K7500

WELLS-GARDNER®

ELECTRONICS CORPORATION

Service Manual

ISO 9001

Table of Contents

Safety Summary

1. POWER UP WARNING —
   This product uses a switch mode power supply to provide the monitor chassis with isolation from the AC line. Although servicing the secondary circuitry can be safely done without the use of an AC isolation transformer, it is recommended that an isolation transformer be used when servicing this product. This will prevent shock hazard in the event of accidental or erroneous contact with primary power supply circuitry. Before servicing is performed, read all the precautions labeled on the CRT chassis.

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

   WARNING: PARTS WHICH INFLUENCE X-RAY RADIATION IN HORIZONTAL DEFLECTION, HIGH VOLTAGE CIRCUITS, PICTURE TUBE, ETC. ARE INDICATED BY H ON THE SCHEMATIC DIAGRAM. FOR REPLACEMENT, USE ONLY THE TYPE SHOWN IN THE PARTS LIST.

3. HIGH VOLTAGE —
   This monitor contains HIGH VOLTAGES derived from power supplies 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 CHARGE REMAINS PRESENT ON THE CRT ANODE AFTER THE SET IS POWERED DOWN. THE CRT ANODE MUST BE DISCHARGED TO CHASSIS GROUND BEFORE HANDLING CRT. Do not handle the CRT by the neck.

5. **PRODUCT SAFETY NOTICE**

   WARNING: FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS WITH MANUFACTURER RECOMMENDED PARTS. THESE PARTS ARE IDENTIFIED BY ⚠ ON THE SCHEMATIC DIAGRAM.

   AVERTISSEMENT: POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPSANTS DONT LE FONCTIONNEMENT EST CRITQUE POUR LA SECURITE QUE 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 High Voltage and power supply circuits). Use of alternative wiring or positioning could result in damage to the monitor, shock or fire.

Monitor Specifications

SPECIFICATIONS

- CRT size (diagonal measure): 25", 27"
- Phosphor type: P22
- CRT etch: Polished faceplate; other faceplates available
- Striped trio spacing: 0.84 mm (25" and 27")

INPUT SIGNALS

- Input connector: 0.156 center header
- Video type: RGB analog
- Video input impedance: 1k ohm; other values available
- Video level: 1.5 to 4 volts peak-to-peak; other levels optional
- Sync type: TTL sync; separate or composite, negative or positive
- Sync input impedance: 4.7k ohms
- Horizontal sync frequency: 25 kHz
- Vertical sync frequency: 47 to 63 Hz

LIGHT OUTPUT

40 fL typical

GEOMETRY

- Horizontal linearity: ± 5%
- Vertical linearity: ± 5%
- Picture size regulation: 2%
- Geometric distortion: ± 2% max

POWER INPUT

- Input voltage: 90 - 264 VAC, 50 - 70 Hz; no isolation transformer required
- Maximum power: 130 watts

USER CONTROLS

- Remote controls: Brightness, contrast, horizontal size, horizontal centering, vertical size, vertical centering, vertical frequency
- Internal controls: Focus, horizontal frequency

MECHANICAL

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MISCELLANEOUS

- Operating temperature: 0 to 55 degrees C
- Agency compliance: U.L., C.S.A., D.H.H.S. radiation performance std., TUV

RESOLUTION

- Graphics modes: 640 X 400 (may be limited by the CRT)
- Video bandwidth: 15 MHz typical

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

CRT Set Up Procedure

STATIC CONVERGENCE ADJUSTMENT

4-Pole Magnets and 6-Pole Magnets are for static convergence.

1. A cross hatch signal should be connected to the monitor.

2. A pair of 4-Pole Convergence Magnets is provided and adjusted to converge the blue and red beams (See Fig. 2). 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 (See Fig. 1). Variation of the angle between the tabs adjusts the convergence of red and blue vertical lines.

3. When both 4-Pole Convergence Magnet Tabs are rotated as a pair, the convergence of the red and blue horizontal lines is adjusted.

4. A pair of 6-Pole Convergence Magnets is also provided and adjusted to converge the magenta (red + blue) to green beams (See Fig. 2). 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. 1). Variation of the opening angle adjusts the convergence of magenta to green vertical lines.

5. When both 6-Pole Convergence Magnet Tabs are rotated as a pair, the convergence of magenta to green horizontal lines is adjusted.

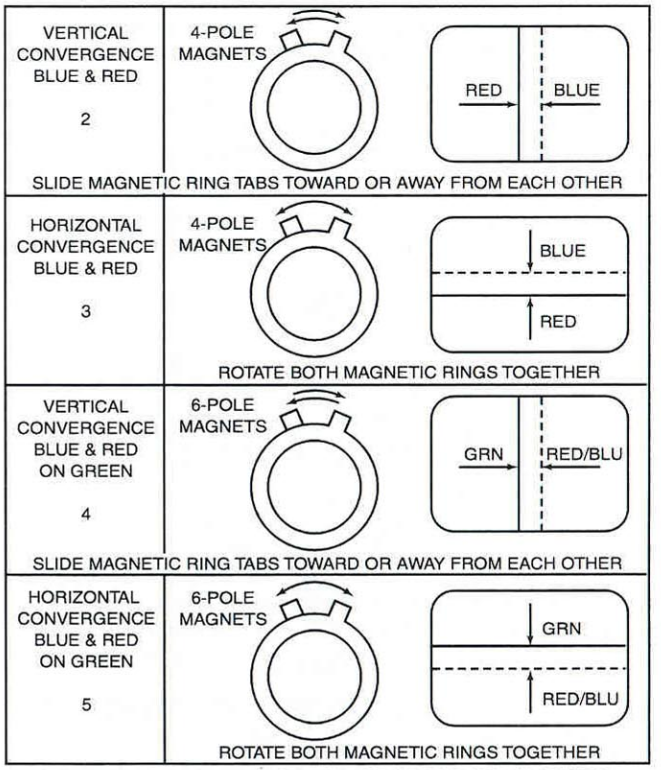


Figure 1

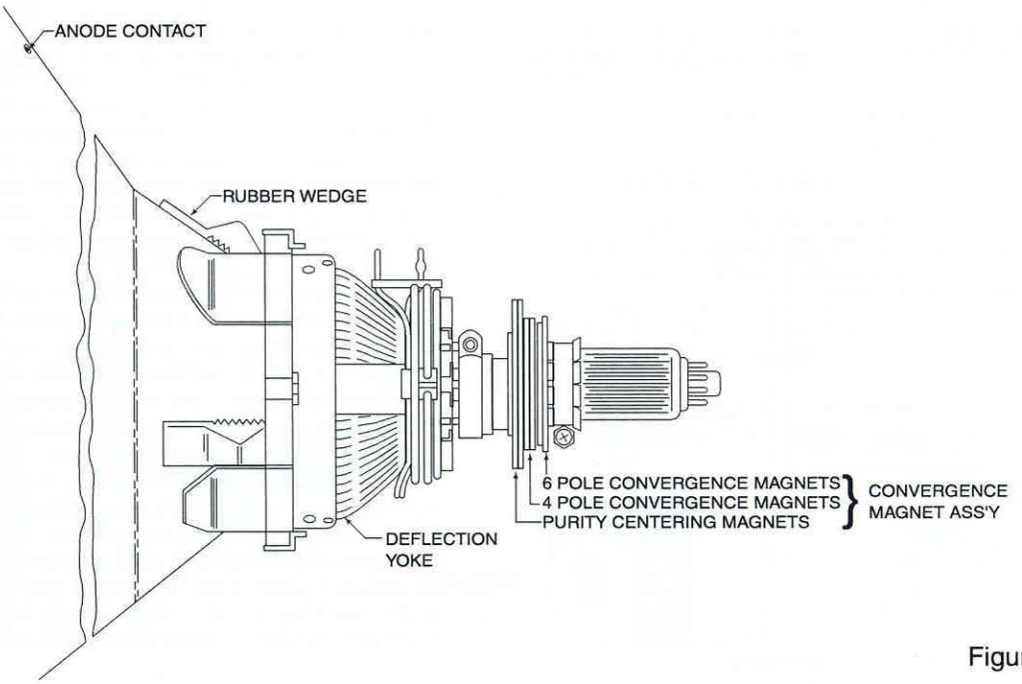


Figure 2

PRECISE ADJUSTMENT OF DYNAMIC CONVERGENCE

1. Feed a cross hatch signal to the monitor.
2. Insert wedge temporarily and fix the Deflection Yoke so as to obtain the best circumference convergence. (See Fig. 4 and 5)

   NOTE:
   The wedges may need to be moved during adjustments.

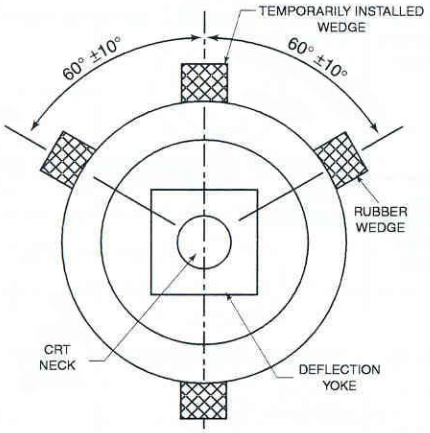


Figure 3

3. Insert three rubber wedges to the position as shown in Figure 3.

   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. 4 (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. 5 (a) and (b).
   3) Use three rubber wedges (tapered rubber wedges are used for a purpose).
   4) The position of each rubber wedge is shown in Fig. 3.
   5) Do NOT force the permanent wedges in. They are to be inserted until they just make contact with the yoke—after the yoke has been positioned.
   6) Remove the temporary wedge.

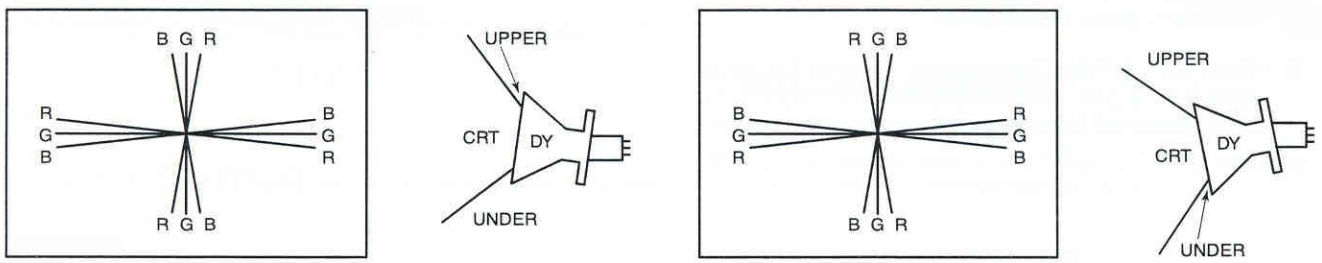


Figure 4

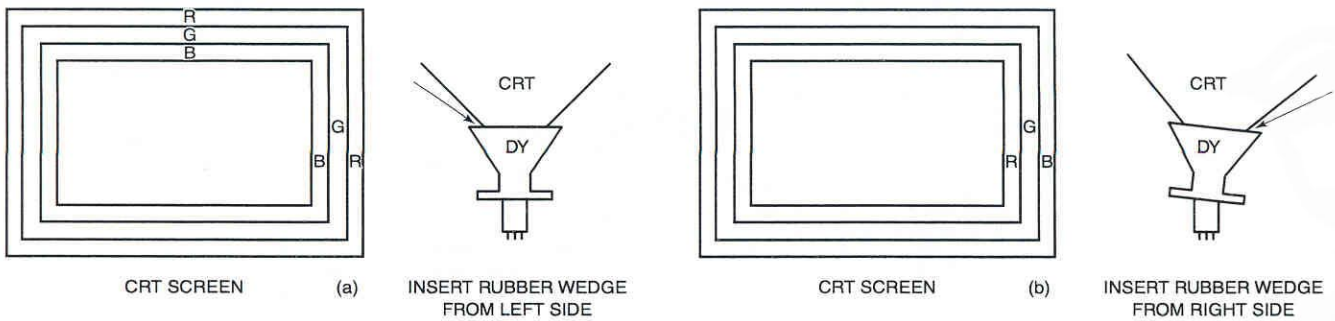


Figure 5

COLOR PURITY ADJUSTMENT

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.

2. On picture tubes with a 29 mm neck diameter, set the ring assembly on the CRT neck with the center line of the purity ring-pair over the gap between grids No. 3 and 4. See Fig. 6.

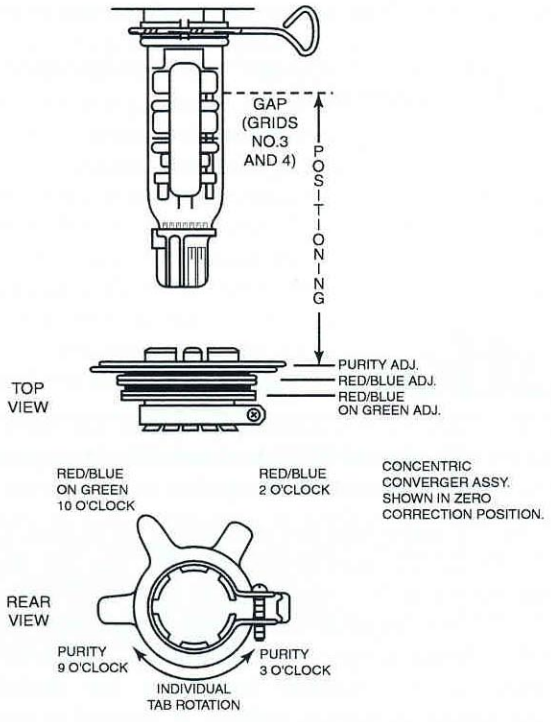


Figure 6

3. Make certain that the magnetic ring-pairs are in their correct starting positions before beginning this procedure. The correct starting position for the purity ring-pair is not necessarily the one shown in Figure 6. The correct starting position will vary from ring assemblies from one manufacturer to another. It will be necessary to determine the correct starting position—also known as the zero correction position.

