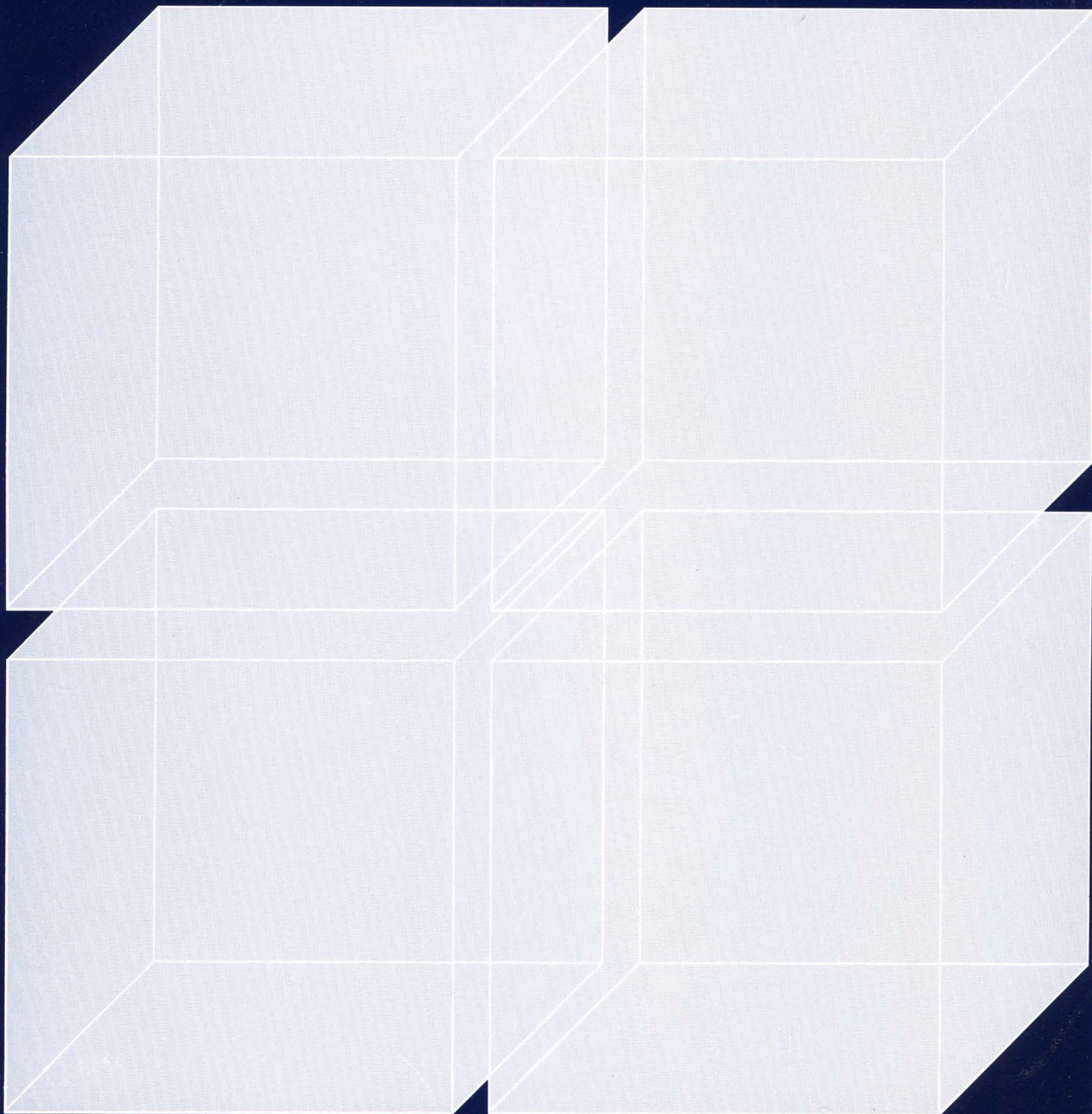




# Setup and Operation for the 6091 Color Displays



P/N 39F9074  
GA23-2114-1



# Setup and Operation for the IBM 6091 Color Displays

GA23-2114-1

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### **Second Edition (October 1989)**

This edition, GA23-2114-1, applies to the IBM 5080 Graphics System, and to any subsequent releases and modifications unless otherwise indicated in new editions or Technical Newsletters.

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This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

### Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions Nécessaires pour éliminer les causes.

### Federal Communications Commission (FCC) Statement

**Warning:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

**Instructions to User:** If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the device with respect to the receiver.
- Move the device away from the receiver.
- Plug the device into a different outlet so that device and receiver are on different branch circuits.

Properly shielded and grounded cables and connectors must be used for connection to peripherals in order to meet FCC emission limits. Proper cables are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables or by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

*How to Identify and Resolve Radio-TV Interference Problems*

This booklet is available from the following:

Consumer Assistance and Small Business Division Room 254 1919 M St. NW Washington, DC 20554 Tele (202) 632-7000	FOB Public Contact Branch Room 725 1919 M St. NW Washington, DC 20554 Tele (202) 634-1940
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### The United Kingdom Telecommunication Act 1984

This apparatus is approved under approval number NS/G/23/J/100003 for indirect connections to the public telecommunications systems in the United Kingdom.



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# Preface

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## Who Uses This Guide

Use this guide if you are planning to attach a 6091 display to a processor with a compatible video interface.

---

## What This Guide Is About

This guide describes the setup and operation details of your 6091 Color Display.

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## How This Guide Is Organized

This guide is intentionally brief, because the setup and operation of your 6091 Color Display varies greatly with the processor you choose to use with your system.

Read this list to find out what sections are in this guide:

- A check list of materials shipped with the 6091 displays
- A short description of the 6091 displays
- A few details on setting up the 6091 displays
- Some simple procedures for operating the 6091 displays
- Display specifications that assist you in making sure the 6091 displays are compatible with your processor.

---

## Further References

- *IBM 5080 Graphics System: Setup Instructions (5085 Models 1, 1A, 2)*, GA23-2007.
- *IBM 5080 Graphics System: Setup Instructions (5085 Model 2A)*, GA23-2035.
- *IBM 5080 Graphics System: Setup Instructions (5086)*, GA23-2051.



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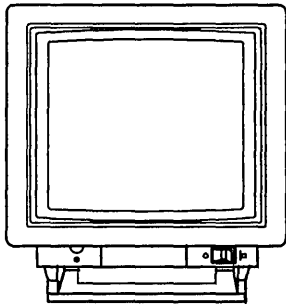
# CHAPTER 1. Materials Shipped with Your Color Display

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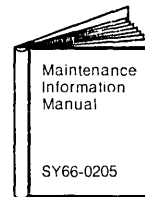
## 6091-023 Check List

Look at the pictures on this page to find out what materials are sent with your 6091-023 display.

