14" COLOR MONITOR - NEW CDU 1448

Manufactured by **HANTAREX**, this monitor is identified with HA61 on the rear of its casing.
It can display four different vertical resolutions: 350, 400, 480 lines (VGA standard mode) and 768 lines (VGA Plus mode). Its vertical scan frequency ranges from 60 to 70 Hz.
It can have a horizontal scan frequency of 31.469 KHz for VGA standard or 48.363 KHz for VGA Plus mode.

NOTE: The **ENEL version** of this monitor is identified with **HA31** on the rear of the monitor casing.
Since this monitor version is non-standard product, this manual does not explain its adjustments. For information on the ENEL version of the New CDU 1448 monitor, refer to the manual "CDU 1448 / HA31 Descrizione Piastre Schemi e Componenti".

CHARACTERISTICS

This is an analog, VGA-compatible, high-resolution and ergonomical monitor.

- Diagonal screen size: 14"
  Horizontal screen size: 240 mm +/- 3 mm
  Vertical screen size: 180 mm +/- 3 mm

- Input voltage: 110 V: 90 - 132 V a.c.
                                       220 V: 180 - 264 V a.c.
  Mains frequency: 50 Hz: 47 - 63 Hz
  Degaussing: At switch-on

- Horizontal sync:
  Frequency: 31.469 KHz +/- 300 Hz (VGA standard mode)
                                       48.363 KHz +/- 300 Hz (VGA plus mode)
  Polarity: Negative or positive
  Level: TTL

- Vertical sync:
  Frequency: 59.94 - 70.08 Hz (VGA standard mode)
                                       60.08 Hz (VGA Plus mode)
  Polarity: Negative or positive
  Level: TTL

- Input signals:
  Video: R, G, B (Red, Green, Blue) driver
  Signal: At linear voltage steps (63 11 mV steps)
  Level: 0 - 700 mV
  Polarity: Positive

- Resolutions displayed: 640 x 350 rows by columns (VGA standard mode)
                                       640 x 400 rows by columns (VGA standard mode)
                                       640 x 480 rows by columns (VGA standard mode)
                                       640 x 768 rows by columns (VGA plus mode)
                                       1024 x 768 rows by columns (VGA plus mode)

- External adjustments: Brightness
                                       Contrast

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REMOVING THE CASING AND DISASSEMBLING THE MONITOR

1. Remove plastic cover (A) in the direction of the arrow in the figure in order to access the two screws that secure the casing.
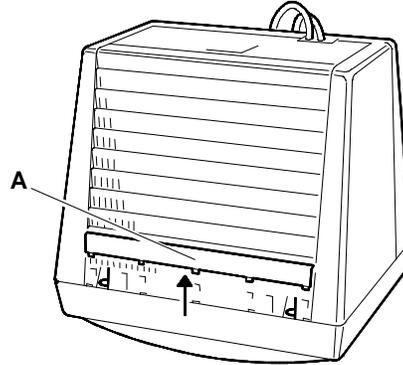
Fig. 15-1   Removing the plastic cover

2. Set the monitor as shown in the figure (puta cloth between the screen and workbench to avoid scratching the screen). Remove the six screws (B, C and D) that secure the casing.
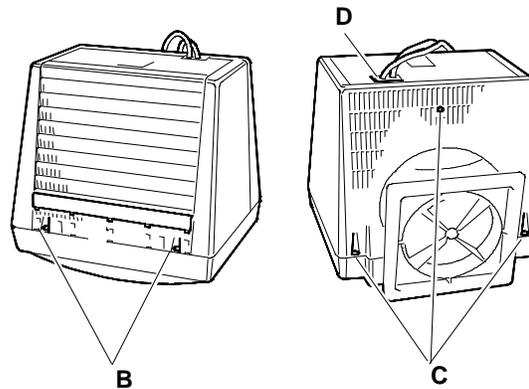
Fig. 15-2   Removing the six screws that secure the monitor casing

DISCHARGING HIGH VOLTAGE

3. Before removing any board, discharge the high voltages
(25 KV CRT anode voltage). To discharge the CRT anode use a screwdriver connected with a wire to the monitor's frame ground.
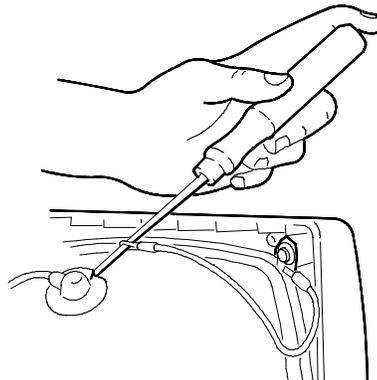
Fig. 15-3   Connecting the screwdriver to ground