   Figure 6 shows a ring assembly in which each of the rings of the purity ring-pair has two tabs—one long and one short. With some ring assemblies of this type, the zero correction position is with the long tab of one ring aligned with the short tab of the other ring. On other ring assemblies of this type, the zero correction position is with the long tab of one ring aligned with the long tab of the other ring. The way to determine which is which is by trying one of these orientations and then rotating the two rings together, as a pair, without changing their orientation with respect to each other. If this rotation of the ring-pair causes no change in the purity, then it is the zero correction position. If the purity does change, then try the other orientation.

   A third type of ring assembly has only one tab on each of the two purity rings. The zero correction position for this type of assembly is with the tabs of the two purity rings aligned with each other and pointing up toward the anode contact of the CRT.

   The correct starting positions for the other ring-pairs are as shown in Figure 6. For the other type of ring assembly (not shown), the correct starting position for the other two ring-pairs is with all of the tabs aligned with each other and pointing up, toward the anode contact of the CRT.

4. Vertical raster position control must be at the center of its rotation.

5. Remove the R-G-B signal from the monitor.

6. Turn the Green Bias Control (VR544) on the Neck Board fully CW. (See Pg. 21).

7. Turn the Red and Blue Bias Controls (VR545 & VR543) fully CCW.

8. Pull the Deflection Yoke backward so that the Green belt will appear. (See Fig. 7).

9. Decrease the horizontal width of the raster, if necessary, in order to be able to see the right and left edges of the raster.

10. Move the two Purity Magnets with respect to each other in order to center the Green belt on the raster horizontally.

11. Push the Deflection Yoke forward gradually and fix it at the place where the Green screen becomes uniform throughout.

12. Turn the Bias and Drive Controls and confirm that each color is uniform.

13. If the color is not uniform, re-adjust it, moving the Purity Magnets slightly.

14. Turn all three Bias controls fully counterclockwise (CCW). Slowly turn up (CW) the Red Bias control until a Red raster is just barely visible.

15. Slowly turn up the Green and Blue Bias controls such that their associated colors, mixing with the Red, results in a White or Gray raster.

16. Confirm that the white or gray color is uniform throughout the screen.

17. Insert a wedge temporarily as shown in Fig. 7 and adjust the angle of the Deflection Yoke.

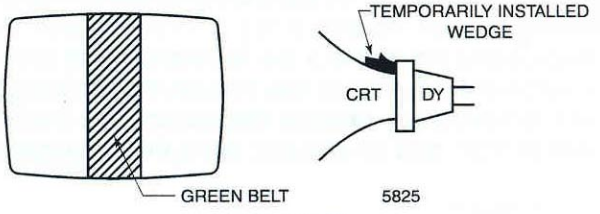


Figure 7

WHITE BALANCE

Equipment Required: Game or test generator that will produce gray and white field test patterns.

Perform this procedure in subdued light after degaussing the monitor and setting the purity.

Procedure

1. Set R-BIAS, G-BIAS, and B-BIAS controls fully CCW; CONTRAST, DRIVE, and BRIGHTNESS controls at center of rotation.
2. Degauss monitor.
3. Ground the R/G/B video inputs to the monitor, but continue applying horizontal and vertical sync.
4. Adjust SCREEN (G2) control until display is barely visible. Note color of display. This is lead color.
5. Adjust G2 control so that illumination is barely extinguished. Remove the ground from R/G/B video inputs.
6. Adjust contrast Control for low light output.
7. Leaving lead color BIAS control at rest, rotate the other two BIAS controls (VR534, VR544, or VR545 on neck board) to achieve the best neutral white.
8. Turn contrast control for high light output.
9. Adjust RED and GREEN DRIVE controls (VR521 and VR523) to achieve best neutral white.
10. Repeat steps 6 through 9 until good tracking of white balance is achieved.

Theory of Operation

SWITCH MODE POWER SUPPLY

(Refer to Figure 8.)

The K7500 monitor uses a switch mode power supply. The system main B+ is developed from the input line voltage (90 – 240 VAC) through a DC – DC converter. Voltage feedback is used to maintain a regulated output with varying AC line and output load conditions.

The monitor will function with any AC voltage in the range of 90VAC to 264VAC. The AC line voltage is applied through connector P101. The hot side of the line is fused with a 3.15A slo-blo fuse, F101. An AC filter consisting of C101, C102, C103, C104, and L101 prevents high frequency noise from entering the power lines. The output of the filter is applied through a positive temperature coefficient (PTC) resistor R121 and connector P102 to the degaussing circuit for degaussing the CRT, and through a negative temperature coefficient (NTC) resistor R101 to a bridge rectifier circuit for generating the main B+ output.

The degaussing coil is wrapped around the "bell" of the CRT in a figure 8 pattern. PTC resistor R121 is a two part resistor. When the monitor is first turned on, one section of resistor R121 is in series with the degaussing coil and is a low resistance. This allows a surge of AC current to flow through the degaussing coil removing any residual magnetism. The second half of R121 acts as a heater, rising the temperature of the PTC resistor R121 and reducing the degaussing current to a negligible amount.

The full wave rectifier consisting of diodes D101, D102, D103, and D104 rectifies the AC voltage producing a DC voltage level that is smoothed by C105. The negative temperature coefficient resistor R101, limits surge current at startup. As the temperature of the resistor increases the resistance decreases. A startup voltage is applied to pin 7 of the switch mode controller U101, through voltage dropping resistors R102 and R103 and the voltage is filtered by C118. The frequency of the switcher is determined primarily by the values of R116 and C116. The output from pin 6 of U101 is a square wave that is applied to the MOSFET, Q101. The inverted output at the drain of Q101 drives the primary winding of transformer T101. The snubber circuit consisting of capacitor C106, resistor R104, and diode D107 minimizes square-wave overshoot, preventing overshoot from reaching destructive levels. Power is transferred to the secondary and auxiliary windings of T101 by transformer action. The secondary winding is used to produce the main B+ output for the monitor and the auxiliary winding is used to provide a feedback voltage to maintain a constant output voltage when input voltage or output load changes occur and also to generate the U101 Vcc voltage.

The auxiliary winding feedback voltage is a waveform representative of the output voltage waveform.

This voltage is rectified by D112, and connected to pin 2 of U101 through a voltage divider consisting of resistors R110, R113, and the B+ ADJUST variable resistor VR101. VR101 sets the main B+ voltage level. The feedback voltage connected to pin 2 of U101 varies the duty cycle (%on time/period) of the output of U101 to maintain a constant output voltage. Vcc voltage for U101 is generated by rectifying the auxiliary winding output via D113 and smoothing the voltage with capacitor C118.

If excess current is demanded from the main B+ rail, the switcher is designed to shut-down its output. When excess current (over about 3.0A) is drawn from the main B+ rail, the switcher responds by increasing the power to the primary of transformer T101. The increased current through the MOSFET, Q101, increases the voltage drop across resistor R108. This voltage is fed back to U101 pin 3 through resistor R117. Capacitor C110 bypasses high frequency noise to ground. When the voltage at pin 3 exceeds 0.6V, U101 shuts down the output at pin 6, preventing failure within the switches. The switcher will attempt to restart but if the fault is still present the switches will again turn off.

The main B+ output is produced from the square wave output at the secondary of transformer T101. This square wave voltage is applied to a half-wave rectifier circuit consisting of D106A, D106B, and D106C. The rectified DC voltage is filtered by a network consisting of capacitors C107, C115 and inductor L100. This voltage is then used as the main B+ supply for the monitor.

SYNC PROCESSING

(Refer to Figure 9)

The sync processing circuit allows a number of different types of vertical and horizontal sync inputs. The vertical and horizontal pulse can be applied separately or as a composite signal of either positive or negative input polarity. The circuit analyzes the incoming signal and provides a sync output which is always negative regardless of the input. When separate vertical and horizontal pulses are used, they are combined, then applied to an integrating circuit to produce output vertical pulses and to a differentiator circuit to generate the horizontal pulses.

Either composite sync or horizontal sync is applied through connector P200, pins 5 or 1. The signal is coupled through capacitor C732 to the base of inverter Q700. Capacitor C732 removes the DC component of the signal. A clamp circuit consisting of diode D700 and resistor R701 clamps the bottom of the signal to a –0.6 V. The inverter output is connected to pin 1 and pin 4 of the XOR gates U702. Pin 5 of the XOR gate is connected to a logic high at all times. When the sync pulses at pin 5 are positive going, the output from pin 6 is a logic low that is stored by capacitor C700 and applied to XOR gate pin 2. The positive going sync pulses applied to pin 1 are now inverted by the XOR gate producing a negative sync output. When the sync pulses at pin 4 is negative going, the output from pin 6 is a logic high that is stored by capacitor C700 and applied to XOR gate input pin 2. With a logic high on pin 2 and a negative going pulse at pin 1, the XOR gate functions as a buffer passing the negative going

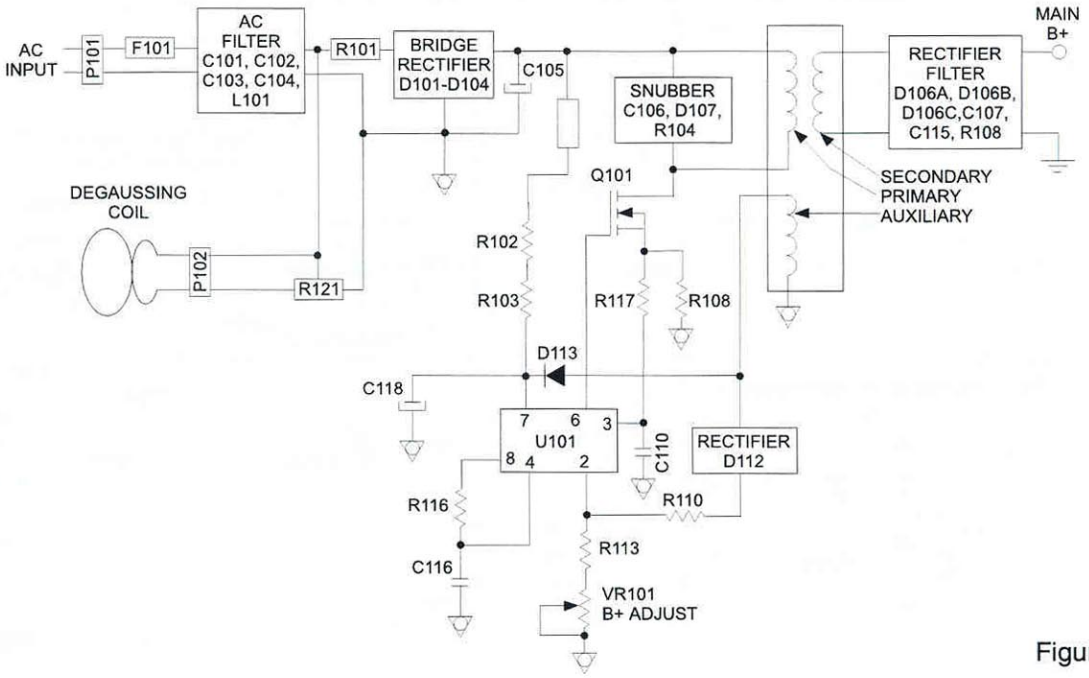


Figure 8

horizontal or composite sync through a steering diode D702 to the base of buffer Q601. Diode D602 functions as a blocking diode to the separate vertical sync circuit. This sync circuit will always provide a negative sync pulse at the emitter output of buffer Q601.When a separate vertical sync input is used, the signal is applied through connector P200 pins 2 or 6, then through current limiting resistor R600 to XOR gate U702 inputs at pins 10 and 13. Diode D801 and resistor R801 clamp the vertical signal at –0.6V. This XOR gate operates the same as the horizontal and composite sync circuit, producing negative sync pulses at the output pin 11. The negative vertical sync routed through diode D602 and the negative horizontal sync routed through diode D702 are combined and applied through a voltage divider to the base of buffer Q601.

The composite sync pulses at the output of buffer Q601 are applied to a differentiator (high pass filter) and to an integrator (low pass filter). The differentiator consisting of capacitor C702, and resistor R710 produces the horizontal drive pulses to U701 pin 1 (horizontal sync input). The integrator consisting of R609 and capacitor C601 produces the vertical drive pulses to U701 pin 19 (vertical sync input).

HORIZONTAL CIRCUITS

(Refer to Figure 10)

The horizontal circuit performs a variety of functions as follows:

Free running oscillator which can be synchronized to incoming horizontal sync pulses.

An Automatic Frequency Control (AFC) circuit to lock the horizontal frequency.

A phase shifting circuit that adjusts the phase between the sync pulses and the incoming video.

A drive signal for the horizontal scan

Overvoltage protection.

Horizontal Sync Processing

The horizontal sync pulses from the sync processor are applied to U701, pin 1. U701 reconstructs the sync pulse internally with a delay that is adjustable by Horizontal Position Control VR901, located on the control board and connected to pin 2. The delay adjusts the horizontal posi- tion of the video with respect to the raster. If no sync pulses are present, the free-running horizontal oscillator frequency is adjustable by Horizontal Hold variable resistor VR701 connected through a network to U701, pin 8. The oscillator frequency is determined by VR701, capacitors C708 and C727 and resistor R716. The duty cycle of the oscillator is determined by the values of R718 and R719 connected to U701, pin 11. The oscillator output at U701, pin 12 is a square-wave applied to the horizontal driver transistor Q703.