6091-023 Display



Documents



Line Cord



(Feature #2001)

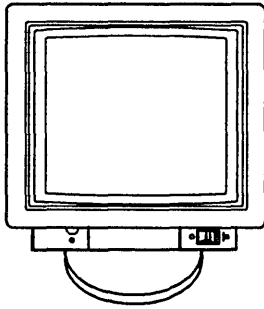
**Note:** Feature #2001 is a line cord that is designed to attach to the AC wall outlet. This cord is to be used with the IBM 5086 graphics processor and other sources that require direct attachment to an AC wall outlet.

## 6091-019 Check List

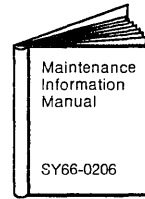
Look at the pictures on this page to find out what materials are sent with your 6091-019 display.



6091-019 Display



Documents



Line Cord



(Feature #2001)

**Note:** Feature #2001 is a line cord that is designed to attach to the AC wall outlet. This cord is to be used with the IBM 5086 graphics processor and other sources that require direct attachment to an AC wall outlet.

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## CHAPTER 2. Setting Up the Color Display

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### 6091-023

The 6091-023 is a raster display that can perform a variety of high resolution (1024 × 1024 pixels or 1280 × 1024 pixels) graphics applications.

The display attaches to a processor with a compatible video interface to create an interactive graphics display station. It is also possible to attach up to five view-only displays to this graphics display station.

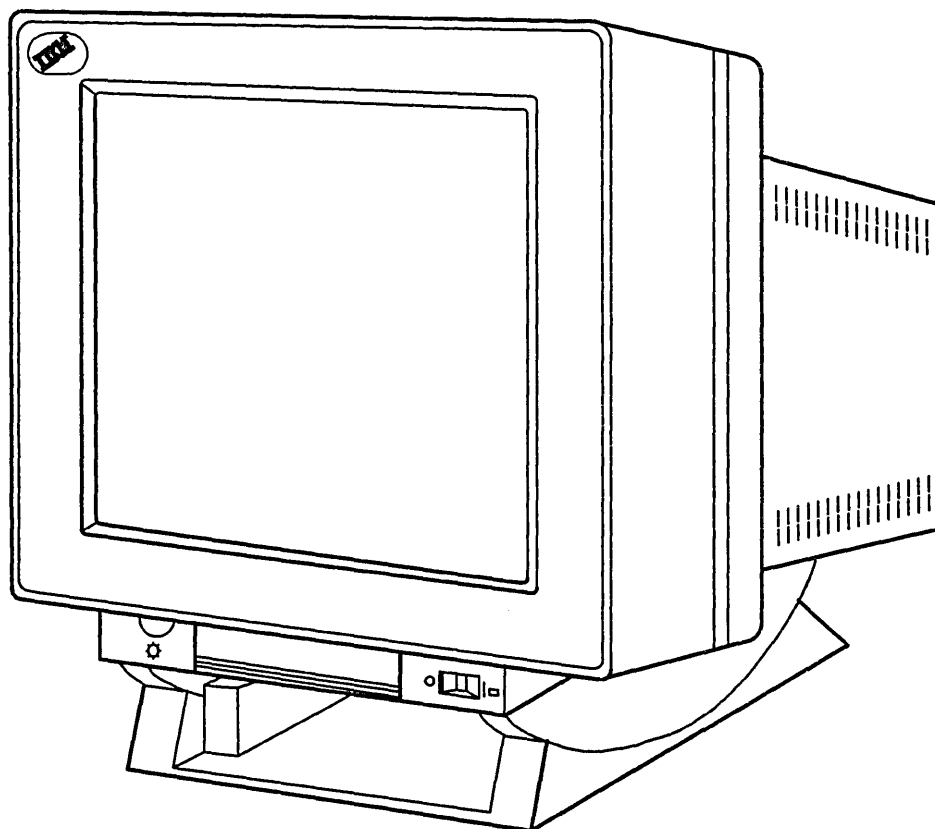


Figure 2-1. The 6091-023 Color Display

Unpacking instructions are printed on the top panel of the display shipping carton. After unpacking this material, read the next few pages to find out how to begin setting up your display.

## 6091-019

The 6091-019 is a raster display that can perform a variety of high resolution (1024 × 1024 pixels or 1280 × 1024 pixels) graphics applications.

The display attaches to a processor with a compatible video interface to create an interactive graphics display station. It is also possible to attach up to five view-only displays to this graphics display station.

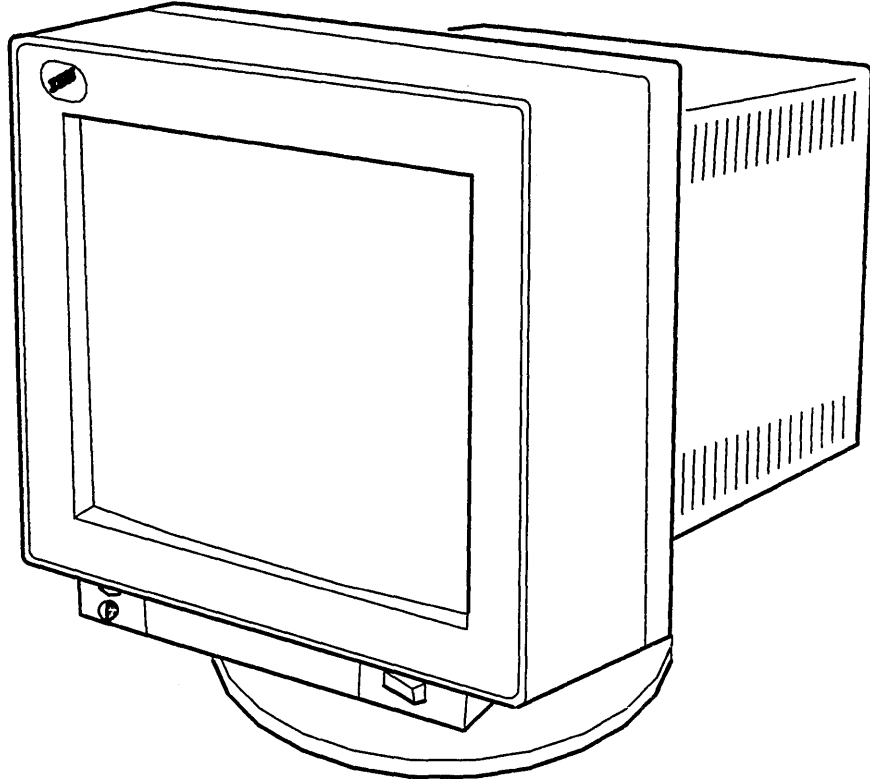


Figure 2-2. The 6091-019 Color Display

Unpacking instructions are printed on the top of the display shipping carton. After unpacking this material, read the next few pages to find out how to begin setting up your display.

