



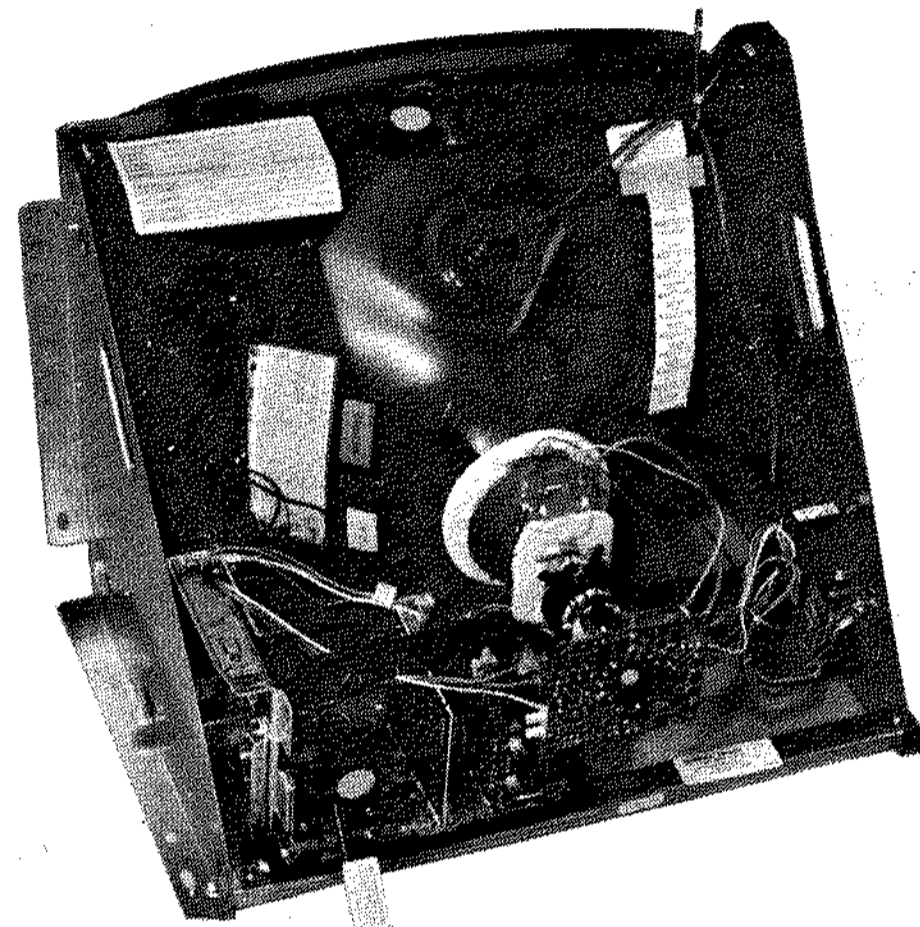
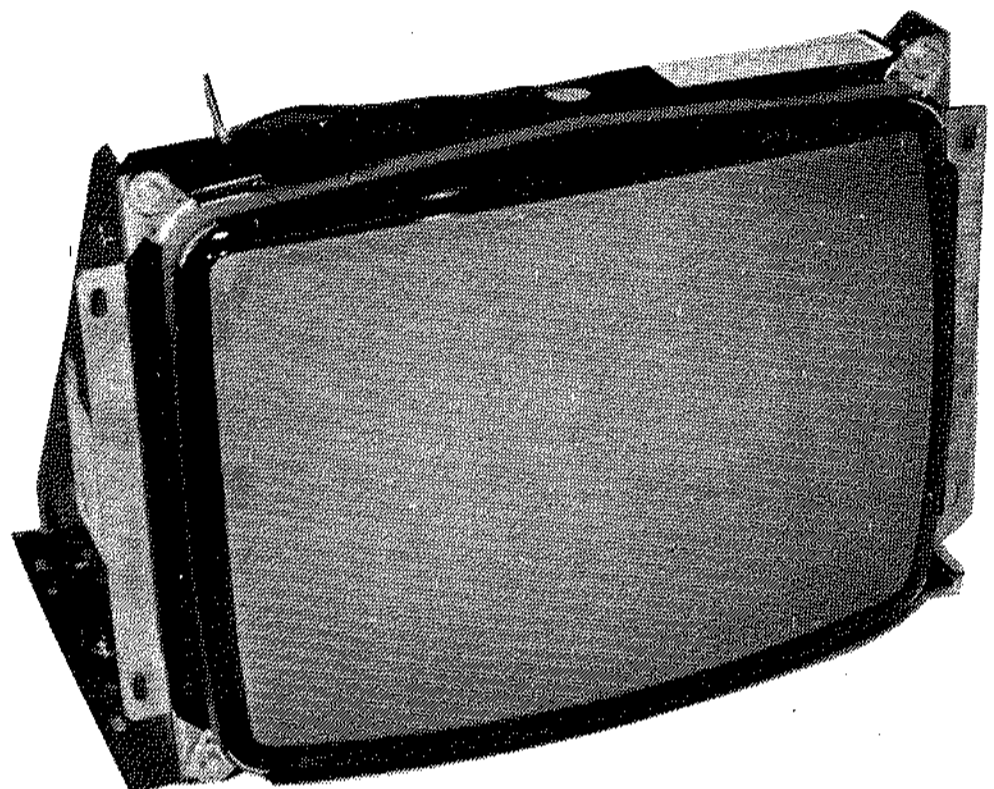
WELLS-GARDNER ELECTRONICS CORPORATION

19" IN LINE COLOR MONITORS

MODELS

19K4625

19K4626

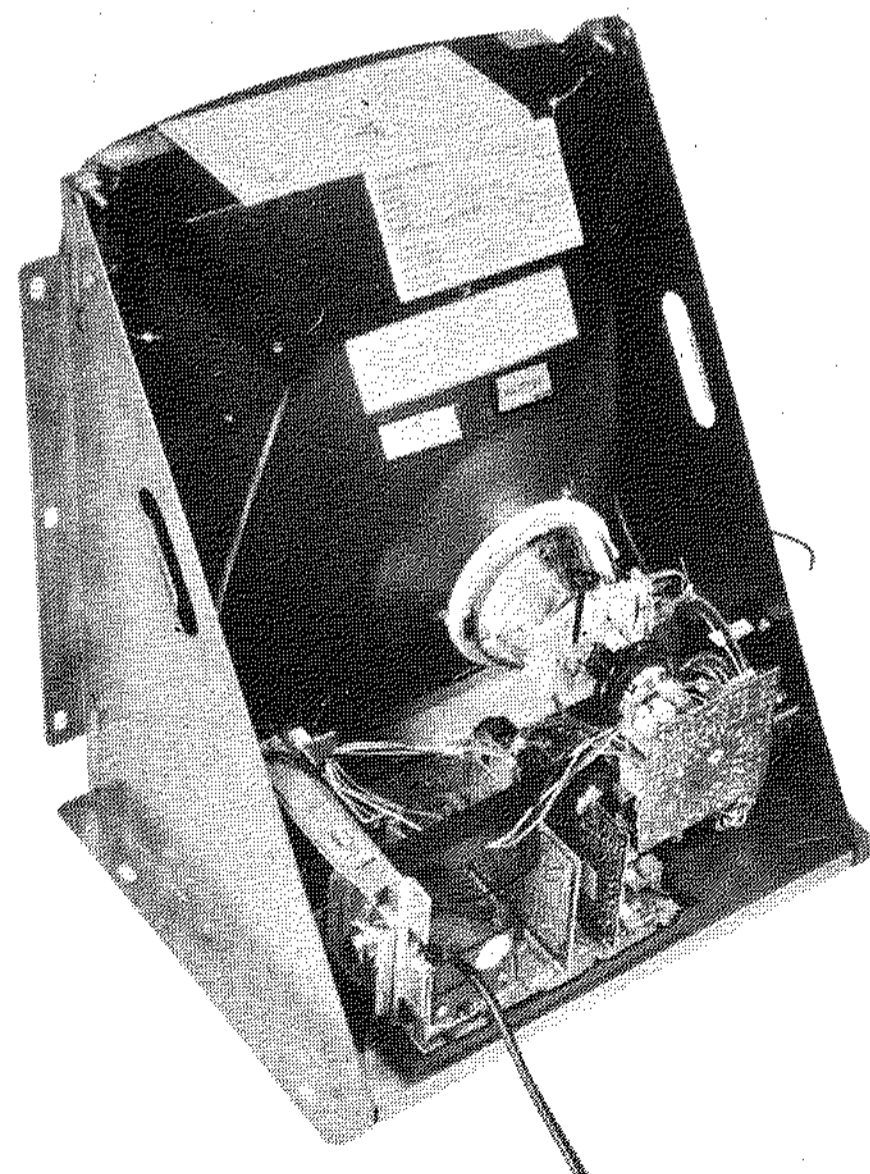
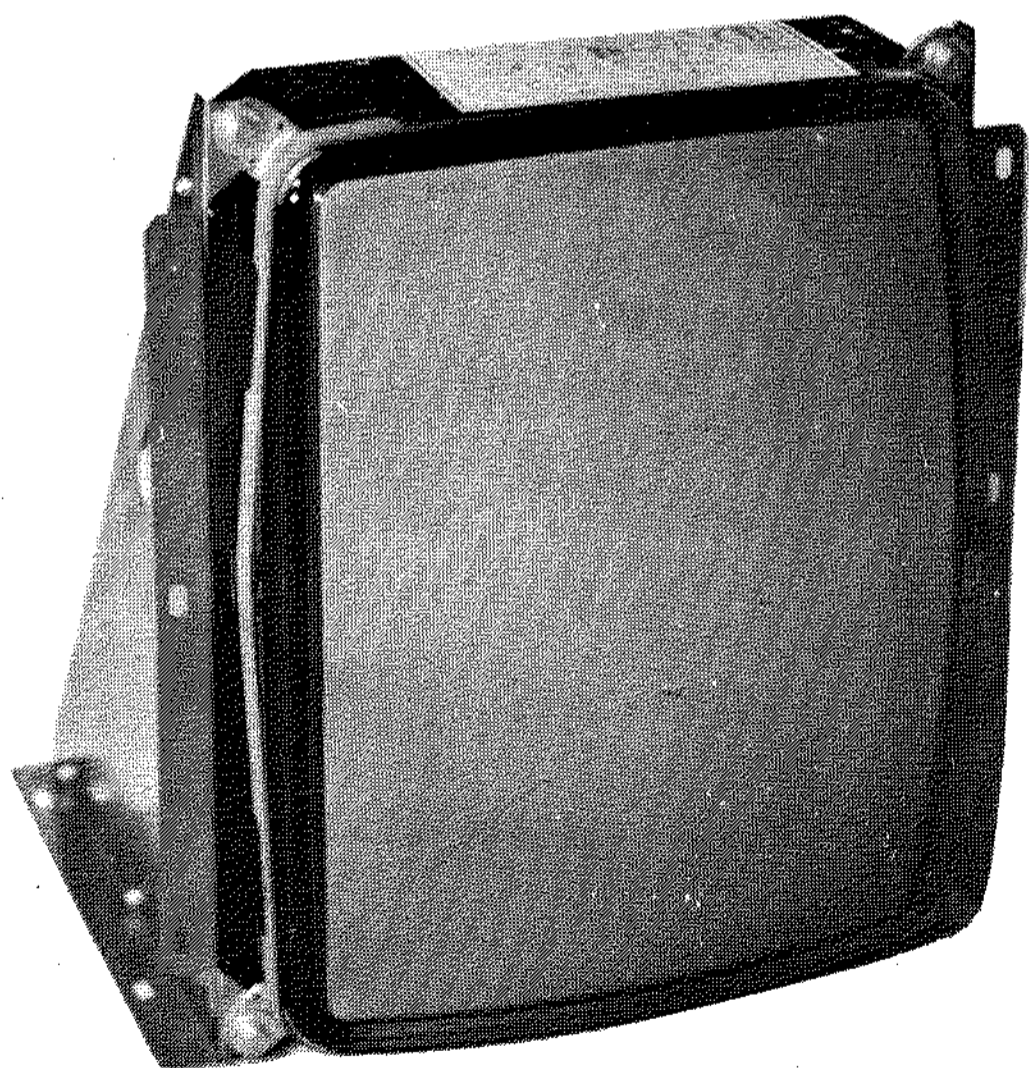


MODELS

19K4675

19K4676

19K4677



**WELLS-GARDNER ELECTRONICS
CORPORATION**

2701 NORTH KILDARE AVENUE
CHICAGO, ILLINOIS 60639

WARNINGS

1. Power Up 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.

Before servicing is performed, read all the precautions labelled on the CRT and chassis.

