# CHAPTER 3
# MONITOR (PXM) REPAIR AND ALIGNMENT

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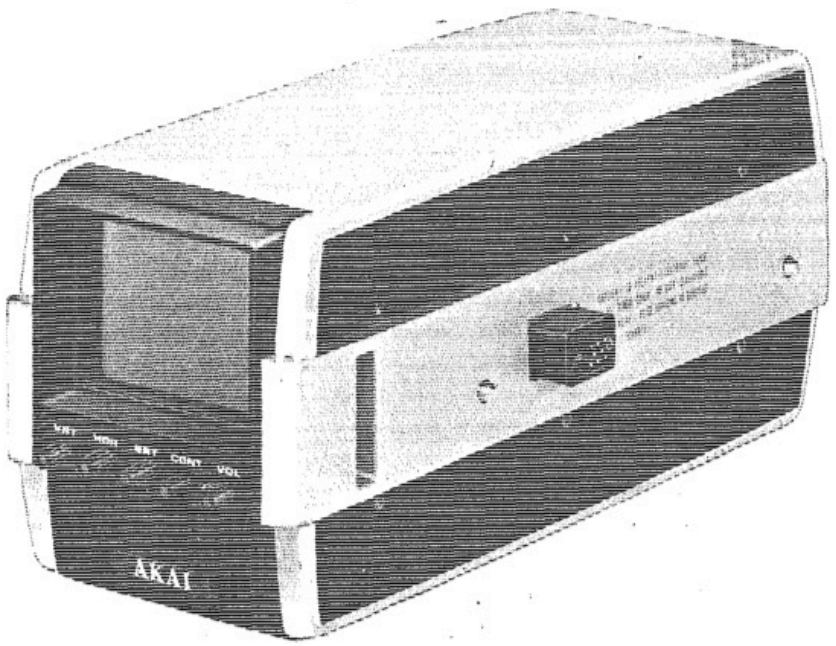


# SECTION 3-1
# SPECIFICATIONS

## 1) Main Constructure

| | |
|---|---|
| **Effective Picture Size** : | 3" |
| **Cathode Ray Tube Deflection Angle** : | 55 degrees |
| **System of Gun** : | Uni-potentional |
| **System of Heater** : | Direct (1.8 V peak to peak) |
| **Power Source** : | DC 12 V (supplied from recorder) |
| **Speaker** : | 3" x 1.7" oval type |

## 2) Electrical Specifications

| | |
|---|---|
| **Luster distortion** : | 3% max. |
| **Non Linearity (Horizontal)** : | 20% max. |
| **(Vertical)** : | 10% max. |
| **Resolution (Horizontal)** : | 250 lines |
| **(Vertical)** : | 350 lines |
| **Sync. Holding Range** | |
| **(Horizontal)** : | 300 Hz. min. |
| **(Vertical)** : | 7 Hz. min. |
| **Video Input Level** : | 1.0 to 1.6 V p-p (Negative Sync.) |
| **Video Input Impedance** : | 75 ohms |
| **Video Output Level** : | 20 V p-p min. |
| **Contrast controlled ratio** : | 12 dB min. |
| **Sound Fidelity (-6 dB point)** : | 300 Hz to 2,000 Hz. |
| **Sound input level and impedance** : | -20 dB (0.774 V rms) 5 K ohms |
| **Sound Max. Output** : | 100 mW min. |
| **Sound Normal Output** : | 80 mW (10% dis.) |
| **Over Scanning** : | 15% |
| **Operation starting voltage** : | 8.5 V p-p (max.) |
| **Heat-up time** : | 2.5 seconds (max.) |
| **Voltage for tull scanning** : | 10.5 V (max.) |
| **Usable Power Source Voltage** : | 16.5 V (max.) |
| **Ripple contents (usable)** : | 0.1 V p-p (max.) |
| **Maximum Power Consumption** : | 3.5 W max. |
| **Temperature characteristics** : | –5° to +45° centigrade (23° to 113° F) |

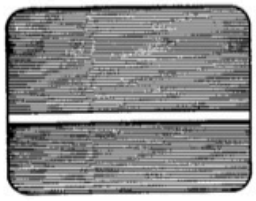
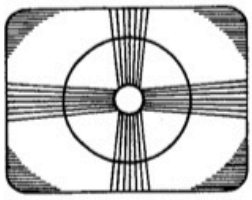
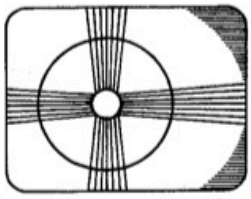
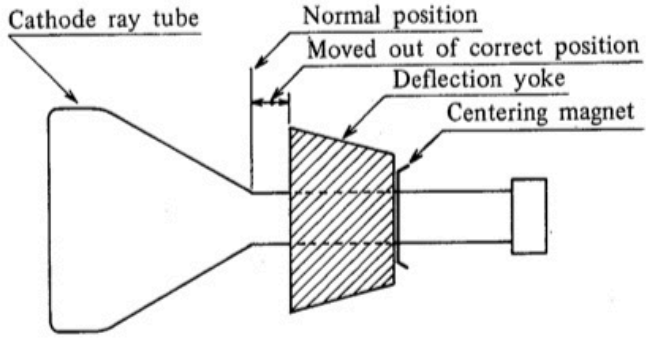
## 3) Dimensions and Weight

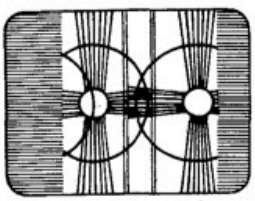
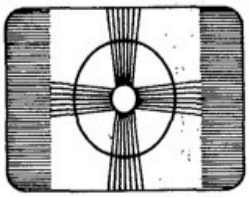
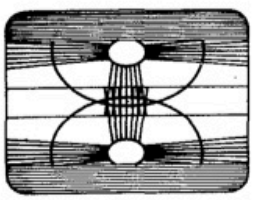
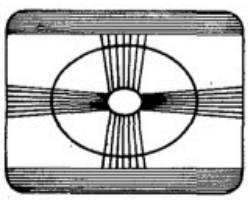
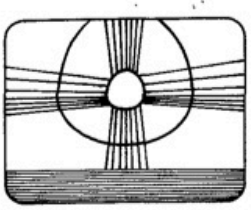
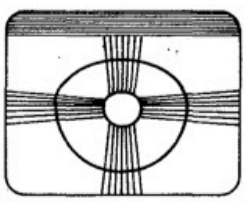
| | |
|---|---|
| **Dimensions** : | 3.8 " H x 10.3" D x 4.4" W |
| **Weight** : | 3.4 lbs. (1.6 kg) |