## Connecting the Video Cables

Before you can begin using the 6091 display, you must connect the video cables from the graphics processor to the display.

Follow these procedures to connect the video cables at your display:

1. Attach the red, green, and blue video cables from your processor to the bottom three connectors on the back of the interactive display. These connectors are marked for input cables. (See Figure 2-3 or Figure 2-4 for the input symbol you need to locate).
2. If using view-only displays, connect video cables to the top three connectors on the back of the interactive display. These connectors are marked as output cables. (See Figure 2-3 or Figure 2-4 for the output symbol you need to locate).
3. Attach the other end of these video cables to the input connectors on the back of the first view-only display. These connectors are marked for input cables.
4. Repeat steps 2 and 3 for each additional view-only display used with your system.

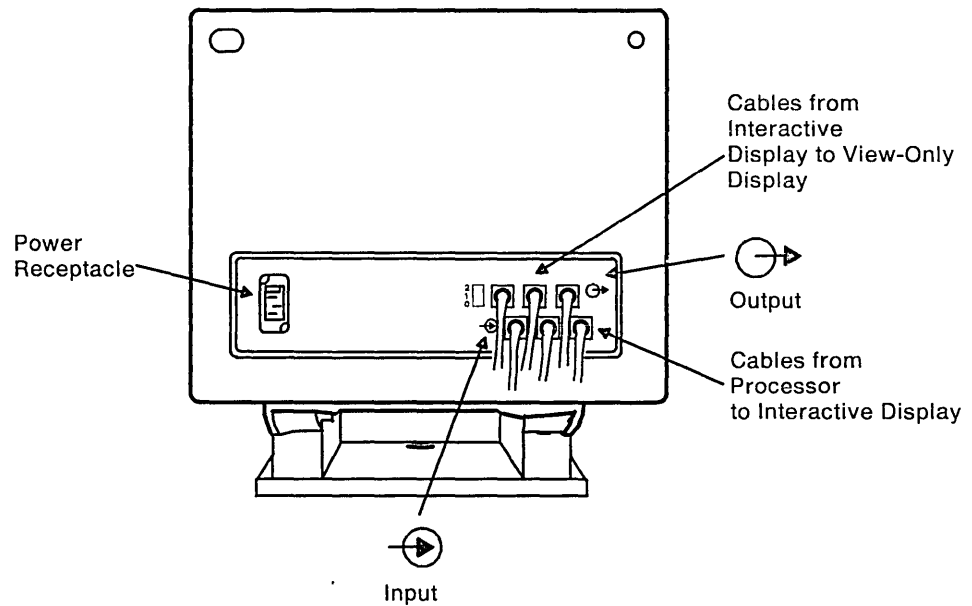


Figure 2-3. Power Receptacle and Cable Connections on the 6091-023 Display

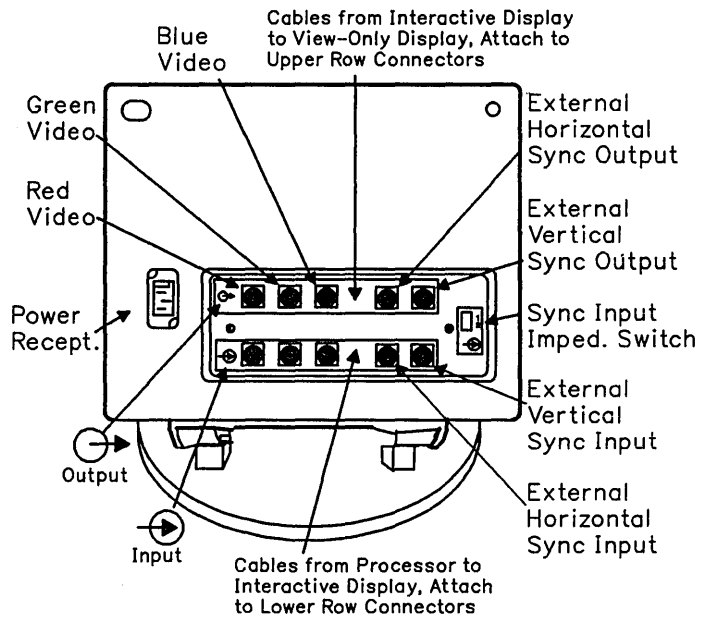


Figure 2-4. Power Receptacle and Cable Connections on the 6091-019 Display

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## Connecting Your Display to an Adapter

The 6091-023 display can attach to a personal computer or a non-IBM Graphics Processor that provides a compatible RGB video interface with a refresh rate of 60 Hz. (For further information on these displays, see “Specifications” on page 4-1).

The 6091-019 display can attach to a PC or non-IBM graphics processor that provides a compatible RGB video interface, a refresh rate of 60 or 67 Hz, and external horizontal and vertical sync (in Mode 3 only).

---

## Plugging In the Power Cord

When using the 6091 display with an IBM RT, or other non-5085/5086 graphics processors, a wall power cord is shipped with your equipment. In this system combination, you must connect the plug to a wall outlet and **not** to the back of the processor.

Follow these two steps to install the wall power cord:

1. Plug the power cord into the power receptacle at the back of the display. (See Figure 2-3 on page 2-3 for the location of this receptacle).
2. Plug the three-prong end of the power cord into a wall outlet.
3. It is important to have the graphics processor and the monitor plugged into the same wall outlet.





## CHAPTER 3. Operating the 6091 Color Displays

### 6091-023

You can tilt the 6091-023 display to fit your work needs.

Figure 3-1 shows all the controls located on the front of the display. The Power ON/OFF switch, operation lights, and controls for picture quality are found here.

