

VR 241-A

Color Video Monitor
Pocket Service Guide

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Color Video Monitor
Pocket Service Guide

Prepared by Educational Services
of
Digital Equipment Corporation

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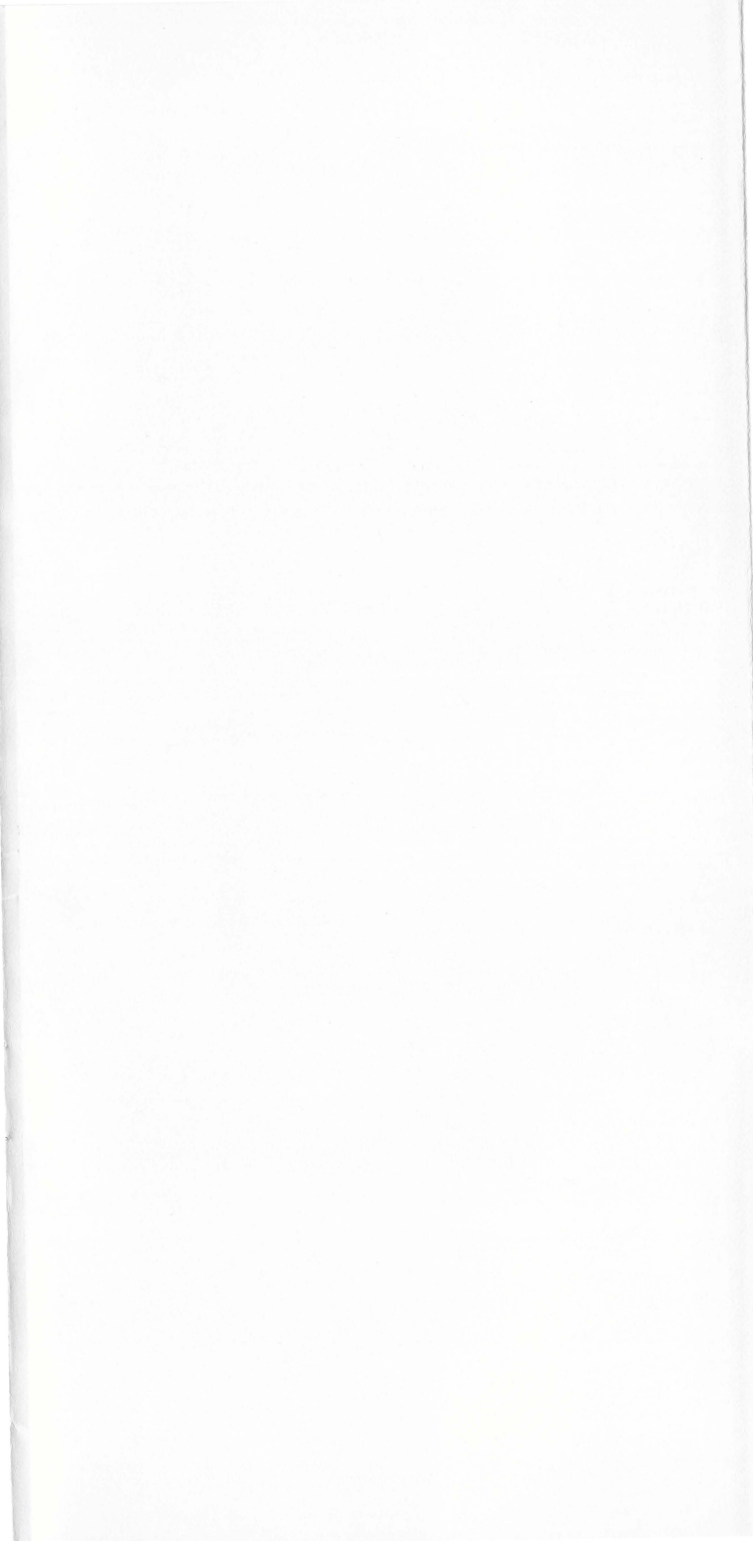
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INTRODUCTION

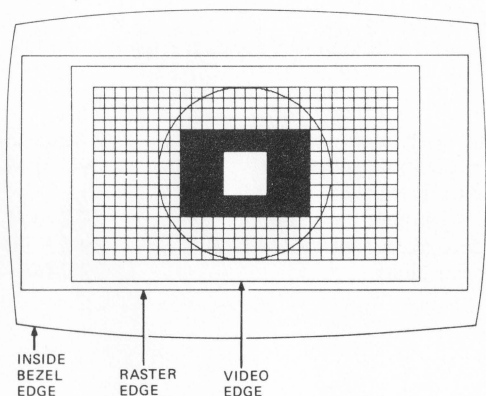
This pocket service guide provides the following information on the VR241-A Color Video Monitor.

- Troubleshooting
- Quality checks and adjustment procedures
- Operation and physical descriptions

This information applies to host system units that have the following standard test patterns.

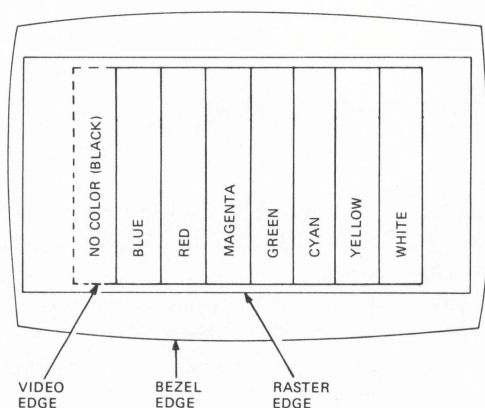
- Universal alignment pattern (Figure I-1)
- Color bar pattern (Figure I-2)
- White screen
- Red screen
- Blue screen
- Green screen

If your host does not provide these test patterns, refer to your host system unit's pocket service guide for more information.



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Figure I-1 Universal Alignment Pattern



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Figure I-2 Color Bar Pattern

Notes, Cautions, and Warnings

Notes, cautions, and warnings appear throughout this document. Notes contain general information you should be aware of. Cautions contain information to prevent damage to the equipment. Warnings contain information to prevent personal injury.

Tools Required

You need the following tools to service the VR241-A.

Tool	PN
VR241 adjustment tool	29-24746-00
Alignment tool (yellow)	29-10144-00
Phillips screwdriver	—
Video alignment template	29-24371-00
Hex-core alignment tool (white)	29-23190-00
Color bar chart	29-24661-00

1 TROUBLESHOOTING

1.1 INTRODUCTION

This chapter provides information to troubleshoot the four types of problems your VR241-A may exhibit: no video, video distortion, color problems, and/or alignment problems. Refer to the section that describes your monitor's problem, match the symptoms, and then take the corrective action.

1.1.1 Troubleshooting Notes

The troubleshooting procedures in this guide assume that only one assembly has failed or only one problem exists. The symptoms your monitor displays may indicate multiple failures or problems because of the monitor circuitry's interactiveness. Therefore, always troubleshoot to the most obvious symptom.

1.2 NO VIDEO

Use Table 1-1 when the monitor will not display a video picture sent by the host system unit.

NOTE

Make sure the color monitor has warmed up for at least 15 minutes before you use Table 1-1.

1.3 DISTORTED VIDEO

Use Table 1-2 to find the proper corrective action when your monitor displays a distorted video picture. The distortion could be rolling, flicker, blooming, or a picture that will not disappear at minimum contrast and brightness control settings.

NOTE

Make sure the color monitor warms up for at least 15 minutes before you use Table 1-2.

Table 1-1 No Video Troubleshooting Procedures

Symptom	Conditions	Corrective Action
Screen is black, there is no video or raster and green power on indicator is off.	One end of power cord is disconnected.	Reconnect power cord.
	Power switch is turned off.	Turn VR241-A power switch on.
	There is no power at wall outlet.	Make sure there is power at the outlet.
	Monitor fuse is blown.	Replace fuse.
Screen is black, there is no video or raster, but green power-on indicator is on.	You performed all the steps above once but the problem is not corrected.	Replace the monitor.
	Brightness and contrast controls are set to minimum.	Turn brightness and contrast controls to maximum.
	Service switch is set to SERVICE position.	Set switch to NORMAL position.
There is raster but no video.	Monitor is faulty.	Replace monitor.
	Signal cable is disconnected.	Connect signal cable between monitor and host system unit.
	Host is not on.	Turn host system unit on.
	Contrast is set to minimum.	Turn contrast control to maximum to see video.
	Signal cable is faulty.	Replace signal cable.