If sync pulses are applied at U701, pin1 the reconstructed sync pulses are applied to the AFC circuit. Capacitor C705 generates the sawtooth signal output from the input sync pulses. The sawtooth waveform is applied to the AFC circuit. Capacitor C706 is used in the AFC circuit to generate a correction voltage. In addition pulses from the

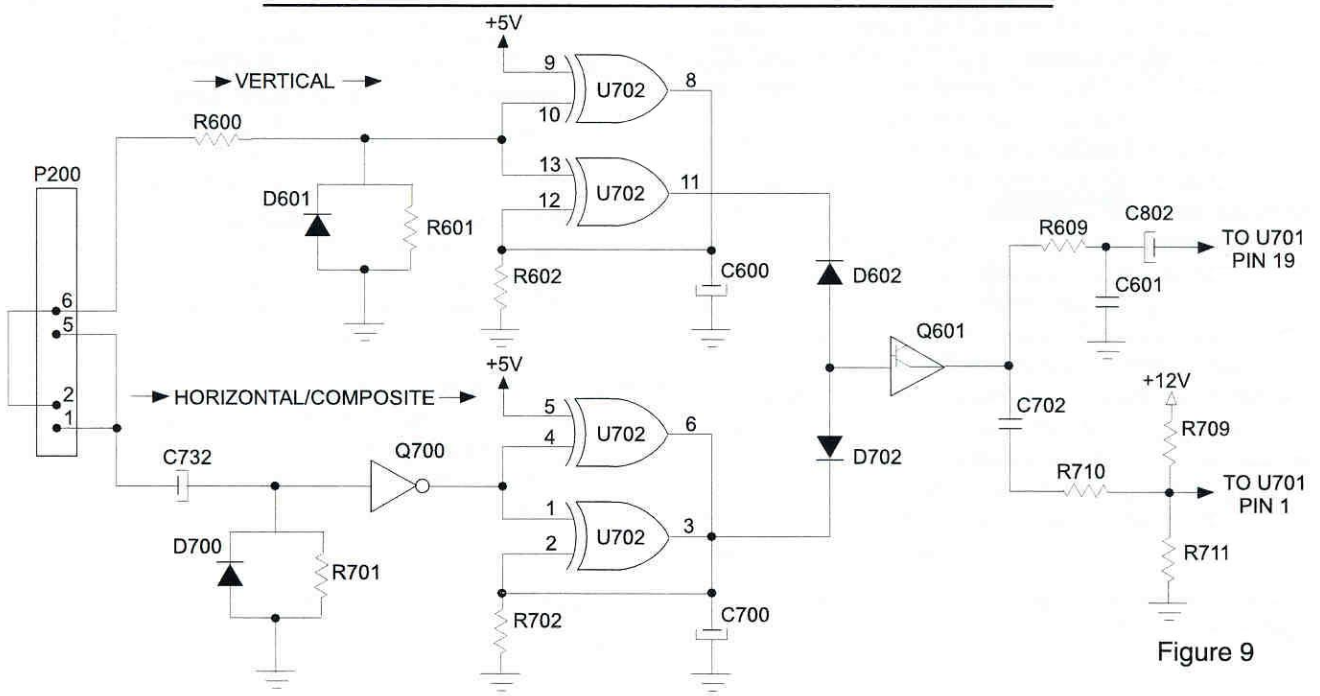


Figure 9

flyback transformer T700 are applied through U701, pin 4 to a sawtooth generator which also inputs the AFC circuit. If the two signals are not at the same frequency, a correction voltage from the AFC is developed from the sawtooth voltage and applied to the frequency control input at U701, pin 8. If the free-running oscillator frequency and the sync pulse frequency are close, the correction voltage will bring the horizontal oscillator frequency in sync with the incoming horizontal sync pulses.

Horizontal Output and Deflection

The horizontal output is connected to the horizontal yoke through connector P206. When no vertical or horizontal outputs are applied to the yoke, the electron beam will be centered on the CRT. In order to deflect the beam, a sawtooth current must be developed and applied to the deflection circuits. At this time the horizontal output transistor Q704 is turned off. When a horizontal output from U701, pin 12 occurs, the signal turns on Q703 and through transformer T701, drives Q704 to saturation. When Q704 is saturated, the current is drawn in a linear fashion from the S-shaper capacitor C722 through the horizontal yoke winding. The current through the yoke produces a magnetic field that deflects the electron beam toward the right side of the screen. When the beam has reached the right edge of the screen, Q704 is abruptly turned off and the C722 discharge current through the yoke is abruptly terminated. The fast change of current in the horizontal yoke causes a high amplitude voltage-ring at the collector of Q704. The frequency of the ring is mainly controlled by the inductance of the horizontal yoke and capacitors C718 and C723. The first half cycle of the ring voltage is called the "retrace time" during this half cycle the collapsing magnetic field moves the beam rapidly to the left side of the raster. When the voltage ring starts through the second half of the cycle by swinging negative, damper diode D707 begins conducting, allowing energy stored in the horizontal sweep system to decay to zero. During the damper diode conduction period, the beam is deflected from the left edge of the raster to the zero current center position. Inductance L701 is connected in series with the yoke to provide horizontal linearity of the picture.

During the flyback interval, the collector pulse at Q704 is applied to the primary winding of T700. This transformer has a large step-up ratio and creates high voltage used to bias the anode of the CRT. The high voltage is rectified by the diodes internal to T700, and filtered through the inherent capacity of the CRT. Inside T700 is a large resistance placed between the high voltage output and ground. Two variable resistors (FOCUS and SCREEN) on T700 are used to deliver the proper voltages to the focus and G2 grids on the CRT.

Additional windings inside T700 create the necessary +27, +15V, and −135V supply voltages used to operate the monitor circuitry. An additional pulse voltage is developed at pin 5 of T700, and is used to supply voltage to the CRT filament, provide the feedback pulse used in the horizontal sync processing,

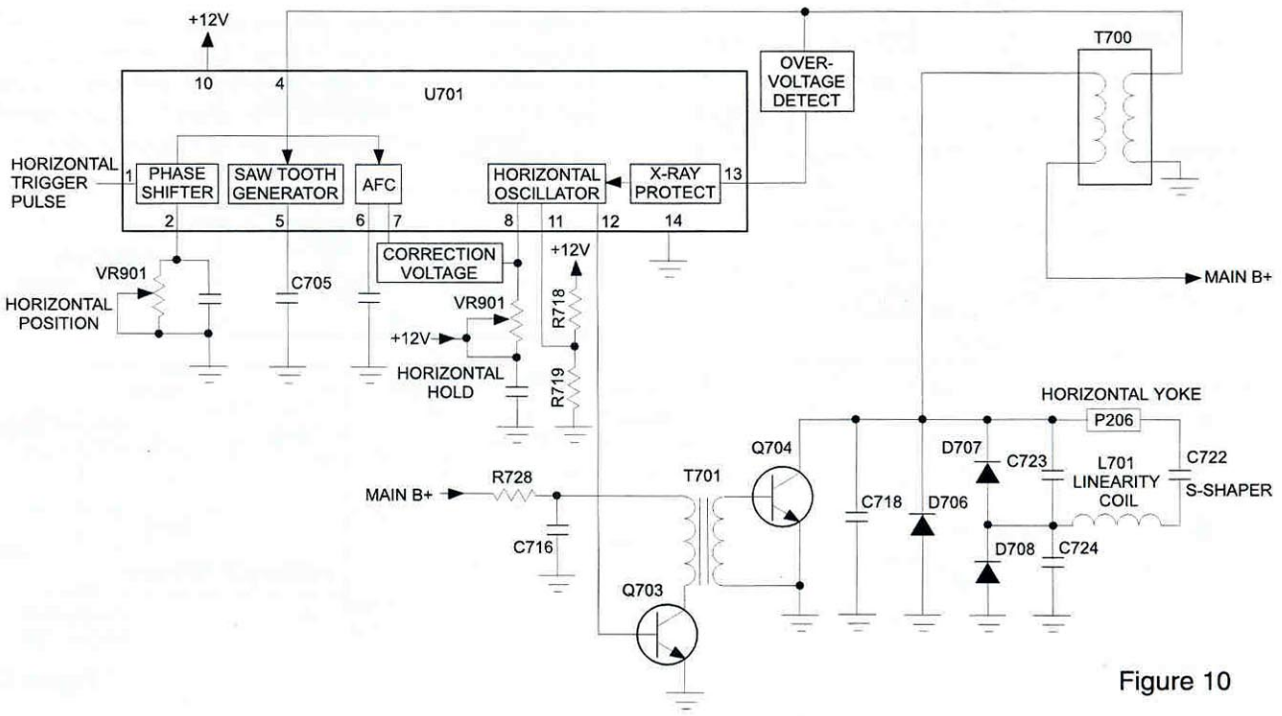


Figure 10

provide a gate signal for the video, and drive the horizontal blanking circuit.

VERTICAL OSCILLATOR AND OUTPUT

(Refer to Figure 11)

The vertical oscillator is free-running when no vertical sync pulses are present. The frequency is determined by the values of capacitor C604, resistor R624 and the VERTICAL HOLD variable resistor VR902 on the control board. If the vertical sync input at U701, pin 19 is slightly higher in frequency than the free-running oscillator frequency, the oscillator will lock to the vertical sync pulses. The vertical oscillator drives an internal vertical ramp generator. The ramp generator output is at U701, pin 16. This signal is coupled through C603 to U601, pin 3. U601 is the vertical output circuit. A vertical sweep is started when a trigger pulse is applied at U601, pin 3. The negative leading edge is detected and initiates a ramp waveform. The time constant for the ramp is determined by capacitor C609 at pin 6. The amplitude of the ramp is controlled by HEIGHT variable resistor VR907 on the control board. The ramp output is routed through an inverter, then output pin 7, through R611 and through pin 8 to the output amplifier. Feedback is inserted into the waveform at pin 8 from the feedback network consisting of resistors R614, R616, R612 and C615. The feedback network improves vertical linearity. The flyback generator output at U601, pin 10 is fed through capacitor C613 back to pin 2. This pulse is added to the B+ so that the flyback voltage is "pumped up" to a higher voltage required for vertical flyback. This allows for faster retrace than the yoke would allow for at the lower B+ level used by the IC. Since the higher voltage is used only during retrace, heat dissipation is reduced. U601 contains an internal voltage regulator that prevents changes in B+ from affecting vertical size. In addition the IC provides internal thermal protection, shutting down in the event of over dissipation.

Pin Cushion Circuit

(Refer to Figure 12)

NOTE: This circuit is used on the 27" monitors only

The pin cushion circuit is used in large screen CRT to minimize distortion in the four corners of the raster. This circuit provides a correction voltage to the horizontal sweep circuit to eliminate this distortion. Due to the geometry of the CRT the horizontal sweep requires a larger sweep at the top and bottom of the CRT compared to the center.

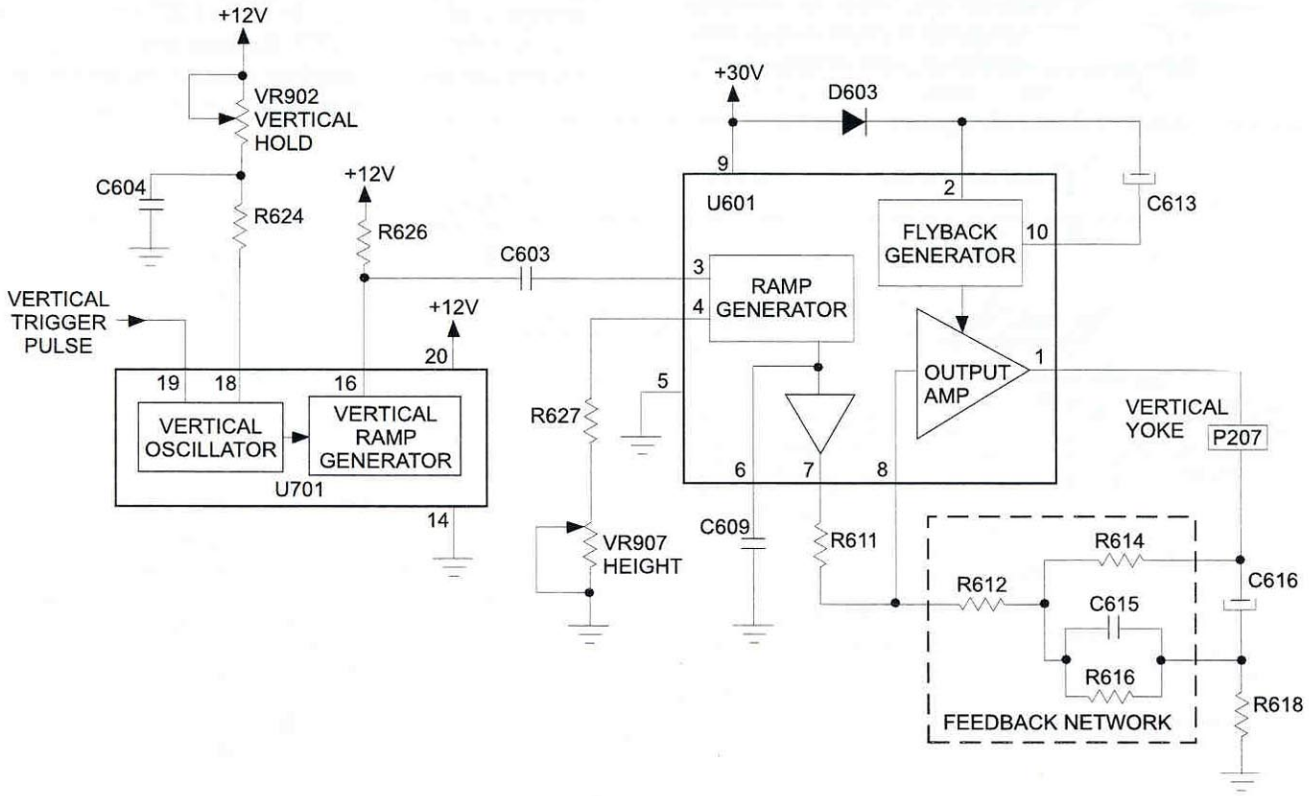


Figure 11

The pin cushion circuit receives the output from vertical transistor Q602 at pin 8 of the pin cushion board. This is ac coupled to the base of amplifier Q770. In addition, the output of the vertical correction network is connected through pin 7 to the TRAP variable resistor VR771. The output of Q770 drives buffer Q771. The buffer output is applied through PIN variable resistor VR770 to a capacitance voltage divider consisting of C772 and C773. The parabolic correction voltage developed across C773 is applied out through pin 3 to the base of transistor Q709, then coupled to the horizontal sweep circuit by transistor Q710. The correction signal causes the horizontal yoke sweep speed to be varied depending on the position of the vertical sweep. Adjusting VR770 determine the amount of correction and is set for the most linear display.

