
DRN C.Y.

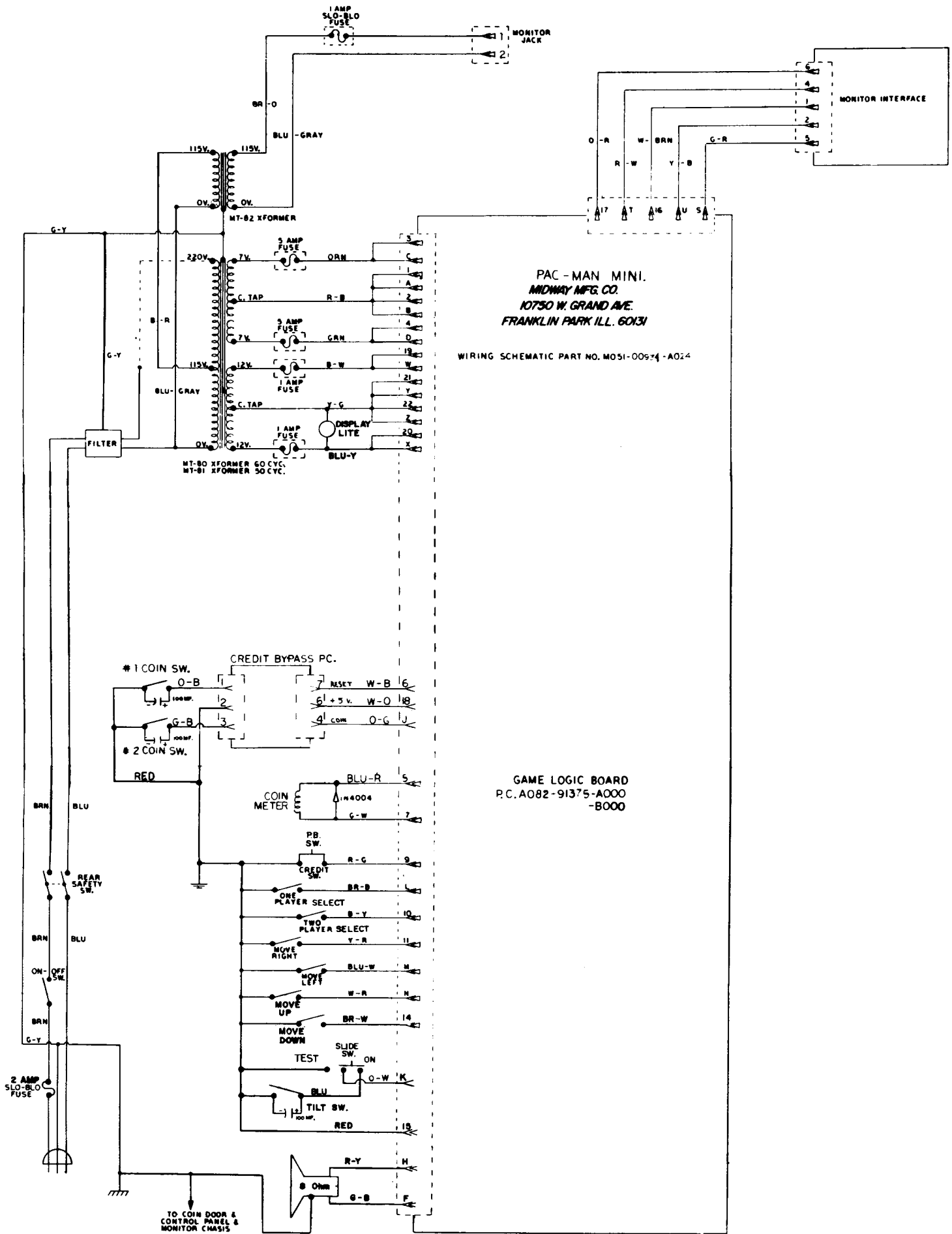
CHKD

DATE 10/22/80



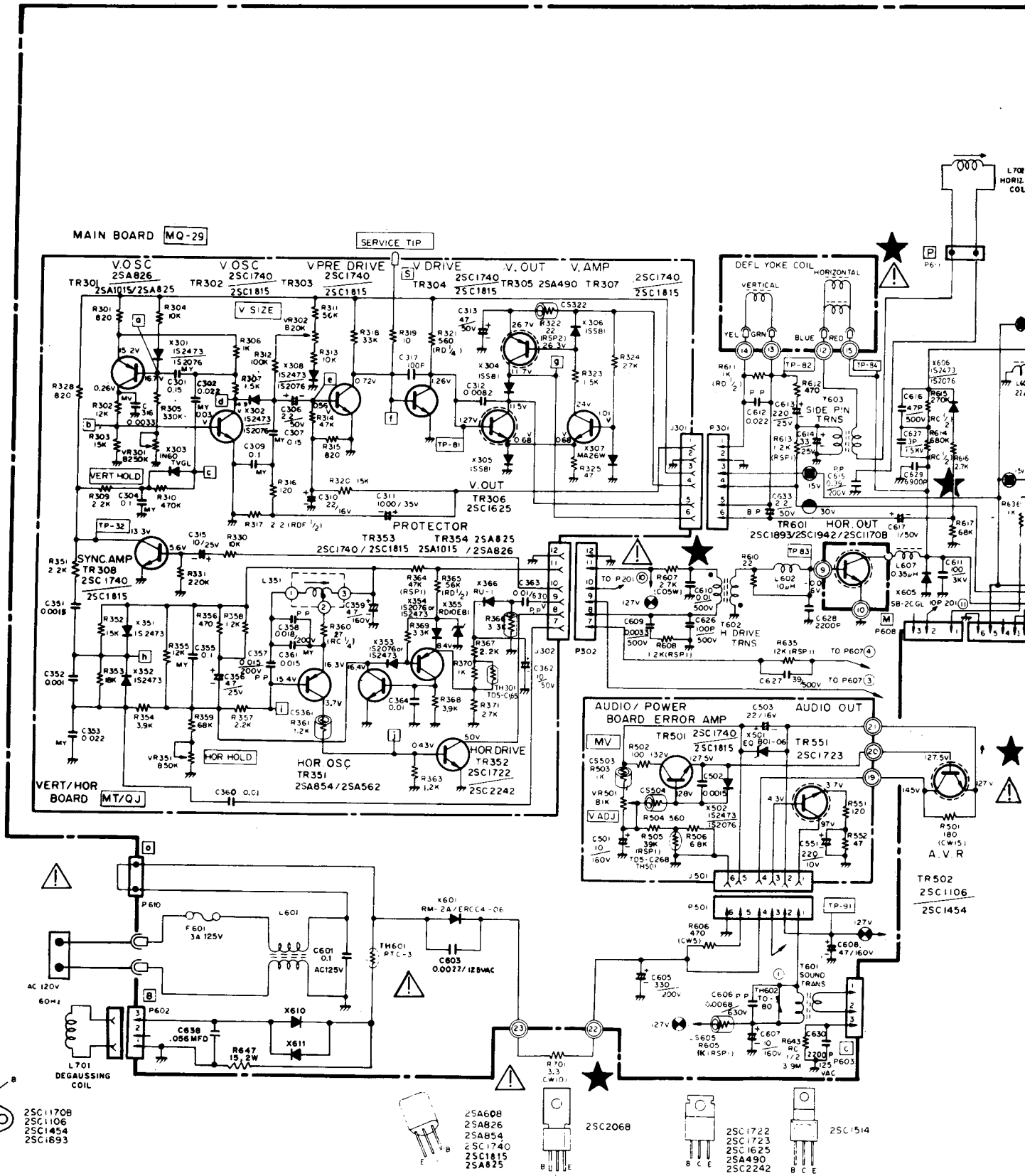




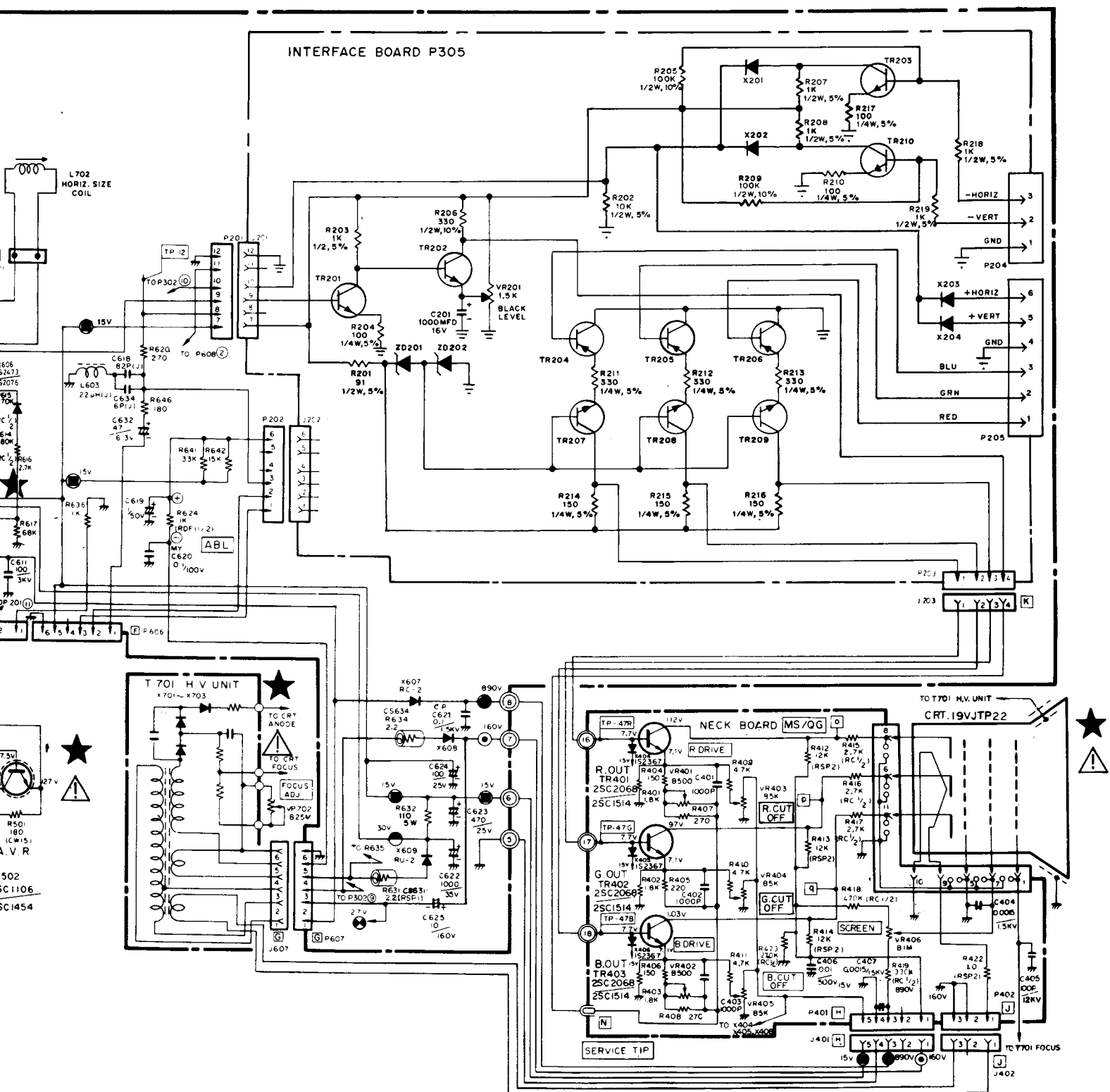




19" COLOR MONITOR



MONITOR SCHEMATIC DIAGRAM



K4606-5800

VERT/HOR BOARD (MT/QJ)

Ref. No.	Part No.	Description
RESISTORS		
R301	203X6500-628	820 Ohm, $\pm 5\%$, 1/8W Carbon
R302	203X6500-902	12k Ohm, $\pm 5\%$, 1/8W Carbon
R303	203X6500-927	15k Ohm, $\pm 5\%$, 1/8W Carbon
R304	203X6500-886	10k Ohm, $\pm 5\%$, 1/8W Carbon
R305	203X6501-241	330k Ohm, $\pm 5\%$, 1/8W Carbon
R306	203X6500-645	1k Ohm, $\pm 5\%$, 1/8W Carbon
R307	203X6500-689	1.5k Ohm, $\pm 5\%$, 1/8W Carbon
R309	203X6500-724	2.2k Ohm, $\pm 5\%$, 1/8W Carbon
R310	203X6501-285	470k Ohm, $\pm 5\%$, 1/8W Carbon
R311	203X6501-065	56k Ohm, $\pm 5\%$, 1/8W Carbon
R312	203X6501-126	100k Ohm, $\pm 5\%$, 1/8W Carbon
R313	203X6001-326	10k Ohm, $\pm 5\%$, 1/8W Carbon
R314	203X6501-044	47k Ohm, $\pm 5\%$, 1/8W Carbon
R315	203X6500-628	820 Ohm, $\pm 5\%$, 1/8W Carbon
R316	203X6500-420	120 Ohm, $\pm 5\%$, 1/8W Carbon
R317	203X6206-441	2.2 Ohm, $\pm 5\%$, 1/2W Carbon
R319	203X6500-169	100 Ohm, $\pm 5\%$, 1/8W Carbon
R320	203X6500-927	15k Ohm, $\pm 5\%$, 1/8W Carbon
R321	203X6700-509	560 Ohm, $\pm 5\%$, 1/2W Carbon
R322	203X9100-121	22 Ohm, $\pm 5\%$, 2W M.O.
R323	203X6500-689	1.5K Ohm, $\pm 5\%$, 1/8W Carbon
R324	203X6500-988	27k Ohm, $\pm 5\%$, 1/8W Carbon
R325	203X6500-326	47 Ohm, $\pm 5\%$, 1/8W Carbon
R328	203X6500-628	820 Ohm, $\pm 5\%$, 1/8W Carbon
R330	203X6500-886	10k Ohm, $\pm 5\%$, 1/8W Carbon
R331	203X6501-209	220k Ohm, $\pm 5\%$, 1/8W Carbon