Table 1-1 No Video Troubleshooting Procedures (Cont)

Symptom	Conditions	Corrective Action
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.
Only a horizontal line appears.	Color monitor is faulty.	Replace color monitor.

Table 1-2 Distorted Video Troubleshooting Procedures

Symptom	Conditions	Corrective Action
Video rolls vertically and horizontally.	Video cable is connected wrong or an external video sync is required from host system unit.	Check video cable at color monitor and at host system unit, or add an external sync cable if required by your host system unit.
	Synchronization switch is set to wrong position.	Check switch settings on monitor and match monitor to host system type. (Refer to Appendix B for correct setting.)
	Signal cable is faulty.	Replace signal cable.
	Monitor is out of adjustment.	Perform color monitor sync check/adjustment procedure (para 2.3).
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.

Table 1-2 Distorted Video Troubleshooting Procedures (Cont)

Symptom	Conditions	Corrective Action
Video rolls vertically.	Monitor sync is out of adjustment.	Perform color monitor sync check/adjustment procedure (para 2.3).
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.
Video rolls horizontally	Monitor sync is out of adjustment.	Perform color monitor sync check/adjustment procedure (para 2.3).
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.
Video flickers.	Host system unit is sending wrong vertical synchronization rate signal to color monitor.	Check host system units setup features for a software-selectable 50 Hz or 60 Hz operating mode. Set to 60 Hz to eliminate display flicker.

CAUTION

Do not confuse software-selectable 50 Hz or 60 Hz operating modes with the 110 V and 230 V power line select switch on the color monitor and host system unit.

NOTE

Not all host system units have a software-selectable 50 Hz or 60 Hz setup feature.

Table 1-2 Distorted Video Troubleshooting Procedures (Cont)

Symptom	Conditions	Corrective Action
	Interlace mode is selected at host system unit.	Check host system unit setup features for a software-selectable interlaced mode operation. Set to NO-interlace to eliminate display flicker.
NOTE Not all host system units have a software-selectable interlace mode setup feature.		
Video shows blooming at high intensity levels.	Impedance switch is set wrong for your system configuration.	Check monitor's impedance switch setting for your system configuration. Refer to Appendix B for correct setting.
	White balance is out of adjustment.	Perform white balance check/adjustment procedure (para 2.15).
Raster and/or video will not disappear when brightness and contrast controls are at minimum.	Color monitor is faulty.	Replace color monitor.
	Monitor's white balance is out of adjustment.	Perform white balance check/adjustment procedure (para 2.15).
	Color monitor is faulty.	Replace color monitor.

1.4 COLOR PROBLEMS

Use Table 1-3 to find the corrective action when your monitor will not display a correct color video picture from the host system unit.

NOTE

Make sure the color monitor warms up for at least 15 minutes before you use Table 1-3.

Table 1-3 Color Troubleshooting Procedures

Symptom	Conditions	Corrective Action
Wrong color is displayed and color bars are in wrong position.	Video cables are connected wrong.	Check video cables at color monitor and host system unit.
NOTE Use the color bar chart (PN 29-24661-00) to determine correct color bar sequencing. The colors on the chart will not match the video perfectly. There is a difference between radiated light (video) and reflected light (color bar chart).		
	Color monitor is faulty.	Replace color monitor.
Wrong color is displayed but color bars are in correct position.	Host system unit software is faulty.	Have customer verify software.
Color bar pattern is missing a color(s).	Signal cable is faulty.	Replace signal cable.
	White balance is not normal.	Perform color monitor white balance check/adjustment procedure (para 2.15).
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.

Table 1-3 Color Troubleshooting Procedures (Cont)

Symptom	Conditions	Corrective Action
Monitor displays only green shades of color bars.	Host system unit software setup incorrect.	Set host system unit setup feature for color operation.
Convergence or purity is not normal.	Monitor needs degaussing.	Turn monitor off for 10 minutes then turn it on to activate internal degaussing circuits.
	Monitor is located near magnetic field.	Move monitor to an area free of magnetic fields.
	Color monitor is faulty.	Replace color monitor.
White balancing is not normal.	Impedance switch is set wrong for your system's configuration.	Check monitor's impedance switch setting for system configuration. (Refer to Appendix B for proper settings.)
	Video cables are connected wrong.	Check video cables at color monitor and host system unit.
	Monitor's white balance is out of adjustment.	Perform color monitor white balance check/adjustment procedure (para 2.15).
	Host system unit is faulty.	Refer to host system unit's pocket service guide.
	Color monitor is faulty.	Replace color monitor.

1.5 ALIGNMENT PROBLEMS

Use Table 1-4 to find the proper corrective action when the monitor displays an abnormal video picture from the host system unit.

NOTE

Make sure the color monitor warms up for at least 15 minutes before you use Table 1-4.

CAUTION

Magnetic fields affect the color monitor's performance. Do not operate the monitor near electromagnetic devices such as printers, or near large magnetized objects such as filing cabinets or steel beams in walls.

Table 1-4 Troubleshooting Alignment Problems

Symptom	Conditions	Corrective Action
Video is rotated.	Monitor is out of rotational adjustment.	Replace color monitor.
Video unstable or jitters after new display.	Monitor is out of sync adjustment.	Perform color monitor sync check/adjustment procedures (para 2.3)
	Color monitor is faulty.	Replace color monitor.
Video is not centered.	Monitor is out of centering adjustment.	Perform proper color monitor centering check/adjustment procedure (paras 2.4, 2.5, and 2.6).
	Color monitor is faulty.	Replace color monitor.

Table 1-4 Troubleshooting Alignment Problems (Cont)

Symptom	Conditions	Corrective Action
Video is not retangular.	Monitor is out of retangular adjustment.	Perform color monitor retangular check/adjustment procedure(para 2.8).
	Color monitor is faulty.	Replace color monitor.
Video has poor aspect ratio.	Monitor is out of aspect ratio alignment.	Perform color monitor aspect ratio check/adjustment procedure (para 2.9).
	Color monitor is faulty.	Replace color monitor.
Video is not linear.	Monitor is out of linear adjustment.	Perform proper color monitor linear check/adjustment procedure (paras 2.10 and 2.11).
	Color monitor is faulty.	Replace color monitor.
Video is not focused.	Monitor is out of focus adjustment.	Perform color monitor focusing check/adjustment procedure (para 2.12).
	Color monitor is faulty.	Replace color monitor.

2 QUALITY CHECK/ADJUSTMENT PROCEDURES

2.1 GENERAL

This chapter describes how to check and adjust the quality of the monitor's video picture. If the picture is acceptable as defined in the procedures, you do not have to perform the adjustment for that check. Go on to the next check and adjustment.

It is important to perform these procedures in the order listed because some of them interact and depend on preceding checks and adjustments being correct.

Perform these procedures when your color monitor can display video. If your monitor cannot display video, go to the troubleshooting procedures in Chapter 1.

The following procedures refer to the universal alignment pattern, solid color test patterns, and color bar test pattern. If your host system unit does not provide these test patterns, refer to your host system unit's pocket service guide.

Appendix B describes how to find and operate the external controls and how to find the alignment points.

If an adjustment is necessary, perform the preadjustment procedure once, then perform the necessary check/adjustment procedure. After you complete all quality check/adjustment procedures:

- Make sure the brightness and contrast controls turn freely.
- Make sure the ground cable is connected to the rear lower-left tab.
- When reinstalling the cabinet cover, make sure the white plastic shield around the brightness and contrast controls is tucked inside the cover.

2.2 PREADJUSTMENT

Perform this procedure only if an adjustment is necessary.