2. **X-RAY RADIATION WARNING NOTICE**

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.

3. High Voltage—

This monitor contains HIGH VOLTAGES derived from power supplies capable of delivering LETHAL quantities of energy. Do not attempt to service until all precautions necessary for working on HIGH VOLTAGE equipment have been observed.

4. CRT Handling—

Care must be taken not to bump or scratch the picture tube as this may cause the picture tube to implode resulting in personal injury. Shatter proof goggles must be worn when handling the CRT. High voltage must be completely discharged before handling. Do not handle the CRT by the neck.

5. **PRODUCT SAFETY NOTICE**

WARNING: FOR CONTINUED SAFETY REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER RECOMMENDED PARTS. THESE PARTS ARE IDENTIFIED BY SHADING AND BY (Δ) ON THE SCHEMATIC DIAGRAM.

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.

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

PERFORMANCE AND OPERATING DATA

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

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

3. Set Up Controls.

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

1.0 Supply

Voltage 108 VAC-132 VAC

Frequency 50 Hz-60 Hz

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

2.0 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

3.0 Service Set-Up Controls

POWER PC BOARD

3.1 Voltage Adjustment, VR501 (Set for 127V DC)

VERT/HORIZ PC BOARD

3.2 Vertical Hold Control, VR301

3.3 Vertical Size Control, VR302

3.4 Horizontal Oscillator Coil, L351

3.5 Horizontal Hold Control, VR351

MAIN PC BOARD

3.6 Vertical Raster Position Adjustment, J604
(3 positions)

3.7 Horizontal Raster Position Adjustment, J608
(3 positions)

INTERFACE PC BOARD

3.8 Black Level Control, VR201

3.9 Horizontal Video Position Control, VR202

NECK PC BOARD

3.10 Video Drive Controls, Red VR401
Green VR402

3.11 CRT Cut Off Controls, Red VR403
Green VR404
Blue VR405

3.12 Screen Control, VR406

CHASSIS

3.13 Focus Control, VR702

3.14 Horizontal Width Coil, L702

SERVICE INSTRUCTIONS

NOTE: All monitors are equipped with automatic degaussing coils (L701) which demagnetize the picture tube every time the monitor is turned on after being off for a minimum of 5 minutes. Should any part of the chassis become magnetized it will be necessary to degauss the affected area with a manual degaussing coil. Move the coil slowly around the CRT face area then slowly withdraw for a distance of 6 feet before turning off.

1.0 +127V ADJUSTMENT (See Fig. 1)

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

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

2.0 BLACK LEVEL CONTROL ADJUSTMENT

This control has been set at the factory and should not need further attention, 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).

3.0 VERTICAL SIZE (HEIGHT)

The vertical height control is a screw-driver adjustment. Location of this control is shown in Fig. 2. This control must be adjusted slowly, if necessary, until the picture or test pattern attains the correct vertical proportions.

4.0 CIRCUIT PROTECTION

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

5.0 FOCUS

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

6.0 HORIZONTAL OSC. ALIGNMENT (See Fig. 2)

A warm-up period of at least five minutes should be allowed before alignment is carried out. With the monitor being driven from the game signal, set VR351 to its mechanical center and short the lower end of R328 (TP32) to ground. Adjust L351 until picture stops sliding horizontally. Remove the short.

7.0 HORIZONTAL VIDEO POSITION

If the video is off center on the raster some compensation can be made by adjusting this control.

8.0 VERTICAL RASTER POSITION ADJUSTMENT

If the video is off center vertically, (short dimension of picture tube) some compensation can be made by moving J604 to either No.1 or No. 3 of P604. Position No. 1 moves raster up and position No.3 moves raster down.

9.0 HORIZONTAL RASTER POSITION ADJUSTMENT

If the video is off center horizontally (long dimension of picture tube) some compensation can be made by moving J608 to either No. 1 or No.3 of P608. Position No. 1 moves raster to the left and position No. 3 moves raster to the right.

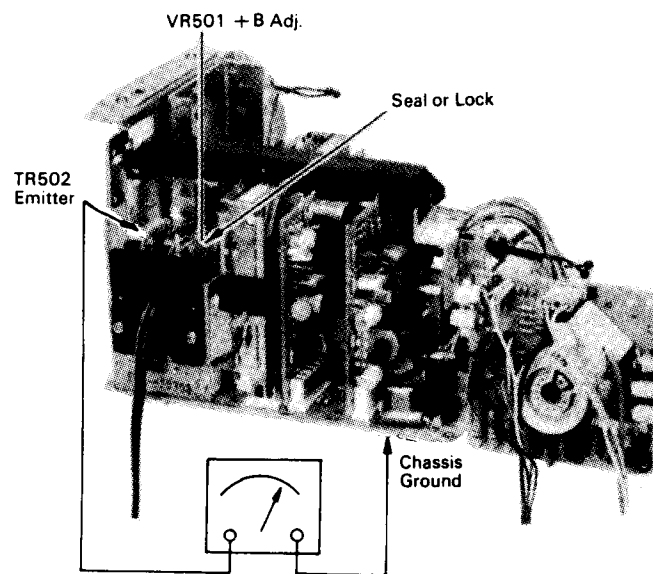


FIGURE 1

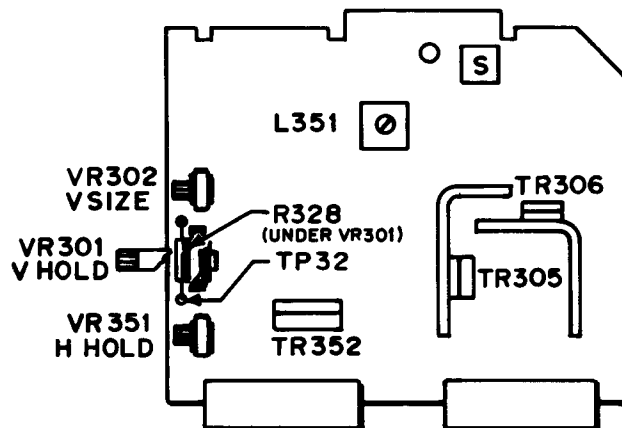


FIGURE 2

VERT./HORIZ. BOARD

INSTALLATION AND SERVICE INSTRUCTIONS

OUTLINE OF CONVERGENCE AND SET-UP PROCEDURE

- 1.0 Degaussing-Demagnetize shadow mask with external degaussing coil.
 - 2.0 Purity and Vertical Centering—Adjust purity magnet and yoke position.
 - 3.0 Static Convergence-Converge Red and Blue on Green in center of screen.
 - 4.0 Dynamic Convergence-Converge Red and Blue at edges of screen.
 - 5.0 White Balance-Set Gray and White brightness tracking.
- NOTE: Number 2.0 and 3.0 adjustments interact.

1.0 DEGAUSSING

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.

2.0 COLOR PURITY AND VERTICAL CENTERING ADJUSTMENT

- 2.1 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.
- 2.2 Set the converger assembly on the CRT neck with the center line (of the Purity Adjustment Magnet) over the gap between grids no. 3 & 4. (See Figure 3).
- 2.3 Make certain that the magnetic ring-pairs are in their correct positions before starting procedure. This produces a zero-correction state and helps facilitate adjustments.
- 2.4 Models which have vertical raster position adjustment, J604 must be in position #2 (center) of P604.
- 2.5 Remove R-G-B signal from monitor.
- 2.6 Turn Green Cut off Control (VR404) on the Neck Board fully CCW. (See Fig. 4)
- 2.7 Turn Red and Blue Cut off Control (VR405) fully CW.
- 2.8 Pull the Deflection Yoke backward so that the Magenta belt will appear. (See Fig. 5)
- 2.9 Move the two Purity Magnets and bring the Magenta belt to the mechanical center of the screen.
- 2.10 Push the Deflection Yoke forward gradually and fix it at the place where the Magenta screen becomes uniform throughout.
- 2.11 Turn Cut off Control, and Drive Control and confirm that each color is uniform.
- 2.12 If the color is not uniform, re-adjust it moving Purity Magnets slightly.
- 2.13 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.
- 2.14 Obtain the three colors and confirm whether white uniformity is balanced.
- 2.15 Insert the temporary wedge as shown in Fig. 5 and adjust the angle of Deflection Yoke.

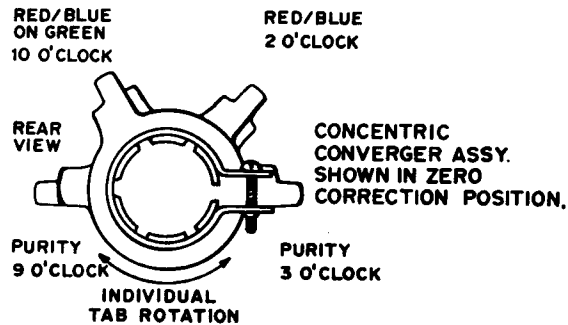
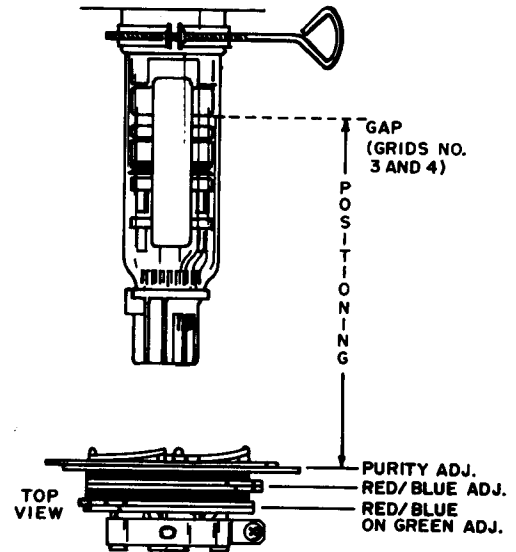