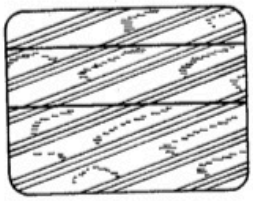
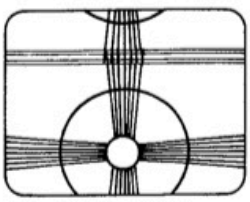
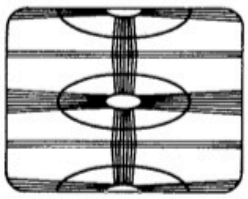
# SECTION 3-2
# TROUBLE SHOOTING CHART

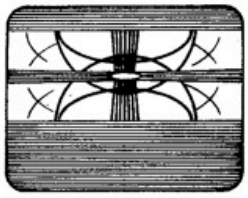
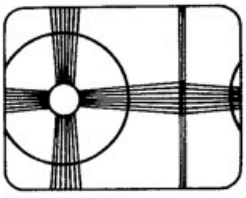
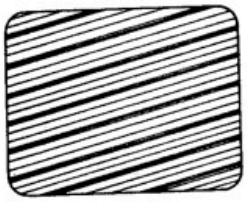
The following checks are made at Stop Mode (Camera and Monitor should be connected)

| Symptom | Trouble |
|---|---|
| • Monitor Switch turned "On", but no power | • VTR Power Switch turned "Off" (Head Motor does not rotate).<br>• Switch S-702 (attached to Volume R-705) defective. |
| • No Raster<br>Relative circuits to be checked :<br>Electric Power Circuit<br>High Voltage Rectifier Circuit<br>Horizontal Output Circuit<br>Horizontal Amplifier Circuit<br>Horizontal Oscillator Circuit | • With Volume Control Knob at maximum position, check to see whether noise is coming from speaker. If noise is coming from speaker, power source is normal. Check the anode voltage of cathode ray tube.<br>• Remove anode cap from cathode ray tube. With tip of wire (anode lead wire) about 5 mm away from cathode ray tube holder metal fitting, if there is a spark, the voltage is normal.<br>If there is no spark, the voltage is not operating. Check horizontal deflection circuit (Y-500). |
| Horizontal Defection Circuit Check<br>(there is no spark) | • With an oscilloscope, measure pulse at Q-511 (2SB467) collector. If there is pulse, but no voltage, check the following :<br>1. Check High Voltage Rectifier Q-604 (HS-3) through Q-608 (HS-3).<br>2. Check Q-602 (SD-1HF), Q-603 (SD-1HF), C-601 (0.047/500), C-511 (10/150) and R-522 (50).<br>• No pulse at Q-511 (2SB467) collector (Horizontal Oscillator Circuit not operating). Check the following points :<br>1. Check blocking transformer T-502 for bad soldering or open circuit.<br>2. Q-509 (2SB172D) or Q-510 (CJ5211) defective.<br>3. Check drive transformer T-503 for bad soldering or open circuit.<br>4. Check C-524 (0.01), C-525 (2/50), C-527 (0.0047) and C-528 (0.04) for short. |
| • Cathode Ray Tube Circuit Check<br>(there is a spark) | • High Voltage Circuit operating, but no raster. Check voltage of Cathode Ray Tube focus grid (P-9) as well as (P-10).<br>If there is no voltage, check the following :<br>1. Check Q-602 (SD-1HF), C-601 (0.047/500), R-527 (680K), R-529 (220K), and R-703 (500K-VR).<br>2. Check to see whether Brightness Control is at minimum position.<br>3. Check to see whether filament of cathode ray tube has open circuit.<br>4. Check C-515 (1/50) for short. |

| Symptom | Trouble |
|---|---|
| • Vertical Deflection not working<br>(thin horizontal line only across screen)<br>Relative circuits to be checked :<br>Vertical Oscillator Circuit<br>Vertical Amplifier Circuit<br>Vertical Output Circuit<br>  <br>Vertical deflection not working<br>(thin horizontal line only across screen) | • With oscilloscope, check Q-501 (CS-1294E) Emitter to see whether or not a sawtooth wave appears.<br>If there is no sawtooth wave, vertical oscillator circuit is not operating.<br>1. Check vertical oscillator transformer (T-501) for bad soldering or open circuit.<br>2. Q-504 (CJ-5209) defective.<br>3. Check R-516 (2.2K), R-517 (6.8K), R-518 (5K-VR) and R-701 (2K-VR) for open circuit.<br>4. Check C-509 (33/16) and C-510 (4.7/10) for short.<br>• If sawtooth wave appears at Q-504 (CJ-5209) Emitter, check Q-301 (CS-1295H) circuit.<br>With Oscilloscope, check Q-301 Collector (CS1295H). If there is no waveform, check the following :<br>1. Q-301 (CS-1295H) defective.<br>2. Check R-305 (500K-VR), R-303 (22K), R-304 (33D 1000), R-310 (10), R-514 (3.9K) and R-515 (5K-VR) for open circuit.<br>3. Check C-301 (10/10). and C-302 (4.7/25) for short.<br>• If waveform appears at Q-301 (CS-1295H), Collector, check the following :<br>1. Q-302 (CS-1295H) or Q-303 (CS-1294H) defective.<br>2. R-309 (2), R-312 (4.7K), R-313 (31D27), R-314 (1K), R-315 (3.3) or R-316 (3.3) defective.<br>3. C-303 (220/10) or C-305 (33/10) defective.<br>4. Deflection Yoke (DY layer shorted or open circuit). |
| • Neck Shadow Appears on screen<br>Relative circuit to be checked :<br>Deflection Yoke Position<br>  <br>Neck shadow at all four corners<br>  <br>Neck shadow on one side of screen only | • Neck shadow at all 4 corners<br>If position of deflection yoke is moved during transportation, etc., reset to correct position.<br>  <br>• Neck shadow appears on one side of screen only. Adjustment of deflection yoke centering magnet faulty. |