1. Turn power off and wait 30 seconds before you continue.

WARNING

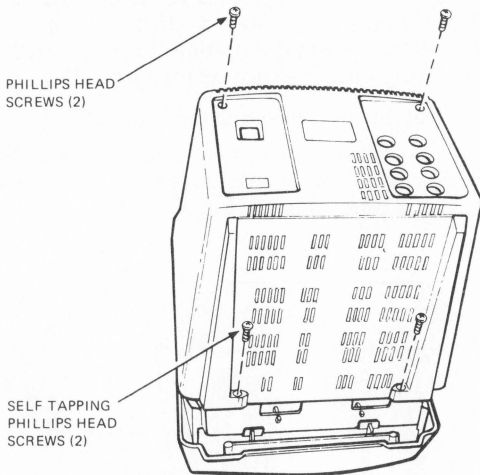
Static charges on the CRT can cause shock. Static charges dissipate for at least 30 seconds after the monitor is turned off. Do not handle during this time.

2. Disconnect power cables.
3. Disconnect video cables.
4. Remove tilt swivel if installed.
5. Carefully set monitor face down.

CAUTION

Do not scratch the bezel or screen. Place the monitor on a nonabrasive surface such as a large desk pad or soft cloth.

6. Remove four screws that hold cover (Figure 2-1).



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Figure 2-1 Monitor Cover Removal

7. Pull cover straight up and away.
8. Carefully set monitor back on its base.
9. Reconnect all cables.
10. Turn on monitor and allow it to warm up 15 minutes.
11. Unless directed otherwise, set the brightness control to the raster's cutoff and set the contrast control to a comfortable intensity.

2.3 VIDEO SYNCHRONIZATION

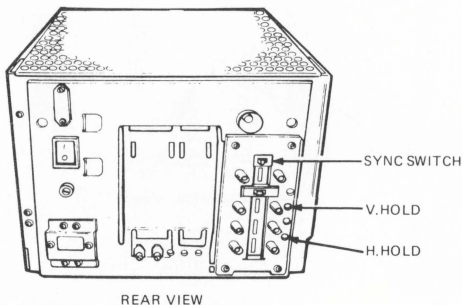
Perform the following steps to check, and if necessary, adjust the video synchronization.

1. Set contrast and brightness controls for comfortable viewing.
2. Display any test pattern.
3. Slide synchronization switch back and forth.
4. Look at the monitor. The picture should lock in quickly with no tearing of the top lines.

NOTE

If the synchronization is not normal, make sure preadjustment procedure was completed. Then continue to step 5. If the synchronization is normal, continue to the vertical centering check/adjustment (para 2.4).

5. Display the universal alignment pattern.
6. Slide synchronization input selector switch so the screen rolls; this means no synchronization input signal is being applied (Figure 2-2).



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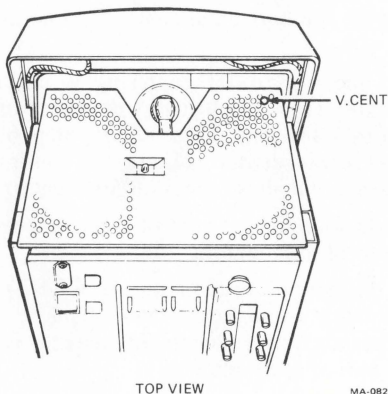
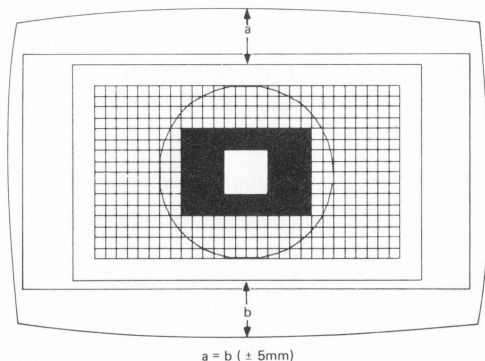
Figure 2-2 Video Synchronization Check/Adjustment

7. Adjust horizontal hold (H. HOLD) control so picture has almost stopped rolling horizontally.
8. Turn vertical hold (V. HOLD) control so picture rolls vertically one way. Then, back up V. HOLD so picture rolls the opposite way. Now, set control to center of this vertical synchronization holding range.
9. Slide synchronization input selector switch so test pattern locks in and stops rolling; this means that a synchronization input signal is being applied.

2.4 VERTICAL CENTERING

Perform the following steps to check, and if necessary, adjust the vertical centering.

1. Display universal alignment pattern (Figure 2-3).



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Figure 2-3 Vertical Centering Check/Adjustment

2. Measure from top center of pattern edge to bezel edge.
3. Measure from bottom center of pattern edge to bezel edge.
4. If the measurements are equal or within 5 mm of each other, the vertical centering is normal.

NOTE

If the vertical centering is not normal, make sure preadjustment procedure was completed and continue to step 5. If the vertical centering is normal, continue to the horizontal centering check/adjustment (para 2.5).

5. Turn vertical centering (V. CENT) until distance from top center of universal alignment pattern to bezel and distance from bottom center of universal alignment pattern to bezel are within 5 mm of each other.

2.5 HORIZONTAL CENTERING

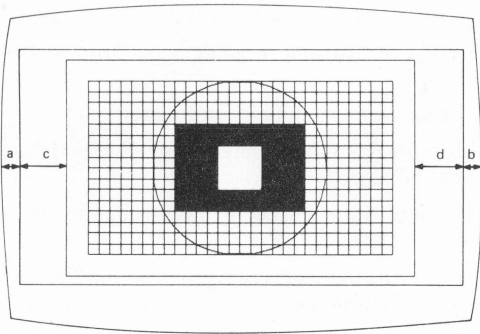
Perform the following steps to check, and if necessary, adjust the horizontal centering.

1. Display universal alignment pattern (Figure 2-4).
2. Turn contrast and brightness controls so raster is visible.
3. Measure from right center of raster edge to bezel edge.
4. Measure from left center of raster edge to bezel edge.
5. If the measurements are equal or within 5 mm of each other, the horizontal centering is normal.

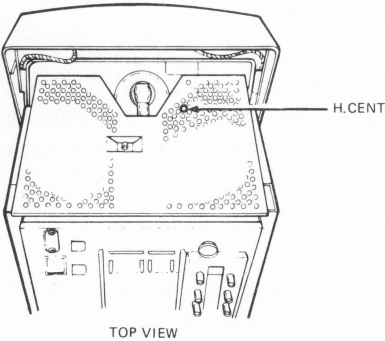
NOTE

If the horizontal centering is not normal, make sure preadjustment procedure was completed and continue to step 6. If the horizontal centering is normal, continue to the horizontal phase check/adjustment (para 2.6).

6. Adjust brightness control to maximum and contrast control to minimum.
7. Turn horizontal centering (H. CENT) control until distance from right center of raster to bezel and distance from left center of raster to bezel are within 5 mm of each other.



$a = b (\pm 5\text{mm [H.CENT]})$
 $c = d (\pm 2\text{mm [H.PHASE]})$



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Figure 2-4 Horizontal Centering Check/Adjustment

2.6 HORIZONTAL PHASE

Perform the following steps to check, and if necessary, adjust the horizontal phase.

1. Display universal alignment pattern (Figure 2-5).
2. Turn contrast and brightness controls so raster is visible.
3. Display universal alignment pattern.
4. Measure from right center raster edge to right center pattern edge.
5. Measure from left center raster edge to left center pattern edge.
6. If the measurements are equal or within 2 mm of each other, the horizontal phase is normal.

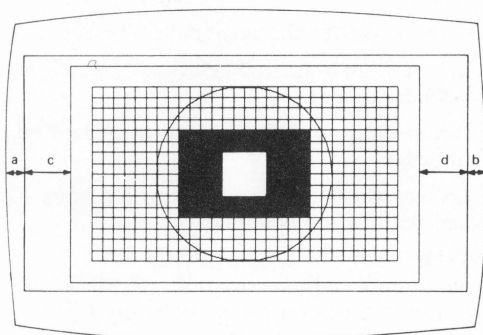
NOTE

If the horizontal phase is not normal, make sure preadjustment procedure was completed and continue to step 7. If the horizontal phase is normal, continue to the rotational check (para 2.7).

7. Adjust brightness and contrast controls so universal alignment pattern and raster are visible.
8. Turn horizontal phase (H. PHASE) control until distance from right center of universal alignment pattern to right center of raster and from left center of universal alignment pattern to left center of raster are within 2 mm of each other.