FIGURE 3

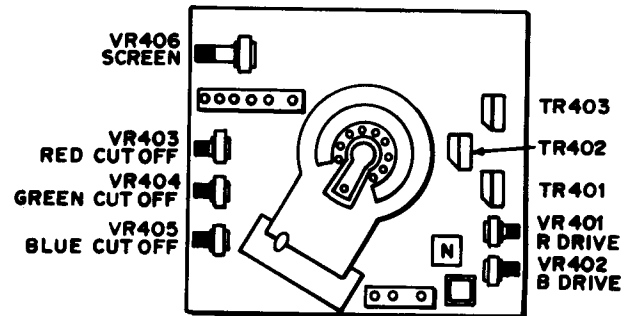


FIGURE 4

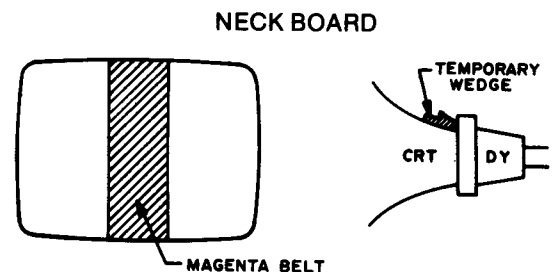


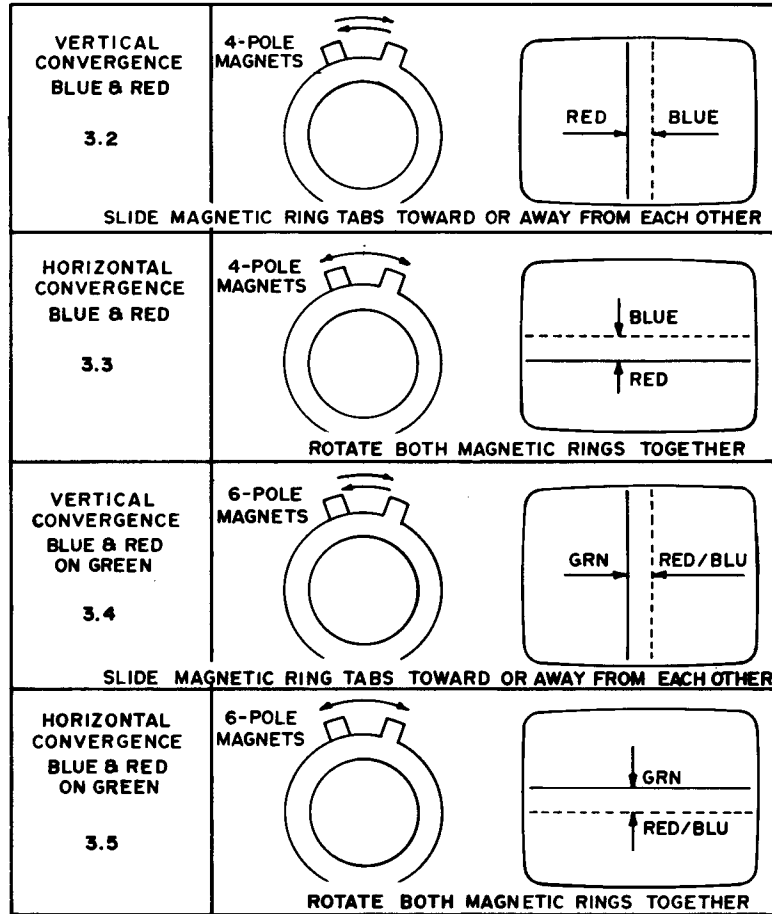
FIGURE 5

3.0 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.

- 3.1 A cross hatch signal should be connected to the monitor.
- 3.2 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. 6) Variation of the angle between the tabs adjusts the convergence of red and blue vertical lines.
- 3.3 When both 4-Pole Convergence Magnet Tabs are rotated as a pair, the convergence of the red and blue horizontal lines is adjusted.
- 3.4 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. 6). Variation of the opening angle adjusts the convergence of magenta to green vertical lines.
- 3.5 When both 6-Pole Convergence Magnet Tabs are rotated as a pair the convergence of magenta to green horizontal lines is adjusted.

GREEN GUN IS THE CENTER GUN.
CONVERGE THE RED AND BLUE.
THEN CONVERGE RED AND BLUE ON GREEN.



REPEAT 3.2 & 3.3 IF ALL LINES ARE NOT CONVERGED AT CENTER

5827

FIGURE 6

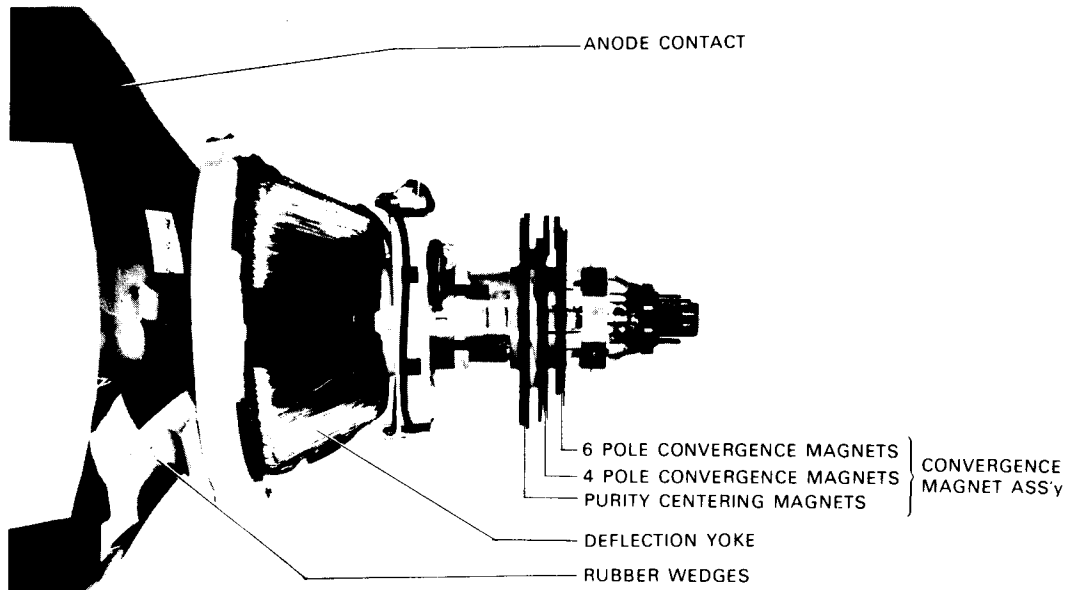


FIGURE 7

4.0 PRECISE ADJUSTMENT OF DYNAMIC CONVERGENCE (See Fig. 9 and 10)

- 4.1 Feed a cross hatch signal to the monitor.
- 4.2 Insert the temporary wedge and fix Deflection Yoke so as to obtain the best circumference convergence (See Fig. 9 and 10)

NOTE:

The temporary wedges may need to be moved during adjustments.

- 4.3 Insert three rubber wedges to the position as shown in Fig. 8 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. 9 (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. 10 (a) and (b).
- 3) Use three rubber wedges (thick and thin rubber wedges are used for a purpose).
- 4) The angle of each rubber wedge is shown in Fig. 8.
- 5) After three rubber wedges have been inserted, pull out the temporary wedge.
- 6) Fix the rubber wedges with chloroprene rubber adhesive.

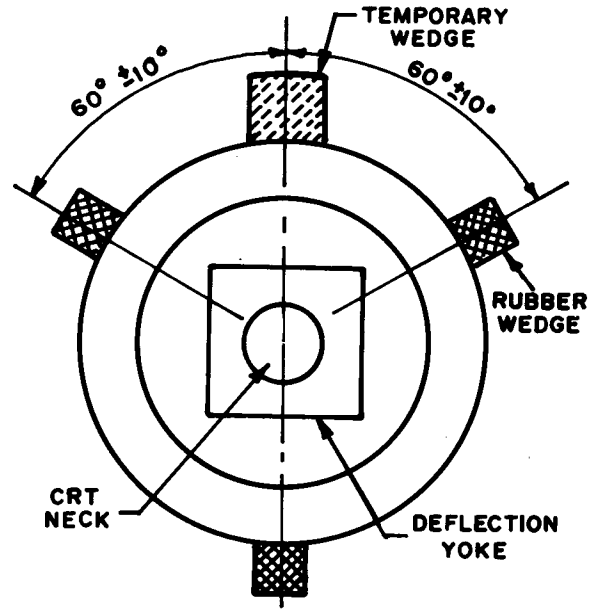


FIGURE 8

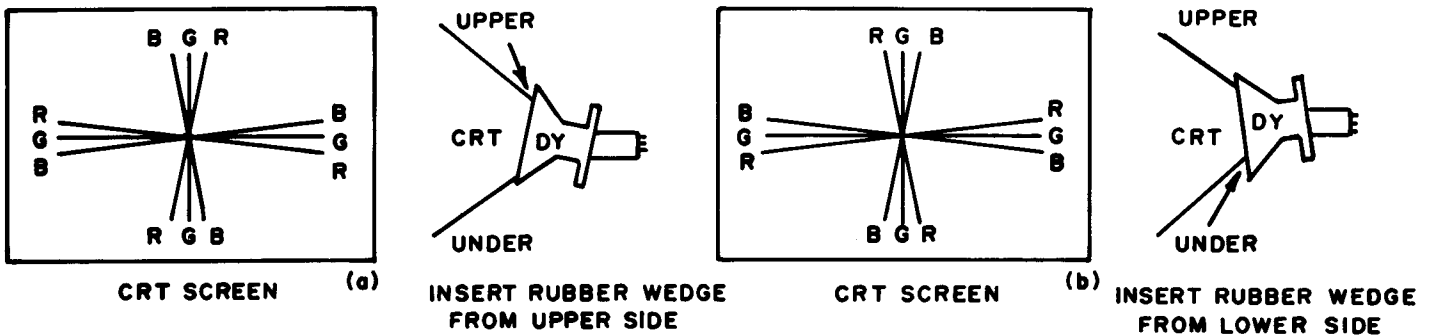


FIGURE 9

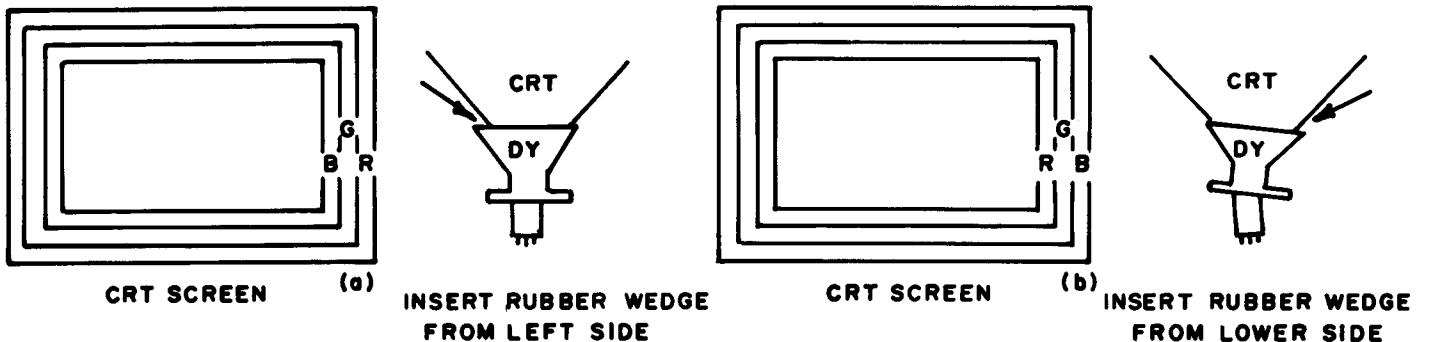
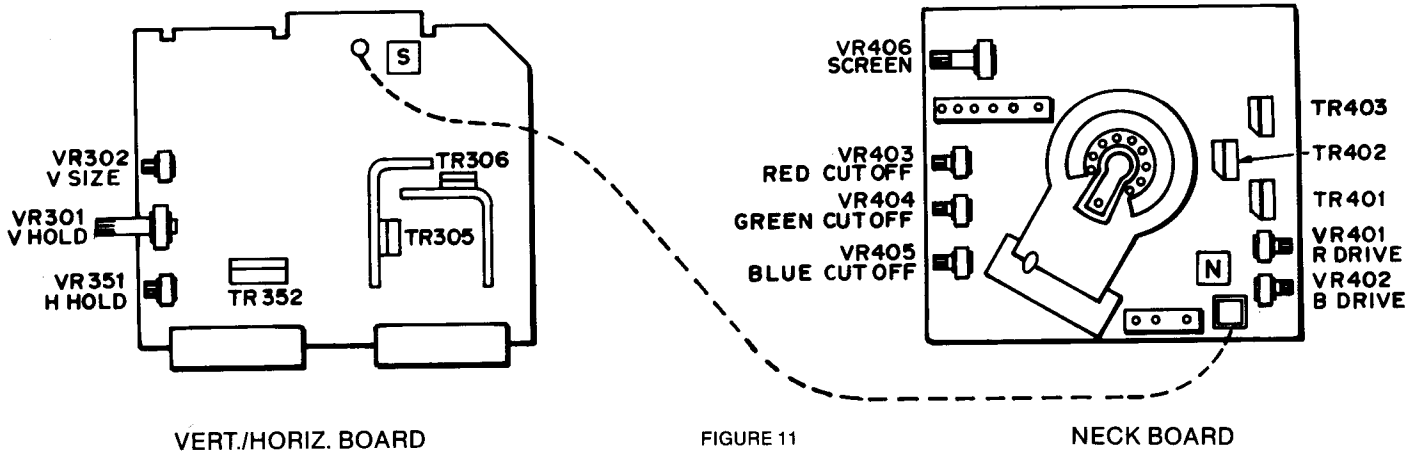


FIGURE 10

5.0 WHITE BALANCE

- 5.1 Refer to Fig. 11. and do the following in sub-dued light.
- 5.2 Ground the R/G/B inputs.
- 5.3 Set the R/B drive controls to their mechanical center.
- 5.4 Set the screen and R/G/B cutoff controls to minimum (fully CCW).
- 5.5 Insert service tip "N" on Neck PCB to "S" on Vert/ Horiz. PCB (see Fig. 11).
- 5.6 Slowly turn the screen control (CW) until the first faint line appears. Do not touch the associated cutoff control—it will stay fully CCW.
- 5.7 Slowly turn up the two remaining cutoff controls to match the first. This should result in a white line.
- 5.8 Replace the Service Tip "N" to the Neck PCB.
- 5.9 Adjust the Black Level Control for dim raster. Touch up the cutoff controls for best gray uniformity.
- 5.10 Adjust the Black Level Control for a bright White Raster, Adjust the R/B Drive Controls if necessary for best neutral white.
- 5.11 Repeat steps 5.9 and 5.10 until good tracking of white balance is achieved.