| Symptom | Trouble |
|---|---|
| • No Horizontal Deflection<br>Relative Circuits to be checked :<br>Horizontal Coil of Horizontal Output Circuit | 1. C-525 (2/50) reduced capacity or open circuit.<br>2. Horizontal deflection coil open. |
| • Horizontal Width Insufficient<br>Relative circuits to be checked :<br>AFC Detector Circuit or<br>Horizontal Oscillator Circuit<br>Horizontal Amplifier Circuit<br>Horizontal Output Circuit<br>  <br>Poor synchronization<br>  <br>Synchronized, but width insufficient | • Check to see whether power supply voltage is low.<br>• Check AFC Detector Circuit or Horizontal Oscillator Circuit to see if horizontal synchronization is poor (insufficient horizontal width)<br>1. Check Q-507 (1N34A), and Q-508 (1N34A).<br>2. Check R-704 (300-VR), R-532 (5K-VR), R-533 (470), R-534 (1.5K), and R-537 (680).<br>• Synchronized, but width insufficient. Check the following :<br>1. Reduced capacity of C-525 (2/50)<br>2. Short in horizontal deflection coil layer.<br>3. Faulty insulation of Fly-back Transformer T-601. |
| • Insufficient Vertical Deflection<br>Relative Circuits to be checked :<br>Vertical Oscillator Circuit<br>Vertical Amplifier Circuit<br>Vertical Output Circuit<br>  <br>Poor synchronization<br>  <br>Synchronized, but vertical deflection insufficient | • Check to see whether power supply voltage is low.<br>• If synchronization is poor (vertical deflection insufficient), check the vertical oscillator circuit.<br>1. Check for leakage at C-509 (33/16) and C-510 (4.7/10).<br>2. Check R-514 (3.9K), R-515 (5K-VR), and R-517 (6.8K).<br>• Synchronized, but vertical deflection insufficient.<br>1. Faulty adjustment of R-305 (500K-VR), R-307 (10K-VR), or R-515 (5K-VR).<br>2. Reduced capacity of C-301 (10/10), or C-303 (220/10). |
| • Poor Vertical Linearity<br>Relative Circuits to be checked :<br>Vertical Amplifier Circuit<br>Vertical Output Circuit<br>  <br>Deflection excessive at upper part and insufficient at lower part of screen.<br>  <br>Insufficient deflection at upper part of screen. | • While viewing monitor screen, adjust R-305 (500K-VR) and R-307 (10K-VR). If after adjustment, vertical linearity is still incorrect, check the following :<br>1. R-305 (500K-VR) or R-307 (10K-VR) open circuit.<br>2. R-302 (33D1000), or R-306 (1.2K) open circuit.<br>3. C-305 (33/10) defective.<br>• While viewing monitor screen adjust R-515 (5K-VR). If after this adjustment, vertical linearity is still incorrect, check the following :<br>1. R-514 (3.9K), or R-515 (5K-VR) open circuit. |

| Symptom | Trouble |
|---|---|
| • Top of picture curves (does not line up with rest of picture) when contrast Knob is at clockwise or nearly maximum position<br>Relative circuits to be checked :<br>Time Constant of AFC Circuit | 1. Check R-537 (680), and R-538 (560).<br>2. Reduced capicity of C-519 (1/10) or C-522 (4.7/16). |
| • Insufficient Contrast when rotating Contrast Knob<br>Relative circuits to be checked :<br>PXV (Recorder)<br>Composite signal of Video<br>Output Voltage<br>Monitor Video Amplifier Circuit | • With an oscilloscope, check video signal at Test Point TP-15 (see schematic). If voltage is lower than 0.8 to 1.6 V p-p, check PXV (Recorder) Circuit.<br>• If voltage is 0.8 to 1.6 V p-p, check the following :<br>1. R-501 (330), R-520 (5.6 K), R-521 (3.3 K), R-522 (50), R-523 (1K), R-524 (50), R-526 (2.7K), or R-702 (1K-VR) defective.<br>2. L-501 (390 μH) open circuit.<br>3. Q-506 (SE-7010) defective.<br>4. C-511 (10/50), C-512 (0.0012), C-513 (0.0022), C-514 (33/10), or C-516 (0.22/100) defective.<br>5. Cathode Ray Tube Defective. |
| • No synchronization<br>Relative Circuits to be checked :<br>Synchronous Separater Circuit<br>Synchronous Amplifier Circuit<br>Vertical Oscillator Circuit<br>AFC Detector Circuit<br>Horizontal Oscillator Circuit<br>  <br>Vertical and Horizontal not synchronized | • If Vertical and Horizontal not synchronized, check the Synchronous Separater Circuit and the Synchronous Amplifier Circuit.<br>• With oscilloscope, check video signal at base of Q-501 (CS-1294E). If there is no signal, C-501 (0.1/25), C-502 (0.0047), or R-502 (2.2K) is defective.<br>• With oscilloscope, check collector of Q-501 (CS-1294E). If there is no signal, check the following :<br>1. Q-501 (CS-1294E) defective.<br>2. R-503 (470K), R-504 (32K), or R-505 (47K) open circuit.<br>• With oscilloscope, check collector of Q-502 (CS-1238F). If there is no signal, check the following :<br>1. Q-502 (CS-1238F) defective.<br>2. R-506 (2.2K), R-507 (220K), R-508 (1.8K), or R-512 (220K) open circuit.<br>3. C-503 (3.3/16) open circuit. |
| • Poor Vertical Synchronization (picture rolling)<br>Relative circuits to be checked :<br>Integrated Circuit<br>Integrated Signal Input Circuit<br>  <br>One picture only rolling<br>  <br>Three pictures rolling | • If one picture only is rolling, check the following :<br>1. R-510 (4.7K) or R-511 (4.7K) open.<br>2. C-506 (0.02), or C-507 (0.033) short.<br>3. Reduced Capacity of C-508 (0.1/25).<br>4. Q-503 (1N34A) defective.<br>• If three or more pictures are rolling, check the following :<br>1. C-508 (0.1/25) short.<br>• If above checks have been made and found to be normal, the check PXV (Recorder).<br>(Refer to PXV Trouble Shooting Chart). |