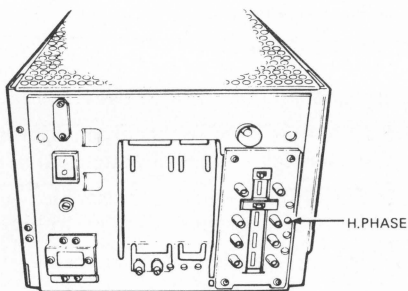
NOTE

When you attempt this adjustment, some host system units cause raster distortion (discoloration of right raster edge). If this distortion occurs, adjust H. PHASE control so no raster distortion is visible, then center the video to the bezel by adjusting H. CENT control.



$$a = b (\pm 5\text{mm [H.CENT]})$$

$$c = d (\pm 2\text{mm [H.PHASE]})$$



REAR VIEW

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Figure 2-5 Horizontal Phase Check/Adjustment

2.7 ROTATION

Perform the following steps to check the rotation.

1. Display universal alignment pattern (Figure 2-6).
2. Measure from lower-right corner of pattern edge to bezel edge.
3. Measure from lower-left corner of pattern edge to bezel edge.
4. If the measurements are equal or within 3 mm of each other, the rotation is normal.

NOTE

You cannot adjust rotation. Replace the monitor if the rotation is not normal. If the rotation is normal, continue with the next procedure.

2.8 RECTANGULARITY

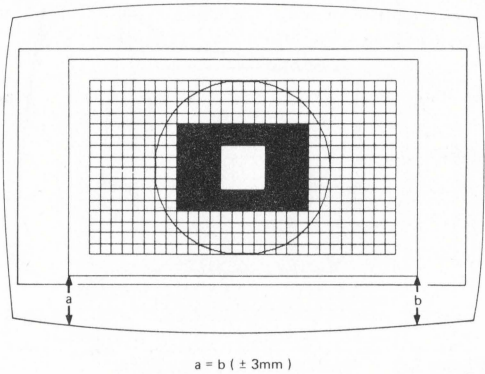
Perform the following steps to check, and if necessary, adjust the rectangularity.

1. Display solid color screen pattern (Figure 2-7).
2. Measure from lower-right corner, right-middle edge, and upper-right corner of pattern, to bezel edge.
3. Measure from lower-left corner, left-middle edge, and upper-left corner of pattern, to bezel edge.
4. If the corresponding measurements are equal or within 1.5 mm of each other, the rectangularity is normal.

NOTE

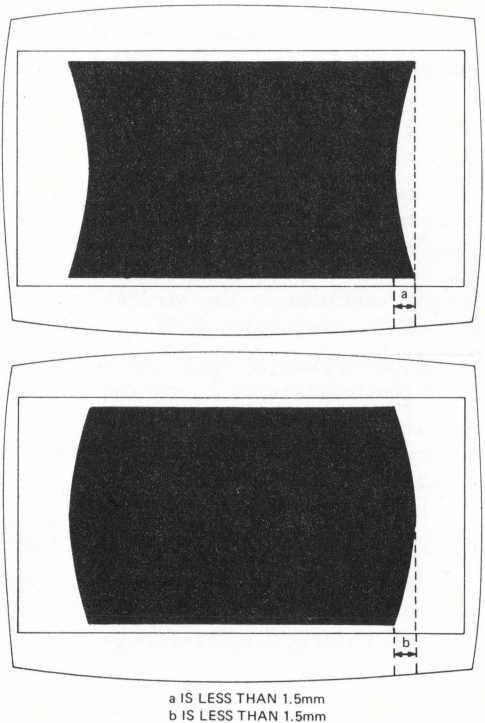
If the rectangularity is not normal, make sure preadjustment procedure was completed and continue to step 5. If the rectangularity is normal, continue to the aspect ratio check/adjustment (para 2.9).

5. Turn SIDE PIN control (Figure 2-8) so that left and right sides of display appear to be vertical without any bowing when viewed straight on. The maximum bowing in or out should be 1.5 mm.



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Figure 2-6 Rotational Check



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Figure 2-7 Rectangularity Check

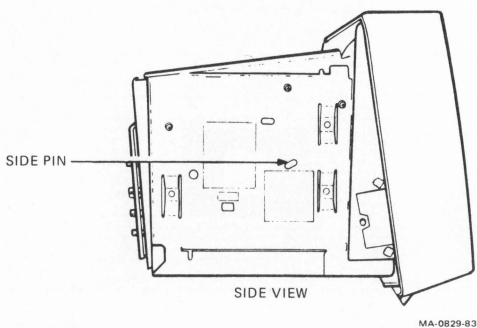


Figure 2-8 Rectangularity Adjustment

2.9 ASPECT RATIO

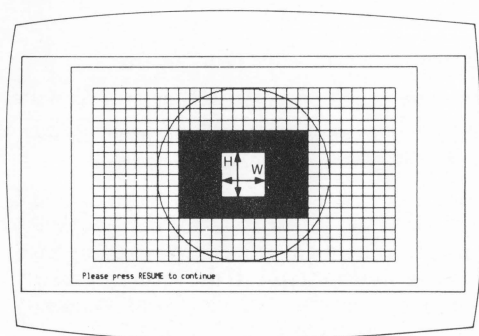
Perform the following steps to check, and if necessary, adjust the aspect ratio.

1. Display universal alignment pattern (Figure 2-9).
2. Measure width and height of pattern's center square.
3. If the measurements are both between 27 mm and 30 mm, and also within 1 mm of each other, the aspect ratio is normal.

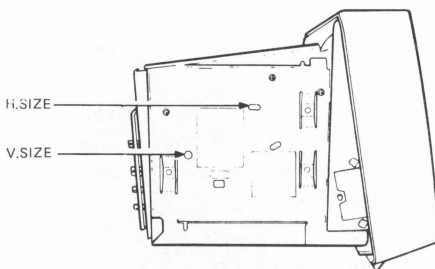
NOTE

If the aspect ratio is not normal, make sure preadjustment procedure was completed and continue to step 4. If the aspect ratio is normal, continue to the vertical linearity check/adjustment (para 2.10).

4. Turn horizontal size (H. SIZE) control until width of center square is between 27 mm and 30 mm.
5. Turn vertical size (V. SIZE) control until height of center square is between 27 mm and 30 mm, and is within 1 mm of width.



H = 27mm TO 30mm (V.SIZE)
 W = 27mm TO 30mm (H.SIZE)
 H = W (± 1 mm)



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Figure 2-9 Aspect Ratio Check/Adjustment

2.10 VERTICAL LINEARITY

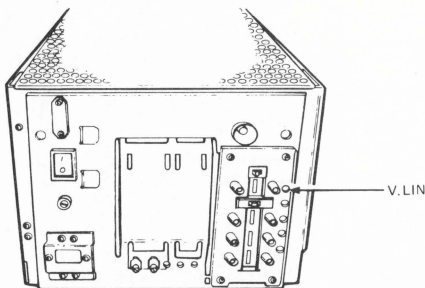
Perform the following steps to check, and if necessary, adjust the vertical linearity.

1. Display universal alignment pattern.
2. Measure height of crosshatch squares on pattern.
3. If the squares appear to be a uniform height across the screen, the vertical linearity is normal.

NOTE

If the vertical linearity is not normal, make sure preadjustment procedure was completed and continue to step 4. If the vertical linearity is normal, continue to the horizontal linearity check/adjustment (para 2.11).

4. Turn vertical linearity (V. LIN) control (Figure 2-10) until all crosshatch squares on the universal alignment pattern appear to be a uniform height across the screen.



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Figure 2-10 Vertical Linearity Adjustment

2.11 HORIZONTAL LINEARITY

Perform the following steps to check the horizontal linearity.

1. Display universal alignment pattern.
2. Measure width of crosshatch squares on pattern.
3. If the squares appear to be a uniform width across the screen, the horizontal linearity is normal.

NOTE

You cannot adjust horizontal linearity. Replace the monitor if the horizontal linearity is not normal. If the horizontal linearity is normal, continue to the next check.

