

CRT Modification Procedure for TM14-17R/RA

1. Outline:

This modification procedure sheet shows the way of CRT replacement with substituted CRT, M34AFA63X01(U) for TM14-17R/RA.

2. Consists of modification kit:

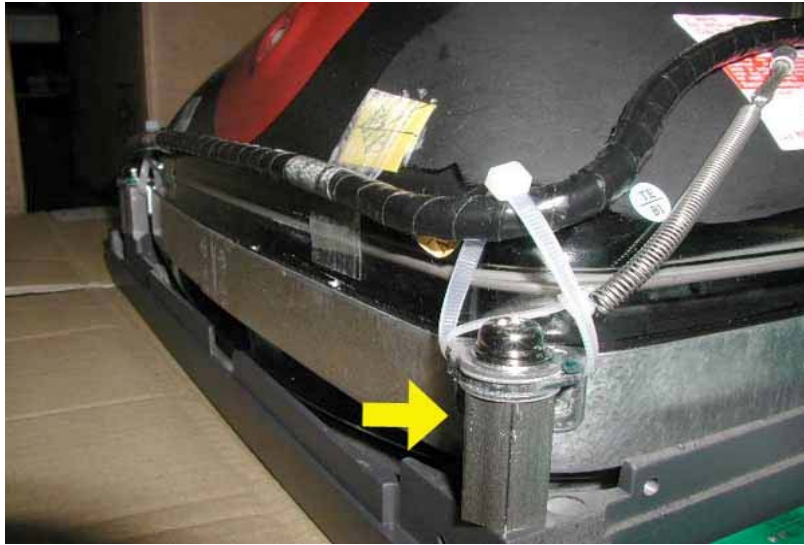
#.	Part No.	Description	Symbol	Location	Q	Remarks
1	CRT	M34AFA63X01 (U)	V901	Main Body	1	
2	DEF & CRT Socket Board			Main Body	1	
3	Washer	8W	—	Main Body	4	f/CRT
4	CRT Support	M4-J90118	—	Main Body	4	f/CRT
5	AC Harness	C4-J90117	—	Main Body	1	
6	Resistor	RSF2B 470 ohm J	—	Video Board	1	Additional

3. Modification Procedure:

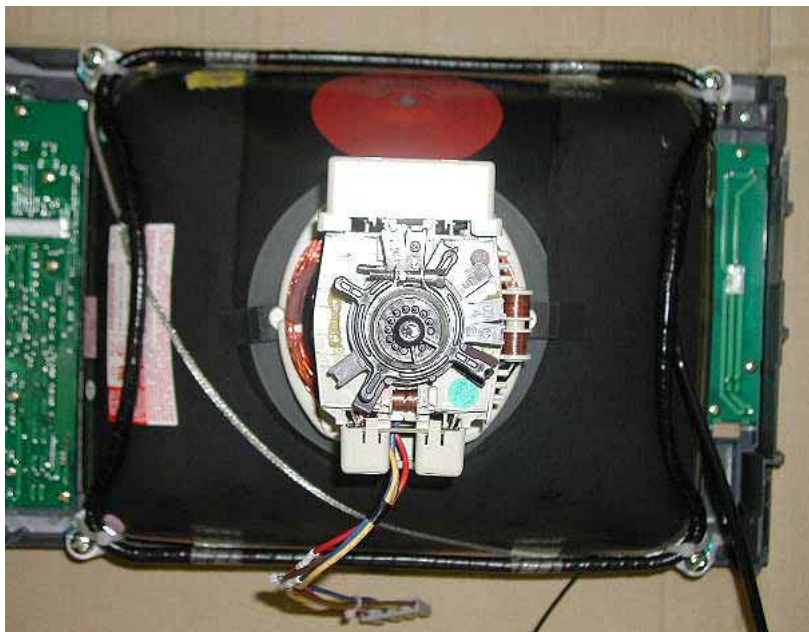
1) Main Body

- * Remove top over, both side covers and rear cover.
- * Remove the connector of Front Right and Left Board.
- * Remove Anode cap, yoke connector, degauss connector, CRT graphite earth wire, and CRT socket board.
- * Remove front escutcheon with CRT.
- * Remove DEF and CRT Socket Board from main body.
- * The harness for a power switch is changed into the sent new harness.
- * Remove degauss coil and CRT earth wire.
- * Attaching CRT onto escutcheon

Attach yellow arrow marked 4 collars on 4 each corners, and fix CRT with screws, WSN5X16+8W. Adjust CRT position and clearance with escutcheon with spacers that were used in the monitor. Fix graphite earth wire on the corner as below picture. Fix degauss coil with cable tie on the corner.