4. Press cable support (P) in the direction of the arrow in the figure to free the cables. Push the support towards the inside of the casing.
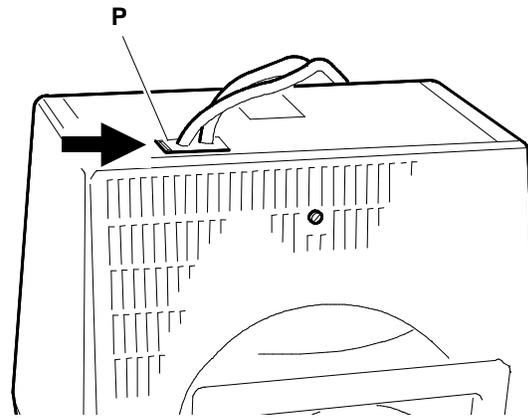
Fig. 15-4   Removing the cable support

5. Remove the casing, passing the cables through the slot. Be careful not to damage the cables nor board components.

6. When the **power cable or signals cable has to be replaced**, proceed as follows:

    *   Remove screw (E) of cable support (P) to separate the two cables.
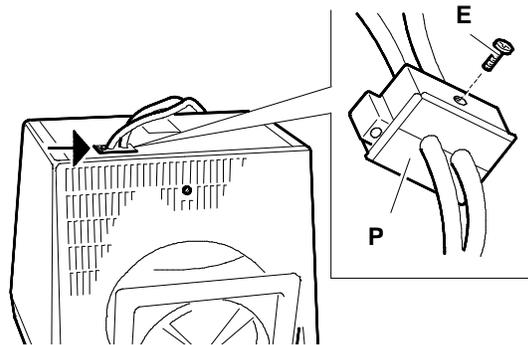
Fig. 15-5   Removing cable support (P)

    *   To remove the power cable, remove screw (F) that connects the power cable to the main board's metal support (ground) and remove connector J101 from the main board.

    *   To remove the video signals cable, remove the video amplifier board from the CRT, remove screw (G) that secures the cable to the main board's metal support, remove connector J103 from the main board and connector J2 from the video amplifier board.
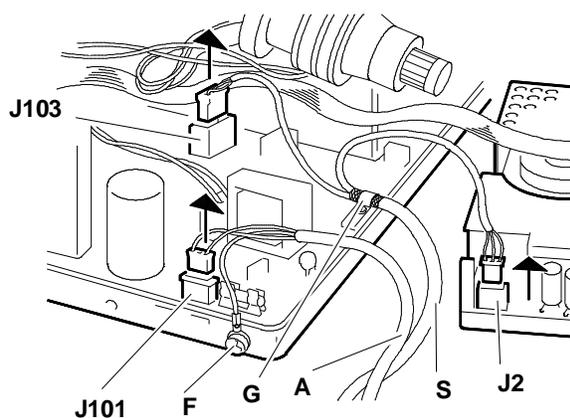
Fig. 15-6   Removing signals cable (S) and power cable (A)

REMOVING THE VIDEO AMPLIFIER BOARD

7. Remove the silicone adhesive that holds the CRT and the video amplifier board together (for safe transportation).

8. Remove the adhesive spunge (S) from the metal plate that covers the soldered side of the video amplifier board (V) so you can access to the adjustment potentiometers on this board.

9. Remove the screw (A) that secures the ground flat band (M) connecting the video amplifier support structure to the main board structure as shown in the figure.

10. Remove the video amplifier board (V) from the CRT.
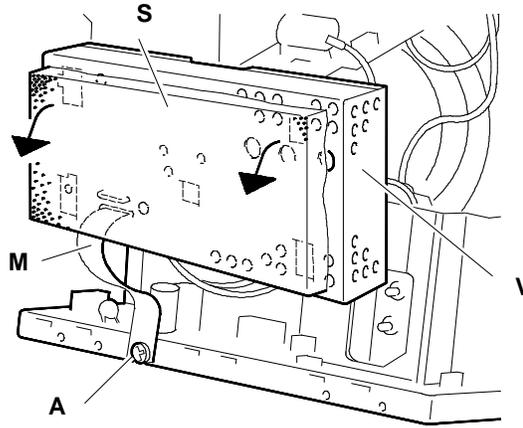
Fig. 15-7 - Removing the adhesive sponge (S)
- Removing the ground flat board (M)