6.0 HIGH VOLTAGE PROTECT

- 6.1 The AUTO PROTECT circuit prevents the high voltage from reaching dangerous levels should a defect such as a short circuit occur between collector and emitter of the voltage regulator transistor.
- 6.2 When the + 127V DC exceeds approx. + 141V DC the horizontal oscillator is shut down.
- 6.3 When the defect is removed the oscillator will not restart until the power is removed momentarily.

P.C. BOARD LAYOUT

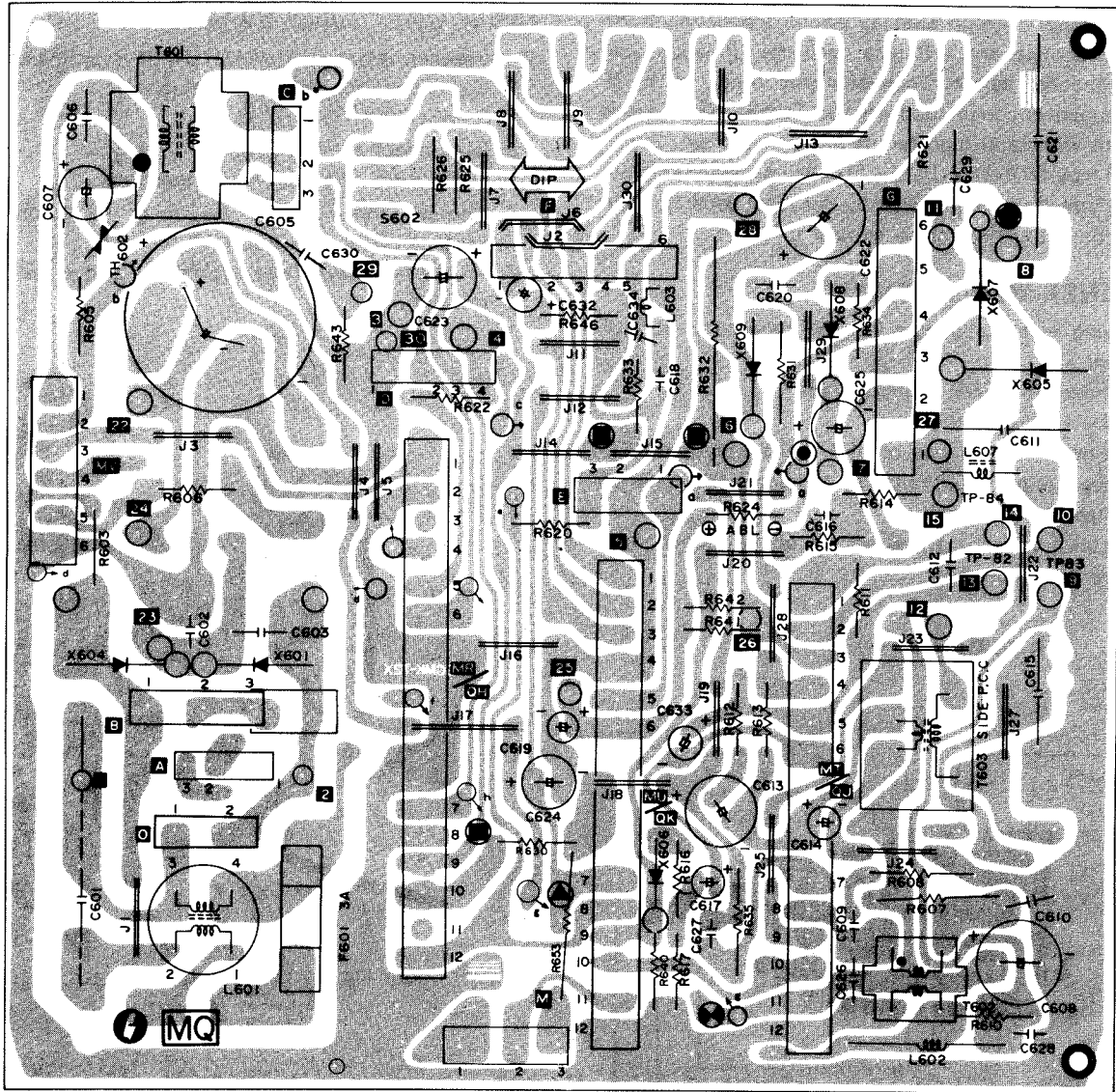


FIGURE 12. MAIN P.C. BOARD

P.C. BOARD LAYOUT

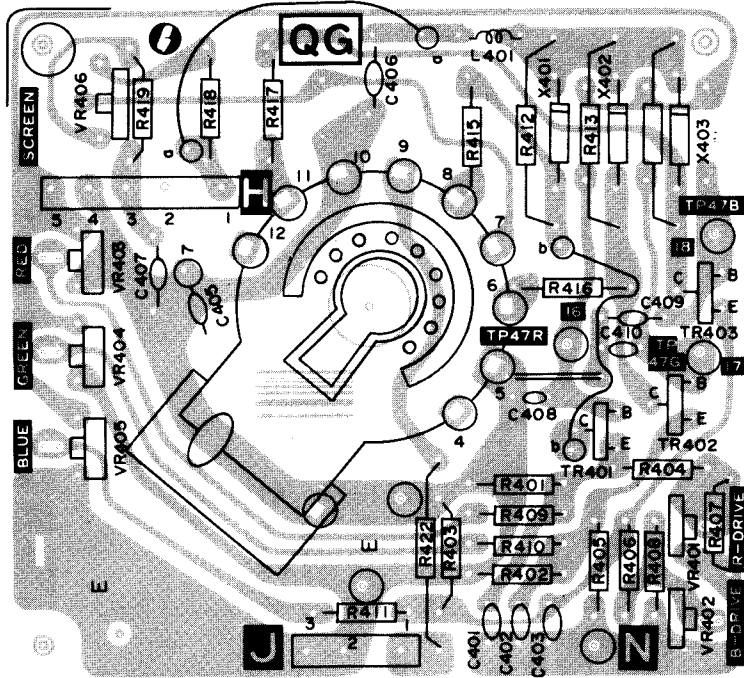


FIGURE 13. NECK P.C. BOARD

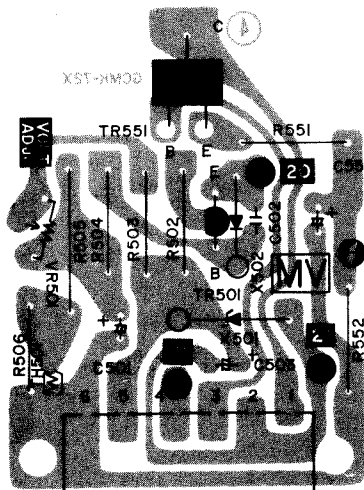


FIGURE 14. POWER P.C. BOARD

P.C. BOARD LAYOUT

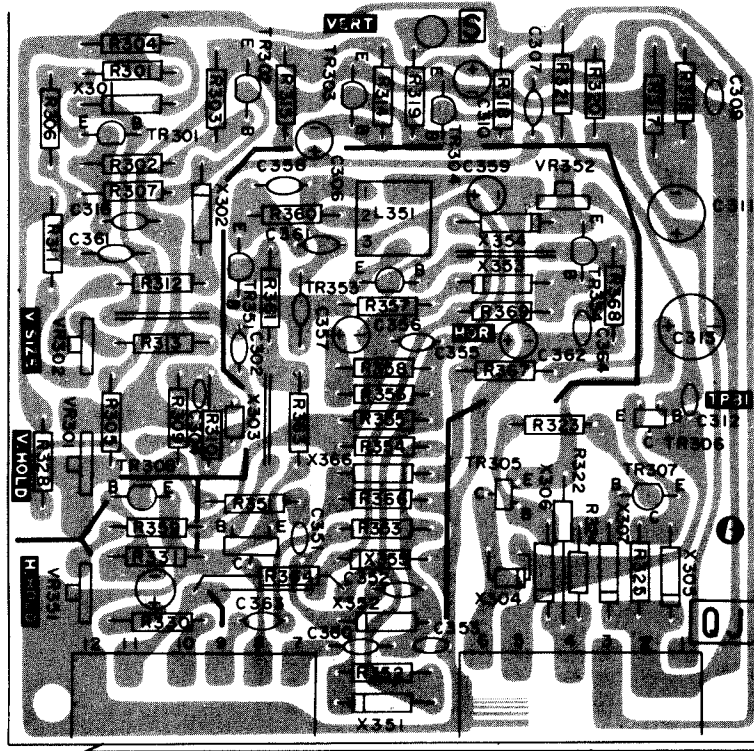


FIGURE 15. HORIZ/VERT P.C. BOARD

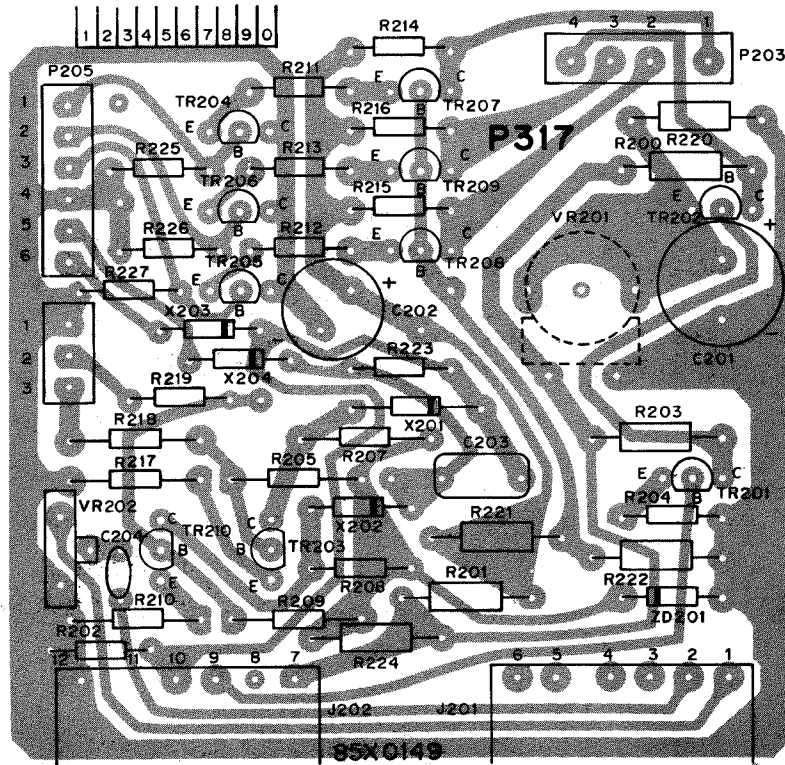


FIGURE 16. INTERFACE BOARD (P317 AND P318)

REPLACEMENT PARTS LIST

This monitor 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 Δ ★ on parts list should be replaced with exact factory replacement parts.