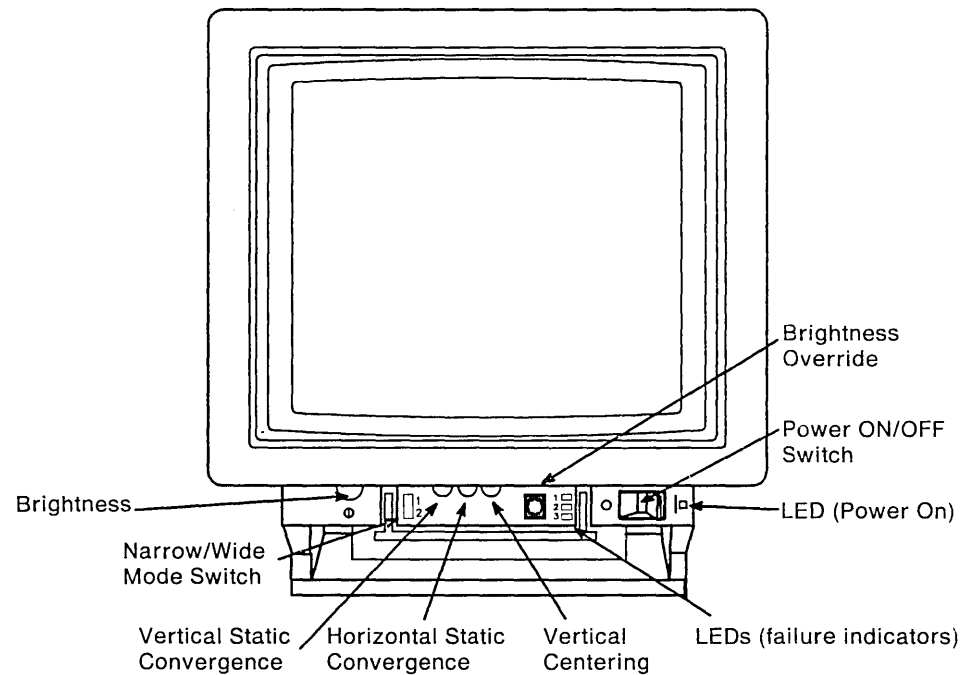


Figure 3-1. Controls for the 6091-023 Display

## 6091-019

You can tilt and swivel the 6091-019 display to fit your work needs.

Figure 3-2 shows all the controls located on the front of the display. The Power ON/OFF switch, operation lights, and controls for picture quality are found here.

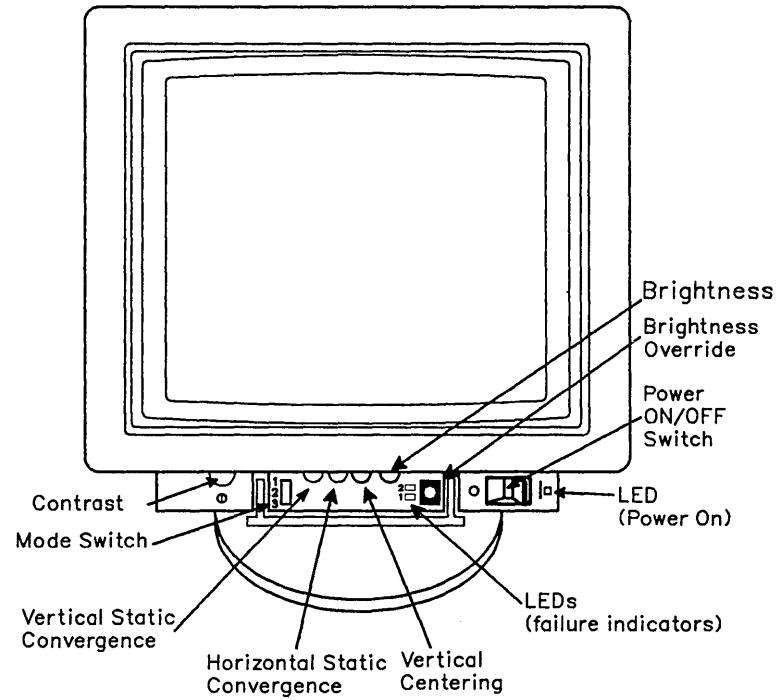
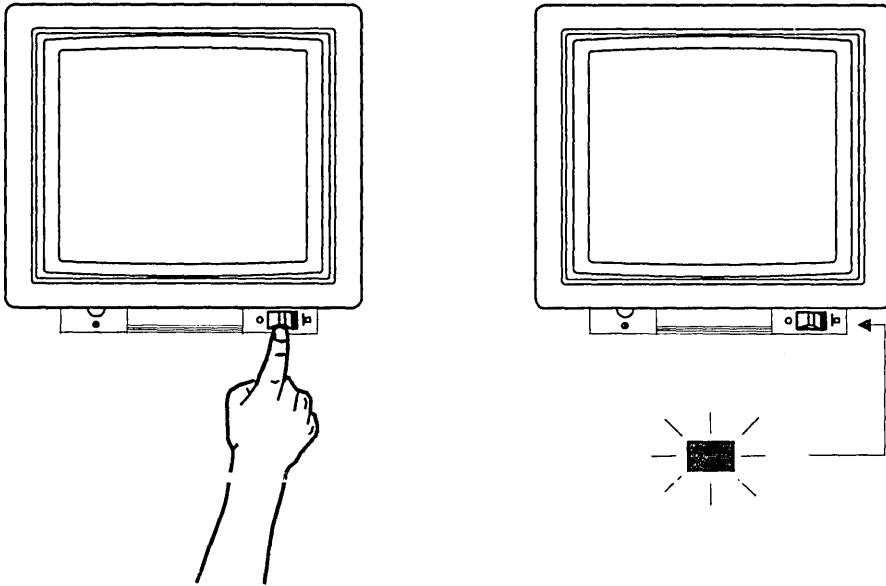


Figure 3-2. Controls for the 6092-019 Display

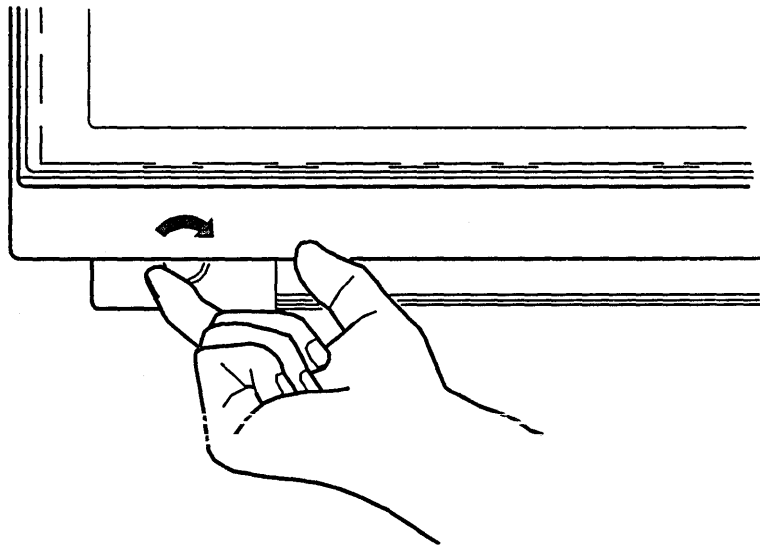
---

## Powering On the Displays



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## Adjusting the Brightness (023) and the Contrast (019) On the Displays