11. Remove the following connectors from the video amplifier board:

- Connector J1 of the main board interface cable

- Connector J2 that interfaces the video signals cable

- Connector J3 of the CRT ground cable.
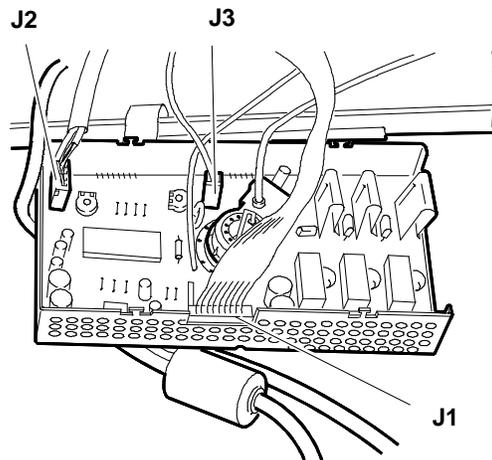
Fig. 15-8 Removing cables from the video amplifier board

12. Unhook and fold back the cover of the G3 grid (focus) on the video amplifier board. Unsolder the cable if it has to be removed.

13. To access G2 (screen cable) you must first remove the metal shield that covers video amplifier board.
Remove this shield by unsoldering the six lugs of the shield.
With the shield removed you can access G2. Unsolder the cable if it has to be disconnected.

14. The video amplifier board is now free of all connections.
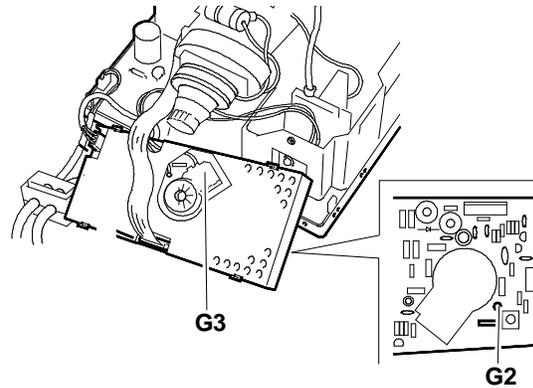
Fig. 15-9   Disconnecting G3 and G2 from the video amplifier board

REMOVING THE MAIN BOARD

15. Disconnect the signals and power cables and remove cable clamp (B).

16. Disconnect the power cable from connector (C) and from the ground (T).
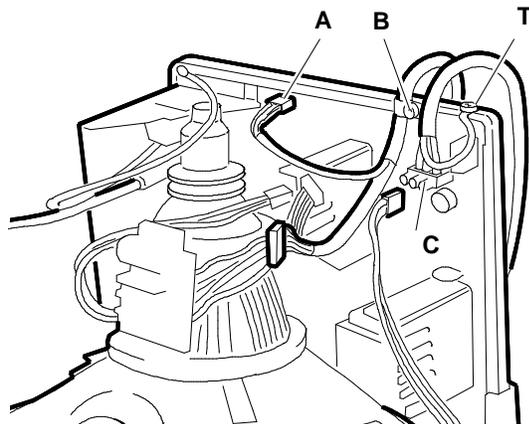
Fig. 15-10   Disconnecting the signals and power cables

17. Remove the screw (A) that secures the degaussing connection to the main board metal support. Disconnect connectors J102 (degaussing connection) and J104 (deflection coil connection).
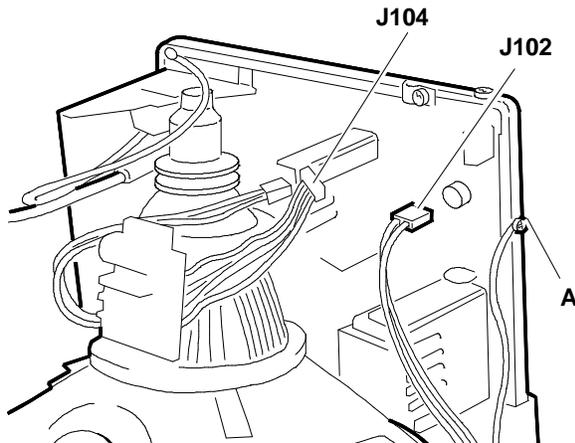
Fig. 15-11   Disconnecting the cables from the main

18. Before disconnecting the CTR anode, ensure that it is completely discharged by inserting the blade of a grounded screwdriver under the CRT rubber suction cup.