The use of substitute parts may create a shock, fire, radiation or other hazard. Service should be performed by qualified personnel only.

MAIN BOARD

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
RESISTORS			CAPACITORS		
R603	340X3334-944	330k Ohm, \pm 10%, 1/2W Carbon	Δ C601	203X1800-451	0.1 uF, 125V, \pm 20% MM
R606	204X1425-021	470 Ohm, \pm 10%, 5W W.W.	C602	80X0096-038	2200 pF, Z5F, \pm 10% Ceramic
Δ ★ R607	204X1450-508	2.7k Ohm, \pm 10%, 5W W.W.	Δ C603	202X7810-214	2200 pF, 125V Ceramic
R608	203X9014-603	1.2k Ohm, \pm 5%, 1W M.O.	C604	80X0096-038	2200 pF, Z5F, \pm 10% Ceramic
R610	203X6500-246	22 Ohm, \pm 5%, 1/8W Carbon	C605	203X0220-043	330 uF, 200V Electrolytic
R611	203X6700-562	1k Ohm, \pm 5%, 1/2W Carbon	C608	203X0040-052	47 uF, 160V Electrolytic
R612	340X3471-944	470 Ohm, \pm 10%, 1/2W Carbon	C609	202X7050-366	.0033 uF, 500V, \pm 10% Ceramic
R613	203X9010-757	1.2k Ohm, \pm 5%, 1W M.O.	C610	202X7050-483	.01 uF, 500V, \pm 10% Ceramic
R614	203X5202-320	680k Ohm, \pm 5%, 1/2W Comp.	C611	202X8140-022	100 pF, 3KV, \pm 10% Ceramic
R615	203X5602-156	270k Ohm, \pm 5%, 1/2W Comp.	C612	203X1201-047	.022 uF, 200V, \pm 10% PP
R616	203X6500-741	2.7k Ohm, \pm 5%, 1/8W Carbon	C613	203X0015-035	220 uF, 25V Electrolytic
R617	203X6501-088	68k Ohm, \pm 5%, 1/8W Carbon	C614	203X0015-006	33 uF, 25V Electrolytic
R624	203X6205-843	1k Ohm, \pm 5%, 1/2W Carbon	C615	203X1201-288	0.39 uF, 200V, \pm 10% PP
R631	203X9015-087	2.2 Ohm, \pm 10%, 5W M.O.	C616	202X8065-499	47 pF, 25V Ceramic
R632	340X8121-731	120 Ohm, \pm 5%, 5W Carbon	C617	203X0025-019	1 uF, 50V Electrolytic
R634	203X6000-002	2.2 Ohm, \pm 5%, 1/8W Carbon	C619	203X0025-019	1 uF, 50V Electrolytic
R635	340X3682-944	6.8 Ohm, \pm 5%, 1/2W Carbon	C620	203X1107-038	0.1 uF, 100V, \pm 10% Mylar
R641	203X6501-002	33k Ohm, \pm 5%, 1/8W Carbon	C621	202X9040-155	0.1 uF, 1.5KV, \pm 20% Paper
R642	203X6500-927	15k Ohm, \pm 5%, 1/8W Carbon	C622	203X0020-099	1000 uF, 35V Electrolytic
R647	340X5150-841	15 Ohm, \pm 10%, 2W Carbon	C623	203X0015-053	470 uF, 25V Electrolytic
R649	340X3182-944	1.8k Ohm, \pm 10%, 1/2W Carbon	C624	203X0015-021	100 uF, 25V Electrolytic
R650	340X3271-944	270 Ohm, \pm 10%, 1/2W Carbon	C625	203X0040-020	10 uF, 160V Electrolytic
R651	340X5241-743	240 Ohm, \pm 10%, 2W Carbon	C626	202X7050-009	100 pF, 500V, \pm 10% Ceramic
R652	340X3682-944	6.8k Ohm, \pm 10%, 1/2W Carbon	C627	202X8065-461	39 pF, 500V, \pm 10% Ceramic
SEMICONDUCTORS			C628	202X7000-327	2200 pF, 500V, \pm 10% Ceramic
TF601	200X3189-304	Transistor, 2SC1893	\star C629	203X1270-470	6900 pF, 1.5KV, \pm 5% PP
X601	201X3130-109	Rectifier, (Si) RM-2AV 600V	C633	203X0315-033	2.2 uF, 50V Electrolytic
X602	201X3130-109	Rectifier, (Si) RM-2AV 600V	C637	202X8105-014	3 pF, 2kV, \pm 0.5 pF Ceramic
X603	201X3130-109	Rectifier, (Si) RM-2AV 600V	C638	342X5632-040	.056 uF, 10% Mylar
X604	201X3130-109	Rectifier, (Si) RM-2AV 600V	MISCELLANEOUS		
X605	200X8130-171	Diode (HS) SB-2CGL 1200V min.	Δ F601	204X7120-062	Fuse (UL/CSA) 3A-125
X606	201X2010-144	Diode (Si) IS2473-772	J607	206X5003-960	Socket, 6 Pin
X607	201X2100-119	Diode (HS) RC-2V 0.8 US	P602	204X9600-260	Plug, 3 Pin (GT)
X608	201X2130-234	Diode (HS) RU-2V	P604	204X9600-298	Plug, 4 Pin (NM)
X609	201X2130-234	Diode (HS) RU-2V	P607	204X9600-380	Plug, 6 Pin (GT)
X610	66X0023-009	Rectifier, Power (Si) 500V PIV	P608	204X9600-254	Plug, 3 Pin (NM)
X611	66X0023-009	Rectifier, Power (Si) 500V PIV	P611	204X9600-670	Plug, 2 Pin (NM)
X612	66X0023-009	Rectifier, Power (Si) 500V PIV	TH601	201X011-034	Thermistor
TRANSFORMERS & COILS			P201	204X9601-195	Plug, 6 Pin
Δ L601	201X6000-112	Coil, Line Filter R-3	P202	204X9601-195	Plug, 6 Pin
L602	201X4600-042	Coil, Filter, 10 uH			
T602	201X1300-080	Transformer, Hor. Drive			
T603	202X1210-191	Transformer, Side PC			
L702	9A2795-003	Width Coil			

VERT/HOR BOARD

RESISTORS			RESISTORS (CONT.)		
R301	203X6500-628	820 Ohm, \pm 5%, 1/8W Carbon	R316	203X6500-420	120 Ohm, \pm 5%, 1/8W Carbon
R302	203X6500-902	12k Ohm, \pm 5%, 1/8W Carbon	R317	203X6206-441	2.2 Ohm, \pm 5%, 1/2W Carbon
R303	203X6500-927	15k Ohm, \pm 5%, 1/8W Carbon	R318	203X6501-002	33k Ohm, \pm 5%, 1/4W Carbon
R304	203X6500-886	10k Ohm, \pm 5%, 1/8W Carbon	R319	203X6500-169	10 Ohm, \pm 5%, 1/8W Carbon
R305	203X6501-241	330k Ohm, \pm 5%, 1/8W Carbon	R320	203X6500-927	15k Ohm, \pm 5%, 1/8W Carbon
R306	203X6500-645	1k Ohm, \pm 5%, 1/8W Carbon	R321	203X6700-509	560 Ohm, \pm 5%, 1/2W Carbon
R307	203X6500-689	1.5k Ohm, \pm 5%, 1/8W Carbon	R322	203X9100-121	22 Ohm, \pm 5%, 2W M.O.
R309	203X6500-724	2.2k Ohm, \pm 5%, 1/8W Carbon	R323	203X6500-689	1.5 Ohm, \pm 5%, 1/8W Carbon
R310	203X6501-285	470k Ohm, \pm 5%, 1/8W Carbon	R324	203X6500-988	27k Ohm, \pm 5%, 1/8W Carbon
R311	203X6501-065	56k Ohm, \pm 5%, 1/8W Carbon	R325	203X6500-326	47 Ohm, \pm 5%, 1/8W Carbon
R312	203X6501-126	100k Ohm, \pm 5%, 1/8W Carbon	R328	203X6500-628	820 Ohm, \pm 5%, 1/8W Carbon
R313	203X6001-326	10k Ohm, \pm 5%, 1/8W Carbon	R330	203X6500-886	10 k Ohm, \pm 5%, 1/8W Carbon
R314	203X6001-044	47k Ohm, 5%, 1/8W Carbon	R331	203X6501-209	220k Ohm, \pm 5%, 1/8W Carbon
R315	203X6500-628	820 Ohm, \pm 5%, 1/8W Carbon	R351	203X6500-724	2.2k Ohm, \pm 5%, 1/8W Carbon

VERT/HOR BOARD (CONT.)

Ref. No.	Part No.	Description
RESISTORS (CONT.)		
R352	203X6500-927	15k Ohm, ± 5%, 1/8W Carbon
R353	203X6500-944	18k Ohm, ± 5%, 1/8W Carbon
R354	203X6500-783	3.9k Ohm, ± 5%, 1/8W Carbon
R355	203X6500-902	12k Ohm, ± 5%, 1/8W Carbon
R356	203X6500-561	470 Ohm, ± 5%, 1/8W Carbon
R357	203X6500-724	2.2k Ohm, ± 5%, 1/8W Carbon
R358	203X6500-666	1.2k Ohm, ± 5%, 1/8W Carbon
R359	203X6501-088	68k Ohm, ± 5%, 1/8W Carbon
R360	203X5500-471	27 Ohm, ± 5%, 1/4W Carbon
R361	203X6000-998	1.2k Ohm, ± 5%, 1/8W Carbon
R363	203X6500-666	1.2k Ohm, ± 5%, 1/8W Carbon
R364	203X9014-988	47k Ohm, ± 5%, 1W M.O.
R365	203X6700-989	56k Ohm, ± 5%, 1/2W Carbon
R366	203X6001-148	3.3k Ohm, ± 5%, 1/8W Carbon
R367	340X2222-734	2.2k Ohm, ± 5%, 1/2W Carbon
R368	203X6500-785	3.9k Ohm, ± 5%, 1/8W Carbon
R369	203X6500-762	3.3k Ohm, ± 5%, 1/4W Carbon
R370	302X6100-961	1k Ohm, ± 5%, 1/4W Carbon
R371	203X6104-751	2.7k Ohm, ± 5%, 1/4W Carbon
R383	340X2222-934	2.2k Ohm, ± 5%, 1/4W Carbon
R384	340X2822-934	8.2k Ohm, ± 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, ± 10% Mylar
C302	203X1100-573	0.022 uF, 50V, ± 10% Mylar
C304	203X1100-858	0.1 uF, 50V, ± 10% Mylar
C306	203X0025-026	2.2 uF, 50V, Electrolytic
C307	203X1100-928	0.15 uF, 50V, ± 10% Mylar
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
C313	203X0025-087	47 uF, 50V Electrolytic
C315	203X0015-082	10 uF, 25V Electrolytic
C316	203X1100-220	3300 uF, 50V, ± 10% Mylar
C317	202X8000-616	100 pF, 50V, ± 10% Ceramic
C351	202X7000-281	1500 pF, 50V, ± 10% Ceramic
C352	202X7000-247	1000 pF, 50V, ± 10% Ceramic
C353	203X1100-573	0.022 uF, 50V, ± 10% Mylar
C355	203X1100-858	0.1 uF, 50V, ± 10% Mylar
C356	203X0015-105	4.7 uF, 25V Electrolytic
C357	203X1201-013	0.015 uF, 200V, ± 10% PP
C358	203X1201-034	0.018 uF, 200V, ± 10% PP

POWER BOARD

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
VR501	204X2050-001	Varistor Volt Adj.