2.12 FOCUS

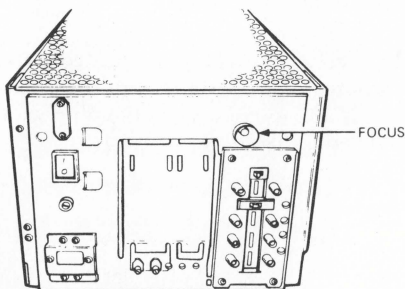
Perform the following steps to check, and if necessary, adjust the focus.

1. Display universal alignment pattern.
2. If the pattern is uniformly clear over the entire screen, the focus is normal.

NOTE

If the focus is not normal, make sure pre-adjustment procedure was completed and continue to step 3. If the focus is normal, continue to the purity check (para 2.13).

3. Turn FOCUS control (Figure 2-11) until universal alignment pattern is uniformly clear over entire screen.



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Figure 2-11 Focus Adjustment

2.13 COLOR PURITY

Perform the following steps to check the color purity.

1. Display solid red test pattern.
2. Check that red is even over entire screen.
3. Display solid green test pattern.
4. Check that green is even over entire screen.
5. Display solid blue test pattern.
6. Check that blue is even over entire screen.

NOTE

If any color is not normal, turn off monitor for 1 minute, then turn it on and recheck each color.

Also, make sure there are no magnetic fields near the monitor. Magnetic fields include motors, printers, magnetized filing cabinets, or structural beams. If a magnetic field is present, relocate the monitor or the object which is causing the field.

You cannot adjust purity. Replace the monitor if you cannot attain normal colors. If the colors are normal, continue to next check.

2.14 CONVERGENCE

Perform the following steps to check convergence.

1. Display universal alignment pattern.
2. If the lines within the circled area appear to be solid white when viewed from a normal distance (arms length), convergence is normal.

NOTE

Some color misconvergence is expected at the display's outer edges. However, this misconvergence should not be objectionable at a normal viewing distance.

Also, make sure there are no magnetic fields near the monitor. Magnetic fields include motors, printers, magnetized filing cabinets, or structural beams. If a magnetic field is present, relocate the monitor or the object which is causing the field.

You cannot adjust convergence. Replace the monitor if you cannot attain normal video. If the video is normal, continue to the next check.

2.15 WHITE BALANCE

Perform the following steps to check, or if necessary, adjust the white balance.

NOTE

If you are color blind, do not try to perform the following procedure.

1. Display solid white test pattern.
2. Vary contrast control between maximum and minimum.
3. Check that white screen goes from white through shades of gray to black.
4. Set brightness control to maximum.
5. Set contrast control to minimum.
6. Check that raster is white.
7. Display color bar test pattern.
8. Vary contrast control between maximum and minimum.
9. Check that all colors fade evenly and no color drops out before the other colors do.
10. With brightness and contrast controls at minimum, check that entire screen is black (no video or raster visible).
11. If everything you checked in this procedure is normal, reassemble monitor if necessary (perform preadjustment procedure, para 2.2, in reverse).

If anything is not normal, make sure preadjustment procedure was completed and continue to white balance presets (para 2.15.1).

2.15.1 White Balance Presets

Perform the following steps to preset the white balance.

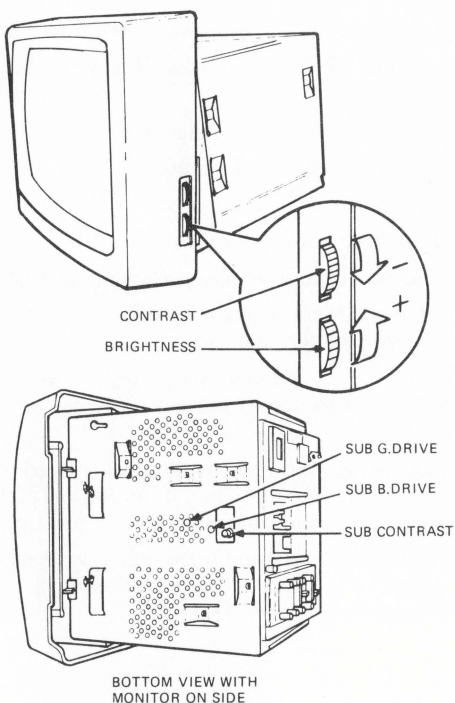
1. Turn brightness control to maximum (Figure 2-12).
2. Turn contrast control to minimum.
3. Set monitor on its side with brightness and contrast controls facing up.

NOTE

The video may show signs of bad purity or misconvergence. Turn off monitor for 10 minutes, then turn it on again and wait 5 minutes.

Perform the remaining procedures with the monitor on its side. Only move the monitor to access the service switch, then place the monitor back on its side.

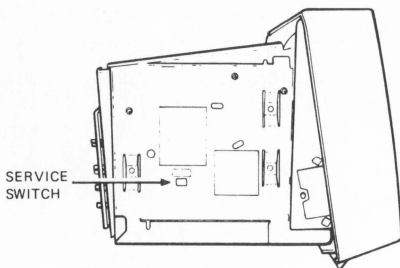
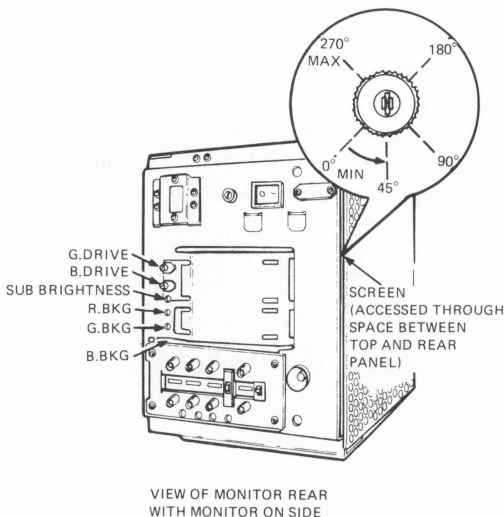
4. Turn SUB-CONTRAST control to midrange.



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Figure 2-12 Presets (Part 1)

5. Turn sub-green drive (SUB-G DRIVE) and sub-blue drive (SUB-B DRIVE) controls fully clockwise.
6. Turn green drive (G. DRIVE) and blue drive (B. DRIVE) controls fully counterclockwise (Figure 2-13).
7. Turn SUB-BRIGHTNESS control fully counterclockwise.
8. Turn red background (R. BKG), green background (G. BKG), and blue background (B. BKG) controls fully counterclockwise.
9. Turn SCREEN control fully clockwise, then back off 45 degrees.
10. Set service switch to SERVICE position.



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Figure 2-13 Presets (Part 2)

11. Disconnect video signal cables.
12. Slide impedance switch to 75 ohm position.

NOTE

The screen should be totally black. Continue to the white balance cutoff procedure (para 2.15.2).

2.15.2 White Balance Cutoff

Perform the following steps to adjust the white balance cutoff.

1. Turn R. BKG control (Figure 2-14) clockwise until a red line just appears on the screen. Then turn the control counterclockwise just until the line disappears.
2. Turn G. BKG control clockwise until a green line just appears on the screen. Then turn the control clockwise just until the line disappears.
3. Turn B. BKG control clockwise until a blue line just appears on the screen. Then turn the control counterclockwise just until the line disappears.
4. Set service switch to NORMAL position.

NOTE

The screen should display a red raster. Continue to the white balance white raster procedures (para 2.15.3).

2.15.3 White Balance White Raster

Perform the following steps to adjust the white balance white raster.

NOTE

Read through steps 1 through 3 before you start.

1. Adjust brightness control to display a dim red raster.

NOTE

If you set the red raster as dim as you can work with, steps 2 through 4 will be easier.