Picture of CRT mount from rear side



2) Replace Def Board & CRT Socket Board

- * It changes to the NEW board to which A Def Board and CRT Socket Board were sent, and each connector is connected.

3) Modification for VIDEO Board

- * Replace below parts (In the case of TM14-17R).

Part No.	Previous	New
*R925	330ohm-1/4W	220ohm-1/4W
*R936	4.7ohm-1W	3ohm-1W
*VR907	500ohm	100ohm
*C922	0.033u/35V	0.022u/35V
*R640	560ohm-1/4W	470ohm-1/4W

- * Replace below parts (In the case of TM14-17RA).

Part No.	Previous	New
*R640	560ohm-1/4W	470ohm-1/4W

4) Assembly

- *Attach escutcheon with CRT onto main body.
- *Install Video Board and connect harnesses.
- *Attach CRT Socket Board onto CRT and connect harnesses.
- *Install Front Right Control Unit and connect harnesses.

That is all of physical modification.

4. Adjustment

- * It adjusts according to 'Adjustment after CRT Replacement' of the following page.

1. MAINTENANCE and ADJUSTMENT

- ⑧ Disconnect the TAB terminal of the CRT SOCKET BOARD from the external electric conductor of CRT.
And remove CRT SOCKET BOARD than CRT.
- ⑨ Remove the eight screws (four screws on the top and each two screws on the right and left) which hold the main unit and escutcheon, and remove the escutcheon from the main unit together with the CRT.
Make sure that the neck of CRT does not touch the main unit at this time.
- ⑩ Place the CRT on a stable surface with the escutcheon down. Place a cloth below the escutcheon to prevent it from being damaged. And remove the four screws which attach the escutcheon to the CRT. At this time, pay attention not to break screw threads because the screw lock is painted on screws.
- ⑪ Remove the degauss coil.
- ⑫ Prepare the new CRT and reassemble the unit by following steps ① through ⑨ above in reverse order. Make sure that the high voltage connectors are connected securely.

(4) Adjustment after CRT Replacement

1. Tentative setting of SCREEN VR

- ① Before turning on the power, make sure that all the connectors are correctly connected, paying special attention to the connectors of anode cap, FOCUS and SCREEN.
- ② Set the SCREEN VR, which is close to the components side of the PC board, of the flyback transformer on the DEF & POWER BOARD to its MIN position.
- ③ Connect the AC cable as well as the signal cable and then turn the power on. At this time, make sure that no troubles are found.
- ④ Rotate slowly the SCREEN VR clockwise to let pictures appear on the screen and set the SCREEN VR to the point where the luminance of the pictures does not vary even when the SCREEN VR is rotated.

2. Setting of WIDTH, HEIGHT, etc.

(Refer to Table 1 of Scanning Size.)

- ① Perform the adjustments of scanning size, linearity, pincushion distortion, raster position and picture position in normal scanning, using the following VRs.

DEF & POWER BOARD

- VR202 (NOR WIDTH)
- VR204 (PIN LEVEL)
- VR206 (SIDE PIN PHASE)
- VR207 (H CENT)
- VR209 (V CENT)

VIDEO BOARD

- VR904 (V LIN)
- VR905 (NOR HEIGHT)
- VR908 (H PHASE)

- ② After the above adjustment is completed, connect the probe to R248 (collector side of Tr215) on the DEF & POWER BOARD and adjust VR903 (V BIAS) so that the voltage of waveform end of vertical deflection output can be DC +5V.