CAPACITORS

C501	203X0040-020	10 uF, 160V Electrolytic
C502	202X7000-281	1500 pF, 50V, ± 10% Ceramic
C503	203X0010-011	22 uF, 16V Electrolytic

NECK BOARD

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	340X2391-934	390 Ohm ± 5% 1/4W Carbon
R408	340X2391-934	390 Ohm ± 5% 1/4W Carbon
R409	203X6500-800	4.7k Ohm ± 5% 1/8W Carbon

Ref. No.	Part No.	Description
CAPACITORS (CONT.)		
C359	203X0040-013	4.7 uF, 160V Electrolytic
C360	202X7000-482	0.01 uF, 50V, ± 10% Ceramic
C361	203X1100-509	0.015 uF, 50V, ± 10% Mylar
C362	203X0025-058	10 uF, 50V Electrolytic
C363	203X1205-487	0.01 uF, 630V, ± 10% PP
C364	202X7000-482	0.01 uF, 50V, ± 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, 2SC1722BK5
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) 1SS81
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	200X8220-851	Diode (Zener) RD10EB1
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	Coil, Horiz. Osc.
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SEMICONDUCTORS

TR501	200X3174-006	Transistor, 2SC1740Q
★ TR502	200X3145-404	Transistor, 2SC1454
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

RESISTORS (CONT.)

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.
R416	203X5601-313	2.7k Ohm ± 10% 1/2W Comp.
R417	203X5601-313	2.7k Ohm ± 10% 1/2W Comp.
R418	203X5602-254	470k Ohm ± 10% 1/2W Comp.

19" COLOR MONITOR SCHEM.

MODELS 19K4625, 19K4626, 19K

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

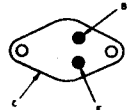
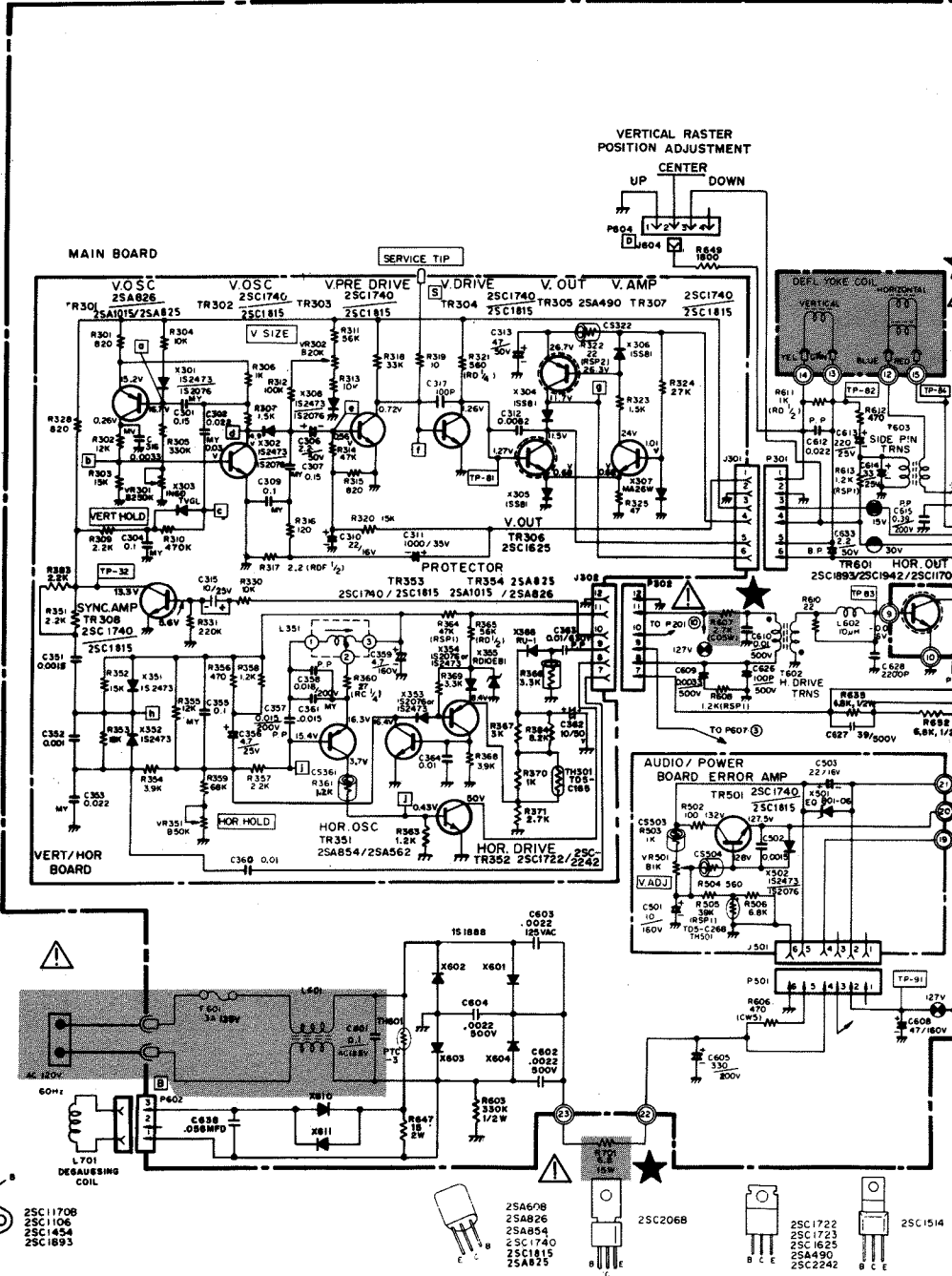
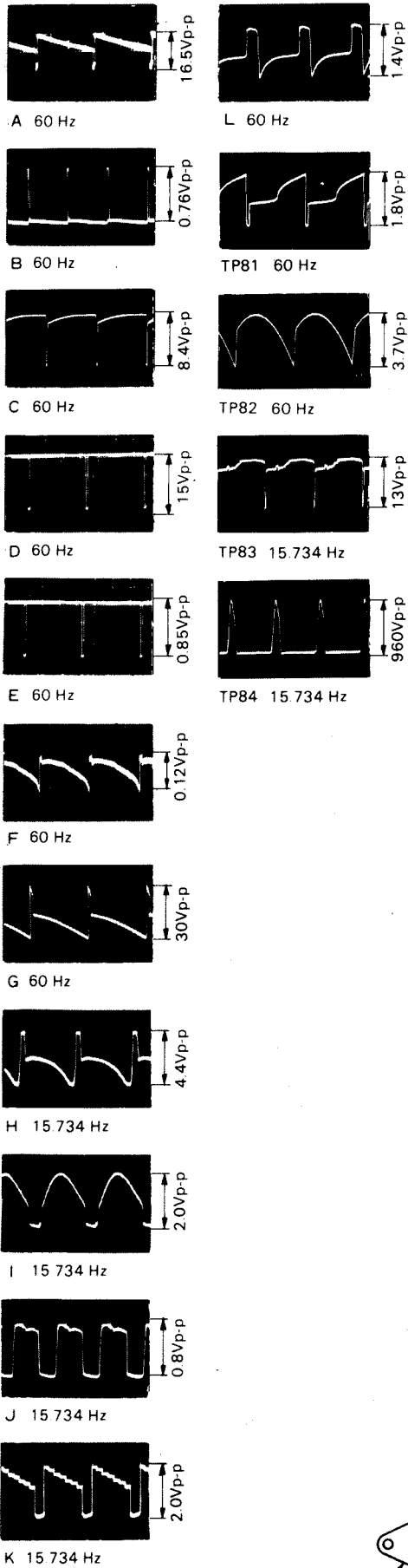


SERVICE TECHNICIAN WARNING

X-RAY RADIATION PRECAUTIONS

THIS PRODUCT CONTAINS CATHODE RAY TUBES WHICH PRODUCE X-RAY RADIATION UNDER CERTAIN ELECTRICAL AND MECHANICAL CONDITIONS. THIS RADIATION IS ESSENTIAL FOR X-RAY RADIOGRAPHY BUT IS DANGEROUS TO LIFE AND LIMB WITHOUT PROTECTION.

FOR REPLACEMENT PURPOSES, ONLY TYPE PARTS SHOWN IN THIS PARTS LIST.



25C1708
25C1106
25C1454
25C1893

25A608
25A826
25A854
25C1740
25C1815
25A825

25C2068

25C1722
25C1723
25C1625
25A490
25C2242

25C1514

SCHEMATIC DIAGRAM

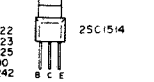
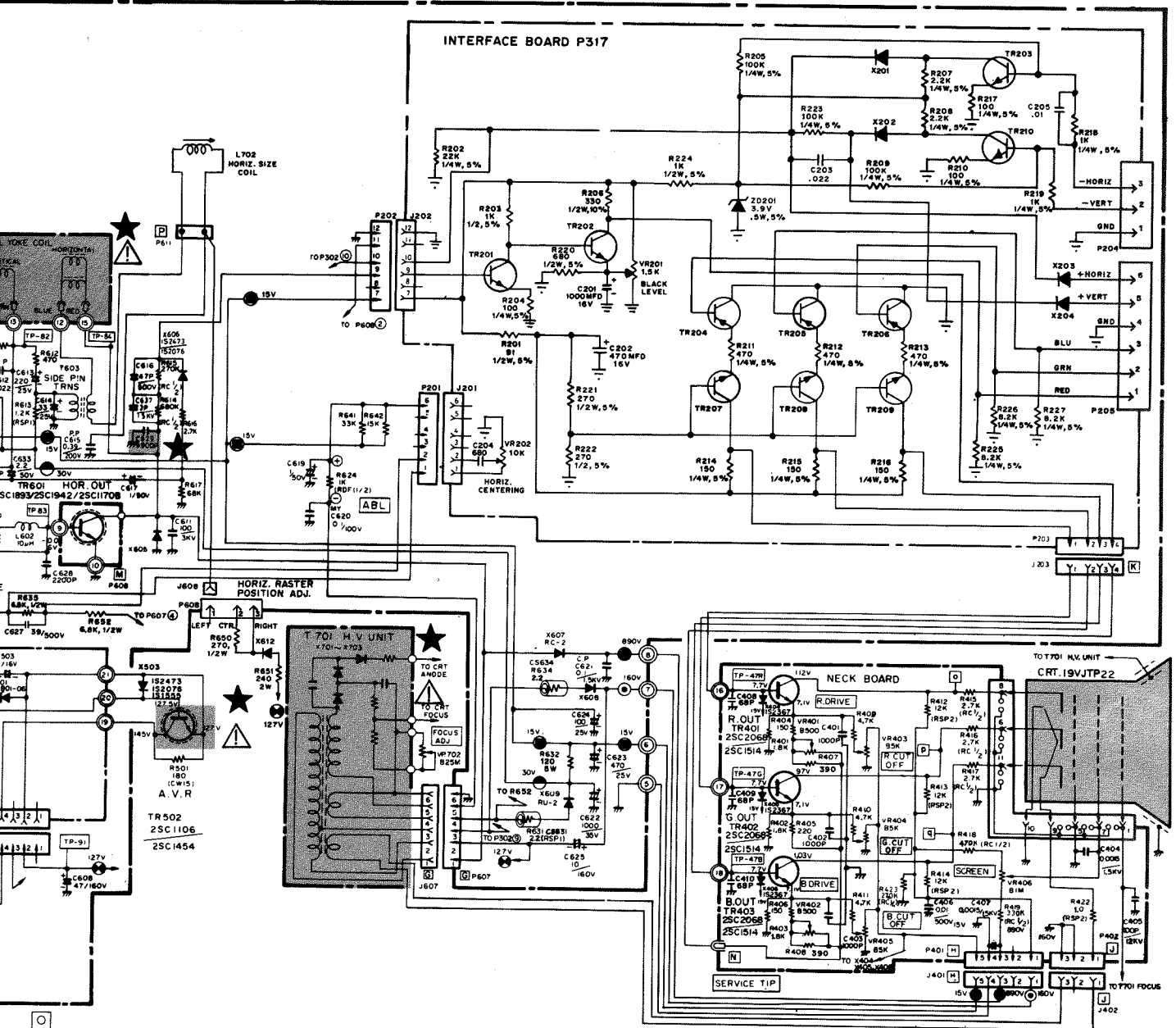
K4626, 19K4675, 19K4676

CAUTION WARNING
PRECAUTION:
 CONTAINS CRITICAL
 MECHANICAL PARTS
 X-RAY RADIATION
 FOR TEST PURPOSES, USE
 PULSES SHOWN IN THE

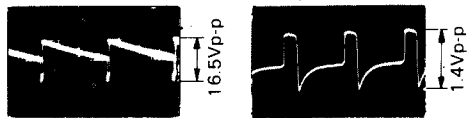
CAUTION: FOR CONTINUED SAFETY,
 REPLACE SAFETY CRITICAL COM-
 PONENTS ONLY WITH MANUFAC-
 TURER'S RECOMMENDED PARTS.
AVERTISSEMENT: POUR MAINTENIR
 LE DEGRE DE SECURITE DE L'APPAREIL
 NE REMPLACER LES COMPOSANTS
 DONT LE FONCTIONNEMENT EST
 CRITIQUE POUR LA SECURITE QUE PAR
 DES PIECES RECOMMANDEES PAR 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.