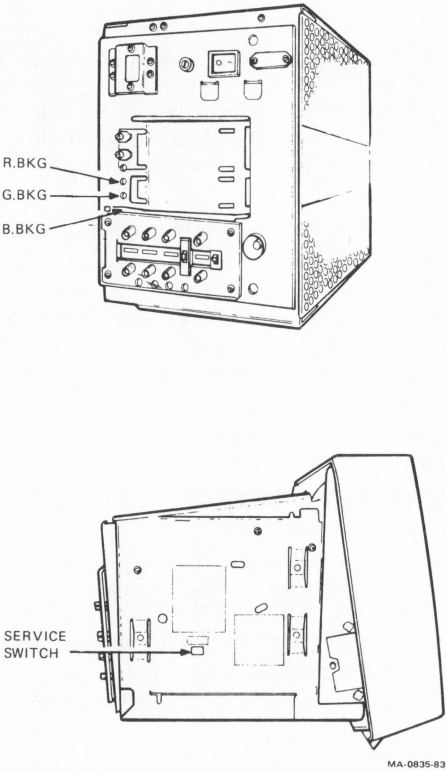


Figure 2-14 Cutoff Adjustment

2. Turn SUB-G DRIVE control (Figure 2-15) just until no red is visible in the screen center.

NOTE

You will start with a red screen; it will turn yellow, then green. You must stop increasing green just as the center of the screen goes from a yellow tint to a green tint. If you do this correctly, the screen will have a green tint but not brilliant green. The level of green is critical.

3. Turn SUB-B DRIVE control just until center of the raster turns gray.

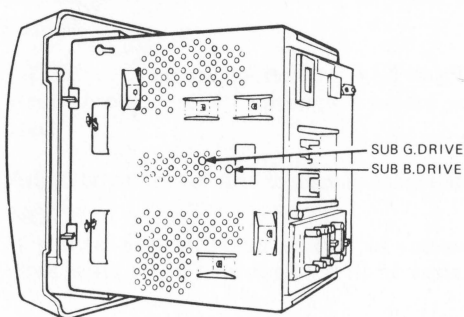
NOTE

You should be able to get gray easily by adding blue. If you cannot get gray, it is because you have either too little or too much green.

A red or purple tint means there is too little green.

A blue or green tint means there is too much green.

4. Slowly turn brightness control from maximum to minimum and make sure the raster goes from white to gray. Readjust SUB-G DRIVE and SUB-B DRIVE controls as necessary to obtain white and gray raster at all brightness levels.



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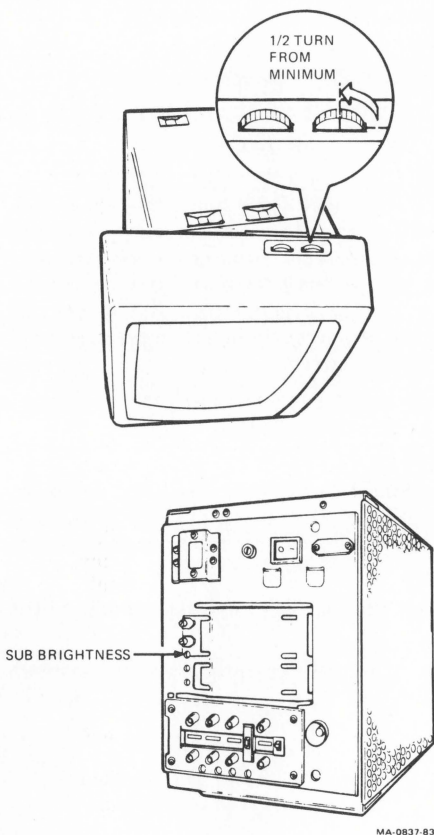
Figure 2-15 White Raster Adjustment (Part 1)

5. Turn brightness control to minimum, then turn it one-half turn towards maximum (Figure 2-16).
6. Make sure contrast control is set to minimum.

NOTE

The screen should be totally black.

7. Turn SUB-BRIGHTNESS control clockwise until raster appears.
8. Adjust SUB-BRIGHTNESS control counterclockwise just until the entire screen goes black.
9. Continue to white balance white video procedures (para 2.15.4).



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Figure 2-16 White Raster Adjustment (Part 2)

2.15.4 White Balance White Video

Perform the following steps to adjust the white balance white video.

NOTE

Read through steps 1 through 6 before you start.

1. Reconnect video signal cables.
2. Turn brightness control to minimum.
3. Turn contrast control until video is dim.

NOTE

If you set the video as dim as you can work with, steps 5 through 7 will be easier.

4. Select the white screen test pattern.

NOTE

The screen should display red video.

5. Turn G. DRIVE control (Figure 2-17) just until no red is visible in the screen center.

NOTE

Step 5 is critical. Like step 2 in para 2.15.3, you will start with a red screen; it will turn yellow, then green. You must stop increasing green just as the screen center goes from a yellow tint to a green tint. If you do this correctly, the screen will have a green tint but not brilliant green.

6. Turn B. DRIVE control just until the raster turns gray in the screen center.

NOTE

You should be able to get gray easily by adding blue. If you cannot get gray, it is because you have either too little or too much green.

A red or purple tint means you have too little green.

A blue or green tint means you have too much green.

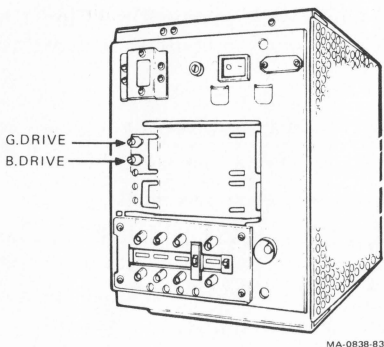


Figure 2-17 White Video Adjustment

7. Slowly turn contrast control from maximum to minimum and make sure the video goes from white to gray. Readjust B. DRIVE and G. DRIVE controls as necessary to get white and gray at all contrast levels in the screen center.
8. Select color bar test pattern.
9. Check the color bars for proper color.
10. Slowly turn contrast control from maximum to minimum and make sure no color drops out before the others (all colors should fade equally). Also make sure the white bar varies from white through shades of gray to black.

NOTE

If green drops out, G. DRIVE is set too low.

If blue drops out, B. DRIVE is set too low.

If red drops out, G. DRIVE and B. DRIVE controls are set too high or R. BKG control is set too low. (Check G. DRIVE and B. DRIVE first.) If the R. BKG is misadjusted, perform the entire white balance adjustment procedure again (para 2.15.1).

2.15.5 Sub-Contrast Adjustment and Final Checks

Perform the following steps to adjust the sub-contrast and make the final checks.

1. Select universal alignment pattern.
2. Turn brightness control to maximum.
3. Turn contrast control to maximum.
4. Adjust SUB-CONTRAST (Figure 2-18) to maximum possible intensity without distortion or blooming of universal alignment pattern.
5. Select white screen test pattern.
6. Slowly turn brightness and contrast controls from maximum to minimum while you check for white to gray background raster.

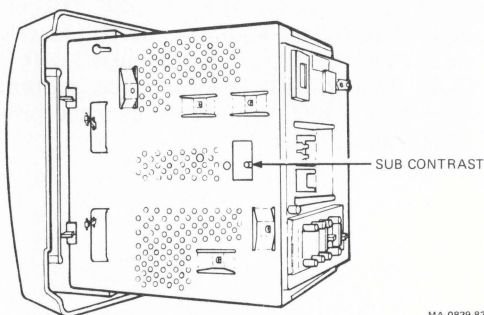
NOTE

If you cannot get the correct background raster at this point, either you did not perform the cutoff procedure or white raster procedure correctly, or the monitor is faulty. Perform the entire white balance procedure (para 2.15.1 through 2.15.3) again.

7. Slowly turn brightness and contrast controls from maximum to minimum while you check for white to gray video.

NOTE

If you cannot get correct video at this point, either you did not perform the white video procedure correctly, or the monitor is faulty. Perform the white video procedure (para 2.15.4) again.



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Figure 2-18 Sub-Contrast Adjustment

A RECOMMENDED SPARES LIST

The following list of replaceable parts and accessories is recommended for maintaining the VR241-A Color Video Monitor.

Description	PN
Color monitor (whole option)	VR241-A
Video alignment template	29-24371-00
Color chart	29-24661-00
Fuses (2.5 A)	90-08387-00
Screen cleaner (1 oz)	49-01607-01
VR241 adjustment tool	29-24746-00
Alignment tool (yellow)	29-10144-00
Hex-core alignment tool (white)	29-23190-00

Table A-1 partially lists commonly used system interconnect video signal cables. For more information on system cables not listed in Table A-1, refer to your host system unit's documentation.