R351	203X6500-724	2.2k Ohm, $\pm 5\%$, 1/8W Carbon
R352	203X6500-927	15k Ohm, $\pm 5\%$, 1/8W Carbon
R353	203X6500-944	18k Ohm, $\pm 5\%$, 1/8W Carbon
R354	203X6500-783	3.9k Ohm, $\pm 5\%$, 1/8W Carbon
R355	203X6500-902	12k Ohm, $\pm 5\%$, 1/8W Carbon
R356	203X6500-561	470 Ohm, $\pm 5\%$, 1/8W Carbon
R357	203X6500-724	2.2k Ohm, $\pm 5\%$, 1/8W Carbon
R358	203X6500-666	1.2k Ohm, $\pm 5\%$, 1/8W Carbon
R359	203X6501-088	68k Ohm, $\pm 5\%$, 1/8W Carbon
R360	203X6500-471	27 Ohm, $\pm 5\%$, 1/4W Comp.
R361	203X6000-998	1.2k Ohm, $\pm 5\%$, 1/8W Carbon
R363	203X6500-666	1.2k Ohm, $\pm 5\%$, 1/8W Carbon
R364	203X9014-988	47k Ohm, $\pm 5\%$, 1W M.O.
R365	203X6700-989	56k Ohm, $\pm 5\%$, 1/2W Carbon
R366	203X6001-148	3.3k Ohm, $\pm 5\%$, 1/8W Carbon
R367	340X2222-734	2.2k Ohm, $\pm 5\%$, 1/2W Carbon
R368	203X6500-785	3.9k Ohm, $\pm 5\%$, 1/8W Carbon
R369	203X6500-762	3.3k Ohm, $\pm 5\%$, 1/4W Carbon
R370	302X6100-961	1k Ohm, $\pm 5\%$, 1/4W Carbon
R371	203X6104-751	2.7k Ohm, $\pm 5\%$, 1/4W Carbon
VR301	204X2122-093	Varistor, 250K Ohm, Vert. Hold
VR302	204X2114-065	Varistor, 20K Ohm, Vert. Size
VR351	204X2114-059	Varistor, 50K Ohm, Hor. Hold

CAPACITORS

C301	203X1100-928	0.15 uF, 50V, $\pm$ 10% Mylar
C302	203X1100-573	0.022 uF, 50V, $\pm$ 10% Mylar
C304	203X1100-858	0.1 uF, 50V, $\pm$ 10% Mylar
C306	203X0025-026	2.2 uF, 50V, Electrolytic
C307	203X1100-928	0.15 uF, 50V, $\pm$ 10% Mylar
C309	203X1100-858	0.1 uF, 50V, $\pm$ 10% Mylar
C310	203X0010-011	22 uF, 16V Electrolytic
C311	203X0020-099	1000 uF, 35V Electrolytic
C312	202X7000-469	0.0082 uF, 50V, $\pm$ 10% Ceramic

POWER BOARD (MV)