DC Width Control

(Figure 12)

The horizontal width control circuit uses the control circuit of Q709 and Q710. The horizontal size voltage from VR900 width control, on the remote control board is applied to the base of Q709 controlling the size setting. The size voltage and pin correction waveforms are combined together and amplified at Q710. This is coupled into the diode modulator circuit (D707, D708). The diode modulator circuit controls the horizontal yoke current that affects the horizontal size.

VIDEO PROCESSING

(Refer to Figure 13)

The video processing circuits receive the red, green and blue video inputs and transforms these into the proper signals for driving the CRT cathodes. All three video circuits are almost identical and the following discussion will describe the red channel.

The red signal enters the K7501 through connector P200 on the deflection Printed Circuit Board (PCB) and is routed though the video cable to pin 3 of connector CN501 on the neck PCB. The red video signal is terminated by resistor R564 and drives the base of transistor buffer Q511. The output signal from Q511 is divided down by resistors R503 and R506 then ac coupled to video processor U500, pin 4. A voltage of 2.4V is provided at pin 11 and is used to properly bias the input at pin 4 through R509. IC U501 provides several functions in the video system. These include signal bias control, signal gain control, and contrast control.

The signal bias control adjusts the DC voltage present in the output stage of each channel. For the red channel this is RED BIAS variable resistor R545. Each channel is separately biased to their cutoff point. The voltage set by R517 and R518 provides a reference brightness level. This voltage is applied at pins 15, 19, and 24. During each horizontal retrace period this voltage is compared to a feedback voltage. For the red channel the feedback voltage is applied to U500, pin 26 by the RED BIAS variable resistor VR545. When these two voltages are unequal, the output of a comparator shifts to correct the difference. The output voltage is stored by capacitor C514 connected at pin 5. The video signal black level is clamped to this voltage. As the voltage across C514 varies, the DC component of the signal will vary. The changing DC voltage across C514 changes the operating point of the amplifier and the bias on its respective cathode.

The red signal exits IC U500 at pin 25 and is terminated by resistors R554 and applied to the input of the driver Q508 and video output Q505. The output at the collector of Q505 is applied to the red cathode.

Signal gain for each channel can be set independently to allow compensation for difference in the

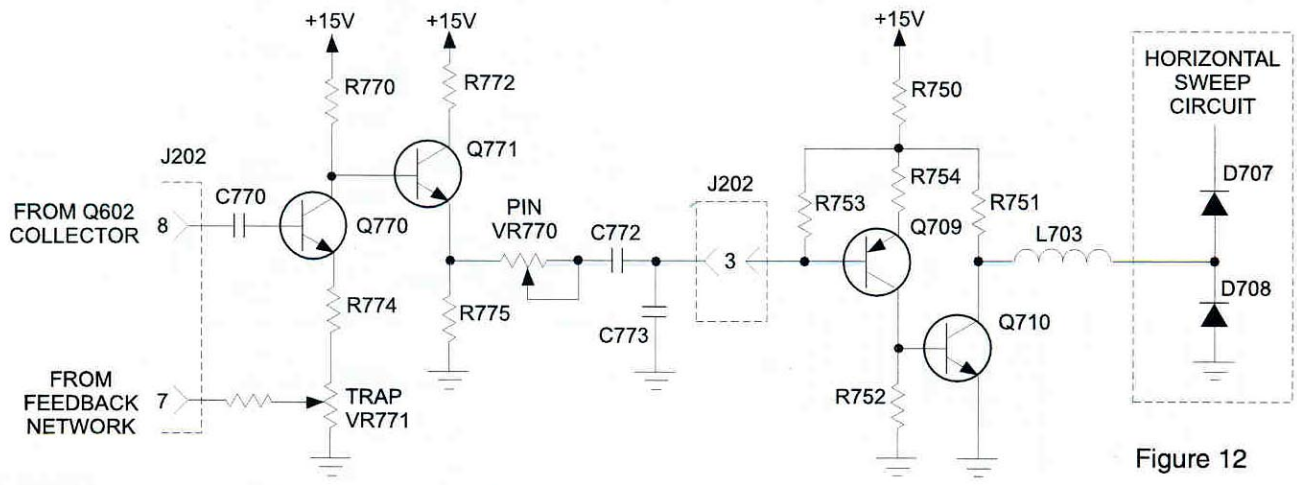


Figure 12

CRT and the output stages. The blue drive is not adjustable and is used as a reference for setting the red and green drive. The gain of the red channel is set by variable resistor VR521.

The CONTRAST control, VR905 is used to set the video intensity of all three channels. The control varies the voltage at U500, pin 12 and internally is applied to each video channel.

Brightness in the K7501 monitor is controlled by BRIGHTNESS variable resistor VR906 on the control board. Adjusting VR906 varies the bias voltage to grid G1 on the CRT. Vertical and horizontal retraces pulses are also applied to the base of Q800. The composite blanking signal at the collector of Q800 is then applied to grid G1, blanking the CRT during retrace time.

Automatic Beam Limiting

Automatic Beam Limiting (ABL) is used to insure that beam current does not become excessive causing distortion in the shadow mask inside the CRT.

Beam current is sensed by resistor R810 and buffered by Q803. Excessive beam current drives the emitting of Q803 downward. The voltage is routed up to the neck board through the video cable and coupled into D507. When this voltage is sufficiently low, the contrast voltage is pulled down at U500 pin 12. This causes a reduction in screen intensity. The circuit at Q802 yields additional range for ABL operation due to the –135V supply via diode D810 through the brightness variable resistor VR906 and R835. Spot kill is accomplished via C812 supplying additional negative supply voltage through Q802, holding the contrast low during monitor turn off.

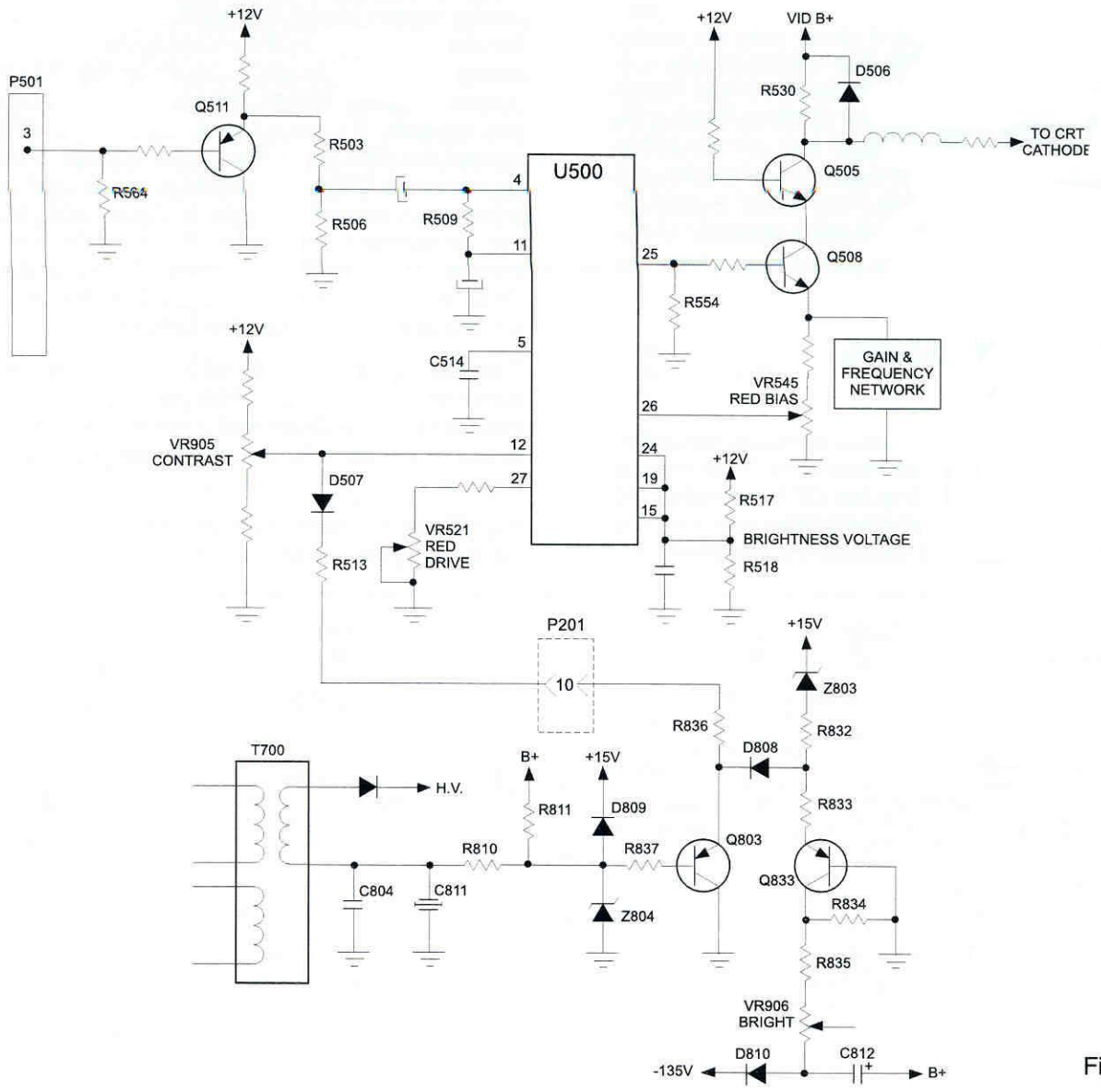
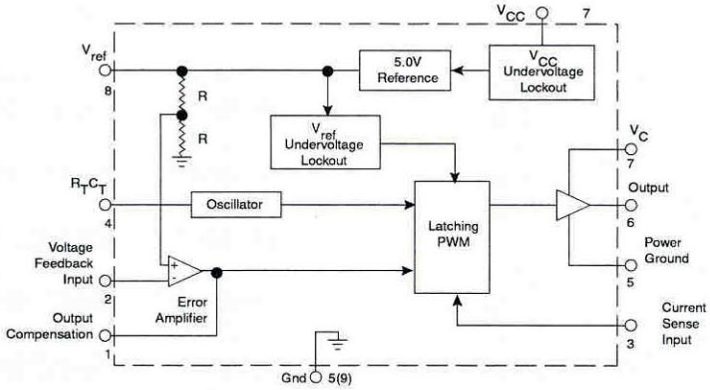


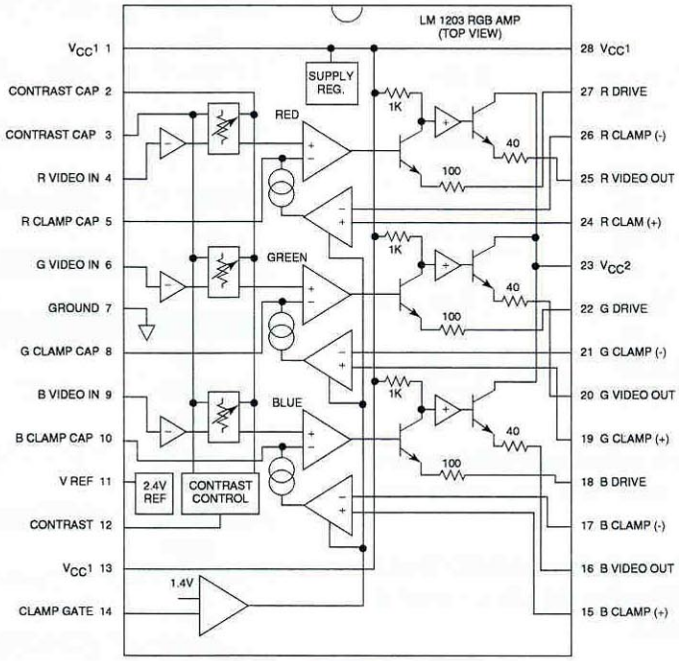
Figure 13

U101

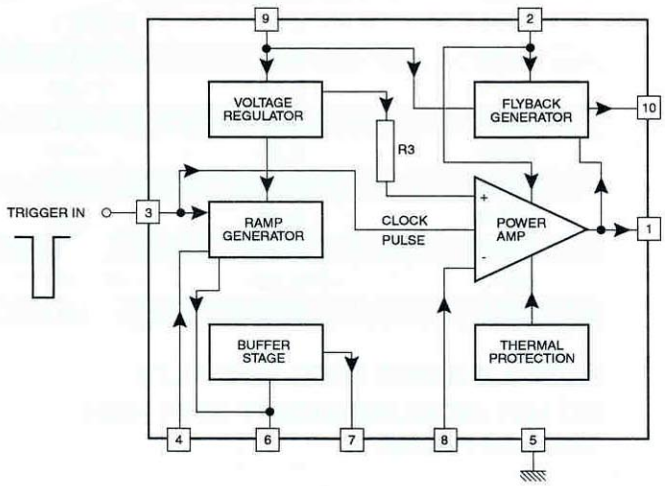
Simplified Block Diagram



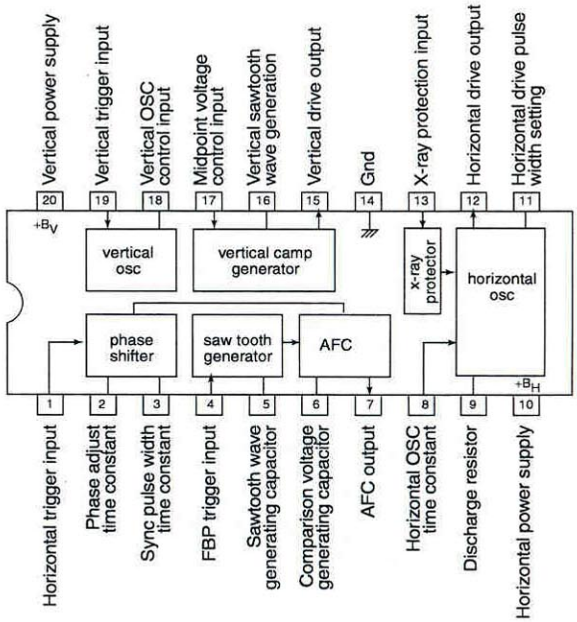
U500



U601



U701



All readings are in volts, and were taken with a crosshatch pattern displayed at nominal screen intensity.