## Adjustment Procedure for 6091 Display (on an IBM Graphics System)

### Procedures for Selecting Monitor Test Patterns

1. Display Customization Panel 01-01 by pressing and holding down an Alt key, press "SetUp."
2. Press F1 for the main menu.
3. On the Main Menu, type in 31, and press "Enter."
4. The Color Bar Test Pattern will appear.
5. Observe that the test pattern appears as shown below and that the colors are in the proper order. (If colors are in wrong order, check RGB cable for proper connections.)
6. When you have finished using this pattern, type in "q" and press "Enter." The Grid Pattern panel will be shown. See the Grid Pattern Panel on the following page.

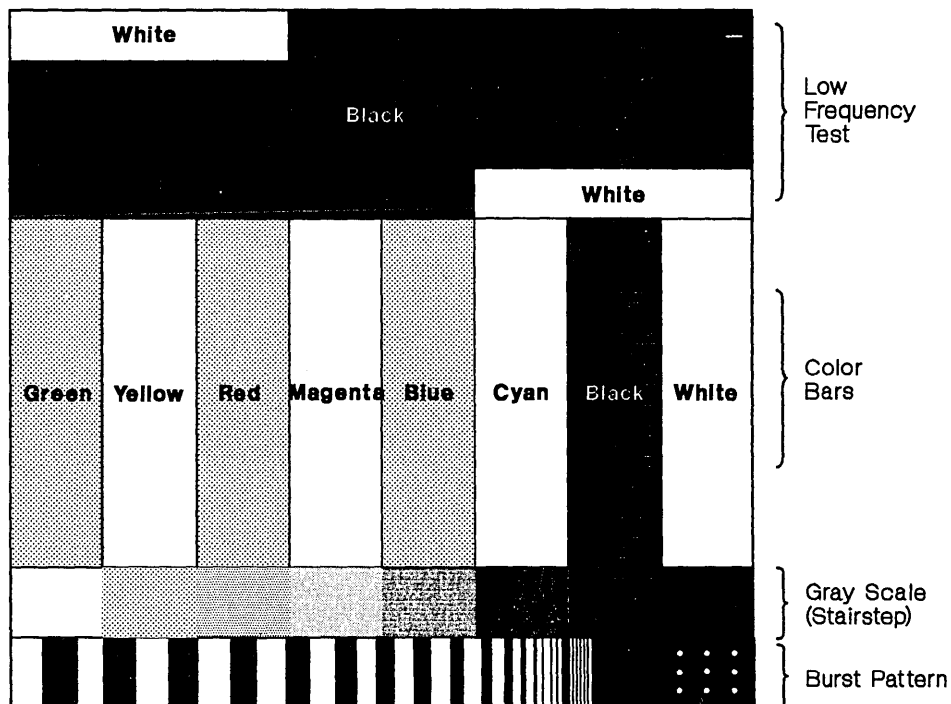


Figure 3-3. Combination Color Test Pattern.

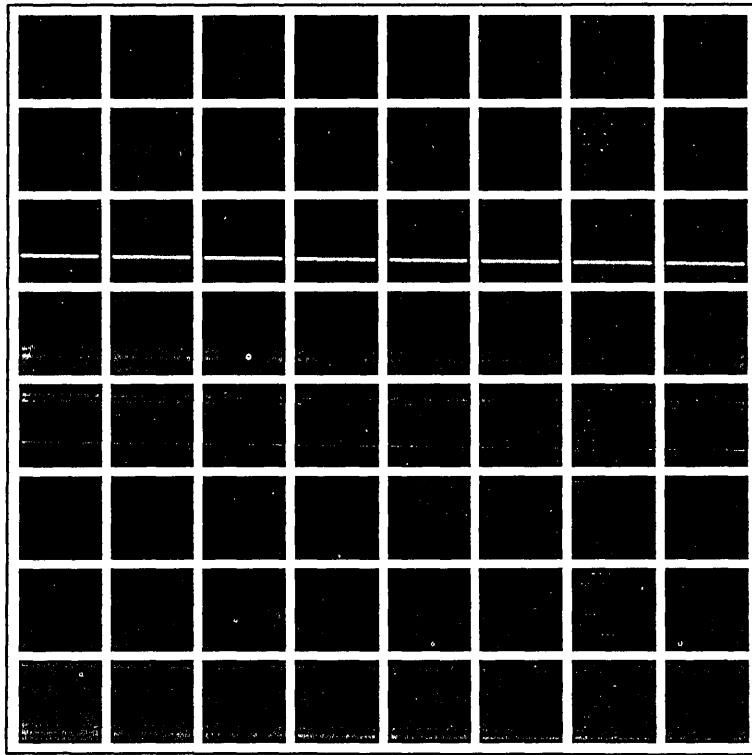


Figure 3-4. Grid Pattern Panel

### Adjust the Vertical Centering

Adjust the Vertical Centering control on the display until the grid is centered on the screen between the top and bottom edges of the screen. If you cannot get the grid centered on the screen, contact your Help Desk.

### Adjust Convergence

Look at the center of the grid. Turn the Vertical Static Convergence control until the horizontal lines are white. Turn the Horizontal Static Convergence control until the vertical lines are white.

If you cannot obtain the proper convergence, contact your Help Desk.

### Verification

Press “q” followed by ENTER until the color bar test pattern reappears and observe the following.

- The color bars should be in the proper order and be bright and crisp.
- The low frequency area at the top should be free of interference and the transition of white to black or black to white should be sharp.
- The gray scale shows 6 clearly defined shades of gray between black and white.
- The burst pattern will show clear vertical fine lines at the lower right and the single pixel dots are clearly defined.

The monitor is now properly adjusted and ready for use. Press F3 to end test.