RESISTORS

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

CAPACITORS

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

Ref. No.	Part No.	Description
CAPACITORS (CONT.)		
C313	203X0025-087	47 uF, 50V Electrolytic
C315	203X0015-082	10 uF, 25V Electrolytic
C316	203X1100-220	3300 uF, 50V, $\pm 10\%$ Mylar
C317	202X8000-616	100 pF, 50V, $\pm 10\%$ Ceramic
C351	202X7000-281	1500 pF, 50V, $\pm 10\%$ Ceramic
C352	202X7000-247	1000 pF, 50V, $\pm 10\%$ Ceramic
C353	203X1100-573	0.022 uF, 50V, $\pm 10\%$ Mylar
C355	203X1100-858	0.1 uF, 50V, $\pm 10\%$ Mylar
C356	203X0015-105	4.7 uF, 25V Electrolytic
C357	203X1201-013	0.015uF, 200V $\pm 10\%$ PP
C358	203X1201-034	0.018 uF, 200V, $\pm 10\%$ PP
C359	203X0040-013	4.7 uF, 160V Electrolytic
C360	202X7000-482	0.01 uF, 50V, $\pm 10\%$ Ceramic
C361	203X1100-509	0.015 uF, 50V, $\pm 10\%$ Mylar
C362	203X0025-058	10 uF, 50V Electrolytic
C363	203X1205-487	0.01 uF, 630V, $\pm 10\%$ PP
C364	202X7000-482	0.01 uF, 50V, $\pm 10\%$ Ceramic

SEMICONDUCTORS

TR301	200X4082-614	Transistor, 2SA826Q
TR302	200X3174-006	Transistor, 2SC1740Q
TR303	200X3174-006	Transistor, 2SA1740Q
TR304	200X3174-006	Transistor, 2SC1740Q
TR305	200X4049-081	Transistor, 2SA490YLBGLI
TR306	200X3162-538	Transistor, 2SC1625YLBGLI
TR307	200X3174-014	Transistor, 2SC1740R
TR308	200X3174-006	Transistor, 2SC1740Q
TR351	200X4085-415	Transistor, 2SA854Q
TR352	200X3172-208	Transistor, 2SC1722BKS
TR353	200X3174-006	Transistor, 2SC1740Q
TR354	200X4082-614	Transistor, 2SA826Q
X301	201X2010-144	Diode, (Si) IS2473-T72
X302	201X2010-144	Diode, (Si) IS2473-T72
X303	200X8000-026	Diode, (GE), IN60TVGL
X304	200X8010-165	Diode (Si) ISS81
X305	201X2010-165	Diode (Si) ISS81
X306	201X2010-165	Diode (Si) ISS81
X307	200X8010-102	Diode (Si) MA26W
X308	200X8010-094	Diode (Si) IS2473
X351	201X2010-144	Diode (Si) IS2473-T72
X352	201X2010-144	Diode (Si) IS2473-T72
X353	201X2010-144	Diode (Si) IS2473-T72
X354	201X2010-144	Diode (Si) IS2473-T72
X355	200X80220-851	Diode (Zener) RD10EBI
X366	200X8100-130	Diode (Hs) RU-1 0.3 US

MISCELLANEOUS

J301	204X9300-958	Socket, 6 Pin
J302	204X9300-958	Socket, 6 Pin
P301	204X9601-195	Plug, 6 Pin
P302	204X9601-195	Plug, 6 Pin
TH301	201X0000-534	Thermistor

TRANSFORMERS & COILS

L351 **201X5200-091** **Coll, Horiz. Osc.**

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	201X2210-144	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)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS					
R401	203X6500-709	1.8k Ohm $\pm$ 5% 1/8W Carbon	C403	202X7000-247	1000 pF, 50V, 10% Ceramic
R402	203X6500-709	1.8k Ohm $\pm$ 5% 1/8W Carbon	C404	202X7110-019	1500 pF, 2kV $\pm$ 10% Ceramic
R403	203X6500-709	1.8k Ohm $\pm$ 5% 1/8W Carbon	C405	202X7150-018	100 pF, 12kV, $\pm$ 10% Ceramic
R404	203X6500-447	150 Ohm $\pm$ 5% 1/8W Carbon	C406	202X7050-483	.01 uF, 500V, $\pm$ 10% Ceramic
R405	203X6500-481	220 Ohm $\pm$ 5% 1/8W Carbon	C407	202X7110-019	1500 pF, 2kV $\pm$ 10% Ceramic
R406	203X6500-447	150 Ohm $\pm$ 5% 1/8W Carbon	C408	202X8000-550	68 pF, 50V, $\pm$ 10% Ceramic
R407	203X6500-508	270 Ohm $\pm$ 5% 1/8W Carbon	C409	202X8000-550	68 pF, 50V, $\pm$ 10% Ceramic
R408	203X6500-508	270 Ohm $\pm$ 5% 1/8W Carbon	C410	202X8000-550	68 pF, 50V, $\pm$ 10% Ceramic
R409	203X6500-800	4.7k Ohm $\pm$ 5% 1/8W Carbon	SEMICONDUCTORS		
R410	203X6500-800	4.7k Ohm $\pm$ 5% 1/8W Carbon			
R411	203X6500-800	4.7k Ohm $\pm$ 5% 1/8W Carbon			
R412	203X9104-809	12k Ohm $\pm$ 5% 2.0W Metal Oxide	TR401	200X3206-800	Transistor, 2SC2068, 2SC1514 (R output)
R413	203X9104-809	12k Ohm $\pm$ 5% 2.0W Metal Oxide	TR402	200X3206-800	Transistor, 2SC2068, 2SC1514 (G output)
R414	203X9104-809	12k Ohm $\pm$ 5% 2.0W Metal Oxide	TR403	200X3206-800	Transistor, 2SC2068, 2SC1514 (B output)
R415	203X5601-313	2.7k Ohm $\pm$ 10% 1/2W Comp.	X404	201X2100-126	Diode, IS2367 (protector)
R416	203X5601-313	2.7k Ohm $\pm$ 10% 1/2W Comp.	X405	201X2100-126	Diode, IS2367 (protector)
R417	203X5601-313	2.7k Ohm $\pm$ 10% 1/2W Comp.	X406	201X2100-126	Diode, IS2367 (protector)
R418	203X5602-254	470k Ohm $\pm$ 10% 1/2W Comp.	MISCELLANEOUS		
R419	203X5602-185	330k Ohm $\pm$ 10% 1/2W Comp.	J401	206X5003-729	Socket, 5 Pin
R422	203X9105-117	1.0 Ohm $\pm$ 10% 2W Metal Oxide	J402	206X5003-983	Socket, 3 Pin
R423	203X5102-155	270k Ohm $\pm$ 5% 1/4W Carbon	P401	204X9600-329	Plug, 5 Pin
VR401	204X2115-014	500 Ohm Varistor R Drive	P402	204X9600-254	Plug, 3 Pin
VR402	204X2115-014	500 Ohm Varistor B Drive			
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			
C402	202X7000-247	1000 pF, 50V, 10% Ceramic			

★ 297X2000-072 HIGH VOLTAGE ASSEMBLY (T701)

★ R701	204X1625-058	3.3 Ohm, $\pm$ 10% 10W WW Resistor
VR702	204X3901-125	Focus Control
X701		Diode (SI HV) } Part of T701
X702		Diode (SI HV) }
X703		Diode (SI HV) }