TEST POINTS	
TP103*	-3.20
TP104*	17.10
TP105*	0.90
TP106*	0.00
TP200	4.80
TP201	0.10
TP202	117.20
TP203	152.00
TP204	14.70
TP205	24.50

ZENERS DIODES	ANODE	CATH
Z500	0.00	12.00
Z601	0.00	114.00
Z602	-2.30	-2.80
Z700	0.00	4.80
Z701	0.00	5.40
Z702	0.00	13.30
Z800	38.70	118.00
Z802	1.70	13.90
Z803	6.80	14.70
Z804	0.00	8.50

Parts marked with an "*" are measured with respect to AC GROUND. All other parts are measured with respect to chassis ground.

FOR YOUR SAFETY, IT IS RECOMMENDED THAT AN ISOLATION TRANSFORMER BE USED WHEN SERVICING THIS PRODUCT.

DIODES	ANODE	CATH
D101*	33.50	149.70
D102*	71.50	149.70
D103*	71.80	77.60
D104*	0.20	77.60
D105*	0.00	0.20
D106A	0.20	86.00
D106B	78.00	97.10
D106C	95.50	116.80
D107*	152.00	318.40
D108*	152.10	156.40
D111*	18.50	18.90
D112*	0.20	18.30
D113*	0.10	0.10
D114*	0.10	0.10
D115	-37.00	-36.00
D116	-36.50	-36.00
D117	-1.20	-169.20
D301	0.60	14.60
D302	0.30	24.90
D303	-149.00	15.00
D310	0.10	156.00
D501	1.54	0.80
D502	1.42	0.72
D503	1.40	0.70
D504	42.00	156.00
D505	9.50	156.00
D506	121.00	132.00
D507	6.17	6.17
D600	4.70	4.90
D601	0.00	4.90
D602	11.60	15.80
D603	24.30	24.70
D604	0.20	0.00
D700	0.60	0.00
D702	11.70	14.10
D707	6.80	NOTE 1
D708	0.30	22.00
D711	0.10	21.60
D803	0.00	0.10
D804	0.20	1.40
D807	0.10	0.20
D808	8.70	1.40
D809	8.90	14.70
D810	-149.70	-149.40
D811	0.00	4.80

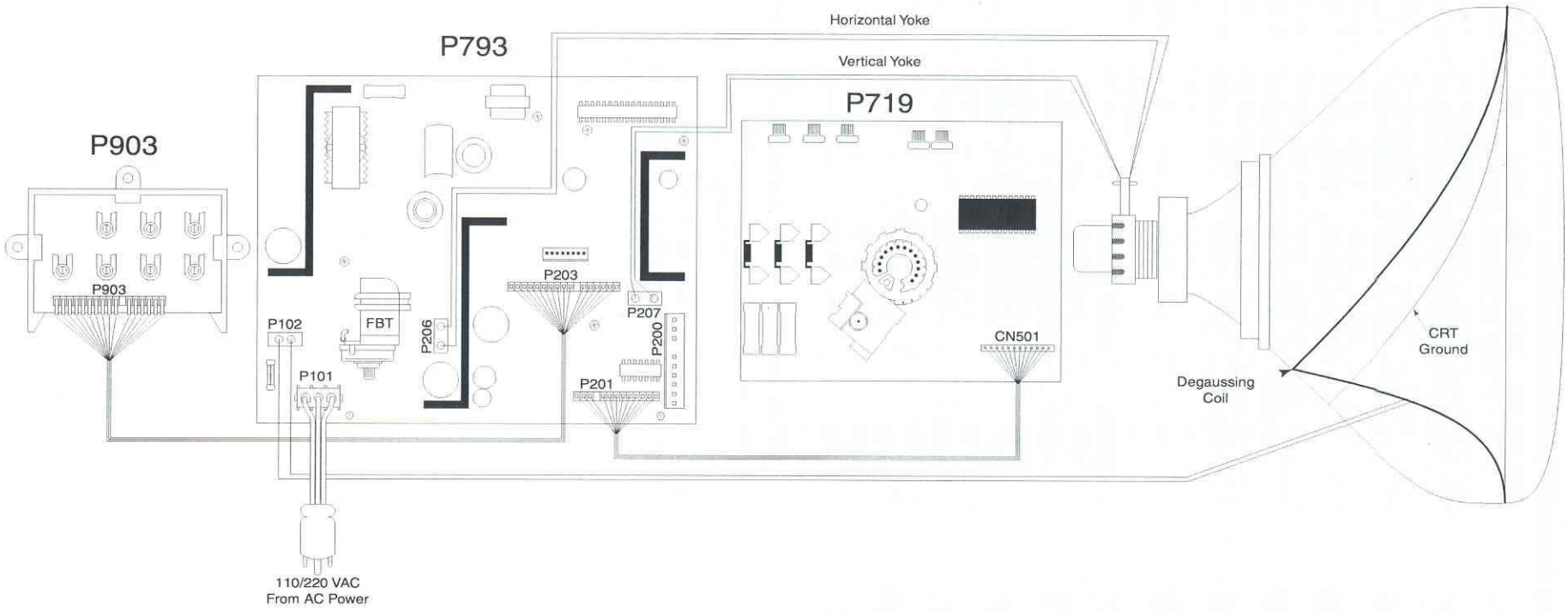
NOTE 1: VOLTAGE OVER 1000 VOLTS.
DO NOT MEASURE EXCEPT WITH HIGH VOLTAGE PROBE.

TRANSISTORS

TRSTR	EMIT	BASE	COLL
Q101*	0.10	5.56	152.10
Q502	0.00	-0.10	10.30
Q503	11.20	11.60	114.40
Q504	11.20	11.70	119.40
Q505	11.20	11.75	120.60
Q506	1.40	2.10	11.20
Q507	1.40	2.20	11.20
Q508	1.50	2.20	11.30
Q509	1.40	0.36	0.00
Q510	1.50	0.36	0.00
Q511	1.40	0.36	0.00
Q601	8.70	9.40	11.60
Q602	2.20	2.80	14.00
Q703	0.00	0.36	79.60
Q704	0.00	0.50	NOTE 1
Q709	5.80	5.20	1.13
Q710	0.00	-1.13	5.75
Q770	5.30	6.41	10.80
Q771	6.40	10.80	14.00
Q800	0.00	-0.28	20.20
Q801	0.44	1.07	5.13
Q802	0.30	0.00	0.58
Q803	8.65	8.90	0.00

INTEGRATED CIRCUITS

ICs PIN NO.	U101	U500	U601	U701	U702
1	3.40	12.20	14.40	4.80	0.20
2	2.50	5.50	25.20	9.10	4.40
3	0.20	5.50	3.60	8.60	14.40
4	1.80	2.30	6.60	0.00	0.20
5	0.00	2.30	0.00	4.00	4.80
6	5.62	2.20	9.20	3.38	4.40
7	18.40	0.00	9.80	6.90	0.00
8	4.90	2.20	4.50	6.85	0.20
9	—	2.23	24.90	5.85	-4.70
10	—	2.14	1.50	13.50	4.90
11	—	2.27	—	6.40	14.50
12	—	4.13	—	0.60	0.20
13	—	12.00	—	0.10	4.90
14	—	10.30	—	0.10	4.80
15	—	0.85	—	0.10	—
16	—	2.50	—	8.70	—
17	—	1.20	—	0.80	—
18	—	1.30	—	5.50	—
19	—	0.80	—	5.70	—
20	—	2.40	—	11.50	—
21	—	1.30	—	—	—
22	—	1.20	—	—	—
23	—	12.00	—	—	—
24	—	0.85	—	—	—
25	—	2.40	—	—	—
26	—	1.30	—	—	—
27	—	1.10	—	—	—
28	—	12.00	—	—	—



AC INPUT CONNECTOR: P101

AMP 350760-4

Mating AMP type 1-480700-0

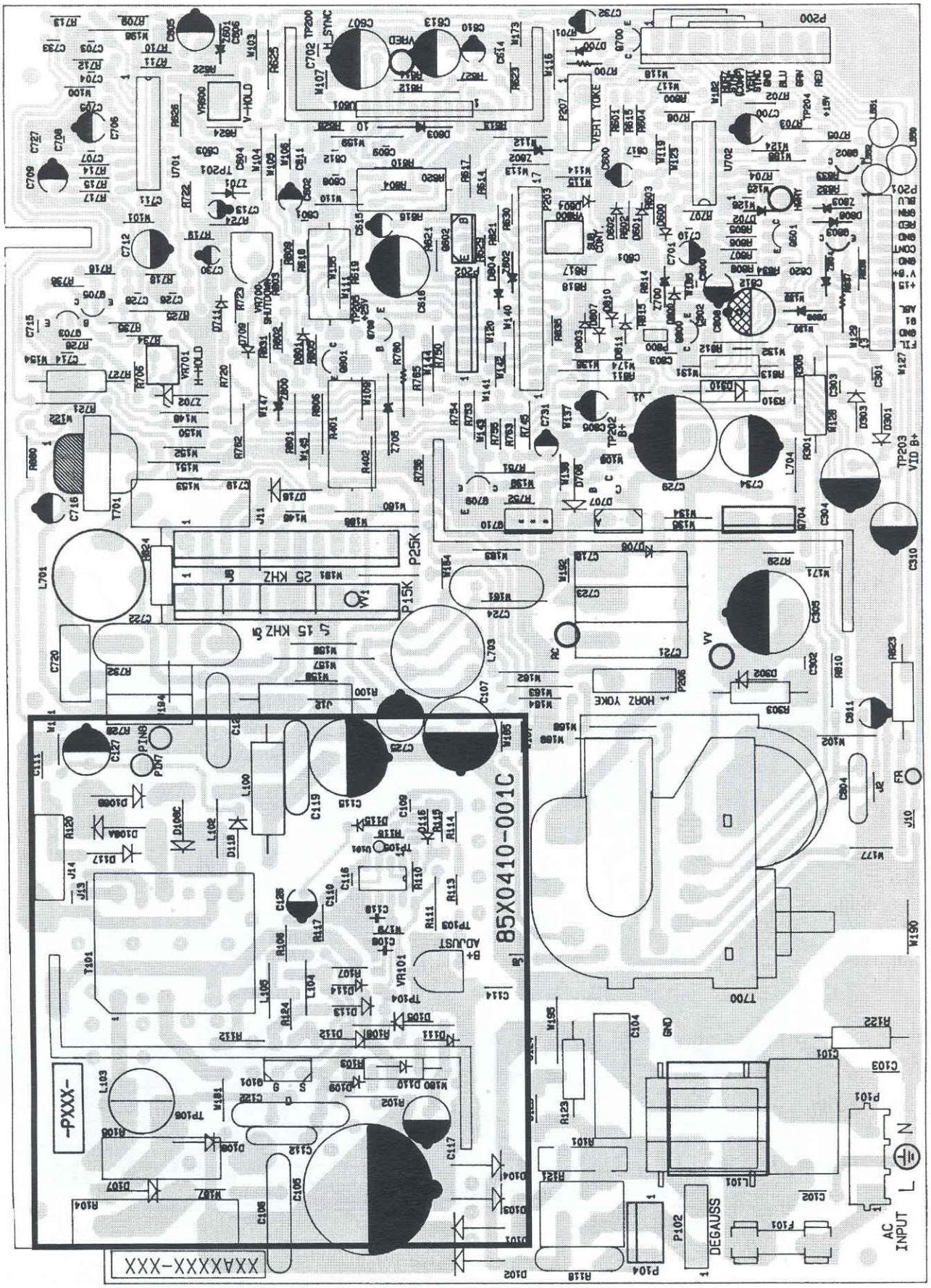
Pin	Description
1	AC hot
2	Earth ground
3	AC neutral