19. To remove the anode, turn the plastic casing up-side down and remove the two contacts.

20. Remove the screw (A) that secures the potentiometers for contrast and brightness adjustments (C & L). Push these potentiometers towards the inside of the casing.

21. Disconnect the cables that connect the two potentiometers to main board connectors J306 and J106.

22. Press retaining clips (B) outwards in order to free the main board. Remove the main board from the casing. When removing this board, be careful not to damage any of its components.

NOTE: The main board is secured to a support plate from which it must never be separated.
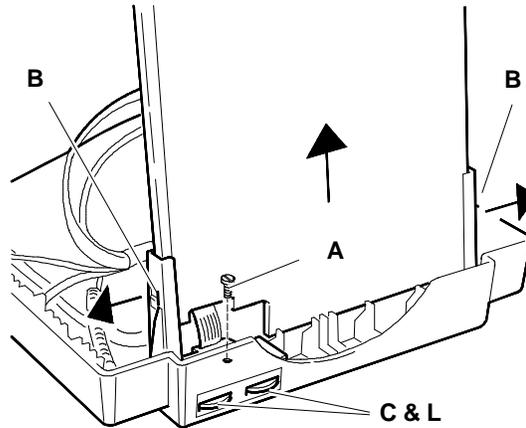
Fig. 15-12   Removing the main board from the monitor frame

23. To remove the metal shield that covers the soldered side of the main board, slide it to free the securing tabs and then remove it. Removing this board gives you access to the adjustment points on the main board.
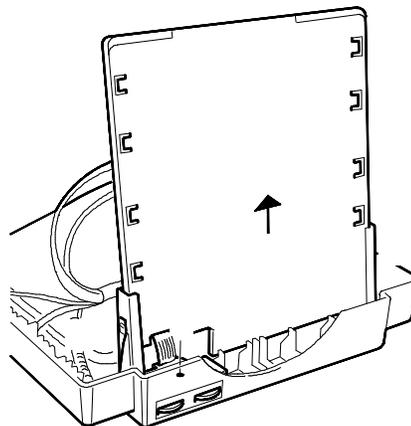
Fig. 15-13   Removing the metal shield that covers the soldered side of the main board

24. When replacing the main board check that the metal ring (C) on the contact of the CRT anode is seated securely under the retaining ring (D) of the anode suction cup.
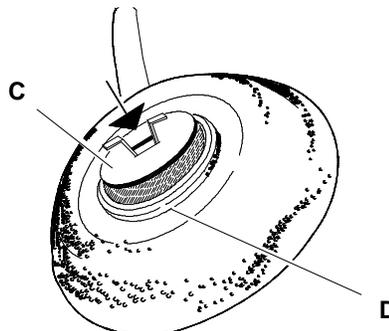
Fig. 15-14   Securing the CRT anode

REMOVING THE CRT

NOTE: Besides the cathode ray tube, the CRT also integrates the deflection yoke and the geometric distortion correction magnets. No adjustments need to be made to the magnets.

25. Remove the four screws (V) that secure the CRT to the front chassis of the monitor.

26. Cut the two clamps (F) that hold the Degauss coil.

27. Lift the CRT and disengage the Degauss coil.

28. Remove the ground band (G) from the CRT by unhooking its tensioning spring (M) and releasing it from the mounting brackets.
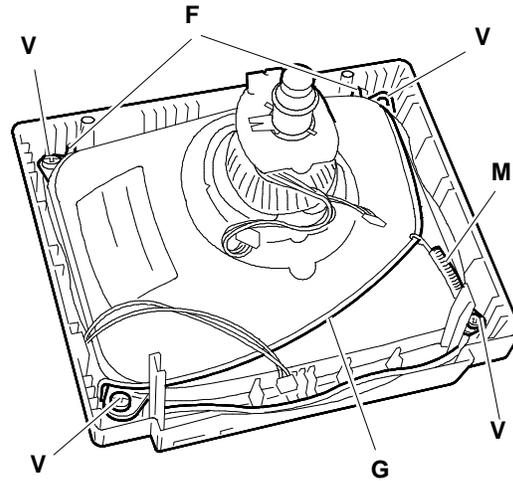
Fig. 15-15   Removing the cathode ray tube

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VIDEO ADJUSTMENTS

The following procedure must be carried out one step at a time and in the order given since some of the adjustments affect those that follow.