| Symptom | Trouble |
|---|---|
| • Poor Vertical Synchronization<br>(see fig. shown below)<br>Relative Circuits to be checked :<br>Vertical Oscillator Circuit<br>  <br>Vertical frequency too high | • Check the following :<br>1. R-518 (5K-VR) or R-701 (2K-VR) open circuit.<br>2. Q-504 (CS-5209) defective.<br>3. C-510 (4.7/10) defective.<br>4. R-516 (2.2K) open circuit.<br>5. R-517 (6.8K) open circuit. |
| Poor Horizontal Synchronization<br>Relative Circuits to be checked :<br>AFC Detector Circuit<br>Horizontal Oscillator Circuit<br>  <br>One picture moving horizontally<br>  <br>Picture does not Synchronize into one | • One picture moves horizontally (This trouble may be caused from monitor or recorder).<br>• First, with oscilloscope, check the following points :<br>1. Check incoming composite video signal at P-15 (see schematic ).<br>2. Check whether horizontal synchronous video signal coming from Q-502 (CS-1238F) is passing through C-504 (0.003).<br>• If above checks have been made and found to be normal, check the following :<br>1. R-539 (2.2K) open circuit<br>2. Short at C-520 (0.1/25) or C-521 (0.033) or reduced capacity.<br>• If picture does not synchronize into one, check the following :<br>1. Reduced capacity of C-517 (4.7/16).<br>2. R-535 (4.7K), R-536 (4.7K), or R-537 (680) open circuit.<br>3. Q-507 (1N34A) or Q-508 (1N34A) defective.<br>4. R-532 (5K-VR), R-533 (470), or R-534 (1.5K) open circuit.<br>5. R-704 (300-VR) open circuit. |
| • Crackling sound from Speaker | Speaker holding screw loose.<br>Speaker defective or foreign matter inside speaker. |
| • Picture quivers from speaker sound (unstable) | Because the filament inside the cathode ray tube is moving due to speaker sound vibration, the picture also moves. Check to see if cathode ray tube holding screws are loose or if speaker holding screws are loose. |
| • Downward movement of stripe on screen (flowing-like stripe) | • Humming is caused by poor electrical filtering. Make the following alterations :<br>1. Connect a ground wire between grounding points of each printed board.<br>2. Insert a condenser (0.001) between base and emitter of Q-610 (CS-1238G).<br>3. Insert a condenser (100 $\mu$F, 20 V) between base and ground of Q-610 (CS-1238G)<br>(See fig. 3-1)<br>4. Check Battery. |

| Symptom | Trouble |
|---|---|
| • Fluxuation of size and brightness of raster | 1. R-703 defective.<br>2. Leakage of Fly-back Transformer T-601.<br>3. Q-604 (HS-3), Q-605, Q-606, Q-607, or Q-608 defective.<br>4. C-602 A, B (470) or C-603 A, B, C (470) defective. |
| • No Sound | 1. Speaker Defective.<br>2. Q-401 (CS-1238H), Q-402 (CS-1295H), or Q-403 (CS-1294H) defective.<br>3. R-401 (68K), R-402 (100), R-403 (470K), R-405 (5), R-406 (2.7K), R-404 (5), or R-407 (680) open circuit. |

# SECTION 3-3
# CASE REMOVAL

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Remantle in reverse order.

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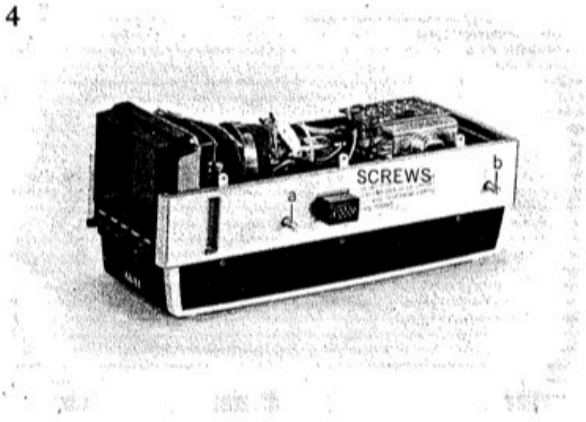
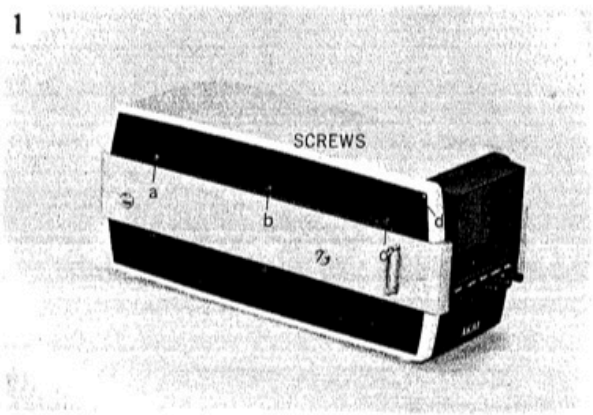



1

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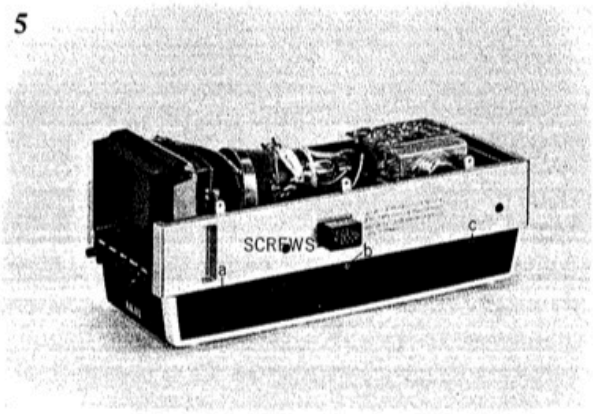
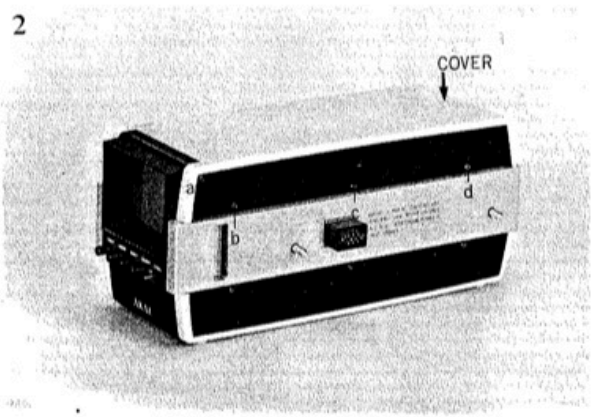