INPUT SIGNAL CONNECTOR: P200

AMP 1-640445-0

Mating AMP type 1-640250-0

PCB Connector Pin	Description
10	Red
9	Green
8	Blue
7	Gnd
6	± Vertical Sync
5	± Horz/Comp Sync
4	Key
3	Gnd
2	± Vertical Sync
1	± Horz/Comp Sync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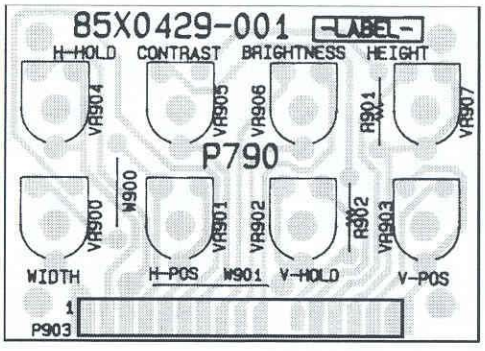
XXAXXXX-XXX
-PXXX-
P25K
P15K
25 KHZ
15 KHZ
H-HOLD
V-HOLD
H_SYNC
VERT YOKE
HORZ YOKE
DEGAUSS
AC INPUT
ADJUST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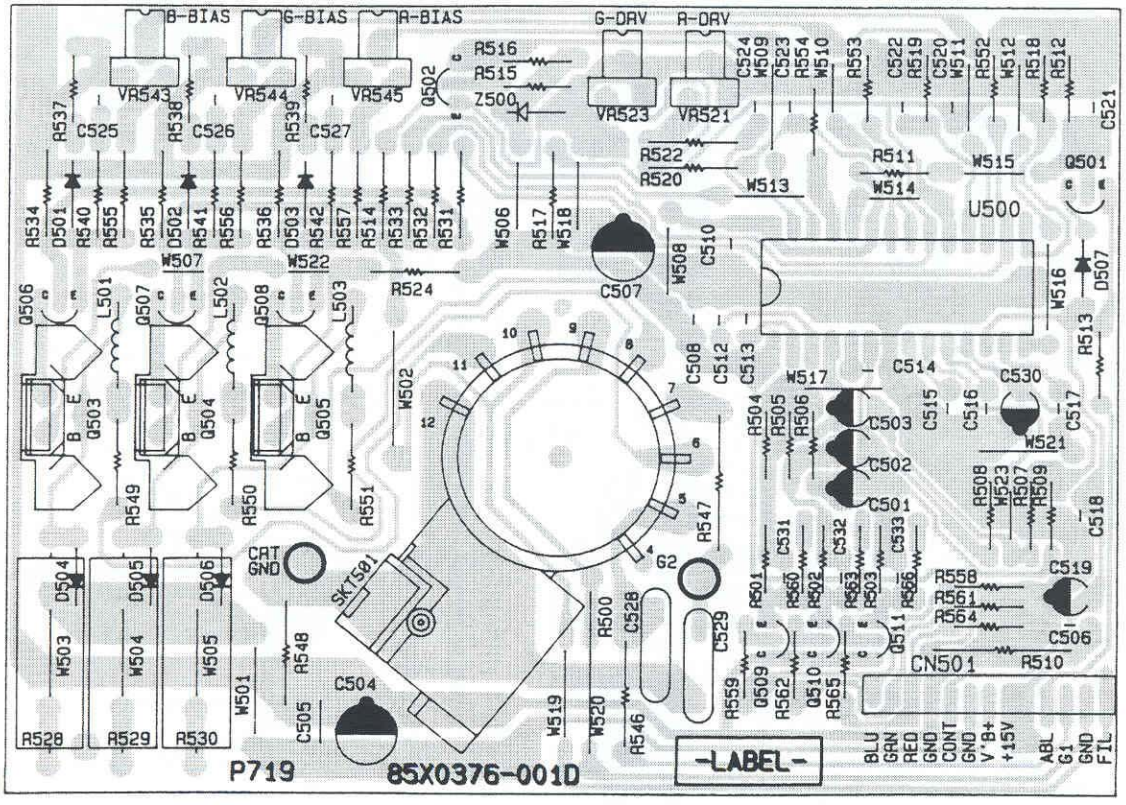
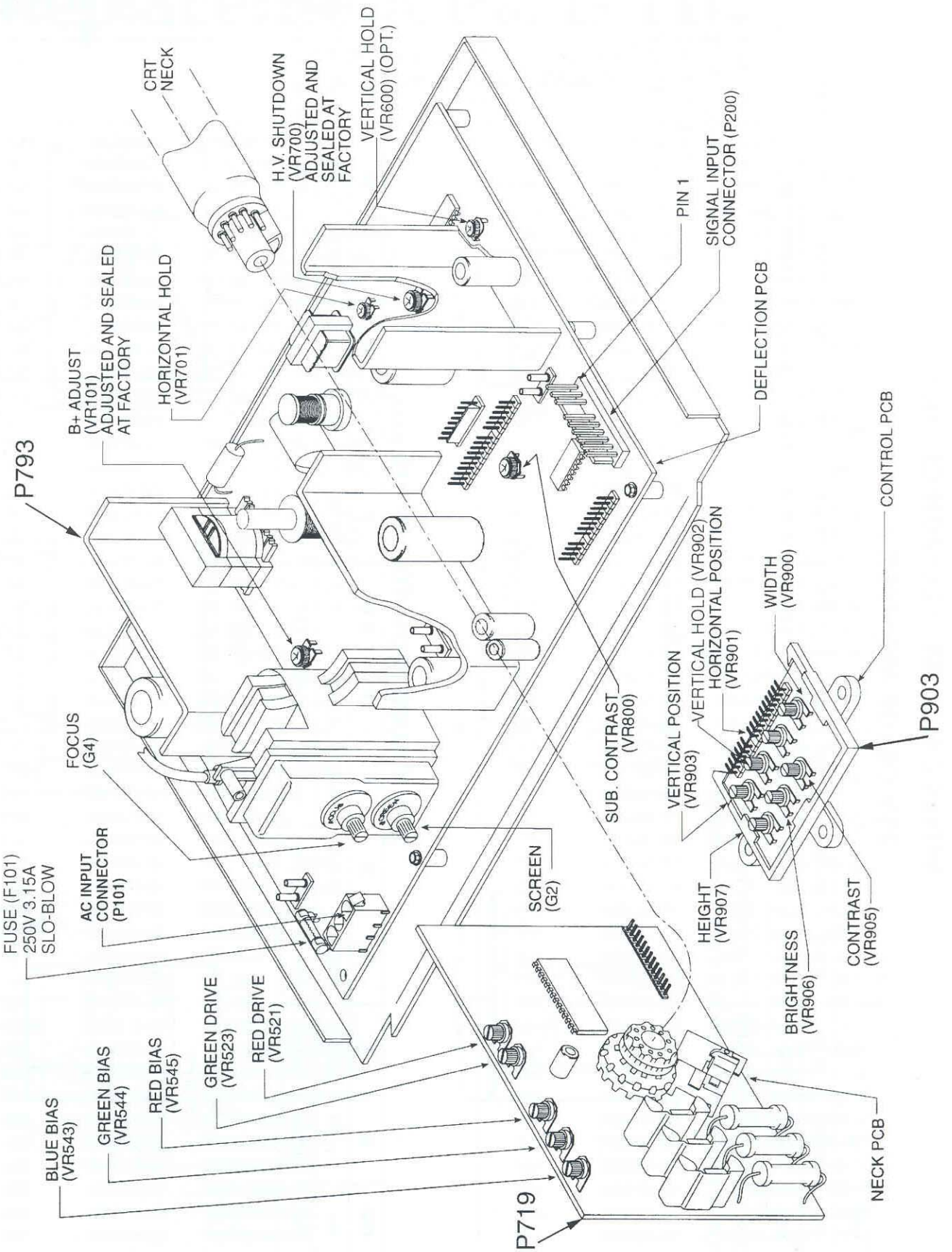
CONTRAST
BRIGHTNESS
HEIGHT
VR904
VR905
VR906
R901
VR907
P790
VR900
W900
VR901
VR902
R902
VR903
WIDTH
H-POS
W901
V-HOLD
V-POS
1
P903


B-BIAS
G-BIAS
R-BIAS
G-DRV
R-DRV
VR543
VR544
VR545
VR523
VR521
U500
CN501
SK7501
P719
85X0376-001D
-LABEL-
BLU
GRN
RED
GND
CONT
GND
V'B+
+15V
ABL
G1
GND
FIL
CRT GND
G2


CRT NECK
H.V. SHUTDOWN (VR700) ADJUSTED AND SEALED AT FACTORY
VERTICAL HOLD (VR600) (OPT.)
PIN 1
SIGNAL INPUT CONNECTOR (P200)
DEFLECTION PCB
B+ ADJUST (VR101) ADJUSTED AND SEALED AT FACTORY
HORIZONTAL HOLD (VR701)
P793
FOCUS (G4)
SUB. CONTRAST (VR800)
VERTICAL POSITION (VR903)
VERTICAL HOLD (VR902)
HORIZONTAL POSITION (VR901)
WIDTH (VR900)
CONTROL PCB
P903
FUSE (F101) 250V 3.15A SLO-BLOW
AC INPUT CONNECTOR (P101)
SCREEN (G2)
HEIGHT (VR907)
CONTRAST (VR905)
BRIGHTNESS (VR906)
BLUE BIAS (VR543)
GREEN BIAS (VR544)
RED BIAS (VR545)
GREEN DRIVE (VR523)
RED DRIVE (VR521)
P719
NECK PCB

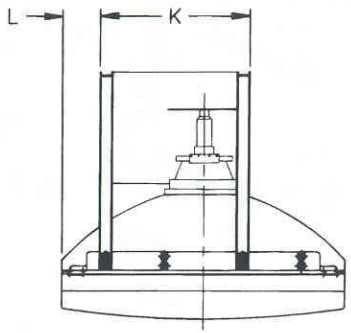
WELLS GARDNER ELECTRONICS CORP.

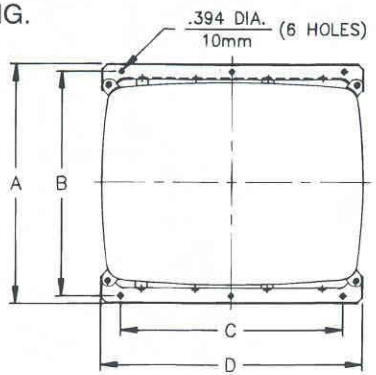
25V COLOR MONITOR 25–U4 (F25M4)

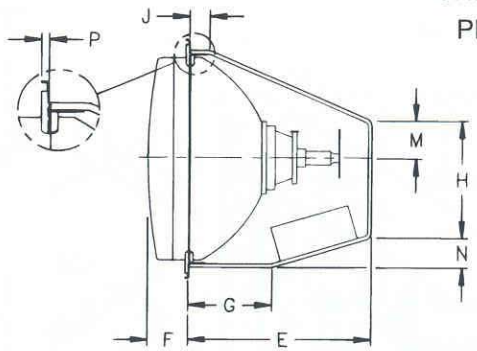
DIM	A	B	C	D	E	F	G	H	J	K	L	M	N	P
IN.	20.630	19.291	19.291	23.000	16.125	3.590	7.375	10.125	1.750	12.000	3.140	3.250	2.562	0.343
mm.	524.00	490.00	490.00	584.20	409.58	91.19	187.33	257.18	44.45	304.80	79.76	82.55	65.07	8.71

DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.
FOR SPECIFICS CONTACT W.G.E.C. ENGINEERING.

2701 N. KILDARE AVE.
CHICAGO, ILLINOIS 60639
PHONE (773) 252-8220
FAX (773) 252-8072

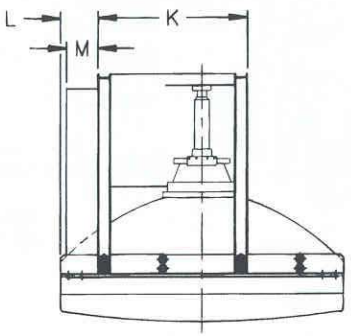


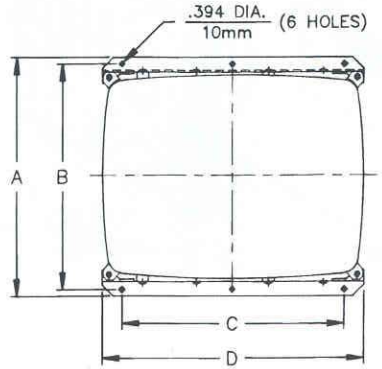


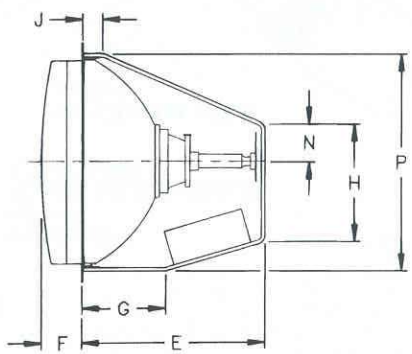


27V COLOR MONITOR 27–U0 (F27M)

DIM	A	B	C	D	E	F	G	H	J	K	L	M	N	P
IN.	21.937	20.644	20.644	24.500	16.125	3.230	7.375	10.125	1.750	12,000	3.875	2.750	3.250	20.210
mm.	557.20	524.36	524.36	622.30	409.58	82.04	187.33	257.18	44.45	304.80	98.43	69.85	82.55	513.34







WG ENG. RL 12–94

Replacement Parts List

54A2193-021 (25" & 27" MODEL)
NECK BOARD ASSEMBLY
(P719)

Location	Part Number	Description
C501	045X0560-518	CAP LYT 10UF 25V
C502	045X0560-518	CAP LYT 10UF 25V
C503	045X0560-518	CAP LYT 10UF 25V
C504	045X0566-007	CAP LYT 4.7UF 20% 200V 105 DEG
C505	080X0099-062	CAP .02UF +80-20% Z5U 500V CER
C506	047X0788-512	CAP .1UF 20% Z5U 50V MON
C507	045X0560-554	CAP LYT 100UF 20% 16V
C508	047X0788-512	CAP .1UF 20% Z5U 50V MON
C510	047X0788-512	CAP .1UF 20% Z5U 50V MON
C512	047X0788-512	CAP .1UF 20% Z5U 50V MON
C513	047X0788-521	CAP .022UF 20% Z5U 100V MON
C514	047X0788-512	CAP .1UF 20% Z5U 50V MON
C515	047X0788-512	CAP .1UF 20% Z5U 50V MON
C516	047X0788-512	CAP .1UF 20% Z5U 50V MON
C517	047X0788-512	CAP .1UF 20% Z5U 50V MON
C518	047X0788-512	CAP .1UF 20% Z5U 50V MON
C520	047X0788-512	CAP .1UF 20% Z5U 50V MON
C525	047X0788-033	CAP 680PF 10% NPO 50V MON
C526	047X0788-033	CAP 680PF 10% NPO 50V MON
C527	047X0788-033	CAP 680PF 10% NPO 50V MON
C529	080X0099-095	CAP 1000PF 10% Z5F 2KV CER
C530	045X0560-518	CAP LYT 10UF 25V
C531	080X0099-703	CAP 3.9PF NPO 50V CER
C532	080X0099-703	CAP 3.9PF NPO 50V CER
C533	080X0099-703	CAP 3.9PF NPO 50V CER
C540	080X0099-506	CAP 470PF 10% Z5F CER
CN501	006A0473-013	HEADER 13 PIN .100 CTR
D501	066X0070-001	DIODE 1N914B
D502	066X0070-001	DIODE 1N914B
D503	066X0070-001	DIODE 1N914B
D504	066X0062-001	DIODE SANYO GMA02
D505	066X0062-001	DIODE SANYO GMA02
D506	066X0062-001	DIODE SANYO GMA02
D507	066X0070-001	DIODE 1N914B
L501	009A2811-004	COIL 12UH
L502	009A2811-004	COIL 12UH
L503	009A2811-004	COIL 12UH
Q502	086X0113-501	TRSTR 2N3904 MOT
Q503	086X0287-001	TRSTR NPN SANYO 2SC3782
Q504	086X0287-001	TRSTR NPN SANYO 2SC3782
Q505	086X0287-001	TRSTR NPN SANYO 2SC3782
Q506	086X0113-501	TRSTR 2N3904 MOT
Q507	086X0113-501	TRSTR 2N3904 MOT
Q508	086X0113-501	TRSTR 2N3904 MOT
Q509	086X0114-501	TRSTR 2N3906 MOT
Q510	086X0114-501	TRSTR 2N3906 MOT
Q511	086X0114-501	TRSTR 2N3906 MOT