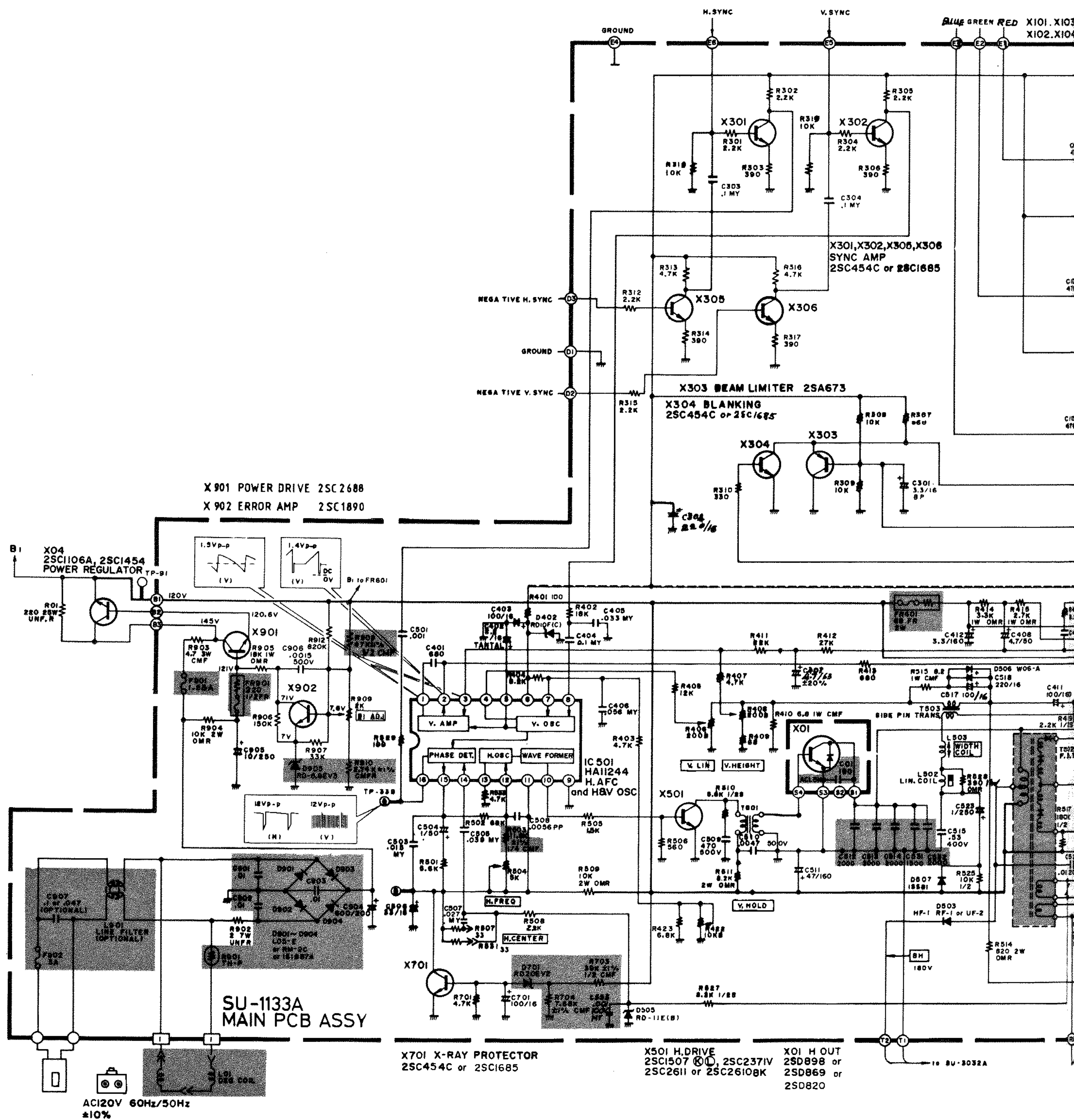
FINAL ASSEMBLY PARTS

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

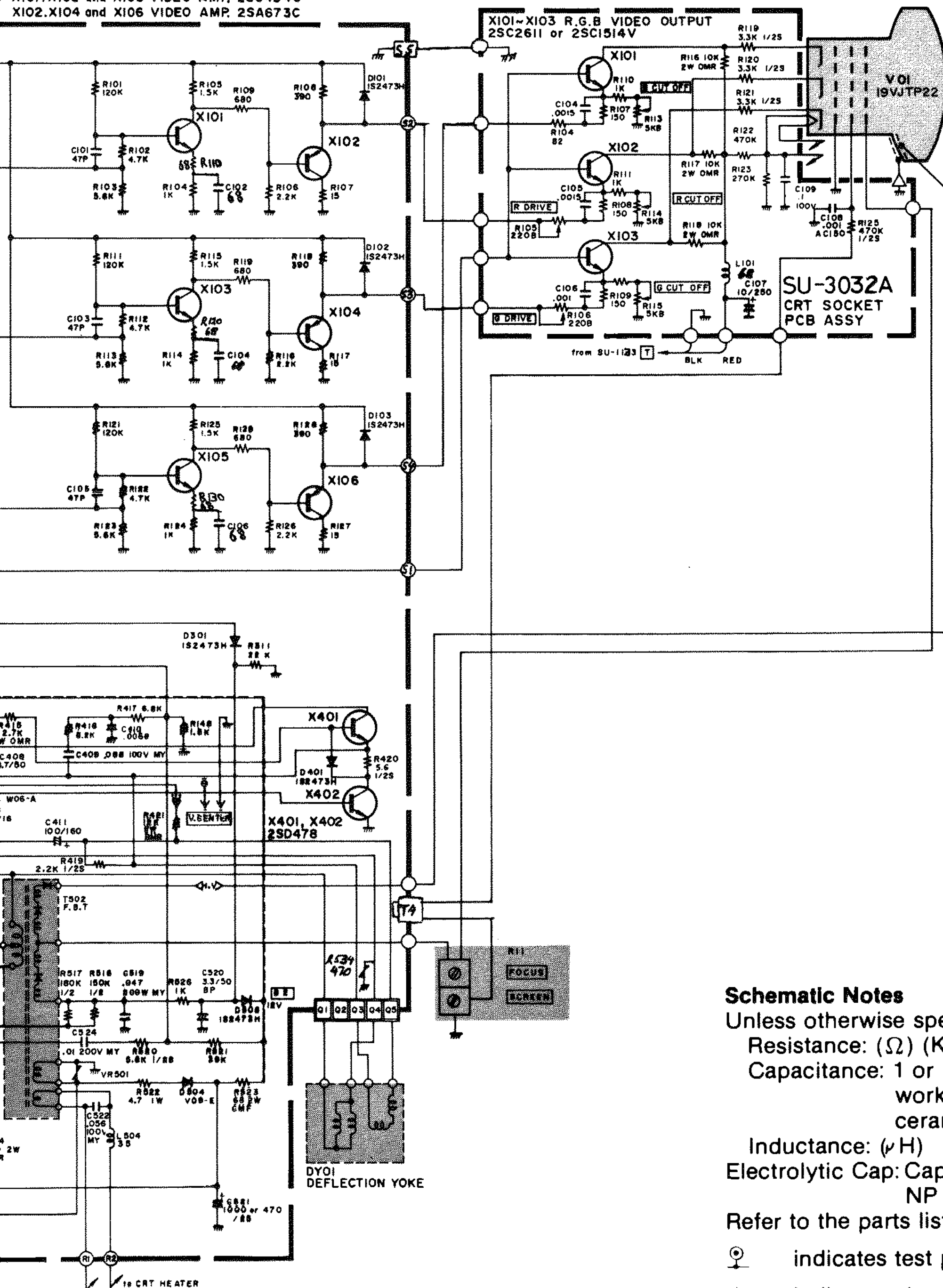
INTERFACE BOARD (P305)

(MODEL 19K4606)

RESISTORS			SEMICONDUCTORS		
R201	340X3910-934	91 Ohm, 5%, 1/2W Carbon	TR201	86X0121-001	Transistor (NPN)
R203	340X3102-934	1k Ohm, 5%, 1/2W Carbon	TR202	86X0121-001	Transistor (NPN)
R204	340X2101-934	100 Ohm, 5%, 1/4W Carbon	TR203	86X0121-001	Transistor (NPN)
R206	340X3331-944	330 Ohm, 10%, 1/2W Carbon	TR204	86X0066-001	Transistor (PNP)
R207	340X3102-934	1k Ohm, 5%, 1/2W Carbon	TR205	86X0066-001	Transistor (PNP)
R208	340X3152-934	1.5k Ohm, 5%, 1/4W Carbon	TR206	86X0066-001	Transistor (PNP)
R209	340X2101-934	100 Ohm, 5%, 1/4W Carbon	TR207	86X0121-001	Transistor (NPN)
R210	340X3102-934	1k Ohm, 5%, 1/2W Carbon	TR208	86X0121-001	Transistor (NPN)
R211	340X2331-934	330 Ohm, 5%, 1/4W Carbon	TR209	86X0121-001	Transistor (NPN)
R212	340X2331-934	330 Ohm, 5%, 1/4W Carbon	ZD201	66X0040-018	Diode, Zener, 6.8v, 5%, 0.5W
R213	340X2331-934	330 Ohm, 5%, 1/4W Carbon	ZD202	66X0040-019	Diode, Zener, 3.9v, 5%, 0.5W
R214	340X2201-934	200 Ohm, 5%, 1/4W Carbon	MISCELLANEOUS		
R215	340X2201-934	200 Ohm, 5%, 1/4W Carbon	J201	204X9300-958	Socket, 6 Pin
R216	340X2201-934	200 Ohm, 5%, 1/4W Carbon	J202	204X9300-958	Socket, 6 Pin
VR201	40X0590-017	1.5k Ohm, Black Level Control	J203	206X5019-207	Socket, 4 Pin
CAPACITORS			P201	204X9601-195	Plug, 6 Pin
C201	45X0524-038	1000 uF, 16V Electrolytic	P202	204X9601-195	Plug, 6 Pin
			P203	204X9600-845	Plug, 4 Pin
			P205	6A0393-006	Plug, 6 Pin



X101, X103 and X105 VIDEO AMP, 2SC454C
X102, X104 and X106 VIDEO AMP, 2SA673C



Schematic Notes

Unless otherwise specified

Resistance: (Ω) (K $\rightarrow$ K Ω , M $\rightarrow$ M Ω), 1/4 (W) carbon resistor

Capacitance: 1 or higher $\rightarrow$ (pF), less than 1 $\rightarrow$ (μ F)

working voltage $\rightarrow$ 50 (V)

ceramic capacitor

Inductance: (μ H)

Electrolytic Cap: Capacitance Value (μ F)/working voltage (V),
NP $\rightarrow$ non-polar (or bipolar) electrolytic cap.