### For Non-IBM Graphics Systems Adjustment of the Monitor

- For vertical centering, use an existing full screen graphics image, and center as above.
- For convergence, a “T” or a “+” character in white at the center of the screen will substitute for the grid pattern. Converge as above.

---

## Preventing Signal Loss When Connecting Additional View-Only Displays

You can connect one 6091 display to a processor with a compatible video interface to create an interactive graphics display station. It is also possible to attach up to five view-only displays to this graphics display station.

However, when you connect additional displays to the 6091-023, you need to take precautions to avoid signal loss. Resetting the gain switch on the 6091-023 is one way to compensate for this signal loss.

**Note:** Refer to the manuals listed in the Preface for details on coaxial cabling.

---

## Setting the Gain Switch on the 6091-023 (Signal Attenuation)

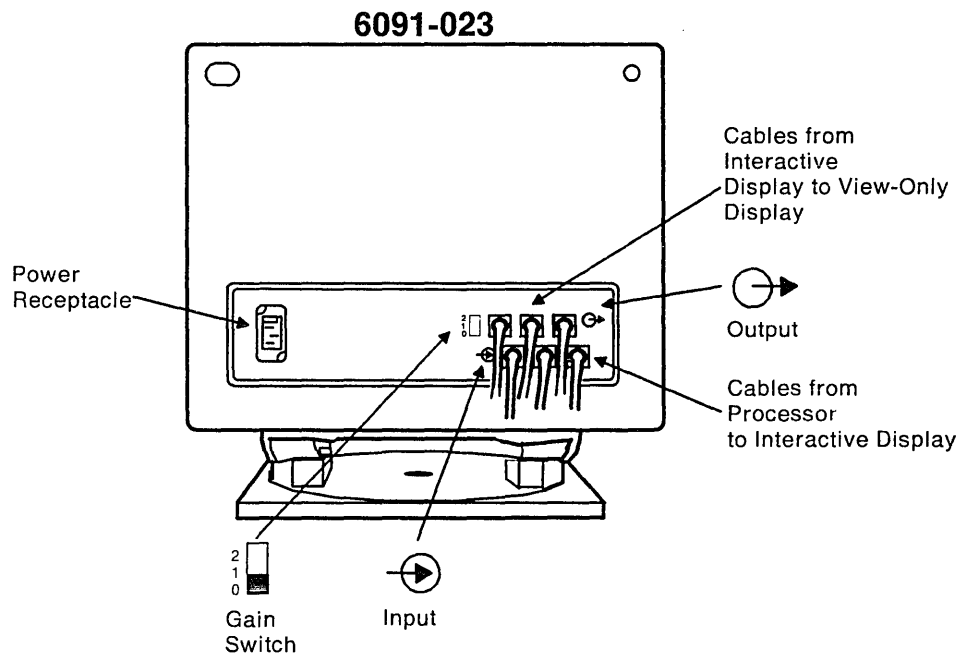


Figure 3-5. Gain Switch on the 6091-023 Display

You need to set the gain switch **only** when using additional view-only displays on the video link. The following information will explain how to set the gain switch on your 6091-023 display.

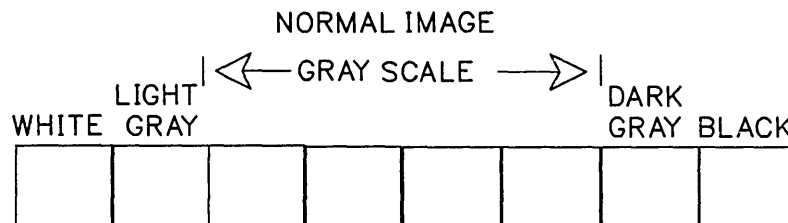
Depending on the length of the video cables to the next display, noticeable signal loss may result. To compensate for this signal loss, set the gain switch at the display driving the video signal.

The gain switch, located at the back of the 6091-023 display (see Figure 3-5 on page 3-6 for the location of this switch) has three positions: 0, 1, and 2. This switch affects the OUTPUT signal level. The OUTPUT signal is the signal received by the next display on the video link.

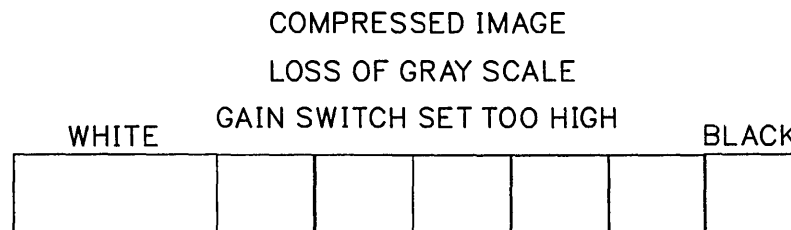
As an approximate guide, use gain position 0 for video cable lengths up to 20 meters; position 1 for cable lengths between 20 and 60 meters; and position 2 for lengths between 60 and 100 meters.

---

### CORRECT



### INCORRECT



---

Figure 3-6. Correct and Incorrect Gray Scales (Color Bar Test Pattern)

Observe the gray scale. The pattern should show white at the left with 6 shades of gray and black at the right. If the black (background) appears gray, reduce the setting of the brightness control. (Normally this control should be at the center detent)



## Setting the Input Impedance Switch on the 6091-019 Display

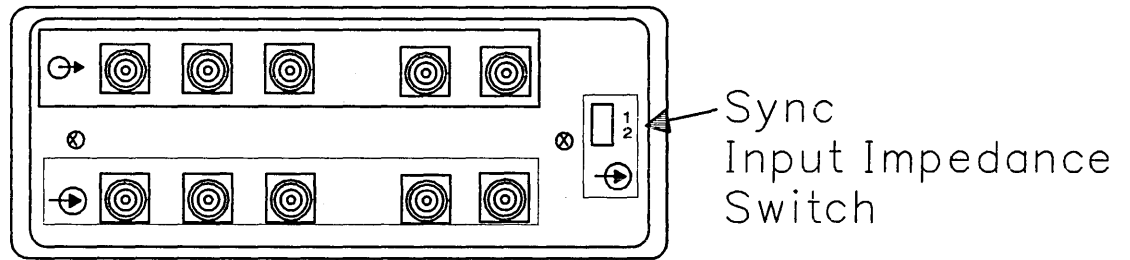


Figure 3-7. Input Impedance Switch on the 6091-019 Display.

The Input Impedance Switch located at the back of the 6091-019 display (see Figure 3-7 for the location of this switch) has two positions; 1 and 2. This switch affects the external sync inputs only.

Position 1 is for High Impedance, 2,000 OHMS.