Location	Part Number	Description
R500	340X4033-633	RES 3.3 OHM 5% 1W MO/MF
R501	340X2242-934	RES 2.4K OHM 5% 1/4W CF
R502	340X2242-934	RES 2.4K OHM 5% 1/4W CF
R503	340X2242-934	RES 2.4K OHM 5% 1/4W CF
R504	340X2112-934	RES 1.1K OHM 5% 1/4W CF
R505	340X2112-934	RES 1.1K OHM 5% 1/4W CF
R506	340X2112-934	RES 1.1K OHM 5% 1/4W CF
R507	340X2103-934	RES 10K OHM 5% 1/4W CF
R508	340X2103-934	RES 10K OHM 5% 1/4W CF
R509	340X2103-934	RES 10K OHM 5% 1/4W CF
R510	340X4300-934	RES 30 OHM 5% 1W CF
R513	340X2910-934	RES 91 OHM 5% 1/4W CF
R514	340X2103-934	RES 10K OHM 5% 1/4W CF
R515	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R516	340X2103-934	RES 10K OHM 5% 1/4W CF
R517	340X2103-934	RES 10K OHM 5% 1/4W CF
R518	340X2751-934	RES 750 OHM 5% 1/4W CF
R519	340X2181-934	RES 180 OHM 5% 1/4W CF
R520	340X2560-934	RES 56 OHM 5% 1/4W CF
R522	340X2560-934	RES 56 OHM 5% 1/4W CF
R524	340X2101-934	RES 100 OHM 5% 1/4W CF
R528	420X8272-326	RES 2.7K OHM 5% 5W MO
R529	420X8272-326	RES 2.7K OHM 5% 5W MO
R530	420X8272-326	RES 2.7K OHM 5% 5W MO
R531	340X2220-934	RES 22 OHM 5% 1/4W CF
R532	340X2220-934	RES 22 OHM 5% 1/4W CF
R533	340X2220-934	RES 22 OHM 5% 1/4W CF
R537	340X2560-934	RES 56 OHM 5% 1/4W CF
R538	340X2560-934	RES 56 OHM 5% 1/4W CF
R539	340X2560-934	RES 56 OHM 5% 1/4W CF
R540	340X2390-934	RES 39 OHM 5% 1/4W CF
R541	340X2390-934	RES 39 OHM 5% 1/4W CF
R542	340X2390-934	RES 39 OHM 5% 1/4W CF
R546	340X3151-234	RES 150 OHM 5% 1/2W CC-AB
R547	340X3102-234	RES 1.0K OHM 5% 1/2W CC-AB
R549	340X3151-234	RES 150 OHM 5% 1/2W CC-AB
R550	340X3151-234	RES 150 OHM 5% 1/2W CC-AB
R551	340X3151-234	RES 150 OHM 5% 1/2W CC-AB
R552	340X2391-934	RES 390 OHM 5% 1/4W CF
R553	340X2391-934	RES 390 OHM 5% 1/4W CF
R554	340X2391-934	RES 390 OHM 5% 1/4W CF
R555	340X2391-934	RES 390 OHM 5% 1/4W CF
R556	340X2391-934	RES 390 OHM 5% 1/4W CF
R557	340X2391-934	RES 390 OHM 5% 1/4W CF
R558	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R559	340X2101-934	RES 100 OHM 5% 1/4W CF
R560	340X2202-934	RES 2.0K OHM 5% 1/4W CF

Component values subject to change without notice.

Replacement Parts List

Location	Part Number	Description
R561	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R562	340X2101-934	RES 100 OHM 5% 1/4W CF
R563	340X2202-934	RES 2.0K OHM 5% 1/4W CF
R564	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R565	340X2101-934	RES 100 OHM 5% 1/4W CF
R566	340X2202-934	RES 2.0K OHM 5% 1/4W CF
U500	086X0270-001	IC LM1203N RGB VID AMP NSC
VR521	040X0715-002	TRIM POT 200 OHM .15W VT MT KB
VR523	040X0715-002	TRIM POT 200 OHM .15W VT MT KB
VR543	040X0715-005	TRIM POT 1K OHM .15W VT MT KB
VR544	040X0715-005	TRIM POT 1K OHM .15W VT MT KB
VR545	040X0715-005	TRIM POT 1K OHM .15W VT MT KB
W507	340X2101-934	RES 100 OHM 5% 1/4W CF
W522	340X2101-934	RES 100 OHM 5% 1/4W CF
Z500	066X0040-050	ZENER DIODE 12V 5% 1W

54A7501-001 (25" MODEL)
DEFLECTION BOARD ASSEMBLY AND REMOTE CONTROL BOARD
(P793)

Location	Part Number	Description
C101	046X0552-002	CAP .47UF 250V UL/CSA/VDE X
C104	046X0547-001	CAP .22UF 20% 250V UL/CSA/VDE
C105	045X0603-003	CAP LYT 270UF 20% 400V 105C
C106	080X0099-218	CAP 0.10UF 20% Z5U 1KV CER
C107	045X0580-044	CAP LYT 33UF 20% 200V 105C
C108	047X0789-510	CAP 1.0UF 63V SMF
C109	080X0099-698	CAP 1000PF 10% Z5P 1KV CER
C110	047X0788-530	CAP 820PF 2% 50V NPO MON
C111	080X0099-232	CAP .01UF +80-20% Z5U 1KV CER
C112	080X0099-245	CAP 120PF 5% N750 1KV CER
C114	046X0561-002	CAP 3300PF 20% 250V CER UL CSA
C115	045X0580-031	CAP LYT 100UF 20% 200V 105 DEG
C116	046X0550-509	CAP .012UF 2% 50V POLY FILM
C117	045X0580-506	CAP LYT 22UF 63V
C118	047X0789-510	CAP 1.0UF 63V SMF
C119	080X0099-234	CAP .10UF 20% Z5U 500V CER
C121	080X0099-234	CAP .10UF 20% Z5U 500V CER
C122	080X0099-244	CAP 470PF 5% N750 1KV CER
C124	046X0547-002	CAP 2200PF 20% 400V UL/CSA/VDE
C125	046X0547-002	CAP 2200PF 20% 400V UL/CSA/VDE
C126	045X0580-545	CAP LYT 1.0UF 20% 50V 105C
C127	045X0580-053	CAP LYT 470UF 20% 35V 105C
C301	080X0099-505	CAP .001 20% Z5F 500V CER
C302	080X0099-505	CAP .001 20% Z5F 500V CER
C303	080X0099-505	CAP .001 20% Z5F 500V CER
C304	045X0560-051	CAP LYT 1000UF 20% 25V
C305	045X0580-032	CAP LYT 2200UF 35V 105 DEG
C310	045X0580-057	CAP LYT 10UF 200V 105C
C600	045X0560-547	CAP LYT 47UF 16V
C601	047X0786-501	CAP .010UF 10% 50V P-ESTR
C602	045X0560-518	CAP LYT 10UF 25V
C603	047X0789-501	CAP .10UF 5% 100V SMF
C604	047X0789-501	CAP .10UF 5% 100V SMF
C605	045X0580-525	CAP LYT 100UF 50V 105C
C606	047X0789-501	CAP .10UF 5% 100V SMF
C607	045X0560-030	CAP LYT 470UF 35V
C608	047X0789-501	CAP .10UF 5% 100V SMF
C609	047X0786-517	CAP .047UF 10% 100V P-ESTR
C610	045X0580-555	CAP LYT 2.2UF 50V 105C
C611	047X0786-502	CAP .022UF 10% 50V P-ESTR
C612	047X0786-508	CAP .033UF 10% 50V P-ESTR
C613	045X0580-525	CAP LYT 100UF 50V 105C
C614	047X0789-504	CAP .22UF 5% 50V SMF
C615	045X0560-531	CAP LYT 33UF 16V
C616	045X0580-038	CAP LYT 1500UF 35V 105C
C617	047X0788-512	CAP .1UF 20% Z5U 50V MON
C620	080X0099-685	CAP .001UF 10% Y5P 50V CER
C7	045X0560-544	CAP LYT 1.0UF 50V
C700	045X0560-560	CAP LYT 220UF 16V
C701	045X0560-518	CAP LYT 10UF 25V
C702	080X0099-710	CAP 100PF 10% Z5F 50V CER
C703	047X0788-502	CAP 1500PF 5% NPO 50V MON
C704	047X0788-505	CAP 270PF 10% NPO 50V MON
C705	046X0550-502	CAP 5600PF 2% 50V POLY FILM
C706	045X0560-544	CAP LYT 1.0UF 50V
C707	047X0788-515	CAP .01UF 20% Z5U 50V MON
C708	046X0550-502	CAP 5600PF 2% 50V POLY FILM
C709	045X0560-544	CAP LYT 1.0UF 50V
C710	047X0786-501	CAP .010UF 10% 50V P-ESTR
C711	047X0789-501	CAP .10UF 5% 100V SMF
C712	045X0560-006	CAP LYT 1000UF 16V
C713	045X0560-501	CAP LYT 4.7UF 25V
C714	080X0099-722	CAP .0033 10% Y5P 500V CER
C715	080X0099-580	CAP 100PF 10% Z5F 500V CER
C716	045X0580-554	CAP LYT 1UF 200V 105C
C718	046X0536-065	CAP 680PF 1600V 2% P-PROP
C720	046X0536-064	CAP 1000PF 630V 10% P-PROP
C722	046X0536-088	CAP .82UF 200V 5% P-PROP
C723	046X0536-047	CAP 11200PF 1600V 2% P-PROP
C724	046X0536-048	CAP .027UF 400V 2% P-PROP
C726	047X0788-505	CAP 270PF 10% NPO 50V MON
C727	047X0786-519	CAP .0022UF 5% 50V P-ESTR
C728	047X0786-511	CAP .1UF 10% 50V P-ESTR
C729	045X0561-017	CAP LYT 10UF 20% 50V BP

Component values subject to change without notice.

Replacement Parts List

Location	Part Number	Description
C730	045X0560-501	CAP LYT 4.7UF 25V
C731	045X0560-518	CAP LYT 10UF 25V
C732	045X0560-518	CAP LYT 10UF 25V
C733	080X0099-697	CAP 120PF 5% NPO 50V CER
C734	045X0580-023	CAP LYT 330UF 63V 105 DEG
C800	080X0099-243	CAP .01UF 10% R (Y5R) 250V CER
C801	080X0099-246	CAP .01UF 20% Y5U 500V CER
C802	047X0788-502	CAP 1500PF 5% NPO 50V MON
C803	047X0788-006	CAP .022UF 20% X7R 500V MON
C804	080X0099-095	CAP 1000PF 10% Z5F 2KV CER
C805	045X0580-556	CAP LYT 2.2UF 200V 105C
C808	045X0580-556	CAP LYT 2.2UF 200V 105C
C811	045X0604-501	CAP LYT 4.7UF 100V NP 105C
C812	045X0569-004	CAP LYT 2.2UF 350V
D101	066X0135-001	DIODE IN5406
D102	066X0135-001	DIODE IN5406
D103	066X0135-001	DIODE IN5406
D104	066X0135-001	DIODE IN5406
D105	066X0095-001	DIODE 1N4007 STATIC SENS
D106A	066X0097-001	DIODE 200V 3.5A BYV28-200
D106B1	066X0097-001	DIODE 200V 3.5A BYV28-200
D107	066X0126-002	DIODE BOOST 900V 4A
D108	066X0090-001	DIODE RU-2 1A 600V FAST REC
D112	066X0090-001	DIODE RU-2 1A 600V FAST REC
D113	066X0090-001	DIODE RU-2 1A 600V FAST REC
D114	066X0071-001	DIODE 1N4001
D115	066X0070-001	DIODE 1N914B
D116	066X0070-001	DIODE 1N914B
D117	066X0144-001	DIODE DAMP 1A 600V GI RGP10J
D118	066X0090-001	DIODE RU-2 1A 600V FAST REC
D301	066X0090-001	DIODE RU-2 1A 600V FAST REC
D302	066X0090-001	DIODE RU-2 1A 600V FAST REC
D303	066X0090-001	DIODE RU-2 1A 600V FAST REC
D310	066X0090-001	DIODE RU-2 1A 600V FAST REC
D600	066X0070-001	DIODE 1N914B
D601	066X0070-001	DIODE 1N914B
D602	066X0070-001	DIODE 1N914B
D603	066X0071-001	DIODE 1N4001
D604	066X0070-001	DIODE 1N914B
D700	066X0070-001	DIODE 1N914B
D702	066X0070-001	DIODE 1N914B
D707	066X0150-001	DIODE DD54RC SANYO
D708	066X0126-005	DIODE BOOST 600V 4A MUR460
D711	066X0070-001	DIODE 1N914B
D803	066X0062-001	DIODE SANYO GMA02
D804	066X0070-001	DIODE 1N914B
D807	066X0062-001	DIODE SANYO GMA02
D808	066X0070-001	DIODE 1N914B
D809	066X0070-001	DIODE 1N914B
D810	066X0075-001	DIODE 1N4005