Refer to the parts list for additional component information.

$\odot$ indicates test point connection

$\perp$ indicates chassis ground unless otherwise specified

Hz indicates cycles per second

For **safety** purposes (and continuing reliability)

$\triangle$ replace all components marked with safety symbol with identical type.

NOTE: FR $\rightarrow$ fusible resistor ($\text{---}\text{---}\text{---}$)

00-4147-04
G07-CB0

Parts identification on circuit boards:

e.g. SU1126A (R107 = R1107)

SU3030A (R113 = R3113)

REPLACEMENT PARTS LIST - ELECTROHOME 19" MONITOR

Components identified by the Δ symbol in the PARTS LIST and on the Schematic have special characteristics important to safety.

DO NOT degrade the safety of the set through improper servicing.

Abbreviations for Resistors and Capacitors

Resistor

C R	: Carbon Resistor
Comp. R	: Composition Resistor
OM R	: Oxide Metal Film Resistor
V R	: Variable Resistor
MF R	: Metal Film Resistor
CMF R	: Coating Metal Film Resistor
UNF R	: Nonflammable Resistor
F R	: Fusible Resistor

Capacitor

C Cap.	: Ceramic Capacitor
M Cap	: Mylar Capacitor
E Cap.	: Electrolytic Capacitor
BP E Cap.	: Bi-Polar (or Non-Polar) Electrolytic Capacitor
MM Cap.	: Metalized Mylar Capacitor
PP Cap.	: Polypropylene Capacitor
MPP Cap.	: Metalized PP Capacitor
PS Cap	: Polystyrol Capacitor
Tan. Cap.	: Tantal Capacitor

NOTE: When ordering replacement parts please specify the part number as shown in this list including part name, and model number. Complete information will help expedite the order.

Use of substitute replacement parts which do not have the same safety characteristics as specified, may create shock, fire or other hazards. For maximum reliability and performance, all parts should be replaced by those having identical specifications.

SERVICE REPLACEMENT PARTS LIST

Symbol	Description	Part Number
	Main P.C.B. Ass'y	SU-1133A
	CRT Socket P.C.B. Ass'y	SU-3032A
	Purity Shield Ass'y	07-220083-03

Outside of the P.C.B. Ass'y

Symbol	Description	Part Number
△	Picture Tube 19"	17-7198-03
△	△Deflection Yoke	A29779-D = 21-141-01
△	PC Magnet	A75034-B = 29-32-01
△	△Flyback Transf.	A29951-B
R05	△HVR	A46600-A
C04	UNF Resistor 220Ω, 25W K	QRF258K-221
X01	C Capacitor 150pF, AC1.5KV	QCZ0101-005
X02	Si. Transistor	2SD870
SC	Si. Transistor	2SC1106A
SC	Screw #8-3/8	31-610818-06
WA	Screw 1/4 x 3/4 Pix Tube Mtg. (4)	31-601418-12
	Pyramidal Lock Washer (4)	33-255-01
	Nut Retainer, Pix Tube Mtg. (4)	33-494-01
	Clip — P.C.B. Support	33-629-02
	Standoff	33-670-010R-02
	Wire Terminal (Gnd. Strap)	34-228-03
	Terminal Lug (Gnd.)	34-33-04
	Groundstrap Assy.	34-574-02
	Grounding Spring	35-212-03
	Wire Hook (Gnd. Strap)	35-3053-02
	Purity Shield Holddown Clamp	35-2348-01
	Support Brkt. RH	35-3890-01
	Support Brkt. LH	35-3890-02
	Chassis Base	38-449-02
	Yoke Wedge (3)	39-1233-01

Purity Shield Ass'y. Parts List

Symbol	Description	Part Number
D911, D912	Degaussing Coil	21-1007-30
	Rectifier 1 Amp 600V (2)	28-22-27
	Pin Terminal (2)	34-708-01
	Pin Terminal Housing	34-709-01
	Purity Shield (2 pcs.)	35-3847-01
	Purity Shield (2 pcs.)	35-3847-02
C911	Capacitor 100nF 10% 400V	48-171544-62
R921	Resistor, Wirewound 33Ω, 4W	42-113301-03
	Fire Retardent Term. Strip 4 Lug	34-492-09

CRT Socket P.C.B. Ass'y (SU-3032A) Parts List**Resistors**

Symbol	Description	Part Number
R3105	V R 200	QVZ3234-022
R3106	V R 200	QVZ3234-022
R3113	V R 5K	QVZ3234-053
R3114	V R 5K	QVZ3234-053
R3115	V R 5K	QVZ3234-053
R3116	OM R 10KΩ2W J	QRG029J-103
R3117	OM R 10KΩ2W J	QRG029J-103
R3118	OM R 10KΩ2W J	QRG029J-103
R3119	Comp. R 3.3KΩ1/2W K	QRZ0039-332
R3120	Comp. R 3.3KΩ1/2W K	QRZ0039-332
C3121	Comp. R 3.3KΩ1/2W K	QRZ0039-332

Capacitors

Symbol	Description	Part Number
C3107	E Cap. 10uF 250V A	QEW53EA-106
C3108	C Cap. 1000pF DC1400V P	QCZ9001-102M

Coils

Symbol	Description	Part Number
L3101	Peaking Coil	QQL043K-101

Semiconductors**Symbol**

X3101

X3102

X3103

Description

Si. Transistor

Si. Transistor

Si. Transistor

Part Number

2SC1514VC

2SC1514VC

2SC1514VC

Miscellaneous**Symbol**

△

Description

△CRT Socket

Part Number

A76068

Main PCB Ass'y (SU-1133A) Parts List**Resistors****Symbol**

R1406

R1408

R1410

R1414

R1415

R1421

R1422

△FR1401

△R1503

R1504

R1509

R1512

R1514

R1515

R1522

R1523

R1528

R1534

VR1501

△R1703

△R1704

△R1901

R1902

R1903

R1904

R1905

△Q1908

△R1909

R1910

△FR1901

Description

V R 200Ω

V R 200Ω

CMF R 6.8Ω1W J

OM R 3.3KΩ1W J

OM R 2.7KΩ1W J

OM R 12KΩ2W J

V R 10KΩ

△F R 68Ω2W K

△CMF R 11.8KΩ½W +1%

V R 5KΩ

OM R 10KΩ2W J

OM R 8.2KΩ2W J

OM R 820Ω2W J

CMF R 8.2Ω1W J

CMF R 4.7Ω1W J

OM R 68Ω2W J

OM R 390Ω1W J

ZN R

ZN R

△CMF R 39Ω½W +1%

△CMF R 7.68KΩ¼W +1%

△Posistor

UNF R 2Ω7W K

CMF R 4.7Ω3W J

OM R 10KΩ2W J

OM R 18KΩ1W J

△CMF R 47Ω½W +1%

V R 2KΩ

△CMF R 2.74KΩ¼W +1%

△F R 220Ω½W K

Part Number

QVZ3230-002

QVZ3230-002

QRX019J-6R8

QRG019J-332

QRG019J-272

QRG026J-123Z

QVZ3230-014

QRH024K-680M

QVR142F-1182

QVZ3230-053

QRG026J-103Z

QRG026J-822Z

QRG026J-821Z

QRX019J-8R2

QRX019J-4R7

QRG026J-680Z

QRG019J-391

ERZ-C05ZK471

ERZ-C05DK271

QRV122F-3902

QVR142F-7681

A75414

QRF076K-2R0

QRX039J-4R7

QRG026J-103Z

QRG019J-183

QRV122F-470Z

QVP5A0B-023E

QRV142F-2741

QRH124K-221M

Capacitors**Symbol**

C1301

C1402

C1407

C1411

C1412

C1508

△C1512

△C1513

△C1514

C1515

C1520

C1523

C1524

△C1531

△C1532

C1904

C1905

Description

BPE Cap. 3.3uF 50V A

Tan. Cap. 2.2uF 16V K

E Cap. 4.7uF 6.3V A

E Cap. 100uF 160V A

E Cap. 3.3uF 160V A

PP Cap. 5600uF 50V J

△PP Cap. 2000pF DC1500V J

△PP Cap. 2000pF DC1500V J

△PP Cap. 2000pF DC1500V J

PP Cap. 0.53uF DC1200V J

BPE Cap. 3.3uF 50V A

E Cap. 1uF 160V A

M Cap. 0.1uF 200V K

△PP Cap. 2000pF DC1500V J

△PP Cap. 1500pF DC1500V J

E Cap.