2

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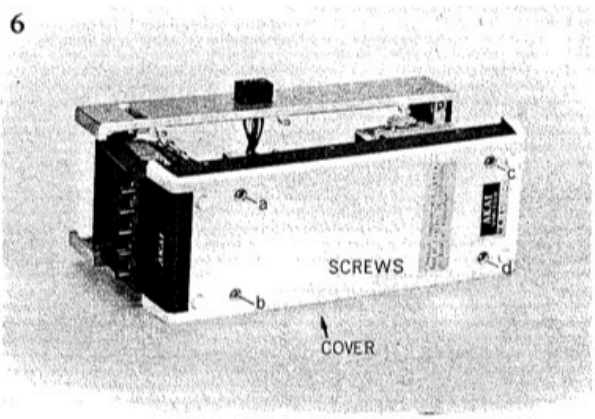


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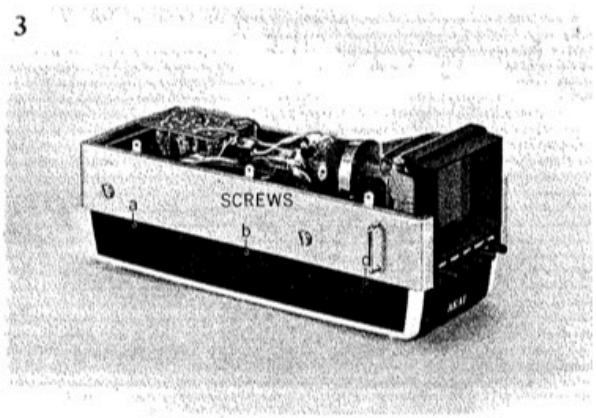


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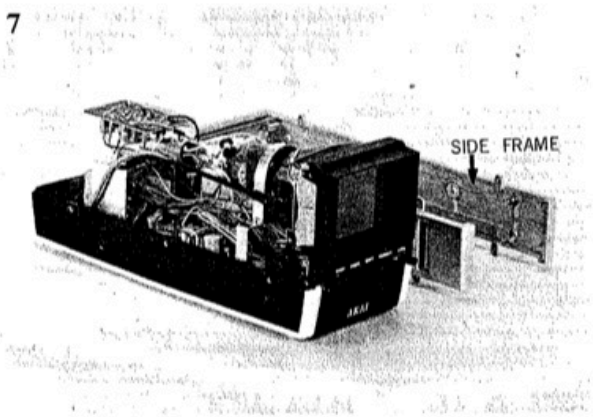


# SECTION 3-4
# EQUIPMENT REQUIRED

1. Oscilloscope
2. Vacuum Tube Voltmeter

# SECTION 3-5
# ADJUSTMENTS

## 1) Adjustment of Voltage Regulator

**(a) Instrument Connections**

Remove the under cover and connect the V.T.V.M. as shown in fig. 3-1.

**(b) Adjustment**

Adjust VR-601 so that the V.T.V.M. Indicator is at 10 V. When making this adjustment, use raster on cathode ray tube or make adjustment while picture is on screen.

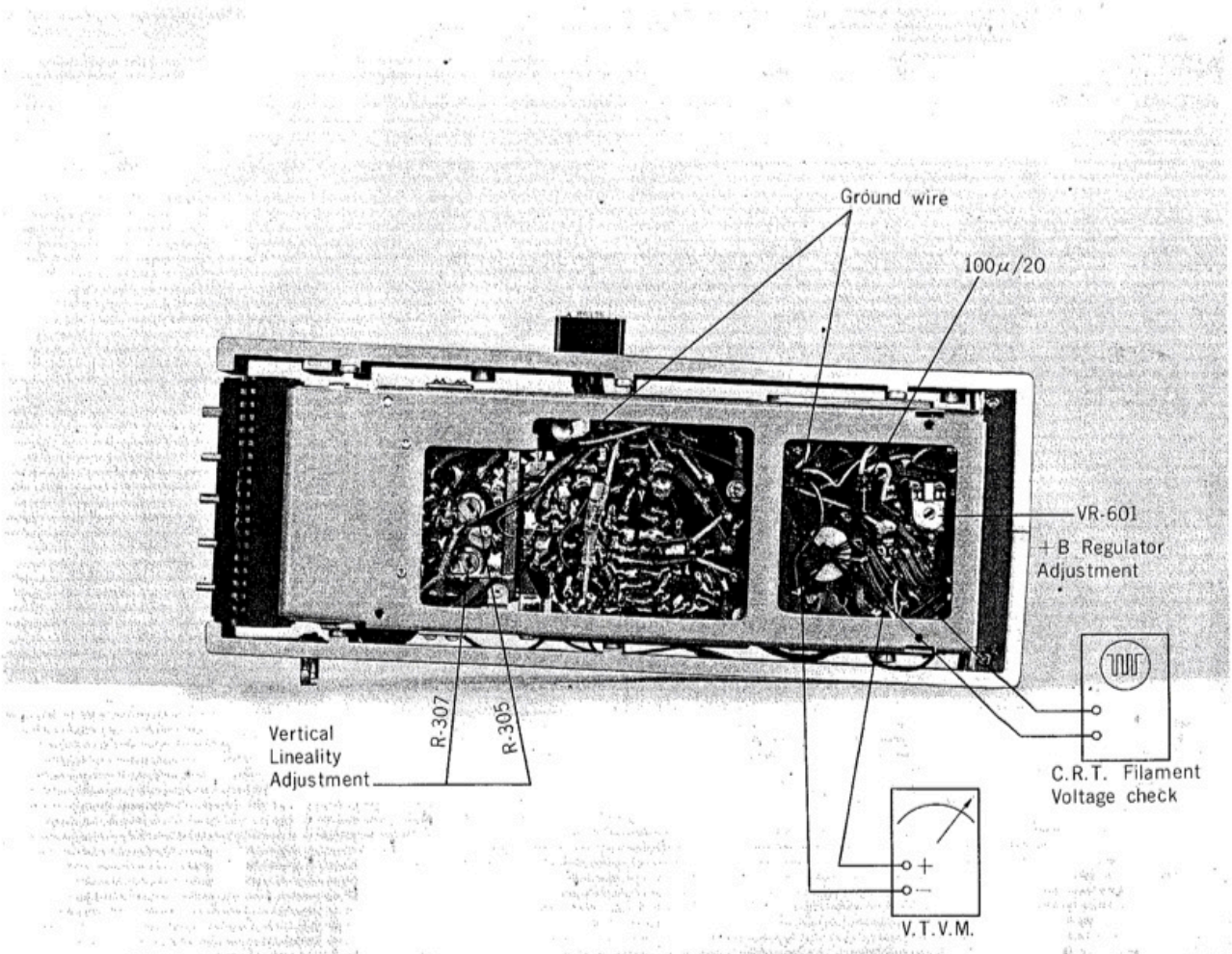



Fig. 3-1

## 2) Adjustment of Vertical Hold and Horizontal Hold Range

### (A) Vertical Hold Range Adjustment

(a) Set "VRT" (Vertical Hold Knob) on front panel to half-way range.