- ③ Perform the adjustments of scanning sizes in under scanning and in 16:9 aspect ratio scanning, using VR203 (US WIDTH) on the DEF & POWER BOARD, VR906 (US HEIGHT) and VR907 (16:9 HEIGHT) on the VIDEO BOARD.

Table 1 Scanning Size

	TM14-17 (mm)		TM20-17 (mm)	
	Height	Width	Height	Width
Normal Scan	The outer frame of picture contacts the escutcheon.		←	←
Under Scan	194	259	278	370
16:9 Scan	146	259	208	370

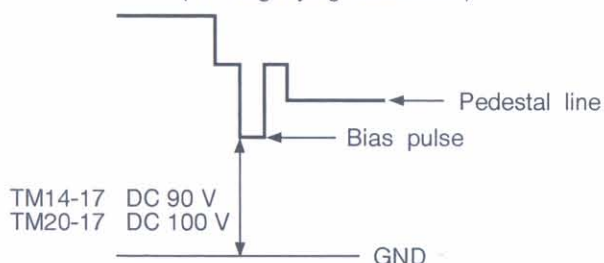
1. MAINTENANCE and ADJUSTMENT

3. Setting of SCREEN VR

(Reference Channel Decision)

- ① Connect the probe of an oscilloscope to TP1 (RK) on the CRT SOCKET BOARD and monitor the waveforms from the end of V. BLK to start of pictures at a V rate.
- ② Next, adjust the SCREEN VR until the top of bias pulse reaches 100V DC.
- ③ Not changing the range of the oscilloscope, measure the voltages of bias pulse at TP2 (GK) and TP3 (BK) on the CRT SOCKET BOARD. Then, readjust the channel of the intermediate voltage among the three channels to 90V(100V) DC with the SCREEN VR in order to decide the reference channel.

Setting of BIAS PULSE LEVEL
(V magnifying waveform)



- ④ Set the BACKGROUND VR of the reference channel decided in the step ③ to its MAX position. Next, preset the BRIGHTNESS and adjust the pedestal potential of the reference channel to 97V(108V) DC with the PRESET BRIGHTNESS VR.

Setting of PRESET BRIGHTNESS



- ⑤ Adjust the BACKGROUND VR set to MAX position in the above step so that the raster of the reference channel can be just before cut off on the screen. In addition, adjust in the same way as the reference channel in the other channels using the respective BACKGROUND VRs.
- ⑥ Input the signal of detailed figures and optimize the FOCUS VR.

4.-a White Balance Adjustment (with Color Analyzer)