E Cap. 10uF 250V A

Part Number

QEN61HA-335Z

QEE51CK-225B

QEW51JA-475

QEW52CA-107

QEW52CA-335

QFP31HJ-562

QFZ0082-202

QFZ0082-202

QFZ0082-202

QFZ0067-534

QEN61HA-335Z

QEW62CA-105Z

QFM720K-104M

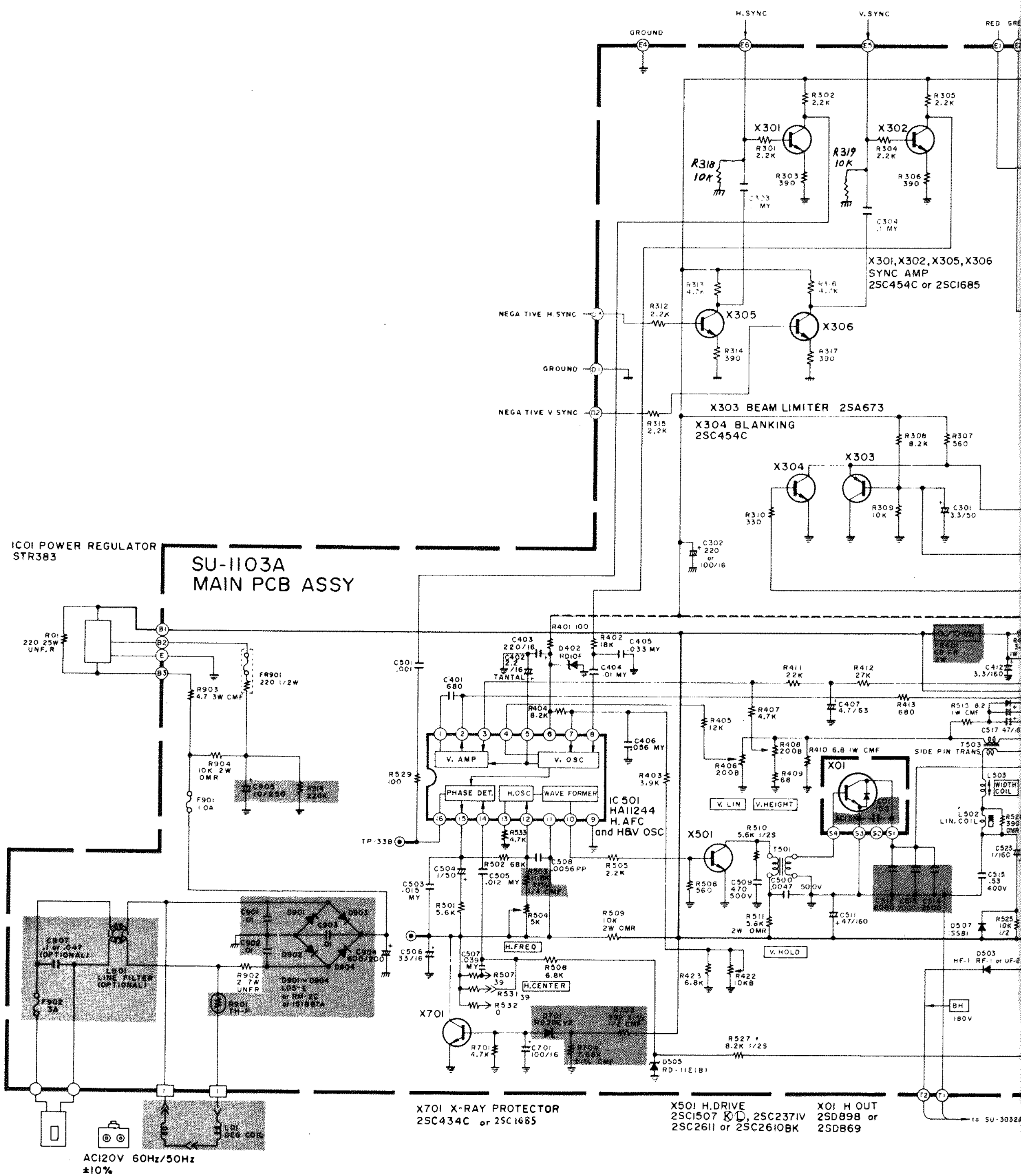
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QFZ0082-152

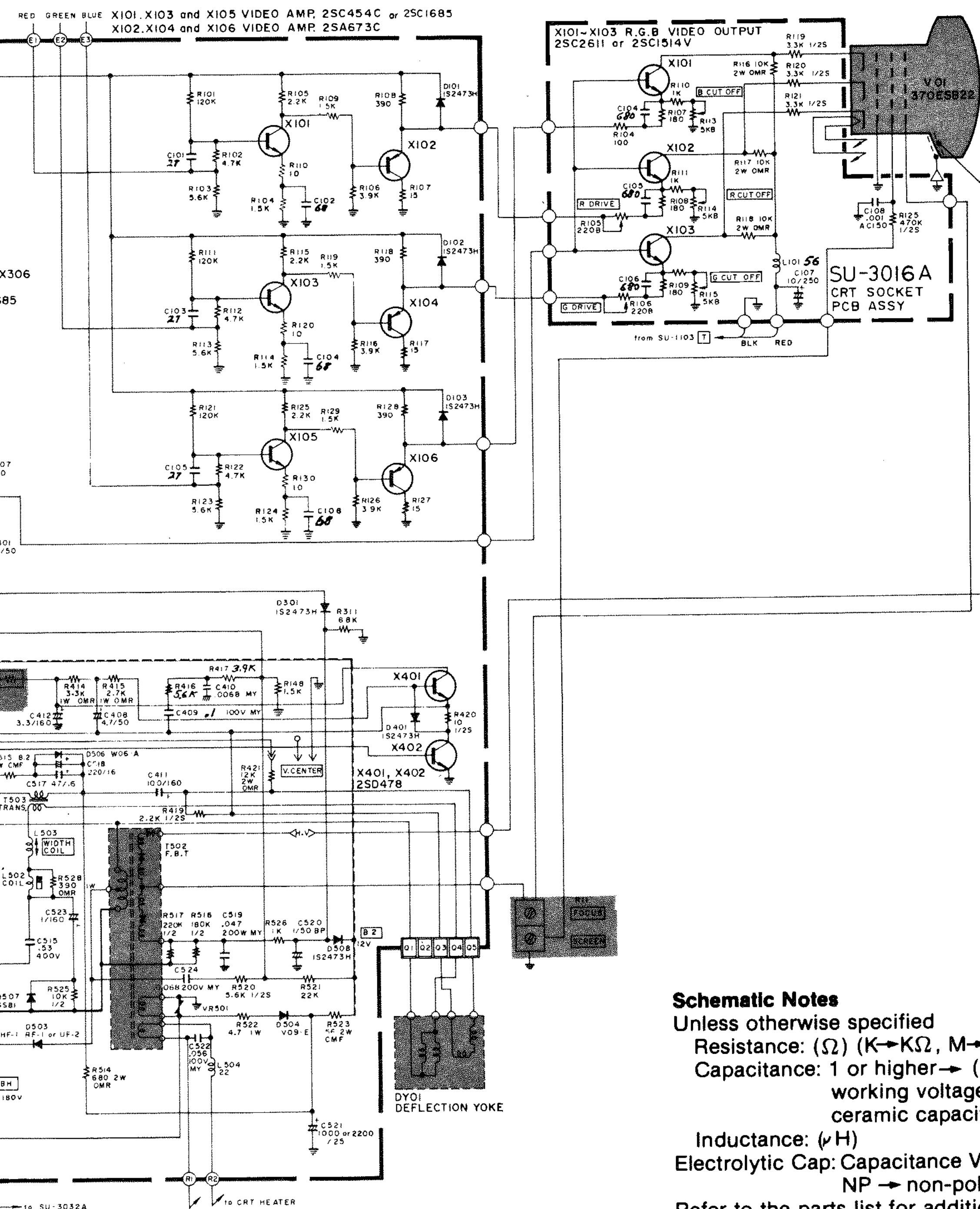
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QEW52EA-106