Table A-1 Video Signal Cables

Description	System Type	PN	Type
RGB signal cable	PC350 PC325 PC278 VT241	17-00284-00	BCC03-06
RGB signal cable	PC100	17-00284-02	BCC17-06
RGB/Mono signal cable	PC100	17-00284-01	BCC16-06
Color interface cables	VT125 VK100	17-00223-00	BC26M-05

B PHYSICAL/FUNCTIONAL DESCRIPTION

This appendix describes how to find and operate the external controls and how to find the alignment points.

B.1 VOLTAGE SELECTION SWITCH

The voltage selection switch (Figure B-1) is on back of the color monitor. This switch has two positions: 115 V and 230 V.

B.2 POWER SWITCH

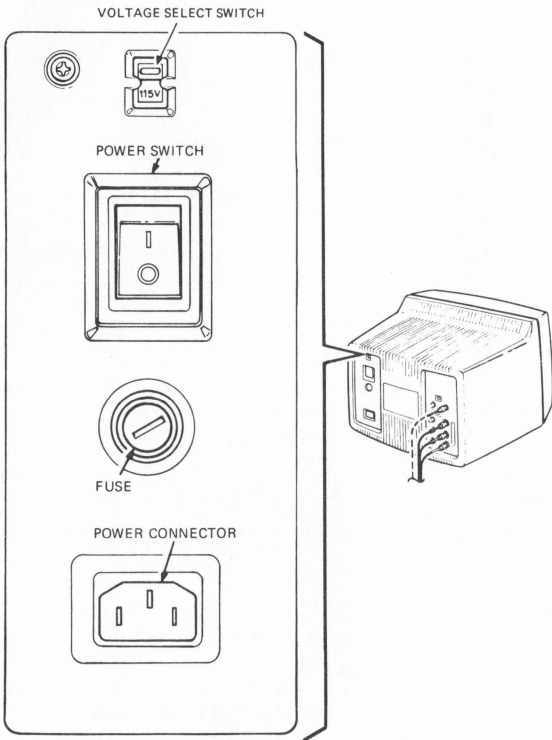
The power switch (Figure B-1) is on back of the color monitor. Pressing the 1 turns on the color monitor. Pressing 0 turns on the color monitor.

B.3 FUSE

The fuse (Figure B-1) is on back of the color monitor. It is a 2.5 A, 250 V fuse, set in a 1/4 inch by 1-1/4 inch fuse holder for the United States. A 2.5 A, 250 V fuse set in a 5 mm by 20 mm fuse holder is also packed with the VR241-A for use outside the United States.

CAUTION

Do not use the 5 mm by 20 mm fuse and fuse holder in the United States.



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Figure B-1 Power Controls

B.4 POWER INDICATOR

The color monitor has one indicator for power (Figure B-2). The indicator lights to show the following:

AC power is applied.

Power switch is on.

Fuse is good.

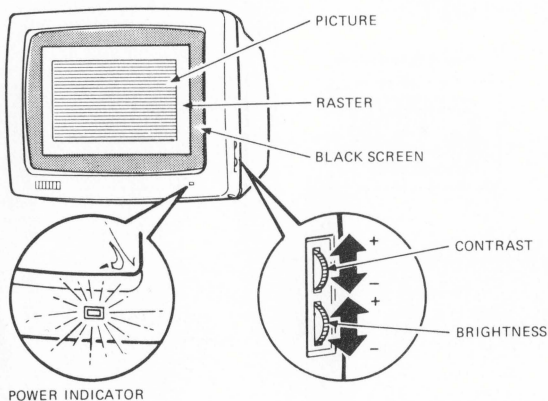
Power is being applied to monitor's circuits.

B.5 CONTRAST (PICTURE INTENSITY ADJUSTMENT)

This control (Figure B-2) allows you to adjust the picture's intensity for viewing preference.

B.6 BRIGHTNESS (BACKGROUND INTENSITY ADJUSTMENT)

This control (Figure B-2) allows you to adjust the raster to cutoff, which compensates for room lighting.



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Figure B-2 Video Controls and Indicators

B.7 SYNCHRONIZATION AND IMPEDANCE SWITCH SETTINGS

The synchronization switch (Figure B-3) determines on which line the monitor receives the synchronization signal from the host system unit. The monitor can receive the signal on the green video line or the external sync line. Hosts that provide three video signals to the color monitor (synchronization on green) should have the synchronization switch in the INT (internal) position. Hosts that provide four video signals to the color monitor (external synchronization) should have the synchronization switch in the EXT (external) position.

The impedance switch allows you to operate the color monitor correctly in either termination or loop-through modes.

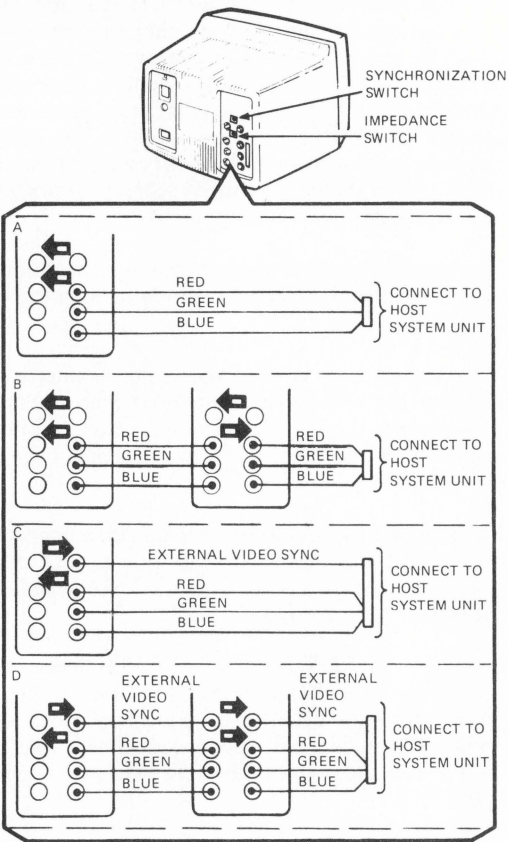
Termination mode is when your color monitor is the only monitor connected to the host, or your monitor is the last monitor in a string of monitors connected to a host. In termination mode the impedance switch should be in the 75 ohm position.

Loop-through mode is when your monitor is connected between a host and another monitor, but is not the last monitor connected. In loop-through mode the impedance switch should be in the HIGH position.

B.8 ALIGNMENT POINT LOCATIONS AND CONTROL DEFINITIONS

Figure B-4 shows the VR241-A alignment point locations. Table B-1 lists and defines the video alignment controls. Table B-2 lists and defines the white balance alignment controls.

SET THE SYNCHRONIZATION AND IMPEDANCE SWITCHES ON COLOR MONITOR(S) TO MATCH ARRANGEMENT.



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Figure B-3 Synchronization and Impedance Switch Setting

Table B-1 Video Alignment Controls

Control	Para	Definition
H. HOLD	2.3	Horizontal synchronization
V. HOLD	2.3	Vertical synchronization
V. CENT	2.4	Vertical video centering
H. CENT	2.5	Horizontal raster and video centering
H. PHASE	2.6	Horizontal video centering on raster
SIDE PIN	2.8	Rectangularity (side pincushion)
H. SIZE	2.9	Aspect ratio horizontal size
V. SIZE	2.9	Aspect ratio vertical size
V. LIN	2.10	Vertical linearity
FOCUS	2.12	Video focus