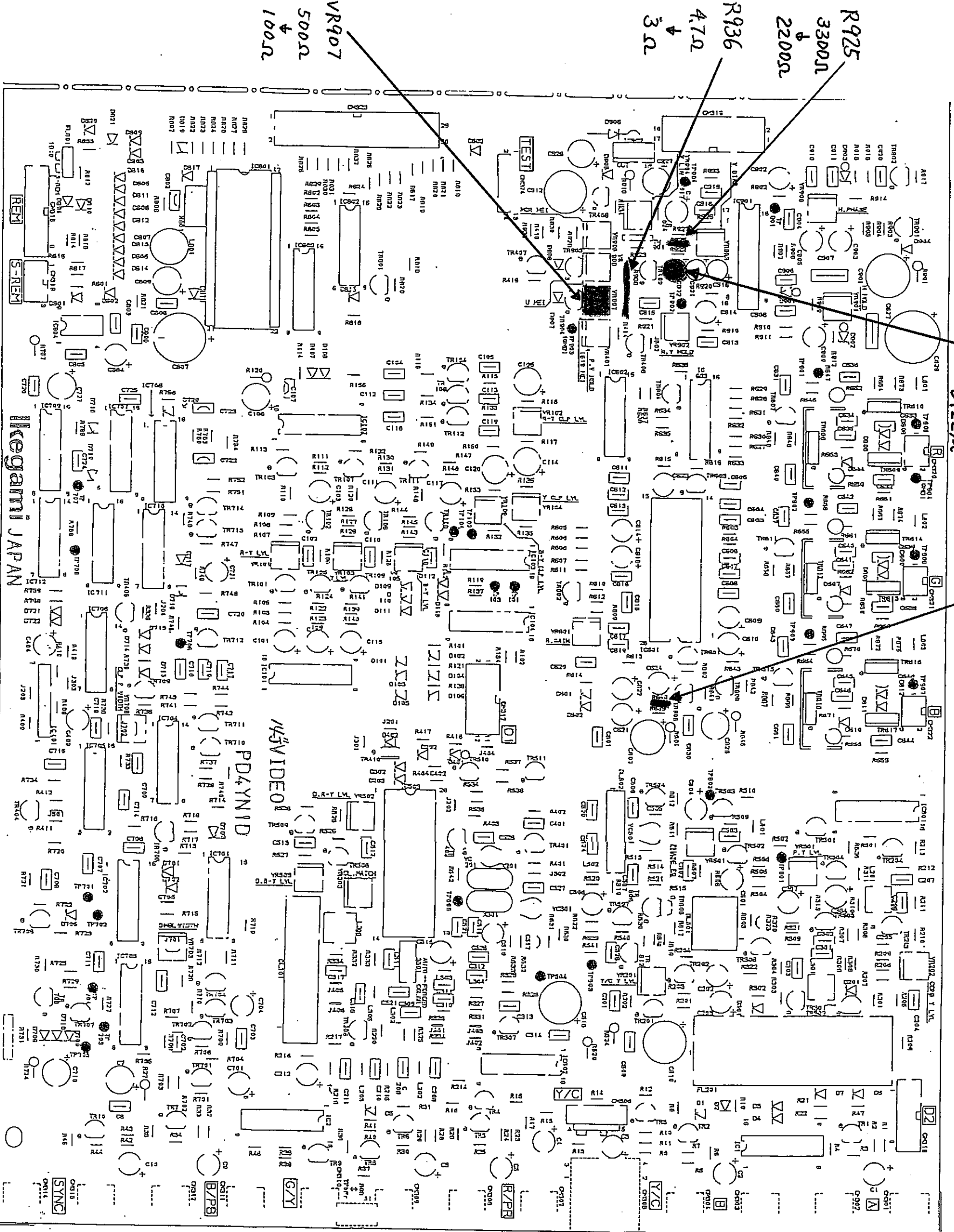
When replacing a CRT, adjust the white balance in the following manner.

- ① Demagnetize the entire monitor with a demagnetizing coil (external).
- ② Input the WINDOW signal as the composite signal, apply the sensor of color analyzer to the center of a CRT and cover the CRT with a blackout curtain or something.
- ③ Adjust the BACKGROUND and GAIN VRs on the FRONT PANEL so that the LOW LIGHT (5cd/m²) and HIGH LIGHT (120cd/m²) in the indication of the color analyzer can be equal. (The R channel is a reference.) For the value of x and y, refer to the following.
- ④ Make sure that the value is almost equal in Y/C or AUX.

	x	y	
6500K	.313	.329	(USA, EUR)
9300K	.283	.297	(JPN)

4.-b White Balance Adjustment (with human eyes)

- ① Input the COLOR BAR signal and turn the MONO switch on. (Black-and-white step waveforms of a gray scale chart, etc. might also be available.)
- ② Paying attention to the dark area of the COLOR BAR signal, adjust the R, G and B BACKGROUND VRs on the FRONT PANEL so that the color of the area can be white.
- ③ Next, pay attention to the bright area of the COLOR BAR signal and adjust the G GAIN and B GAIN VRs on the FRONT PANEL so that the color of the area can be white.
- ④ Adjust the G and B GAIN VRs for the bright area as well as the G and B BACKGROUND VRs for the dark area so that all the area from bright one to dark one can be same color.



VR907
500Ω
↓
100Ω

R936
4.7Ω
↓
3Ω

R925
3300Ω
↓
2200Ω

C922
0.33μ
↓
0.22μ

R640
560Ω
↓
470Ω

VIDEO 基板 改修図

REGAMI JAPAN

PD4YND

VIDEO

SYNC

B/PB

G/Y

Z/PB

Z/C

Z/C

Z/C

Z/C

Z/C