Position 2 is for Low Impedance, 75 OHMS.

---

## **Cleaning the Display**

It is important to clean the anti-glare surface of your CRT display properly. We recommend using a solution of water and isopropyl alcohol. **Do not use cleaners containing wax or silicones, these products will remove the antiglare qualities of the surface.** Apply the cleaning fluid to a cloth or tissue and then apply to the screen.

**CAUTION:**

**Do not spray cleaners directly on the CRT screen. Excess cleaner may run down the face plate and bezels that could cause damage to the components and the CRT.**

---

## **About Overheating the Display**

**CAUTION:**

**Do not lay anything on top of the display since this may cause the unit to overheat.**

---

## **Four Ways to Make Working with Your Display More Comfortable**

These four recommendations can make viewing your display more comfortable:

- Use characters with favorable color contrast.
- Comfortable viewing distance for the 6091 is from 355 to 500 mm (16 to 24 inches). For continuous viewing, the screen should never be further than 600 mm (26 inches).
- Tilt and/or swivel the CRT plate to minimize ambient glare and provide the best view of the entire screen.
- The anti-glare screen is most effective when you look directly to the center of the screen.



---

## CHAPTER 4. Display and Video Specifications You May Need to Know

Use the display and video specifications in this section if you need information on making the 6091 display compatible with your processor.

---

### Specifications

General display specifications for the 6091:

Specifications	6091-023	6091-019
Pixel Resolution	1024 x 1024 or 1280 x 1024	1024 x 1024 or 1280 x 1024 @ 1024 60Hz and 1280 x 1024 @ 67Hz.
Video Bandwidth	100 MHz	100 MHz
Horizontal Sync Rate	63.36 KHz	Mode 1,2 - 63.36KHz Mode 3 - 70.7KHz
Vertical Sync Rate	60 Hz, non- interlace	Mode 1,2 - 60Hz non-interlace. Mode 3 - 67Hz non-interlace
RGB Input, Timing	See Figure 4-1 on page 4-2 and Figure 4-2 on page 4-2	See Figure 4-1 on page 4-2 and Figure 4-2 on page 4-2
RGB Input, Amplitude	See Figure 4-3 on page 4-3	See Figure 4-3 on page 4-3
RGB Input, Connector	3 -- BNC Jack	3 -- BNC Jack
Video Input Impedance (RGB)	75 ohms	75 ohms
Sync Input Impedance	N/A	Switchable 75 ohms or 2,000 ohms
Sync Output Impedance	N/A	75 ohms
Power Consumption	240 Watts	240 Watts

# Video Specifications

## Monitor Timing for 6091-023 and 6091-019

Video specifications on RGB Input Timing and Signal Amplitude appear in the Figures 4-1, 4-2 and 4-3.

These graphics depict 1024 x 1024 mode on both the 6091-023 and 6091-019 displays.

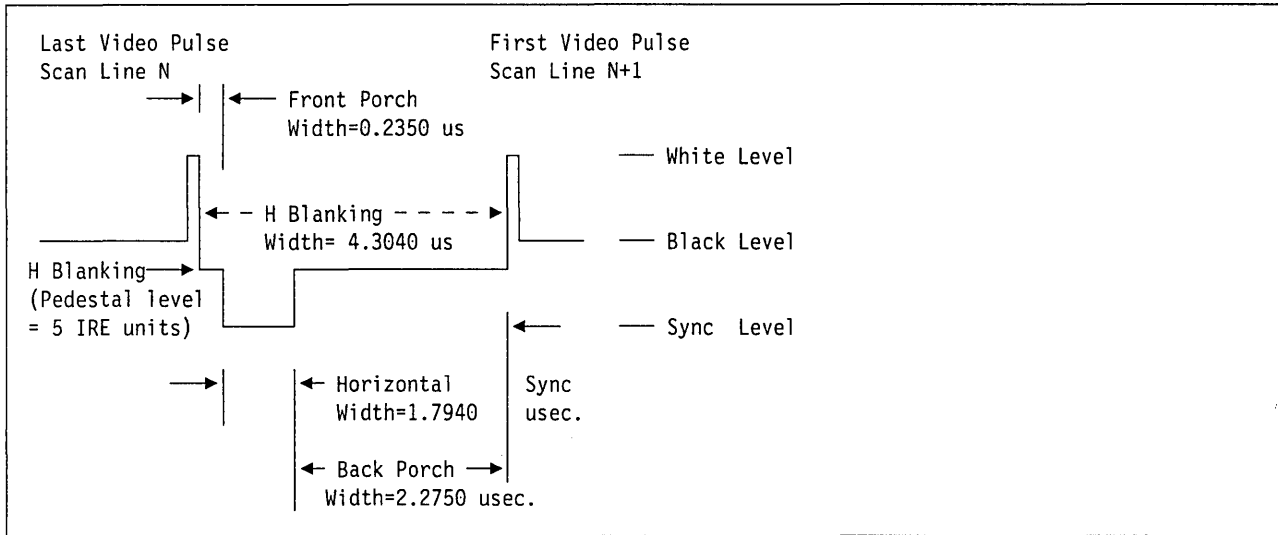


Figure 4-1. RGB Input Timing, Horizontal Sync Interval (6091)