Location	Part Number	Description
D811	066X0062-001	DIODE SANYO GMA02
F101	016X0211-009	FUSE 3.15A 5X20 IEC/UL SLO-BLO
L100	009A2877-001	CHOKE COIL 20UH
L101	052X0150-001	CHOKE COM MODE INPUT 3.5A 250V
L104	009A2811-009	COIL 22UH
L105	009A2811-009	COIL 22UH
L701	009A2813-010	COIL LINEARITY
L703	009A2838-003	COIL WIDTH 75UH-350UH
L704	340X3010-934	RES 1.0 OHM 5% 1/2W CF
P101	006A0475-003	HEADER 3 PIN FEM AMP 350760-4
P102	006A0427-001	PLUG HEADER 2 PIN
P200	006A0403-010	HEADER 10-PIN 1-640445-0
P201	006A0473-013	HEADER 13 PIN .100 CTR
P202	006A0419-008	HEADER 8-PIN AMP 640456-8
P203	006A0473-017	HEADER 17 PIN .100 CTR
P203	013X1331-001	CABLE ASSY CUST CONTROL
P206	006A0427-001	PLUG HEADER 2 PIN
P207	006A0427-002	HEADER 2 PIN
Q101	086X0334-001	TRSTR N-MOSFET 6N60
Q601	086X0113-501	TRSTR 2N3904 MOT
Q602	086X0176-001	TRSTR 2SC2275 NEC
Q700	086X0113-501	TRSTR 2N3904 MOT
Q703	086X0185-501	TRSTR 2SC2482 TOSH
Q704	086X0321-001	TRSTR 2SC3688
Q709	086X0211-501	TRSTR 2N4403 STATIC SENS
Q800	086X0147-001	TRSTR MPSA42 MOT
Q801	086X0113-501	TRSTR 2N3904 MOT
Q802	086X0133-501	TRSTR MPSA92 MOT
Q803	086X0133-501	TRSTR MPSA92 MOT
R101	043X0493-001	THERM NTC 10 OHM
R102	420X4683-313	RES 68K OHM 5% 1W
R103	420X4683-313	RES 68K OHM 5% 1W
R104	043X0484-006	RES 10K OHM 5% 7W
R105	340X6471-631	RES 470 OHM 5% 3W MO/MF
R106	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R107	340X2100-934	RES 10.0 OHM 5% 1/4W CF
R108	420X5339-323	RES 0.33 OHM 5% 2W MF NOBLE
R110	421X1652-221	RES 16.5K OHM 1% 1/4W MF
R111	420X4681-323	RES 680 OHM 5% 1W MO
R112	340X2561-934	RES 560 OHM 5% 1/4W CF
R113	421X2151-221	RES 2.15K OHM 1% 1/4W MF
R114	340X2103-934	RES 10K OHM 5% 1/4W CF
R115	340X2222-934	RES 2.2K OHM 5% 1/4W CF
R116	421X1001-221	RES 1.0K OHM 1% 1/4W MF
R117	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R120	340X5683-531	RES 68K OHM 5% 2W CF
R121	043X0514-001	THERM PTC 14 OHM 220V 3 TERM
R122	340X5106-531	RES 10M OHM 5% 2W CF
R123	340X5105-531	RES 1M OHM 5% 2W CF
R124	340X2101-934	RES 100 OHM 5% 1/4W CF

Component values subject to change without notice.

Replacement Parts List

Location	Part Number	Description
R301	043X0486-002	RES 1.2 OHM 5% 2W MF
R303	043X0486-002	RES 1.2 OHM 5% 2W MF
R305	043X0509-008	RES 47 OHM 5% 1/2W FP FAILSAFE
R310	043X0486-002	RES 1.2 OHM 5% 2W MF
R402	340X3012-934	RES 1.2 OHM 5% 1/2W CF
R600	340X2101-934	RES 100 OHM 5% 1/4W CF
R601	340X2473-934	RES 47K OHM 5% 1/4W CF
R602	340X2223-934	RES 22K OHM 5% 1/4W CF
R603	340X2681-934	RES 680 OHM 5% 1/4W CF
R604	340X2472-934	RES 4.7K OHM 5% 1/4W CF
R605	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R606	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R607	340X2432-934	RES 4.3K OHM 5% 1/4W CF
R608	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R609	340X2103-934	RES 10K OHM 5% 1/4W CF
R610	340X2103-934	RES 10K OHM 5% 1/4W CF
R611	340X2154-934	RES 150K OHM 5% 1/4W CF
R612	340X2153-934	RES 15K OHM 5% 1/4W CF
R613	340X2022-934	RES 2.2 OHM 5% 1/4W CF
R614	340X2242-934	RES 2.4K OHM 5% 1/4W CF
R615	340X2273-934	RES 27K OHM 5% 1/4W CF
R616	340X2911-934	RES 910 OHM 5% 1/4W CF
R617	340X3821-934	RES 820 OHM 5% 1/2W CF
R618	340X3012-934	RES 1.2 OHM 5% 1/2W CF
R619	420X5560-314	RES 56 OHM 2W 5% MO
R620	420X5331-323	RES 330 OHM 5% 2W
R621	340X2272-934	RES 2.7K OHM 5% 1/4W CF
R622	340X2105-934	RES 1M OHM 5% 1/4W CF
R623	340X2474-934	RES 470K OHM 5% 1/4W CF
R624	340X2184-934	RES 180K OHM 5% 1/4W CF
R625	340X3201-934	RES 200 OHM 5% 1/2W CF
R626	340X2683-934	RES 68K OHM 5% 1/4W CF
R627	340X2913-934	RES 91K OHM 5% 1/4W CF
R628	340X2103-934	RES 10K OHM 5% 1/4W CF
R629	340X2181-934	RES 180 OHM 5% 1/4W CF
R630	340X2183-934	RES 18K OHM 5% 1/4W CF
R700	340X2220-934	RES 22 OHM 5% 1/4W CF
R701	340X2103-934	RES 10K OHM 5% 1/4W CF
R702	340X2223-934	RES 22K OHM 5% 1/4W CF
R703	340X2301-934	RES 300 OHM 5% 1/4W CF
R704	340X2472-934	RES 4.7K OHM 5% 1/4W CF
R705	340X3391-934	RES 390 OHM 5% 1/2W CF
R706	340X2431-934	RES 430 OHM 5% 1/4W CF
R707	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R708	340X2512-934	RES 5.1K OHM 5% 1/4W CF
R709	340X2223-934	RES 22K OHM 5% 1/4W CF
R710	340X2103-934	RES 10K OHM 5% 1/4W CF
R711	340X2123-934	RES 12K OHM 5% 1/4W CF
R712	340X2103-934	RES 10K OHM 5% 1/4W CF
R713	340X2222-934	RES 2.2K OHM 5% 1/4W CF
R714	340X2333-934	RES 33K OHM 5% 1/4W CF
R715	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R716	421X8661-221	RES 8.66K OHM 1% 100PPM 0.25W
R717	340X2822-934	RES 8.2K OHM 5% 1/4W CF
R718	340X2103-934	RES 10K OHM 5% 1/4W CF
R719	340X2912-934	RES 9.1K OHM 5% 1/4W CF
R721	340X3393-934	RES 39K OHM 5% 1/2W CF
R722	340X2682-934	RES 6.8K OHM 5% 1/4W CF
R723	340X2222-934	RES 2.2K OHM 5% 1/4W CF
R724	340X2162-934	RES 1.6K OHM 5% 1/4W CF
R725	340X2101-934	RES 100 OHM 5% 1/4W CF
R726	340X2103-934	RES 10K OHM 5% 1/4W CF
R727	340X4392-631	RES 3.9K OHM 5% 1W MO/MF
R728	420X5102-324	RES 1.0K OHM 5% 2W MO
R729	340X2220-934	RES 22 OHM 5% 1/4W CF
R732	420X5102-324	RES 1.0K OHM 5% 2W MO
R736	340X2153-934	RES 15K OHM 5% 1/4W CF
R745	340X2182-934	RES 1.8K OHM 5% 1/4W CF
R750	340X2471-934	RES 470 OHM 5% 1/4W CF
R751	340X2682-934	RES 6.8K OHM 5% 1/4W CF
R752	340X2103-934	RES 10K OHM 5% 1/4W CF
R753	340X2333-934	RES 33K OHM 5% 1/4W CF
R754	340X2682-934	RES 6.8K OHM 5% 1/4W CF
R755	340X2103-934	RES 10K OHM 5% 1/4W CF
R756	340X2222-934	RES 2.2K OHM 5% 1/4W CF
R762	340X2330-934	RES 33 OHM 5% 1/4W CF
R763	340X2822-934	RES 8.2K OHM 5% 1/4W CF
R770	420X8620-326	RES 62 OHM 5% 5W MO/MF
R801	340X2821-934	RES 820 OHM 5% 1/4W CF
R803	340X2103-934	RES 10K OHM 5% 1/4W CF
R804	340X2106-934	RES 10M OHM 5% 1/4W CF
R806	340X2471-934	RES 470 OHM 5% 1/4W CF
R810	340X3221-234	RES 220 OHM 5% 1/2W CC-AB
R811	340X3753-934	RES 75K OHM 5% 1/2W CF
R813	420X4822-323	RES 8.2K OHM 5% 1W MO/MF
R814	340X2302-934	RES 3.0K OHM 5% 1/4W CF
R815	340X2474-934	RES 470K OHM 5% 1/4W CF
R817	340X2474-934	RES 470K OHM 5% 1/4W CF
R818	340X2244-934	RES 240K OHM 5% 1/4W CF
R821	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R823	420X5018-324	RES 1.8 OHM 5% 2W MO/MF
R831	421X2802-221	RES 28K OHM 1% 1/4W MF
R832	340X2512-934	RES 5.1K OHM 5% 1/4W CF
R833	340X2821-934	RES 820 OHM 5% 1/4W CF
R834	340X2105-934	RES 1M OHM 5% 1/4W CF
R835	340X2102-934	RES 1.0K OHM 5% 1/4W CF
R836	340X2331-934	RES 330 OHM 5% 1/4W CF
R837	340X3221-934	RES 220 OHM 5% 1/2W CF
R880	420X4151-313	RES 150 OHM 5% 1W MO
T101	053X0649-001	TFMR SMPS K7400 V/STX

Component values subject to change without notice.

Replacement Parts List

Location	Part Number	Description
T700	053X0651-001	TFMR FLBK FARAD(GLO-TECH)
T701	052X0131-001	TFMR HORIZ DRIVER
U101	086X0257-001	IC PWM UC3842AN
U601	086X0326-001	IC VERT DEFL TDA1771
U701	086X0274-001	IC LA7850 H/V SYNC PROC SANYO
U702	086X0333-001	IC QUAD 2-INPUT X-OR SN74LS136
VR101	040X0639-014	TRIM POT 1K OHM 0.3W 20%
VR700	040X0639-008	TRIM POT 10K OHM 0.3W 20%
VR701	040X0711-006	TRIM POT 2000 OHM 0.15W
VR800	040X0711-011	TRIM POT 30K OHM 0.15W
Z601	066X0040-046	MOT IN5242B DIODE 12V 5% 0.5W
Z700	066X0040-028	ZENER DIODE 5.1V 5% 0.5W
Z701	066X0040-022	ZENER DIODE 5.6V 5% 0.5W
Z702	066X0040-017	ZENER DIODE 13V 5% 1W
Z800	066X0040-048	ZENER DIODE 75V 5% 0.5W
Z802	066X0040-031	ZENER DIODE 24V 3% 0.5W
Z803	066X0040-042	ZENER DIODE 8.2V 5% 0.5W
Z804	066X0040-020	ZENER DIODE 9.1V 5% 0.5W

CHANGES FOR 27" MODEL

Location	Part Number	Description
R620	340X5221-633	RES 220 OHM 5% 2W MO/MF

54A2391-018 (PINCUSHION BOARD TO 54A7501-001 For 27" MODEL)

(P777)

Location	Part Number	Description
C770	045X0580-510	CAP LYT 100UF 25V
C771	045X0580-510	CAP LYT 100UF 25V
C772	045X0580-027	CAP LYT 10UF 50V 105 DEG
C773	047X0789-506	CAP .22UF 5% 100V SMF
J202	003A0660-008	CONN 8 CKT PCB RT-ANGL
Q770	086X0113-501	TRSTR 2N3904 MOT
Q771	086X0113-501	TRSTR 2N3904 MOT
R770	340X2622-934	RES 6.2K OHM 5% 1/4W CF
R771	340X2432-934	RES 4.3K OHM 5% 1/4W CF
R772	340X2242-934	RES 2.4K OHM 5% 1/4W CF
R773	340X2470-934	RES 47 OHM 5% 1/4W CF
R774	340X2122-934	RES 1.2K OHM 5% 1/4W CF
R775	340X2471-934	RES 470 OHM 5% 1/4W CF
R776	340X2681-934	RES 680 OHM 5% 1/4W CF
VR770	040X0639-007	TRIM POT 5K OHM 0.3W 20%
VR771	040X0639-011	TRIM POT 500 OHM 0.3W 20%

MISCELLANEOUS COMPONENTS

Part Number	Description
004X2577-001	PCB PLASTIC SUPPORT
088X0373-506	"CRT 25"" RAULAND A63AGD10X "
038A6209-000	DEGAUSSING COIL
038A6805-000	"CRT GND DAG WIRE (25"")"
086X0335-001	TRSTR BDX53A SGS NPN DAR

MISCELLANEOUS CHANGES FOR 27" MODEL

Part Number	Description
088X0411-506	"CRT 27"" RAULAND A68AGD01X"
038A7400-000	DEGAUSSING COIL
038A7108-000	"CRT GND DAG WIRE (27")

Component values subject to change without notice.