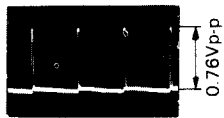
K4625C, K4626C, K4675C, K4676C-5816



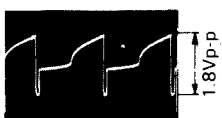
A 60 Hz



L 60 Hz



B 60 Hz



TP81 60 Hz



C 60 Hz



TP82 60 Hz



D 60 Hz



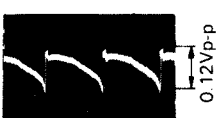
TP83 15.734 Hz



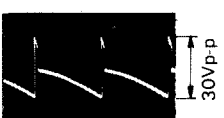
E 60 Hz



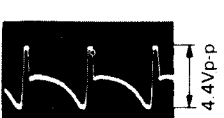
TP84 15.734 Hz



F 60 Hz



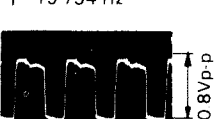
G 60 Hz



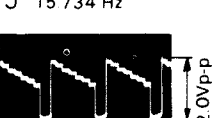
H 15.734 Hz



I 15.734 Hz



J 15.734 Hz



K 15.734 Hz

Power Supply Voltage and Symbols

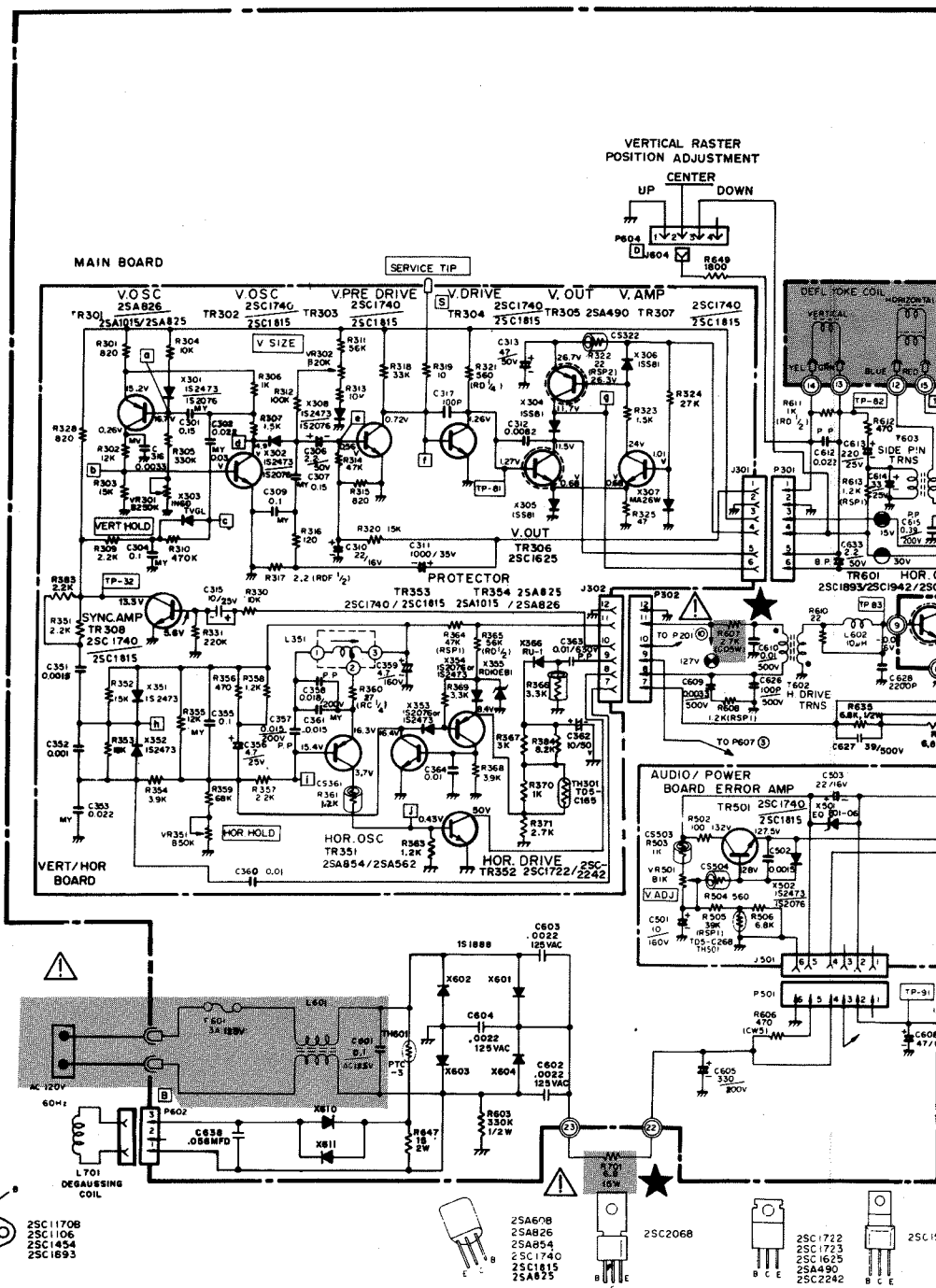
Symbols	Line Voltage	Working Circuit
	15V	Vert. — Drive stage ABL — Bias CRT Cut-Off
	30V	Vert. Output Side pin Trans. — Bias
	127V	Horiz. Osc. Horiz. Drive Horiz. Output
	160V	Video Output
	890V	Screen-Bias



SERVICE TECHNICIAN WARNING

X-RAY RADIATION PRECAUTIONS

THIS PRODUCT CONTAINS CATHODE RAY TUBE (CRT) WHICH EMITS ELECTRICAL AND MECHANICAL RADIATION ESSENTIAL FOR X-RAY RADIATION PROTECTION. FOR REPLACEMENT PURPOSES, ONLY TYPE PARTS SHOWN IN THIS PARTS LIST.



SCHEMATIC DIAGRAM

9K4677

WARNING
PRECAUTION:

CONTAINS CRITICAL
MECHANICAL PARTS
MAY RADIATION

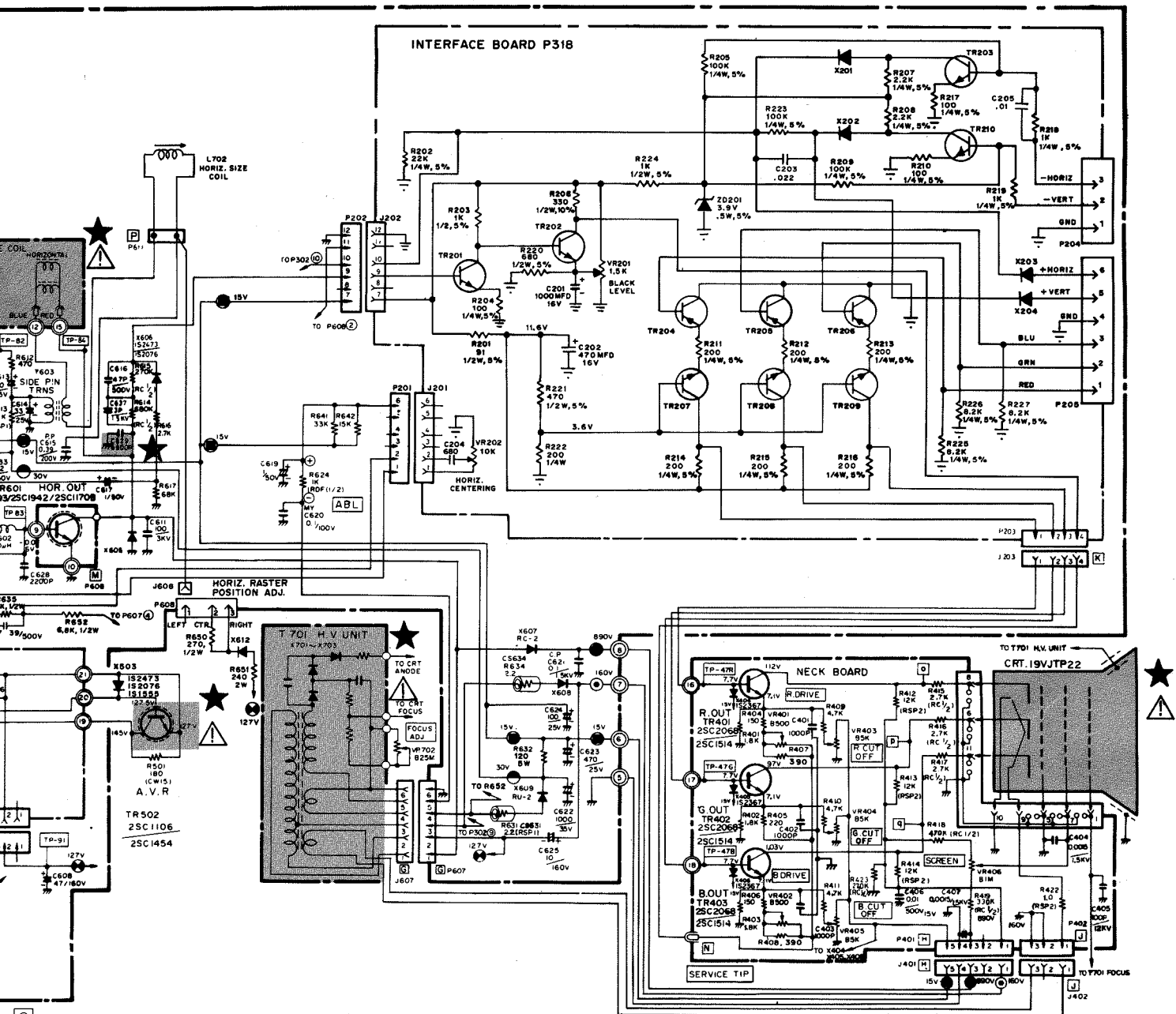
FOR PURPOSES, USE
AS SHOWN IN THE

**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.



K4677C-5818

NECK BOARD (CONT.)