MAIN BOARD ADJUSTMENTS

VOLTAGE ADJUSTMENT

- Set the contrast and brightness controls half way.

- Turn the RV109 beam limiter potentiometer clockwise completely.

- Switch on the unit.

RV109
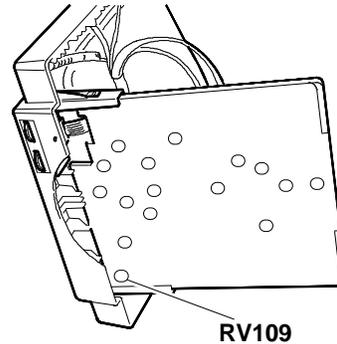
Fig. 15-16   Locating the beam limiter potentiometer

- Darken the screen using the brightness and contrast controls and using the G2 SCREEN potentiometer of the TH102 transformer.

G2
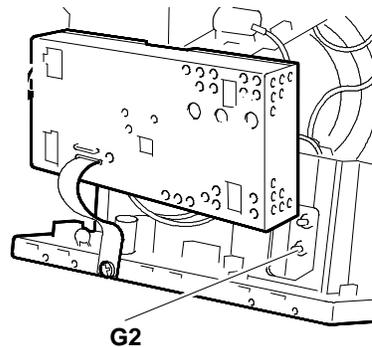
Fig. 15-17   Locating the G2 SCREEN potentiometer

- Adjust RV101 until the voltmeter connected between diode D114 and ground measures 60 V.

D114

RV101
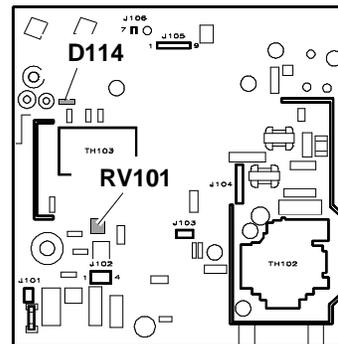
Fig. 15-18   Voltage adjustment

FREQUENCY ADJUSTMENT

- Disconnect the signals cable to stop horizontal synchronism.

- Connect a frequency meter on PIN 4 of the IC104 component.

- Adjust the RV117 trimmer until a signal frequency of 29.5 KHz is measured.
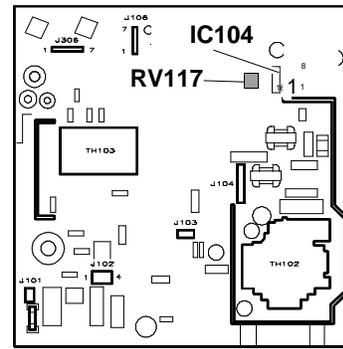
Fig. 15-19   Frequency adjustment

31/48 KHZ FREQUENCY ADJUSTMENT

- System Test: *640 x 480 GRAPHICS.*

- Connect a voltmeter between PIN 4 of the IC103 and ground.

- Measure the voltage obtained when the horizontal scan frequency is 31 KHz (standard VGA mode).

- Measure the voltage when the horizontal scan frequency is 48 KHz (VGA plus mode). To change the scan frequency, use the VIDEO REFRESH RATE option of the System Test's SETUP utility.

- Connect the voltmeter between PIN 5 of the IC103 and ground.

- Adjust RV102 until the measured voltage is the average of the two values measured previously on PIN 4 of the IC103.
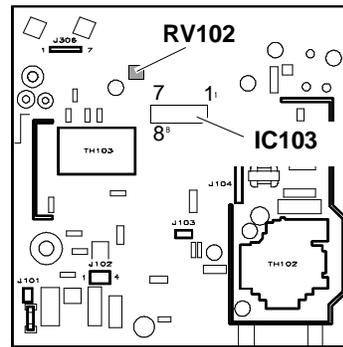
Fig. 15-20   31/48 KHz frequency adjustment

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**DATA AREA SIZE ADJUSTMENT
(31 KHz STANDARD VGA)**

- System Test: *640 x 480 GRAPHICS.*

- Adjust RV110 to obtain a horizontal width of 240 mm +/- 4 mm.