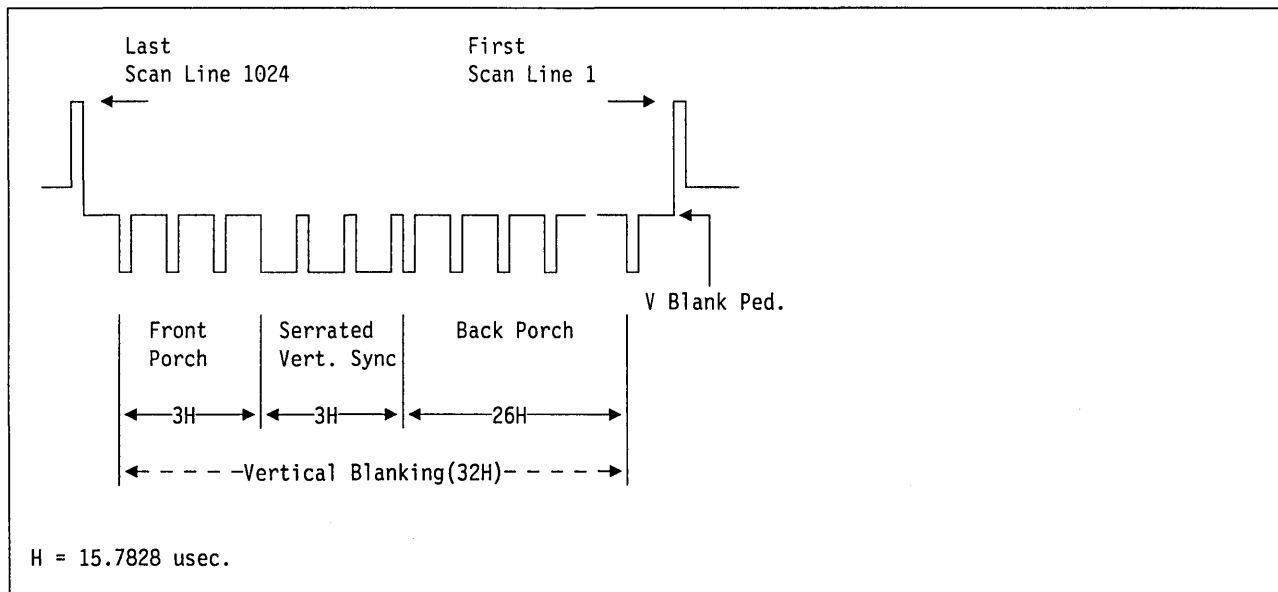


Figure 4-2. RGB Input Timing, Vertical Sync Interval (6091)

## Composite Video Signal Levels

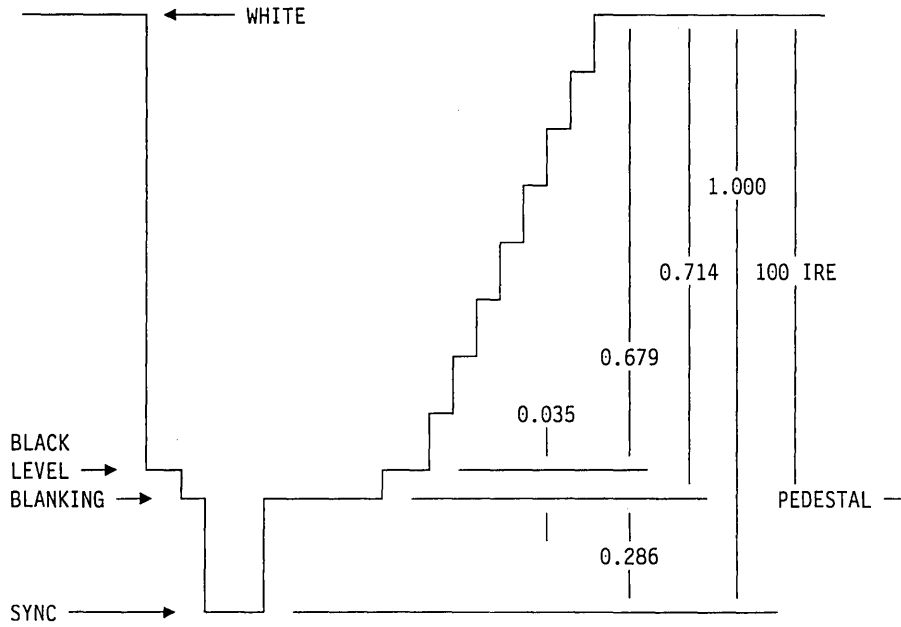


Figure 4-3. RGB Input Signal Amplitude, Horizontal Interval (6091)

## Composite Video Amplitude Summary

Level	IRE Units	P-P Volts Nominal	Tolerance +	-
Sync to Blanking Pedestal	40	0.286	0.292	0.278
Blanking Pedestal Setup	05	0.035	0.731	0.034
Reference Blanking to White	100	0.714	0.731	0.696
Composite Video Amplitude	140	1.000	1.023	0.974

Video overshoot/undershoot = 2 percent maximum (of 100 IRE)

1 IRE Unit = 7.14 millivolts or 1 percent of Video (that is, Blanking to White) DC bias of the video signal with respect to ground is equal to, or less than, 2.0 volts.

## Summary of Monitor Timing Parameters for 6091-023 and 6091-019

Mode	Mode 1	Mode 2	Mode 3 6091-019 Only	Mode 3 6091-019 Only
Sync Type	Composite Sync on Green	Composite Sync on Green	Composite Sync on Green	Separate Sync
Format	1024x1024	1280x1024	1280x1024	1280x1024
Pixel Clock Freq.	89.2108 Mhz	111.518 Mhz	120.0 Mhz	120.0 Mhz
Pixel time	11.2094 ns	8.9671 ns	8.333 ns	8.333 ns
H Line Rate	15.7828 us	15.7828 us	14.1333 us	14.333 us
H Line Frequency	63.360 Khz	63.360 Khz	70.75 Khz	70.75 Khz
H Active Scan Time	11.4780 us	11.4780 us	10.6667 us	10.6667 us
H Sync Width	1.7940 us	1.7940 us	1.3333 us	1.3333 us*
H Front Porch Width	0.2350 us	0.2350 us	0.2667 us	0.1333 us*
H Back Porch Width	2.2750 us	2.2750 us	1.8667 us	2.0000 us*
H Blanking Width	4.3040 us	4.3040 us	3.4667 us	3.4667 us*
H Retrace	< 3.5 us	< 3.5 us	= > 3.2 us	= > 3.2 us
V Frame Rate (Freq)	60 hz(N/I)	60 hz(N/I)	67 hz(N/I)	67 hz(N/I)
V Period	16,666 us	16,666 us	14,925 us	14,925 us
Serrated V sync width	(3H) 47.3 us	(3H) 47.3 us	(3H) 42.4 us	(3H) 42.4 us*
V Front Porch Width	(3H) 47.3 us	(3H) 47.3 us	(3H) 42.4 us*	(3H) 42.4 us*
V Back Porch Width	(26H)410.4us	(26H)410.4us	(26H)367.5 us	(26H)367.5 us*
V Blanking Width	(32H) 505 us	(32H) 505 us	(32H) 452 us	(32H) 452 us
V Retrace	350 us	350 us	350 us	350 us
Total Scan Lines	1056	1056	1056	1056
V Displayable lines	1024	1024	1024	1024

\* For reference, denotes sync width and position of sync with respect to the leading edge of blanking for Mode 3 application.

Engineering Graphics Products  
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User Information

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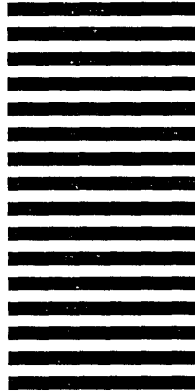
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