Ref. No.	Part No.	Description
RESISTORS (CONT.)		
R419	203X5602-185	330k Ohm $\pm 10\%$ 1/2W Comp.
R422	203X9105-117	1.0 Ohm $\pm 10\%$ 2W Metal Oxide
R423	203X5102-155	270 Ohm $\pm 5\%$ 1/4W Carbon
VR401	204X2115-014	500 Ohm Varistor R Drive
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

Ref. No.	Part No.	Description
CAPACITORS		
C401	202X7000-247	1000 pF, 50V, 10% Ceramic
C402	202X7000-247	1000 pF, 50V, 10% Ceramic
C403	202X7000-247	1000 pF, 50V, 10% Ceramic
C404	202X7100-019	1500 pF, 2kV $\pm 10\%$ Ceramic
C405	202X7150-018	100 pF, 12kV, $\pm 10\%$ Ceramic
C406	202X7050-483	.01 uF, 500V, $\pm 10\%$ Ceramic
C407	202X7110-019	1500 pF, 2kV, $\pm 10\%$ Ceramic
C408	202X8000-550	68 pF, 50V, $\pm 10\%$ Ceramic
C409	202X8000-550	68 pF, 50V, $\pm 10\%$ Ceramic
C410	202X8000-550	68 pF, 50V, $\pm 10\%$ Ceramic

Ref. No.	Part No.	Description
SEMICONDUCTORS		
TR401	200X3206-800	Transistor, 2SC2068, 2SC1514 (R output)
TR402	200X3206-800	Transistor, 2SC2068, 2SC1514 (G output)
TR403	200X3206-800	Transistor, 2SC2068, 2SC1514 (B output)
X404	201X2100-126	Diode, IS2367 (protector)
X405	201X2100-126	Diode, IS2367 (protector)
X406	201X2100-126	Diode, IS2367 (protector)

Ref. No.	Part No.	Description
MISCELLANEOUS		
J401	206X5003-729	Socket, 5 Pin
J402	206X5003-983	Socket, 3 Pin
P401	204X9600-329	Plug, 5 Pin
P402	204X9600-254	Plug, 3 Pin

★ 297X2000-072 HIGH VOLTAGE ASSEMBLY (T701)

★ R701	204X1625-058	6.8 Ohm, $\pm 10\%$ 15W WW Resistor	} Part of T701
VR702	204X3901-125	Focus Control	
X701		Diode (SI HV)	
X702		Diode (SI HV)	
X703		Diode (SI HV)	

FINAL ASSEMBLY PARTS

★ 88X-0129-506	19VJTP22 Pix 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)
6A0396-001	Plug, Line Cord (K4625, K4675, K4677)
6A0402-001	Plug, Line Cord (K4626, K4676)
9A2753-003	Degaussing Coil (L701)

INTERFACE FACE BOARD (P317)

Ref. No.	Part No.	Description
RESISTORS		
R201	340X3910-934	91 Ohm $\pm 5\%$, 1/2W Carbon
R202	340X2223-934	22k Ohm $\pm 10\%$, 1/4W Carbon
R203	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R204	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R205	340X2104-934	100k Ohm $\pm 5\%$, 1/4W Carbon
R206	340X3331-944	330 Ohm $\pm 5\%$, 1/2W Carbon
R207	340X2222-934	2.2k Ohm $\pm 5\%$, 1/4W Carbon
R208	340X2222-934	2.2k Ohm $\pm 5\%$, 1/4W Carbon
R209	340X2104-934	100k Ohm $\pm 5\%$, 1/4W Carbon
R210	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R211	340X2471-934	470 Ohm $\pm 5\%$, 1/4W Carbon
R212	340X2471-934	470 Ohm $\pm 5\%$, 1/4W Carbon
R213	340X2471-934	470 Ohm $\pm 5\%$, 1/4W Carbon
R214	340X2151-934	150 Ohm $\pm 5\%$, 1/4W Carbon
R215	340X2151-934	150 Ohm $\pm 5\%$, 1/4W Carbon
R216	340X2151-934	150 Ohm $\pm 5\%$, 1/4W Carbon
R217	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R218	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R219	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R220	340X3681-934	680 Ohm, 5%, 1/2W Carbon
R221	340X3271-934	270 Ohm, 5%, 1/2W Carbon
R222	340X3271-934	270 Ohm, 5%, 1/2W Carbon
R223	340X2104-934	100k Ohm, 5%, 1/4W Carbon
R224	340X3102-934	1k Ohm, 5%, 1/2W Carbon
R225	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R226	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R227	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R228	340X3391-934	390 Ohm, 5%, 1/2 W Carbon
VR201	40X0641-005	1.5k Ohm Black Level Control
VR202	40X0641-006	10k Ohm Horizontal Centering

Ref. No.	Part No.	Description
CAPACITORS		
C201	45X0524-038	1000 uF, 16V Electrolytic
C202	45X0524-053	470 uF, 16V Lytic
C203	349X2232-109	.022 uF, 10%, 100V
C204	80X0099-020	680 pF, 10%, Z5F
C205	349X1032-109	.01 uF, 10%, 100V
SEMICONDUCTORS		
TR201	86X0113-001	Transistor (NPN) 2N3904
TR202	86X0113-001	Transistor (NPN) 2N3904
TR203	86X0113-001	Transistor (NPN) 2N3904
TR204	86X0066-001	Transistor (PNP) MPS-A70
TR205	86X0066-001	Transistor (PNP) MPS-A70
TR206	86X0066-001	Transistor (PNP) MPS-A70
TR207	86X0113-001	Transistor (NPN) 2N3904
TR208	86X0113-001	Transistor (NPN) 2N3904
TR209	86X0113-001	Transistor (NPN) 2N3904
TR210	86X0113-001	Transistor (NPN) 2N3904
X201	66X0046-001	Diode Silicon FDH-444
X202	66X0046-001	Diode Silicon FDH-444
X203	66X0046-001	Diode Silicon FDH-444
X204	66X0046-001	Diode Silicon FDH-444
ZD201	66X0040-019	Diode, Zener 3.9V, 5%, 0.5W IN5228B

Ref. No.	Part No.	Description
MISCELLANEOUS		
J201	204X9300-958	Socket, 6 Pin
J202	204X9300-958	Socket, 6 Pin
P203	204X9600-845	Plug, 4 Pin
P204	6A393-003	Plug, 3 Pin
P205	6A0393-006	Plug, 6 Pin

INTERFACE BOARD (P318)

Ref. No.	Part No.	Description
RESISTORS		
R201	340X3910-934	91 Ohm $\pm 5\%$, 1/2W Carbon
R202	340X2223-934	22k Ohm $\pm 10\%$, 1/4W Carbon
R203	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R204	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R205	340X2104-934	100k Ohm $\pm 5\%$, 1/4W Carbon
R206	340X3331-944	330 Ohm $\pm 10\%$, 1/2W Carbon
R207	340X2222-934	2.2k Ohm $\pm 5\%$, 1/4W Carbon
R208	340X2222-934	2.2k Ohm $\pm 5\%$, 1/4W Carbon
R209	340X2104-934	100k Ohm $\pm 5\%$, 1/4W Carbon
R210	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R211	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R212	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R213	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R214	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R215	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R216	340X2201-934	200 Ohm $\pm 5\%$, 1/4W Carbon
R217	340X2101-934	100 Ohm $\pm 5\%$, 1/4W Carbon
R218	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R219	340X3102-934	1k Ohm $\pm 5\%$, 1/2W Carbon
R220	340X3102-934	1k Ohm, 5%, 1/2W Carbon
R221	340X3471-934	200 Ohm, 5%, 1/2W Carbon
R222	340X2201-934	200 Ohm, 5%, 1/2W Carbon
R223	340X2104-934	100k Ohm, 5%, 1/4W Carbon
R224	340X3681-934	680k Ohm, 5%, 1/2W Carbon
R225	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R226	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R227	340X2822-934	8.2k Ohm, 5%, 1/4W Carbon
R228	340X3391-934	390 Ohm, 5%, 1/2W Carbon
VR201	40X0641-005	1.5k Ohm Black Level Control
VR202	40X0641-006	10k Ohm Horizontal Centering

Ref. No.	Part No.	Description
CAPACITORS		
C201	45X0524-038	1000 uF, 16V Electrolytic
C202	45X0524-053	470 uF, 16V Lytic
C203	349X2232-109	.022 uF, 10%, 100V
C204	80X0099-020	680 pF, 10%, Z5F
C205	349X1032-109	.01 uF, 10%, 100V

Ref. No.	Part No.	Description
SEMICONDUCTORS		
TR201	86X0113-001	Transistor (NPN) 2N3904
TR202	86X0113-001	Transistor (NPN) 2N3904
TR203	86X0113-001	Transistor (NPN) 2N3904
TR204	86X0066-001	Transistor (PNP) MPS-A70
TR205	86X0066-001	Transistor (PNP) MPS-A70
TR206	86X0066-001	Transistor (PNP) MPS-A70
TR207	86X0113-001	Transistor (NPN) 2N3904
TR208	86X0113-001	Transistor (NPN) 2N3904
TR209	86X0113-001	Transistor (NPN) 2N3904
TR210	86X0113-001	Transistor (NPN) 2N3904
X201	66X0046-001	Diode Silicon FDH-444
X202	66X0046-001	Diode Silicon FDH-444
X203	66X0046-001	Diode Silicon FDH-444
X204	66X0046-001	Diode Silicon FDH-444
ZD201	66X0040-019	Diode, Zener 3.9V, 5%, 0.5W IN5228B

Ref. No.	Part No.	Description
MISCELLANEOUS		
J201	204X9300-958	Socket, 6 Pin
J202	204X9300-958	Socket, 6 Pin
P203	204X9600-845	Plug, 4 Pin
P204	6A393-003	Plug, 3 Pin
P205	6A0393-006	Plug, 6 Pin

REAR CHASSIS CONTROLS

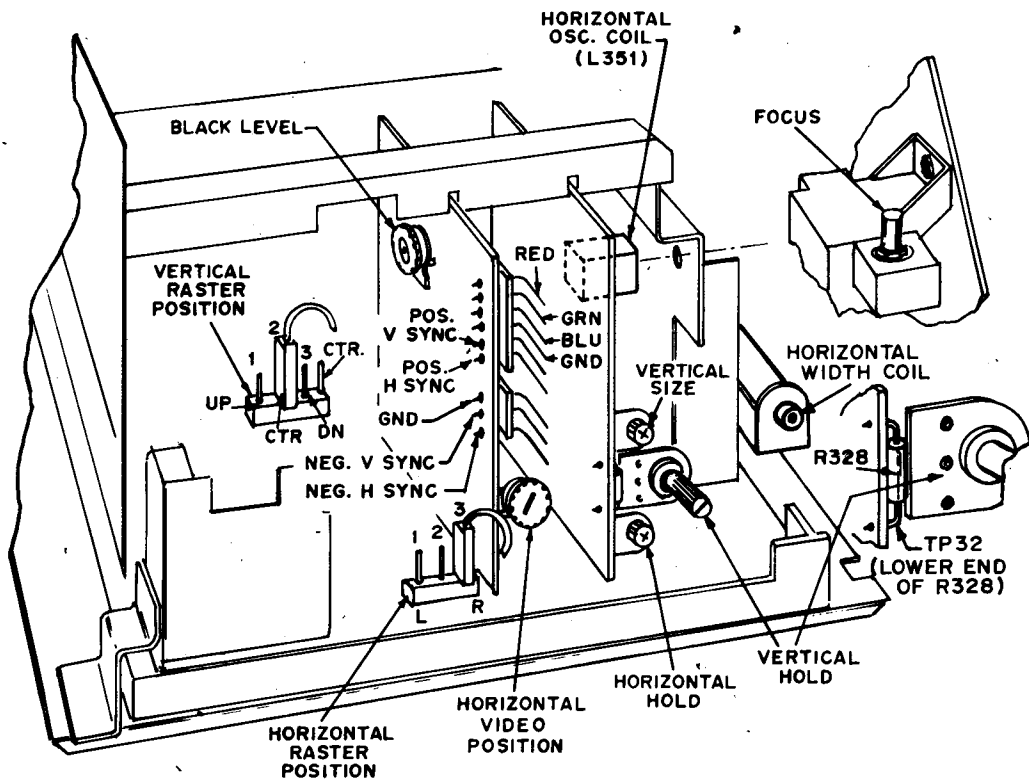


FIGURE 17