(b) Adjust R-518 (5K-VR). Fix at position at which picture is stationary (Ref. fig. 3-2).

(c) After adjustment is completed, rotate VRT Knob. Confirm that the picture rolls (downward) when knob is at maximum clockwise position.

### (B) Horizontal Hold Range Adjustment

(a) Set "HOR" (Horizontal Hold) Knob on front panel to half-way range (half-way of it's movable range).

(b) Adjust R-532 (5K-VR). Fix at point at which the picture synchronizes into one picture. After adjustment has been made, rotate HOR Knob. Confirm that the horizontal synchronization is stable at all points within the rotable range of the HOR Knob. (See fig. 3-2).

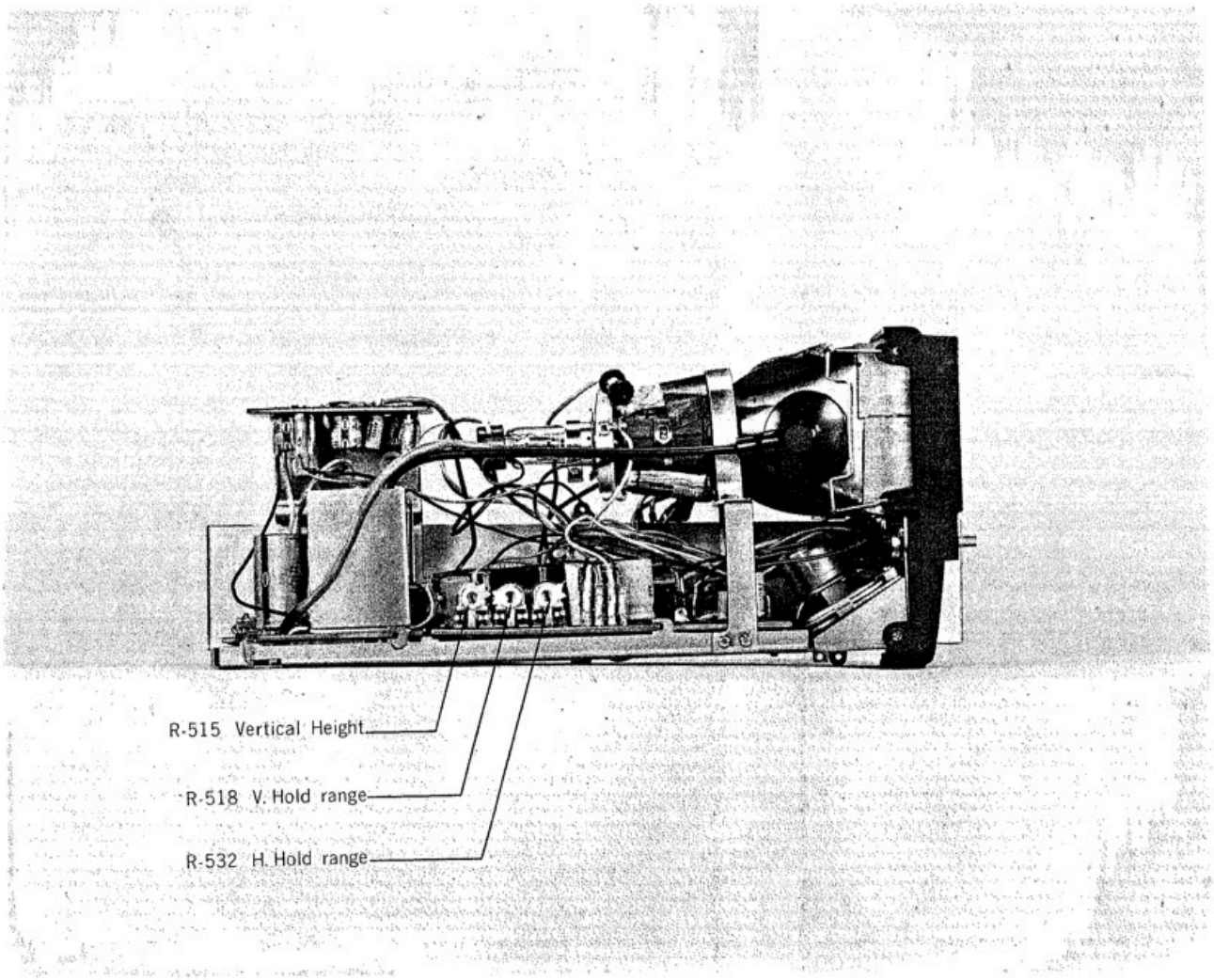



Fig. 3-2

### 3) Adjustment of Vertical Linearity and Height

Using a perfectly adjusted camera (PXC), take a test pattern (or photograph something like a round circle and while viewing monitor screen, adjust R-305 (500K-VR), R-307 (10K-VR), and R-515 (5K-VR) (See fig. 3-1 and 3-2). Try to obtain pattern as shown in fig. 3-3.

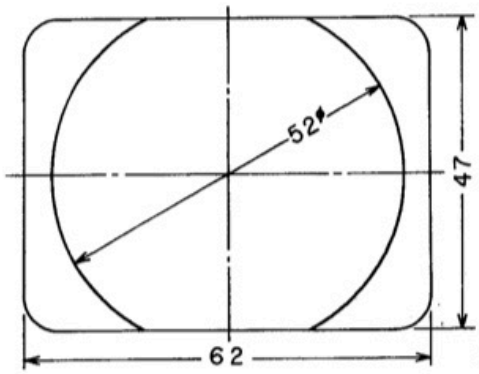



Fig. 3-3

After these adjustments have been made, if focus is not good or if picture is not centered in middle of screen, with the center ring magnet of deflection yoke, focus, and adjust so that the pattern appears at the center part of the picture.