- Adjust RV108 to obtain a vertical height of 180 mm +/- 4 mm.
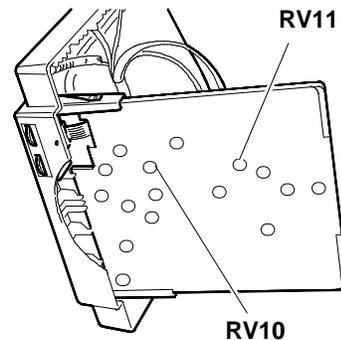
Fig. 15-21   Data area size adjustment (standard VGA)

PINCUSHION DISTORTION ADJUSTMENT

- System Test: *640 BY 400 GRAPHICS.*

- Adjust the distortion using RV114.

HORIZONTAL LINEARITY ADJUSTMENT

- System Test: *640 BY 400 GRAPHICS.*

- Adjust horizontal linearity using coil L105 (H LIN).

L106   RV114
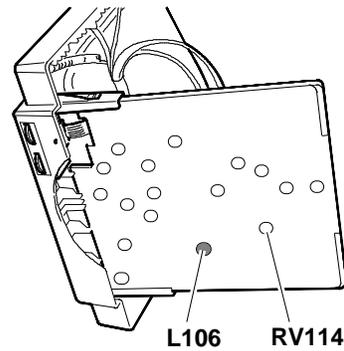
Fig. 15-22 - Pincushion distortion adjustment
- Horizontal linearity adjustment

VERTICAL LINEARITY ADJUSTMENT

- System Test: *640 BY 480 GRAPHICS.*

- Adjust vertical linearity using RV112.

HORIZONTAL CENTERING ADJUSTMENT (31 KHz STANDARD VGA)

- System Test: *640 BY 480 GRAPHICS.*

- Adjust RV103 to center the image vertically on the screen |a - b| < 4 mm.

RV103   RV112
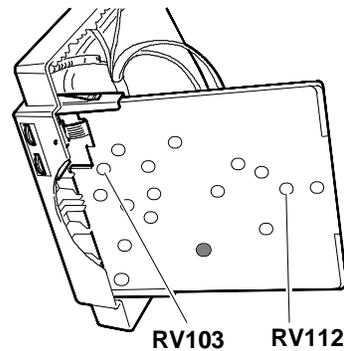
Fig. 15-23 - Vertical linearity adjustment
- Horizontal centering adjustment (31 KHz standard VGA)

a | DATA AREA | b
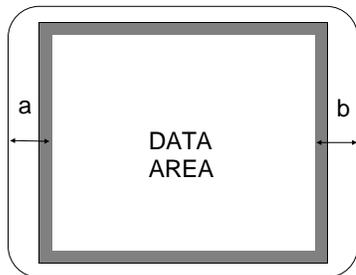
VERTICAL CENTERING ADJUSTMENT

- System Test: *640 BY 480 GRAPHICS.*

- Adjust RV113 to center the image vertically on the screen |a - b| < 4 mm.

a
DATA AREA
b

RV113
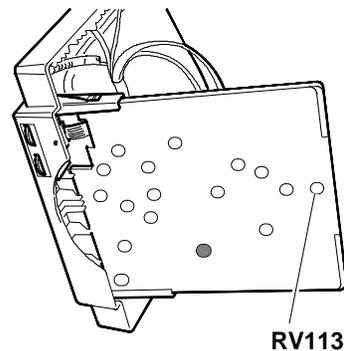
Fig. 15-24   Vertical centering adjustment
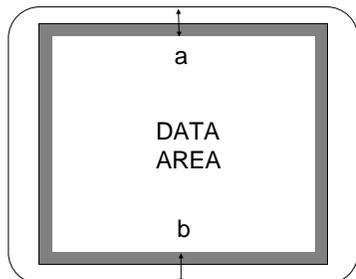
VERTICAL WIDTH ADJUSTMENT

- System Test: *640 BY 350 GRAPHICS.*

- Adjust RV106 to obtain a vertical width of 180 mm +/- 4 mm.

- System Test: *640 BY 400 GRAPHICS.*

- Adjust RV107 to obtain a vertical width of 180 mm +/- 4 mm.
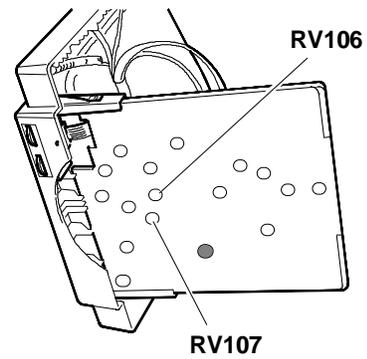
Fig. 15-25   Vertical width adjustment

DATA AREA SIZE ADJUSTMENT
(48 KHz VGA PLUS)

- System Test: *1024 BY 768 GRAPHICS.*

- Adjust RV111 to obtain a horizontal width of 240 mm +/- 4 mm.