Table B-2 White Balance Alignment Controls

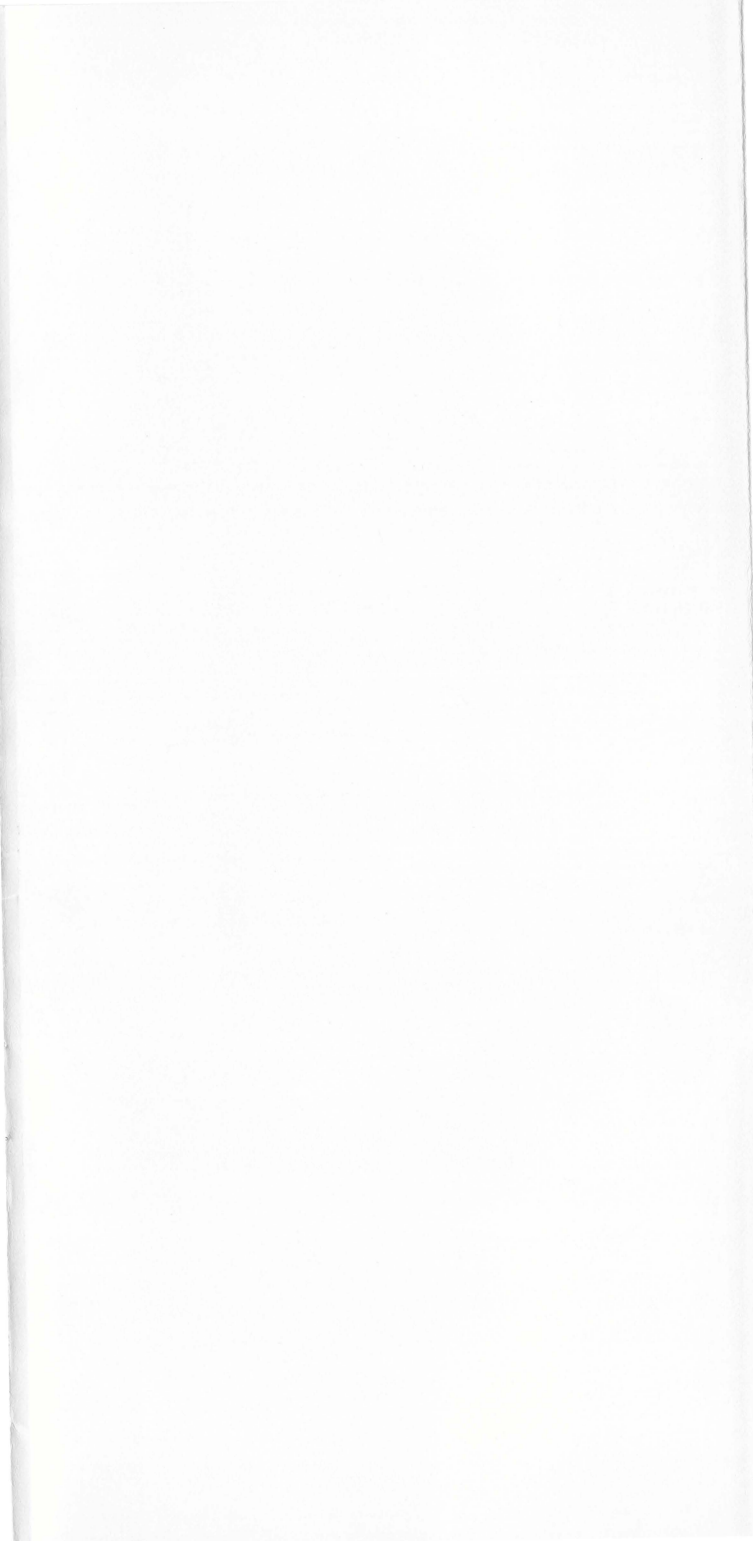
Control	Para	Definition
SCREEN	2.15.1	Presets bias on CRT control gun 2 (G2).
Service switch	2.15.2	Selects service for cutoff adjustment.
R. BKG	2.15.2	Sets cutoff point of red gun.
G. BKG	2.15.2	Sets cutoff point of green gun.
B. BKG	2.15.2	Sets cutoff point of blue gun.
SUB-G DRIVE	2.15.3	Sets amount of green background raster.
SUB-B DRIVE	2.15.3	Sets amount of blue background raster.

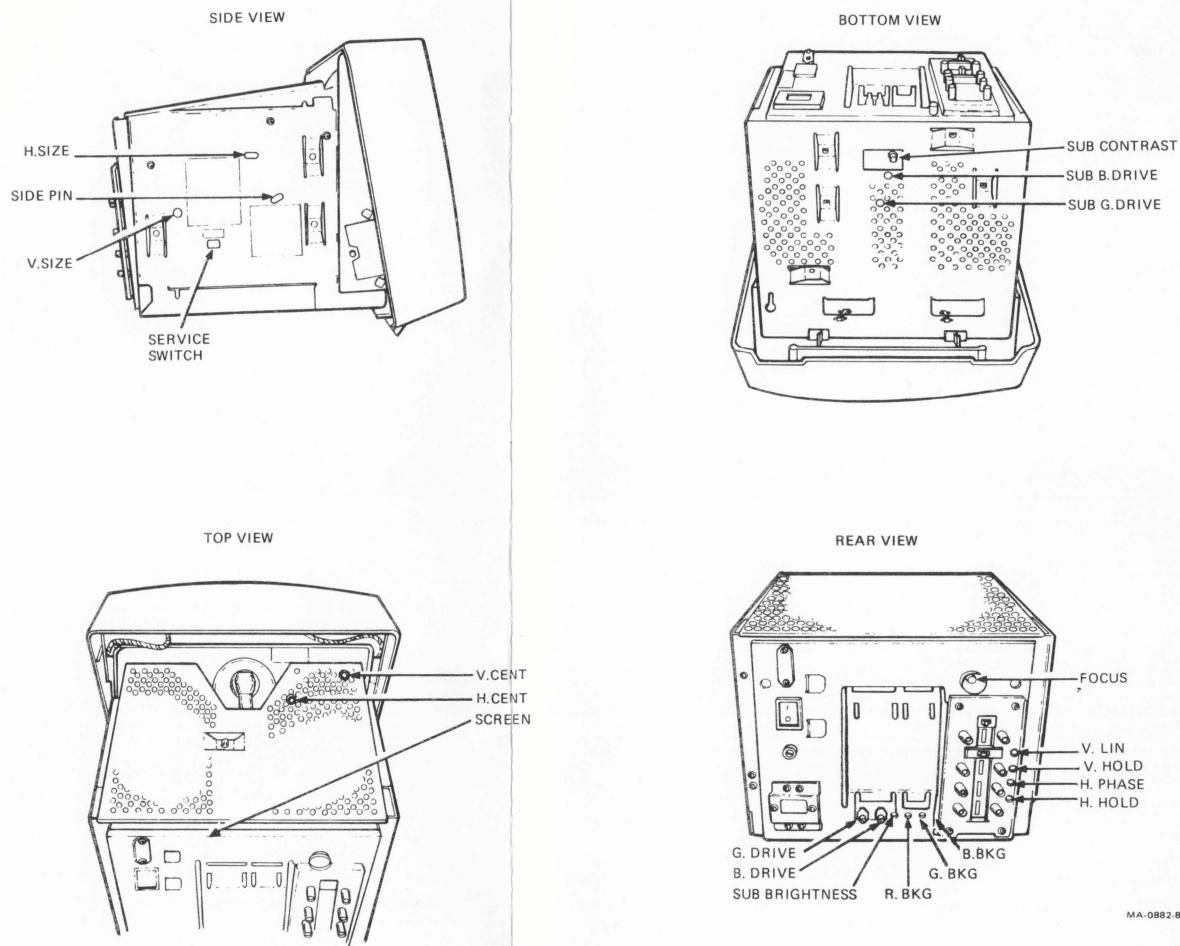
NOTE**The red background raster is fixed.**

SUB-BRIGHTNESS	2.15.3	Sets range of user brightness control.
G. DRIVE	2.15.4	Sets amount of green video.
B. DRIVE	2.15.4	Sets amount of blue video.

NOTE**The red video is fixed.**

SUB-CONTRAST	2.15.5	Sets range of user contrast control.
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Figure B-4 Adjustment Locations

EDUCATIONAL SERVICES – TRAINING PROGRAMS

Digital Equipment Corporation's Educational Services Group provides one of the most extensive educational programs offered by a computer manufacturer.

Educational Services designs, develops, and delivers courses which help people learn skills and achieve understanding and expertise in using computers. Our courses range from introductory to advanced, covering basic computer knowledge through the highest level technical subjects. We design many courses for users of Digital's hardware and software, and also create courses which are not product specific.

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