### 4) Focus Adjustment

As in conditions of 3), using camera, take a test pattern or photograph a scene. While viewing picture appearing above cathode ray tube on monitor screen, adjust R-530 (1M-VR) to a better focused point (See fig. 3-4).

### 5) Cathode Ray Tube Filament Voltage Check

In case Fly-back Transformer has been replaced, check the voltage supply to cathode ray tube (see fig. 3-1). With an oscilloscope, measure voltage of secondary transformer T-602 Voltage is normal at 1.8 V p-p ± 0.1 V.

If voltage is too high or too low, it can be adjusted by changing the winding ratio of primary and secondary transformer (T-602).

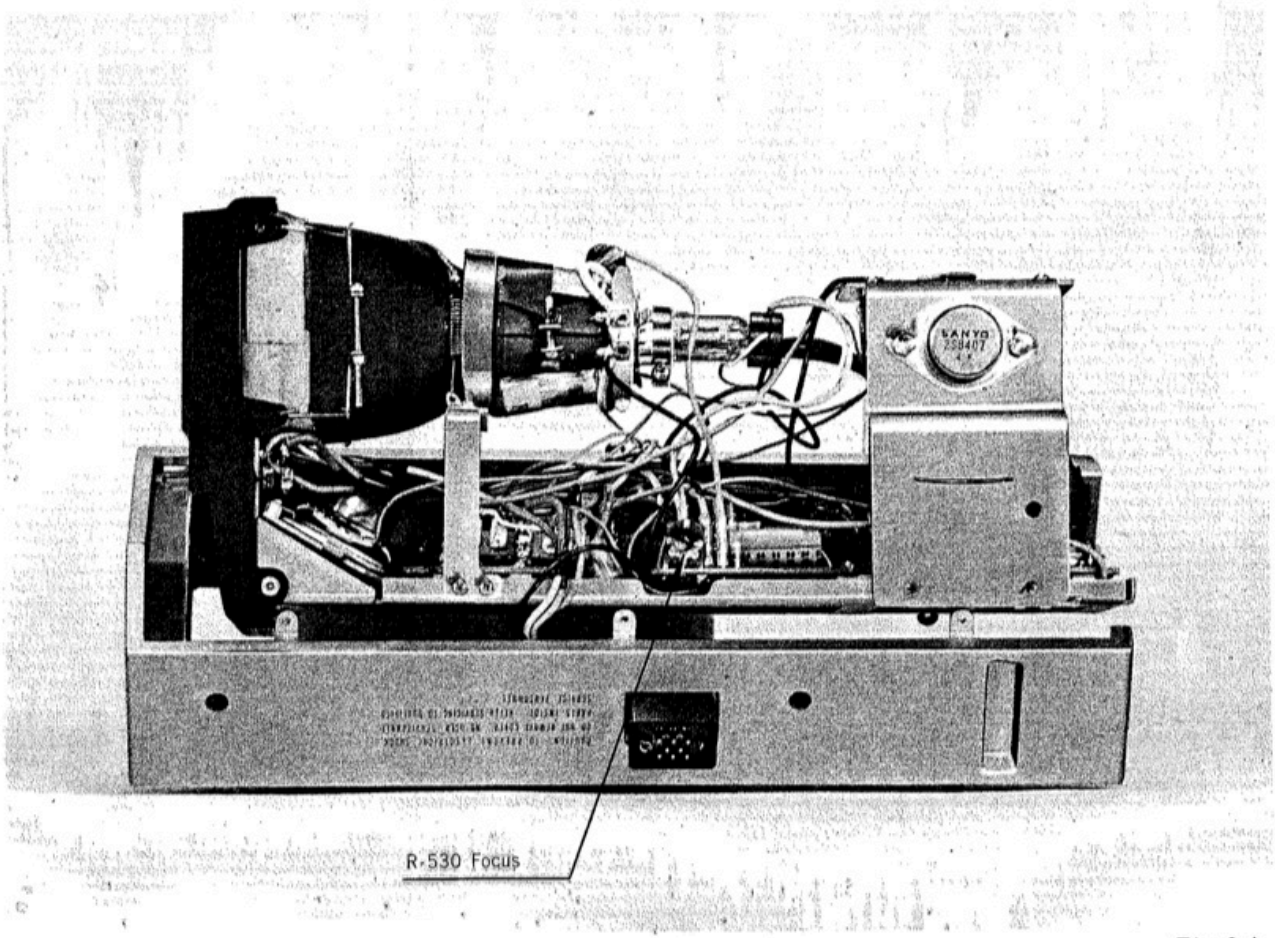
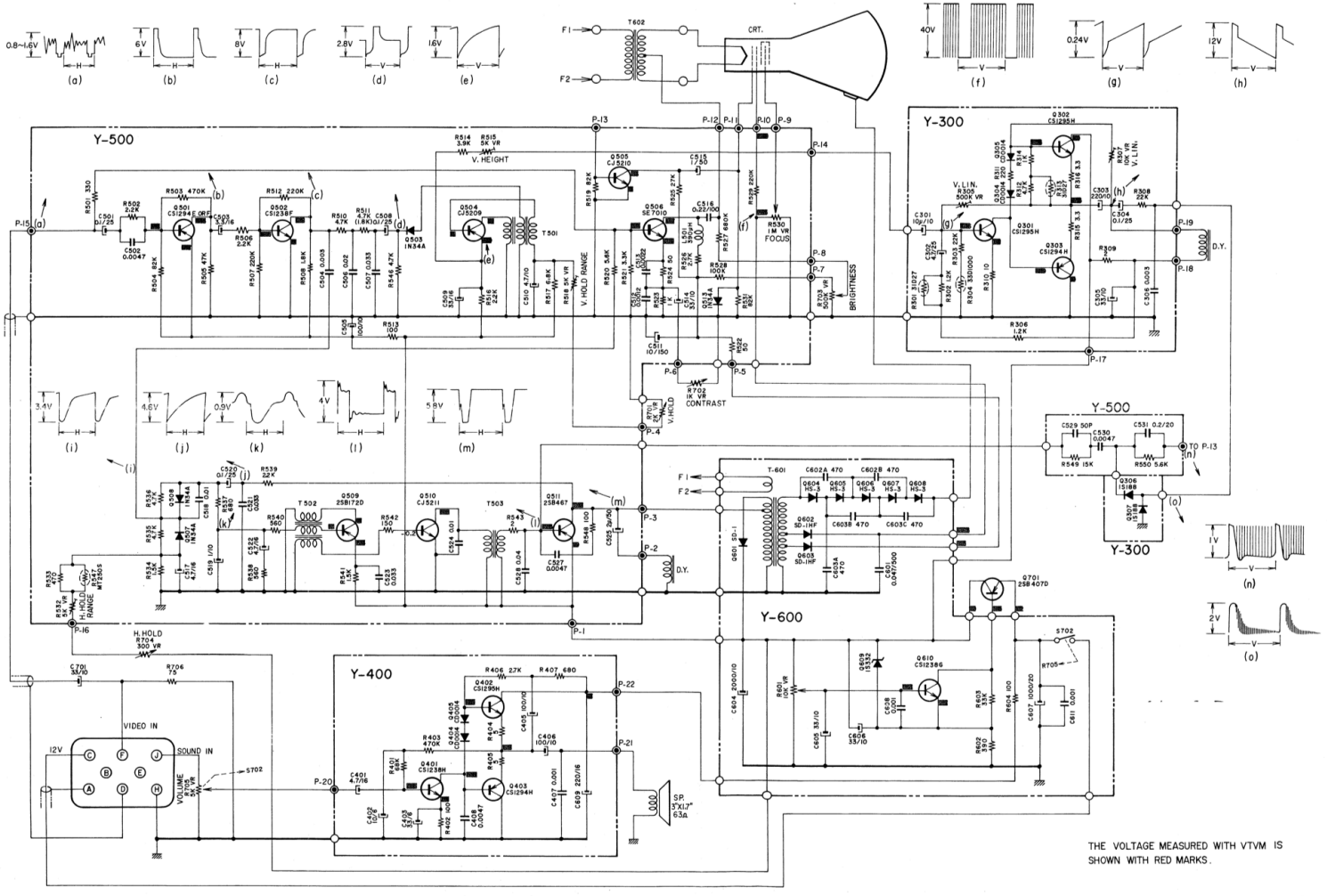