Coils		
Symbol	Description	Part Number
L1502	Linarity Coil	A39835
L1503	Width Coil	C30380-A
L1504	Heater Choke	C30445-A
Transformers		
Symbol	Description	Part Number
T1501	Hor. Drive Transf.	A46022-BM
T1503	Side Pin Transf.	C39050-A
Semiconductors		
Symbol	Description	Part Number
IC1501	IC	HA11244
X1101	Si. Transistor	2SC1685(R)
X1102	Si. Transistor	2SA673(C)
X1103	Si. Transistor	2SC1685(R)
X1104	Si. Transistor	2SA673(C)
X1105	Si. Transistor	2SC1685(R)
X1106	Si. Transistor	2SA673(C)
X1301	Si. Transistor	2SC1685(R)
X1302	Si. Transistor	2SC1685(R)
X1303	Si. Transistor	2SA673(C)
X1304	Si. Transistor	2SC1685(R)
X1305	Si. Transistor	2SC1685(R)
X1401	Si. Transistor	2SD478
X1402	Si. Transistor	2SD478
X1501	Si. Transistor	2SC2610BK
X1901	Si. Transistor	2SC2688 (K.L.M.)
X1902	Si. Transistor	2SC1890A (E.F.)
D1101	Si. Diode	W06A
D1102	Si. Diode	W06A
D1103	Si. Diode	W06A
D1301	Si. Diode	1SZ473H
D1401	Si. Diode	1SZ473H
D1402	Zener Diode	RD10F(C)
D1503	Si. Diode	HF-1
D1504	Si. Diode	V09E
D1505	Zener Diode	RD11E(B)
D1506	Si. Diode	W06A
D1507	Si. Diode	1SS81
D1508	Si. Diode	1SZ473H
△D1701	△Zener Diode	RD20EV2
△D1901	△Si. Diode	1S1887A
△D1902	△Si. Diode	1S1887A
△D1903	△Si. Diode	1S1887A
△D1904	△Si. Diode	1S1887A
△D1905	△Zener Diode	RD6.8EV3
Miscellaneous		
Symbol	Description	Part Number
△F1901	△Fuse 1.25A	QMF53U1-1R25S
△F1902	△UL Fuse 3A	QMF66U1-3R0S



RED GREEN BLUE X101, X103 and X105 VIDEO AMP, 2SC454C or 2SC1685
X102, X104 and X106 VIDEO AMP, 2SA673C



Schematic Notes

Unless otherwise specified

Resistance: (Ω) (K $\rightarrow$ K Ω , M $\rightarrow$ M Ω), 1/4 (W) carbon resistor

Capacitance: 1 or higher $\rightarrow$ (pF), less than 1 $\rightarrow$ (μ F)

working voltage $\rightarrow$ 50 (V)

ceramic capacitor

Inductance: (μ H)

Electrolytic Cap: Capacitance Value (μ F)/working voltage (V),

NP $\rightarrow$ non-polar (or bipolar) electrolytic cap.

Refer to the parts list for additional component information.

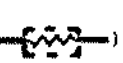
$\odot$ indicates test point connection

$\perp$ indicates chassis ground unless otherwise specified

Hz indicates cycles per second

For **safety** purposes (and continuing reliability)

$\triangle$ replace all components marked with safety symbol with identical type.

NOTE: FR $\rightarrow$ fusible resistor ($\rightarrow$ )

G07-FBO

00-4147-03

Parts identification on circuit boards:

e.g. SU1126A (R107 = R1107)

SU3030A (R113 = R3113)

REPLACEMENT PARTS LIST - ELECTROHOME 13" MONITOR

Components identified by the Δ symbol in the PARTS LIST and on the Schematic have special characteristics important to safety.

DO NOT degrade the safety of the set through improper servicing.

Abbreviations for Resistors and Capacitors

Resistor

C R	: Carbon Resistor
Comp. R	: Composition Resistor
OM R	: Oxide Metal Film Resistor
V R	: Variable Resistor
MF R	: Metal Film Resistor
CMF R	: Coating Metal Film Resistor
UNF R	: Nonflammable Resistor
F R	: Fusible Resistor

Capacitor

C Cap.	: Ceramic Capacitor
M Cap	: Mylar Capacitor
E Cap.	: Electrolytic Capacitor
BP E Cap.	: Bi-Polar (or Non-Polar) Electrolytic Capacitor
MM Cap.	: Metalized Mylar Capacitor
PP Cap.	: Polypropylene Capacitor
MPP Cap.	: Metalized PP Capacitor
PS Cap	: Polystyrol Capacitor
Tan. Cap.	: Tantal Capacitor

NOTE: When ordering replacement parts please specify the part number as shown in this list including part name, and model number. Complete information will help expedite the order.

Use of substitute replacement parts which do not have the same safety characteristics as specified, may create shock, fire or other hazards. For maximum reliability and performance, all parts should be replaced by those having identical specifications.

Symbol	Description	Part Number
	Main P.C.B. Ass'y	SU-1103A
	CRT Socket P.C.B. Ass'y	SU-3016A

Outside of the P.C.B. Ass'y

Symbol	Description	Part Number
Δ V01	Δ Picture Tube	370ESB22(E)
Δ DY01	Δ Deflection Yoke	C29123-V
	PC Magnet	A76366-A
	Wedge	C30006
	Δ Flyback Transf.	A19183-A
Δ R11	Δ Focus V R	A46606-A
Δ R05	UNF Resistor 220 Ω , 25W. K	QRF258K-221
Δ C04	Δ C Capacitor 150 pF, AC1.5KV	QCZ0101-005
X01	Si. Transistor	2SD869
IC01	IC Regulator	STR383
L01	Degaussing Coil	21-1007-31
	Degaussing Coil Pin Terminal (2)	34-708-01
	Degaussing Coil Pin Terminal Housing	34-709-01
	Groundstrap Ass'y.	34-697-04
	Groundstrap Wire Terminal	34-228-03
	Groundstrap Spring (2)	35-3560-01
BR	Support Bracket RH	35-3919-01
BR	Support Bracket LH	35-3919-02
SC	SCREW 10- $\frac{1}{2}$ Pix Tube Mtg. (4)	31-631018-08
WA	Pyramidal Lockwasher (4)	33-255-01
	Clip P.C.B. Support (2)	33-629-02
	Ground Lug	34-33-04
CH	Chassis Base	38-452-01

Main P.C.B. Ass'y (SU-1103A) Parts List

Resistors

Symbol	Description	Part Number
R1406	V R 200 Ω	QVZ3230-022
R1408	V R 200 Ω	QVZ3230-022
R1410	CMF R 6.8 Ω 1W J	QRX019J-6R8
R1414	OM R 3.3K Ω 1W J	QRG019J-332
R1415	OM R 2.7K Ω 1W J	QRG019J-272
R1421	OM R 12K Ω 2W J	QRG029J-123
R1422	V R 10K Ω	QVZ3224-014H
△FR1401	△F R 68 Ω 2W K	QRH024K-680M
△R1503	△CMF R 11.8K Ω ¼W +1%	QRV142F-1182
R1504	V R 5K Ω	QVZ3230-053
R1509	OM R 10K Ω 2W J	QRG029J-103
R1511	OM R 5.6K Ω 2W J	QRG029J-562
R1514	OM R 680 Ω 2W J	QRG029J-681
R1515	CMF R 8.2 Ω 1W J	QRX019J-8R2
R1522	CMF R 4.7 Ω 1W J	QRX019J-4R7
R1523	OM R 56 Ω 2W J	ORG029J-560
R1528	OM R 390 Ω 1W J	ORG019J-391
R1534	ZN R	ERZ-C05ZK471
VR1501	ZN R	ERZ-C05DK271
△R1703	△CMF R 39K Ω ½W +1%	QRV122F-3902
△R1704	△CMF R 7.68K Ω ¼W +1%	QRV142F-7681
△R1901	△Posistor	A75414
R1902	UNF R 2 Ω 7W K	QRF076K-2R0
R1903	CMF R 5.6 Ω 3W J	QRX039J-5R6
R1904	OM R 10K Ω 2W J	QRG026J-103Z
△FR1901	△F R 220 Ω ½W K	QRH124K-221M