- Adjust RV105 to obtain a vertical height of 180 mm +/- 4 mm.
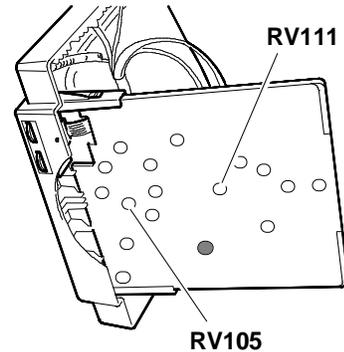
Fig. 15-26   Data area size adjustment (48 KHz VGA plus)

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HORIZONTAL CENTERING ADJUSTMENT
(48 KHz VGA PLUS)

- System Test: *1024 BY 768 GRAPHICS.*

- Adjust RV104 to center the image horizontally on the screen. |a - b| < 3 mm.
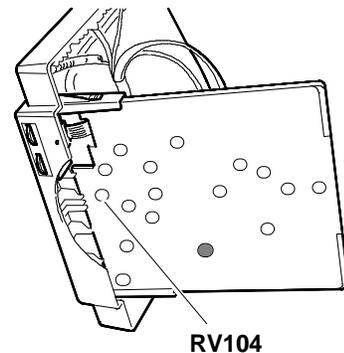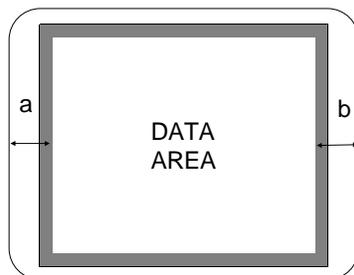
Fig. 15-27   Horizontal centering adjustment (38 KHz VGA plus)

PINCUSHION DISTORTION ADJUSTMENT (VGA PLUS 48 KHz)

- System Test: *1024 BY 768 GRAPHICS.*

- Adjust the distortion using RV115.

RV115
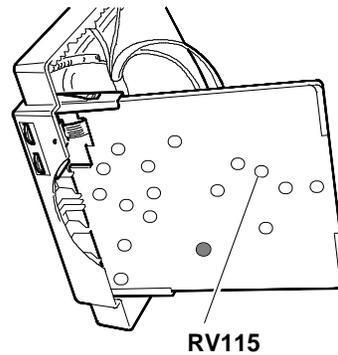
Fig. 15-28   Pincushion distortion
adjustment
(48 MHz VGA plus)

FOCUS ADJUSTMENT

- System Test: *CHECK LINEARITY.*

- Adjust the G3 "FOCUS" potentiometer on the TH102 transformer to obtain the best focused image.

NOTE: Vertical width adjustments using trimmers RV110 and RV122 in the 640 x 350 and 640 x 400 operating modes with a 38 KHz scan frequency are not used.

G3
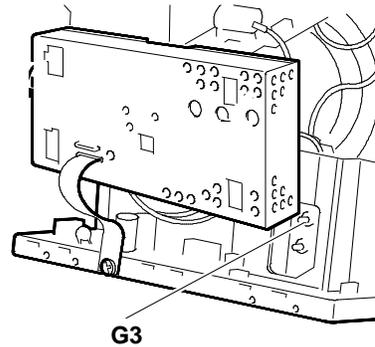
Fig. 15-29   Focus adjustment

TILT ADJUSTMENT

- System Test: *CROSS HATCH WITH CIRCLE IN THE CENTRE OF SCREEN.*

- Check that the size of the image on the screen does not exceed the parameters of the figure.
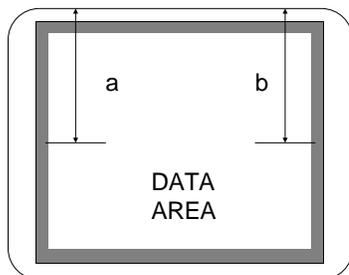
$|a - b| >= 1.7$ mm $<= 2.3$ mm: min. defect
$|a - b| >= 2.3$ mm: max. defect

- If it does, move the cathode ray tube by means of the securing screws shown in figure 15-15.

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