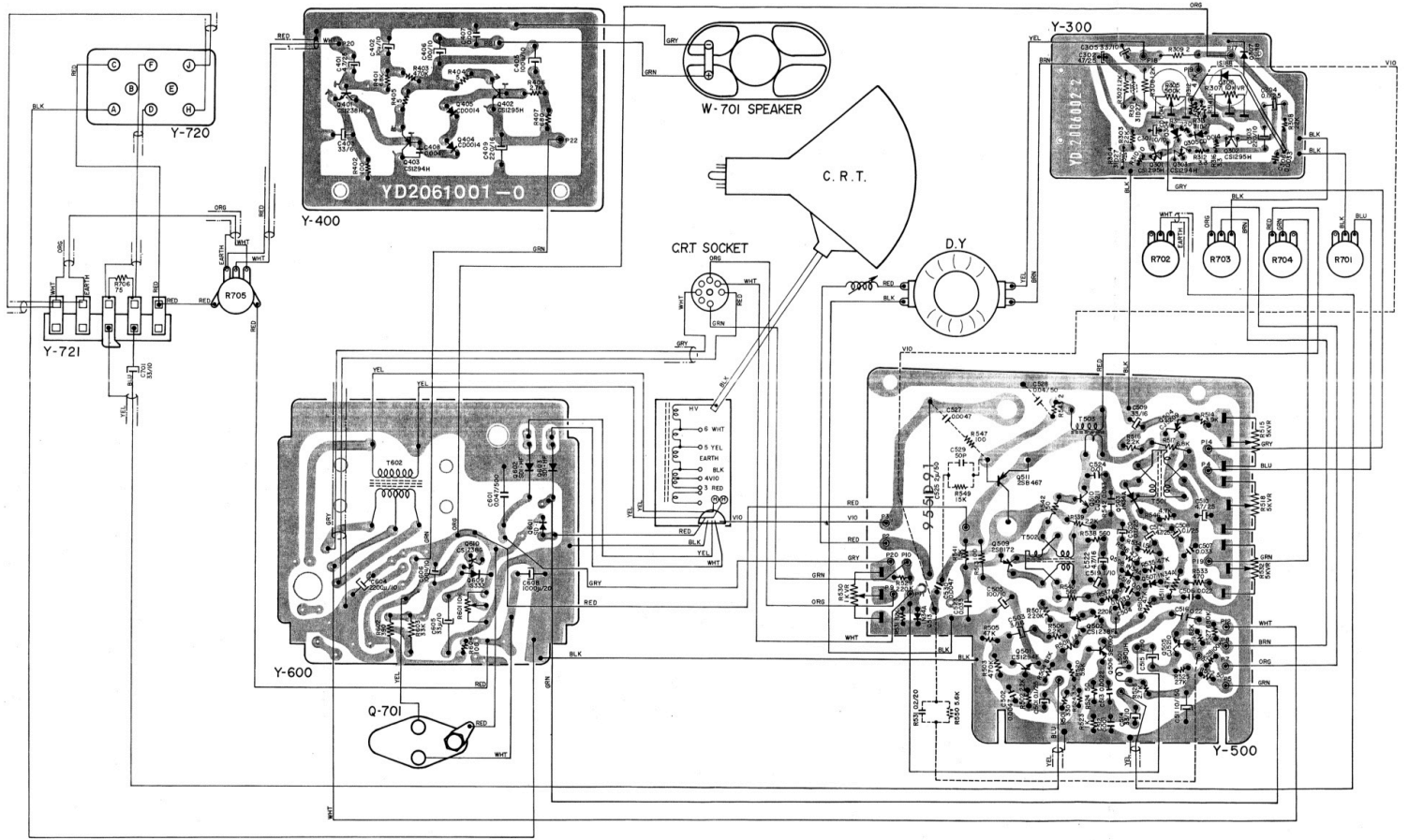

Fig. 3-4

# SECTION 3-6
# EXPLODED VIEW
# &
# SCHEMATIC DIAGRAM

PXM (MONITOR) SCHEMATIC DIAGRAM




PXM (MONITOR) SCHEMATIC DIAGRAM NO.4-3 14012061


Y-720
Y-400
YD2061001-0
W-701 SPEAKER
C.R.T.
CRT SOCKET
D.Y
Y-300
Y-721
R705
R702
R703
R704
R701
Y-600
Q-701
Y-500