Capacitors

Symbol	Description	Part Number
C1402	Tan. Cap. 2.2uF 16V K	QEE51CK-225B
C1411	E Cap. 100uF 160V A	QEW52CA-107
C1412	E Cap. 3.3uF 160V A	QEW52CA-335
C1508	PP Cap. 5600pF 50V J	QFP31HJ-562
C1511	E Cap. 47uF 160V A	QEW52CA-476S
△C1512	△PP Cap. 2000pF DC1500V J	QFZ0082-202
△C1513	△PP Cap. 2000pF DC1500V J	QFZ0082-202
△C1514	△PP Cap. 2500pF DC1500V J	QFZ0082-252
C1515	PP Cap. 0.53uF DC1200V K	QFZ0067-534
C1520	BPE Cap. 1uF 50V A	QEN61HA-105Z
C1524	M Cap. 0.1uF 200V K	QFM72DK-682M
C1904	E Cap.	QEY0034-001
C1905	E Cap. 10uF 250V A	QEW52EA-106
△C1907	△MM Cap. 0.1uF AC150V Z	QFZ9008-104

Coils

Symbol	Description	Part Number
L1501	Peaking Coil	A75360-6
L1502	Linearty Coil	A39934
L1503	Width Coil	C30380-A
L1504	Heater Choke	C30333-A
L1901	Line Filter	A39475-J

Transformers

Symbol	Description	Part Number
T1501	Hor. Drive Transf.	A46022-BM
T1503	Side Pin Transf.	C39050-A

Semiconductors		
Symbol	Description	Part Number
IC1501	I.C.	HA11244
X1101	Si. Transistor	2SC1685(R)
X1102	Si. Transistor	2SA673(C)
X1103	Si. Transistor	2SC1685(R)
X1104	Si. Transistor	2SA673(C)
X1105	Si. Transistor	2SC1685(R)
X1106	Si. Transistor	2SA673(C)
X1301	Si. Transistor	2SC1685(R)
X1302	Si. Transistor	2SC1685(R)
X1303	Si. Transistor	2SA673(C)
X1304	Si. Transistor	2SC1685(R)
X1305	Si. Transistor	2SC1685(R)
X1401	Si. Transistor	2SD478
X1402	Si. Transistor	2SD478
X1501	Si. Transistor	2SC2610BK
X1701	Si. Transistor	2SC1685(P-S)
D1101	Si. Diode	W06A
D1102	Si. Diode	W06A
D1103	Si. Diode	W06A
D1301	Si. Diode	1S2473H
D1401	Si. Diode	1S2473H
D1402	Zener Diode	RD10F(C)
D1503	Si. Diode	HF-1
D1504	Si. Diode	V09E
D1505	Zener Diode	RD11E(B)
D1506	Si. Diode	W06A
D1507	Si. Diode	1SS81
D1508	Si. Diode	1S2473H
△D1701	△Zener Diode	RD20EV2
△D1901	△Si. Diode	1S1887A
△D1902	△Si. Diode	1S1887A
△D1903	△Si. Diode	1S1887A
△D1904	△Si. Diode	1S1887A
Miscellaneous		
Symbol	Description	Part Number
△F1901	△Fuse 1A	QMF53U1-1R0S
△F1902	△UL Fuse 3A	QMF66U1-3R0S

CRT Socket P.C.B. Ass'y (SU-3016A) Parts List

Resistors

Symbol	Description	Part Number
R3105	V R 200 Ω	QVZ3234-022
R3106	V R 200 Ω	QVZ3234-022
R3113	V R 5K Ω	QVZ3234-053
R3114	V R 5K Ω	QVZ3234-053
R3115	V R 5K Ω	QVZ3234-053
R3116	OM R 10K Ω 2W J	QRG029J-103
R3117	OM R 10K Ω 2W J	QRG029J-103
R3118	OM R 10K Ω 2W J	QRG029J-103
R3119	Comp. R 3.3K Ω ½W K	QRZ0039-332
R3120	Comp. R 3.3K Ω ½W K	QRZ0039-332
R3121	Comp. R 3.3K Ω ½W K	QRZ0039-332

Capacitors

Symbol	Description	Part Number
C3107	E Cap. 10uF 250V A	QEW52EA-106
C3108	C Cap. 1000pF DC1400V P	QCZ9001-102M

Coils

Symbol	Description	Part Number
L3101	Peaking coil	QQL043K-101

Semiconductors

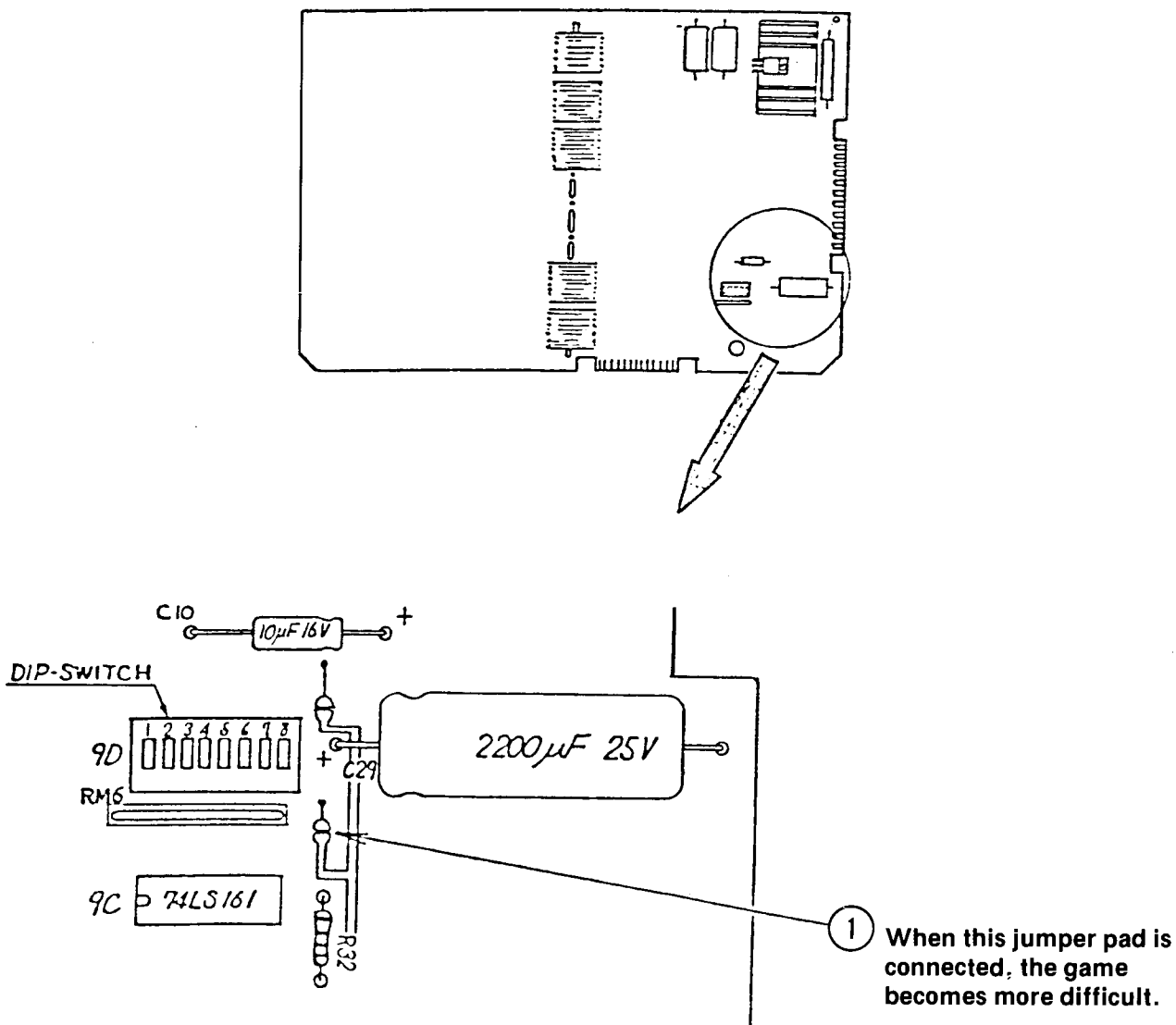
Symbol	Description	Part Number
X3101	Si. Transistor	2SC2611
X3102	Si. Transistor	2SC2611
X3103	Si. Transistor	2SC2611

Miscellaneous

Symbol	Description	Part Number
	 CRT Socket	A75522

INSTRUCTIONS FOR MODIFICATION OF PAC-MAN GAME PCB

THE FOLLOWING ARE INSTRUCTIONS FOR MODIFYING PAC-MAN PCB SUCH THAT ① THE DEGREE OF DIFFICULTY OF THE GAME IS INCREASED.



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 TO SUBPART J OR 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.

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